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Mapleview Village – North Block

FUNCTIONAL SERVICING REPORT

Pearl Builders

File 422433 | October 8, 2024

Document Control

File:

422433

Date:

October 8, 2024

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Issue	Date	Description
1	October 8, 2024	Issued for 1st SPA Submission

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1 Introduction

Tatham Engineering Limited has been retained by Pearl Builders to prepare a Functional Servicing Report (FSR) in support of a Site Plan Approval (SPA) application for a proposed residential development of the North Block on property located on the northeast corner of Essa Road and Mapleview Drive West intersection, with the following addresses: 664 Essa Road, 674 Essa Road, 692 Essa Road, 320 Mapleview Drive West and 364 Mapleview Drive West in the City of Barrie (City).

1.1 OBJECTIVES

This report was prepared to demonstrate the feasibility of the proposed development with respect to civil servicing including water supply and distribution, sanitary sewage collection, site grading, drainage and stormwater management (SWM), floodplain hazard, roadways and transportation, and utility distribution.

The FSR summarizes complementary reports prepared by Tatham (October 2024), under separate covers. Some engineering drawings are appended in the FSR while additional details and design drawings are provided in the engineering drawing package.

1.2 GUIDELINES AND BACKGROUND REPORTS

This report is prepared in consideration of the following municipal, provincial and agency guideline documents:

- The Ministry of the Environment, Conservation, and Parks (MECP, formerly known as Ministry of Environment), *Stormwater Management Practices Planning and Design Manual* (March 2003);
- The Ministry of the Environment, Conservation, and Parks (MECP, formerly known as Ministry of Environment), *Lake Simcoe Protection Plan (LSPP)* (July 2009);
- Nottawasaga Valley Conservation Authority (NVCA), *Stormwater Technical Guide* (December 2013);
- The Credit Valley Conservation Authority (CVC) and the Toronto and Region Conservation Authority (TRCA), *Low Impact Development Stormwater Management Planning and Design Guide* (2010);
- City of Barrie, *Sanitary Infrastructure Design Standard* (September 2024);
- City of Barrie, *Stormwater Infrastructure Design Standard* (June 2023); and

- City of Barrie, *Drinking Water Infrastructure Design Standard* (April 2024).

This report is prepared in consideration of the following site-specific studies and reports:

- GEI Consultants Limited, *Supplemental Geotechnical Investigation – Proposed Residential Development* (January 2024);
- GEI Consultants Limited, *Supplemental Hydrogeological Investigation – Proposed Mapleview Village Residential Development* (February 2024);
- Tatham Engineering Limited, *2041 and 2071 Horizon Year Capacity Review of Existing Sewage Infrastructure* (October 2024);
- Tatham Engineering Limited, *2031 Horizon Year Sanitary Backwater Analysis* (October 2024);
- Tatham Engineering Limited, *Hydraulic Analysis of Water Distribution System* (October 2024);
- Tatham Engineering Limited, *Natural Hazard Study* (July 2023);
- Tatham Engineering Limited, *Traffic Impact Study* (December 2022);
- Tatham Engineering Limited, *Traffic Impact Study Addendum – North Block* (October 2024); and
- Tatham Engineering Limited, *Stormwater Management Report* (October 2024).

2 Site Description

2.1 SITE LOCATION

The subject property is located at 664 Essa Road, 674 Essa Road, 692 Essa Road, 320 Mapleview Drive West and 364 Mapleview Drive West in the City of Barrie. The site is bound by existing churches to the north and east, existing residential dwellings along Essa Road to the west, and existing commercial buildings along Mapleview Drive West to the south. The site is located within the Nottawasaga Valley Conservation Authority (NVCA) watershed, within the County of Simcoe. Due to the presence of a tributary of Bear Creek, the site is located partially within the NVCA regulated area.

Refer to Figure 1 for the site location plan.

2.2 LAND USE AND COMMUNITY STRUCTURE

Based on the City's current Official Plan the property is designated "Medium Density". Previously, the subject site underwent an Employment Land Conversion through an amendment of the Official Plan to designate the property "Mixed-used Nodes and Corridors" and "Environmental Protection".

Based on the City's current Official Plan the property's community structure is "Designated Greenfield Area" due to the presence of Bear Creek.

2.3 TOPOGRAPHY

Information relating to existing topography, ground cover, and drainage patterns was obtained through a review of relevant background studies, available plans, base mapping, and topographic surveys, and was confirmed during site visits.

A detailed topographic survey was completed by Tatham Engineering Limited in April 2020.

The subject property is approximately 10.19 ha of undeveloped lands. The site is mostly flat and bisected in an east-west direction by the Bear Creek tributary channel corridor. The northern half of the site is generally higher in elevation than the southern half. Refer to the *Stormwater Management Report* for detailed existing site drainage characteristics.

2.4 GEOTECHNICAL AND HYDROGEOLOGICAL SETTING

Based on the Ontario Soil Survey the site's existing soils are classified as Sargent Sand Loam, part of Hydrologic Soil Group (HSG) AB, which is well-draining. Supplemental geotechnical and hydrogeological investigations were completed by GEI to identify the subsurface conditions and

determine the engineering properties of the in-situ soils for the design and construction of the proposed development. The geotechnical investigation describes the existing soils as sandy silt to silty sand, sand and silt. The hydrogeological investigation measured stabilized groundwater levels in the North Block between 1.6 m and 4.5 m below the ground surface.

3 Proposed Development

The proposed development is located at the northeast intersection of Mapleview Drive West and Essa Road. The North Block of the site is approximately 5.32 ha in area and located immediately north of the newly reconstructed Bear Creek tributary channel corridor (approximately 1.63 ha in area). Phase 1 of the North Block development consists of back-to-back, dual-frontage and traditional front-loaded townhouse residential blocks. Phase 2 of the North Block consists of two mid-rise buildings fronting Essa Road. The lands immediately south of the Bear Creek tributary channel corridor are designated as Future South Block, and will be developed as mixed-use under a separate SPA submission. The ultimate buildout of the entire 10.19 ha site will be constructed in three phases, summarized below.

3.1 BEAR CREEK CHANNEL CORRIDOR AND ESSA ROAD CULVERT REPLACEMENT

The newly constructed, realigned Bear Creek tributary bisects the property in an east-west direction. The drainage channel corridor is 47 m wide and located approximately 90 m north of Mapleview Drive West. The replacement of the existing Essa Road culvert crossing will be constructed concurrently with the development of the North Block.

3.2 NORTH BLOCK

Phase 1 of the North Block development will be comprised of:

- 244 medium density residential units (144 back-to-back townhouses, 60 dual-frontage townhouses and 40 front-loaded townhouses)
- 66 medium density optional secondary suites

Phase 2 of the North Block development will include two mid-rise buildings fronting Essa Road, with 107 apartments in each building for a combined total of 214 apartment units. These buildings include above ground and underground parking.

The total North Block development will contain up to 524 medium-density residential units and outdoor amenity space.

3.3 FUTURE SOUTH BLOCK

The Future South Block will be developed as mixed-use development under a future, separate SPA. It is estimated to consist of 1,921 high-density residential units and 1,400 m^2 of commercial retail space.

3.4 SITE ACCESS

The proposed North Block development includes two accesses: from Essa Road and Hollyholme Farm Road.

The proposed Site Plan, as prepared by Hunt Design Associates Incorporated, is provided in Appendix A.

4 Water Supply and Distribution

Tatham has prepared a separate study of the existing water distribution system within the vicinity of the site (*Hydraulic Analysis of Water Distribution System*, dated October 2024) to demonstrate that the proposed development can be provided with adequate pressures and flows for domestic and fire protection water via connections to the existing watermain on Mapleview Drive West and Essa Road. A summary of the key findings of that document, as well as additional information, is provided below. A complete copy of the existing analysis is provided in Appendix B.

4.1 EXISTING WATER SYSTEM

The site is located within an area of the City serviced by the municipal water system. Specifically, the site is located within Pressure Zone 3S, supplied by the City's surface water system. The City's Surface Water Treatment Plant (SWTP) is located on the southern shore of Kempenfelt Bay at 20 Royal Parkside Drive and draws water supply from Lake Simcoe.

The existing watermains surrounding the subject site include a 400 mm dia. watermain on Mapleview Drive West and a 200 mm dia. watermain on Essa Road that ends 90 m south of the proposed development Essa Road entrance.

4.2 PROPOSED WATER SYSTEM

The development will be serviced internally by a 300 mm dia. watermain. There will be one connection made to the existing 200 mm dia. watermain on Essa Road by extending a 300 mm dia. watermain 90 m north to the development. The alignment of this 300 mm dia. watermain extension has been designed based on the Essa Road ROW Expansion Design 90% Submission, prepared by Hatch Ltd. One connection will be made to the existing 400 mm dia. watermain on Mapleview Drive West to support of the North Block development.

A future second connection may be required to the 400 mm dia. Mapleview Drive West watermain to support the future South Block development.

Refer to the Site Servicing Plan (SS-1) in Appendix E.

4.3 WATER DEMANDS

Water demands were calculated for Phases 1 and 2 of the North Block. The Average Day Demand (ADD), Maximum Day Demand (MDD) and Peak Hour Demand (PHD) for each phase are shown in Table 1.

Table 1: Water Demands

DEVELOPMENT PHASE	UNITS	POPULATION	ADD (L/s)	MDD (L/s)
Phase 1 - Townhouses	310	797	2.07	5.71
Phase 2 - Apartments	214	550	1.43	3.58
North Block Buildout	524	1,347	3.51	9.29
North Block + Future South Block Buildout	2,445	4,555	11.91	26.09

A WaterCAD pipe network was created to simulate the development's water distribution system, based on Drawing SS-1. The North Block and future South Block pipe networks are shown on the WaterCAD network figures within the WaterCAD report in Appendix B.

The model was used to analyze flows, pressures, and pipe velocities throughout the distribution system under ADD, MDD, PHD, AFF, and MDD plus fire flow.

4.4 FIRE FLOW

The calculated minimum required fire flows for each of the buildings as per FUS Guidelines (2020) methodology are provided in Appendix B. The minimum required fire flows for the Townhouse Blocks range from 183 L/s to 367 L/s, and for Buildings B1 and B2 range from 233 to 250 L/s. The FUS assumptions are listed below:

Townhouse Blocks

- Construction materials: Type V – Wood Frame Construction with non-combustible roofing material.
- Total effective area: 100% of total floor area of all storeys (not including basement).
- Occupancy and contents hazard: limited combustible as per FUS Table 3 for residential.
- Automatic sprinkler system not included.
- Building exposure: distances to adjacent buildings and property lines as per Drawing No. SS-1, and exposure adjustments based on FUS Table 6.

Buildings B1 and B2

- Construction materials: Type V – Wood Frame Construction with non-combustible roofing material.
- Total effective area: 100% of total floor area of all storeys (not including basement).

- Occupancy and contents hazard: limited combustible as per FUS Table 3 for residential.
- Automatic sprinkler system designed and installed in accordance with NFPA 13.
- Building exposure: distances to adjacent buildings and property lines as per Drawing No. SS-1, and exposure adjustments based on FUS Table 6.

4.5 WATERCAD MODELLING RESULTS

The WaterCAD model results predict that the existing and proposed watermains, including extension of the Essa Road watermain to the site entrance, will provide an adequate supply of water for domestic use and fire protection for the development.

Junctions located around the proposed development are used to compare the results of pre-development and post-development conditions, as identified and shown in Figure 3 of Appendix B. The results of the comparison between the two conditions, under ADD, MDD, and MDD plus fire flow conditions are provided in Table 3, Table 4, and Table 5 of Appendix B, respectively.

The future South Block was modelled with two nodes with each representing half of the residential population and commercial retail space. To remain conservative with the model, the anticipated impact of the future South Block was also considered under the MDD and MDD plus Fire Flow scenarios as shown in Table 6 and Table 7 of Appendix B, respectively.

All pressures under each condition of the existing infrastructure are predicted to be within the pressure range outlined in the City of Barrie standards (April 2024).

The available external fire flows (MDD plus Fire Flow) predicted by the model ranges from 449.1 L/s (Node JUNC-5825 at Essa Road) to 597.4 L/s (Node 3S006-A at Mapleview Drive), while maintaining system pressures of at least 20 psi. These flows do not consider the maximum velocity through the external pipes. The internal 300 mm dia. watermain system can provide the maximum required fire flow of 367 L/s at a maximum velocity of 5.2 m/s, which marginally exceeds the City standard, however it is our opinion this is an acceptable exceedance. This confirms that the proposed water distribution network in the development with the existing water distribution system will be able to supply sufficient flows to meet required fire flow demand.

The proposed water distribution system is looped throughout in both the North Block and future South Block, with only one short dead end watermain in the North Block and one in the future South Block. Water age is not expected to be a concern as this is a looped watermain system, and no auto-flushers are proposed.

Booster pumps are expected to be required for the multi-storey buildings in the future South Block and should be considered for the North Block mid-rise buildings. Fire flow requirements

for the mixed-use buildings in the future South Block will be confirmed during the detailed design stage.

5 Sanitary Sewer Collection

Tatham has prepared the following two separate studies of the existing sanitary system within the vicinity of the site to determine the impacts of the proposed development on existing municipal sewage infrastructure:

- *2031 Horizon Year Sanitary Backwater Analysis,* dated October 2024 (Refer to report in Appendix C for further details)
- *2041 and 2071 Horizon Year Capacity Review of Existing Sewage Infrastructure,* dated October 2024 (Refer to report in Appendix D for further details)

A summary of the key findings of the studies, as well as additional information, is provided below.

5.1 EXISTING SANITARY SYSTEM

There are existing 525 mm dia. trunk sanitary sewers on Mapleview Drive West fronting the site which increase to 600 mm dia. sewers mid-way between Hollyholme Farm Road and Reid Drive, east of the subject site. The 525 mm dia. trunk sewer is relatively flat with an approximate grade of 0.2%. The existing sewer configuration is illustrated on Figure 1 – Sanitary Drainage Plan in Appendix C.

Existing sewage from the upstream and neighbouring areas is conveyed east along Mapleview Drive West, ultimately discharging to the Barrie Wastewater Treatment Facility (WWTF). There are no existing sanitary sewers within Essa Road along the frontage of the subject site.

The Mapleview Drive trunk sewer between Essa Road and Veteran's Drive services commercial, institutional and light industrial development properties extending 710 m to the north and 670 m to the south of Mapleview Drive, as well as an upstream residential area via the Holly Sewage Pumping Station (SPS).

The upstream service area directly connected to the trunk sewer consists of commercial and industrial properties on the west side of the intersection of Mapleview Drive with Essa Road. Sewage flows from a predominantly residential area west of Essa Road are conveyed to the trunk sewer via 350 mm and 400 mm dia. forcemains from the Holly SPS. In coordination with the City and based on available flow records from the operation of the Holly SPS, an average flow of 112 L/s, peak flow of 180 L/s and maximum flow of 221 L/s were considered in assessing the capacity of the existing trunk sewer.

Referring to the City of Barrie Wastewater Collection Master Plan Update (prepared by Cole Engineering Group Ltd., 2019), existing sections of the Mapleview Drive Trunk sewer are flagged for future replacement to increase capacity, however, are not presently included in the 10-year

Capital Works forecast. These upgrades include replacing sections of the existing 525 mm and 600 mm diameter sewers with 675 mm diameter pipes.

5.2 EXISTING AND PROPOSED POPULATIONS

The local equivalent population serviced by the Mapleview trunk sewer, as well as the peak flows discharged from the Holly SPS, have been determined utilizing information from the City's Wastewater Collection Master Plan Update (WCMP, July 15, 2019). Due to expected growth in the area, design scenarios based on equivalent population projections for the 2041 and 2071 horizons were considered and investigated. These assessments of future growth and their impact on the existing sewer system are presented in more detail in the reports provided in Appendix C.

The North Block is planned to proceed to construction prior to 2031 and is the subject of the current SPA application. The future South Block will be subject to a separate application and is anticipated to proceed between the 2031 and 2041 timeline. All sewage generated on the development site (North Block and future South Block) is proposed to be connected to the Mapleview Drive sewers through connection at maintenance hole SAP33015.

For this assessment, we have reviewed impacts to the receiving sewers for both the North Block and the future South Block culminating in the full build-out condition based on 2041 growth figures.

5.3 EXISTING INFRASTRUCTURE CAPACITY

Modelling completed in PCSWMM alongside a series of existing conditions Sanitary Design Sheets (SDS) have been created to understand the peak flows contributing to the Mapleview Drive sewers presently and under currently planned growth projections.

For current conditions up to 2031 growth projections, the PCSWMM modelling incorporates pro-rated populations of development tributary to the Mapleview Drive sewer. Peak flows from this population are assessed in conjunction with peak flows from the Holly SPS and the temporary Salem SPS connected to the Mapleview Drive West sewer at Veterans Drive. The temporary SPS is anticipated to be decommissioned or re-routed by 2031. This assessment was completed using PCSWMM to evaluate hydraulic grade lines as minor surcharging is anticipated to occur while the temporary SPS is in service.

For future growth conditions, the design sheets conservatively apply pro-rated populations for the 2041 and 2071 growth horizons. This provides a long-term performance assessment of any potential upgrades to the Mapleview Drive sewers, based on the two growth scenarios with the variable discharge rates from the Holly SPS described previously.



In scenarios up to 2031, the existing sewer is anticipated to be capable of accommodating the planned growth alongside the operation of both SPSs with minor surcharge of the sewer occurring just upstream of the Veterans Drive intersection. Under future population scenarios, the 525 mm dia. trunk sewers on Mapleview Drive West will exceed their maximum design capacity and will need to be upgraded due to the combination of their shallow slope, currently projected growth and assumption the Holly SPS begins operating at its maximum capacity of 221 L/s. Further details of both assessments are provided in Appendices C and D.

5.4 PROPOSED SANITARY DESIGN

The proposed sanitary system for the site will consist of 250 mm and 300 mm dia. gravity sewers, designed to accommodate both the currently proposed North Block and future South Block, and will convey the flows to the Mapleview Drive West trunk sewers. The proposed development is planned to be constructed in phases from 2024 through 2031. PCSWMM modelling and individual SDS have been assembled for each phase of the development alongside the remaining growth projections and Holly SPS flows utilized in the review of the existing sewers.

With the Holly SPS discharging at an average flow of 112 L/s, there is sufficient capacity in the sewers to accept sewage flows from the North Block and future South Block in all of the scenarios considered in the assessments. While the temporary SPS is in operation, the extent of surcharge in the Mapleview Drive West sanitary sewer is similar to the current growth projections.

When increasing the discharge of the Holly SPS to the peak flow of 180 L/s, the PCSWMM modelling indicates sufficient capacity is available for construction of the North Block with minor surcharge of similar scope to the existing condition assessment. The addition of the future South Block is anticipated to increase the depth and extent of surcharge in the Mapleview Drive West trunk sewer though it is noted the surcharge will remain below grade and is based upon both the Holly and temporary SPS' operating simultaneously. Referring to the sanitary SDS' for the 2041 and 2071 projections for this scenario, sewage flows are anticipated to be 18% higher (approximately 34 L/s) than anticipated under existing growth projections. These SDS's consider peak flows in the sewer post decommissioning/re-routing of the temporary Salem SPS which is understood to have a rated capacity of 55 L/s. The addition of the sewage flows from the future South Block, following decommissioning of the temporary SPS in 2031, are, therefore, anticipated to have minimal impact on sewer capacity or surcharging when compared with the temporary SPS operating under current growth projections.

The 525 mm dia. sewers will exceed their full flow capacities when the Holly SPS is discharging at the 180 L/s peak flow and maximum 221 L/s flow alongside planned growth and sewage flows from the North Block and future South Block in the 2041 and 2071 conditions. Both of these conditions will ultimately require future infrastructure improvements depending on the rate of



growth in the Holly SPS tributary area. The North Block is generally consistent with current growth projections allocated for the property and could proceed with marginal differences in sewage flows compared with planned growth for the property. Development of the future South Block may require the noted sewer replacements be completed sooner than under current growth would otherwise require, however, this is still dependent on the pace of growth in the Holly SPS tributary area.

While the combined North Block and future South Block developments contribute toward the need to upgrade the sanitary infrastructure, it is not the trigger of the required upgrades, nor does it appear to impact the limits or sizes of replacement infrastructure compared with the upgrades already necessary to accommodate planned growth on Mapleview Drive.

As previously noted, current studies identify sections of the sewer will require replacements to improve conveyance capacity. While our assessments confirm the planned sizing per these studies is sufficient, we note extension of the limits to include the full length of the 525 mm dia. sewers should be considered as part of these planned works.

Therefore, the development of the North Block can proceed utilizing the existing infrastructure and does not trigger immediate upgrades to the Mapleview Drive West sanitary sewers.

Further details are provided in Appendices C and D.

6 Stormwater Management

Tatham has prepared a separate *Stormwater Management Report,* dated October 2024, to demonstrate how the proposed development will not adversely affect local surface water conditions. This will be accomplished by evaluating the effect of the development on local drainage conditions under existing and proposed site conditions and, where necessary, provide solutions to mitigate any adverse impacts. A summary of the key findings of the report, as well as additional information, is provided below.

Refer to the SWM report under separate cover for further details.

6.1 EXISTING DRAINAGE CONDITIONS

The site is located within the NVCA watershed, and a portion of the site is located within the NVCA regulated area associated with the tributary of Bear Creek which flows through the subject site. The existing drainage conditions for the subject property were determined through a review of the available background information and aerial photos, topographic survey, and interpretation of topographic maps and available LiDAR data.

Under pre-development conditions, the subject site drains to the tributary of Bear Creek that flows from east to west across the subject site. Four drainage catchments were delineated and modelled using Visual OTTHYMO (VO6.2) hydrologic model.

6.2 PROPOSED DRAINAGE CONDITIONS

Under proposed conditions, the residential development will drain internally via a combination of storm sewers and by overland flow through the internal road network to the proposed end-of-pipe dry pond Stormwater Management Facility (SWMF#1) located at the south end of the subject site and north of the proposed channel corridor. SWMF#1 will provide quantity and quality control for runoff from the developed portions of the subject site. The storm sewers will be sized to convey the minor (1:5-year return frequency) design storm peak flows to the end-of-pipe SWMF#1. The major (1:100-year return frequency) design storm will be conveyed through designated overland flow routes at the north and east property line swale, through the internal road network, and two designated Overland Flow Routes #1 and #2 upstream of SWMF#1.

Three drainage catchments (one controlled catchment and two uncontrolled catchments) were delineated and modelled using VO6.2 hydrologic model.

6.3 STORMWATER QUANTITY CONTROL

Stormwater quantity control of runoff will be provided by SWMF#1 located north of the proposed channel corridor. Attenuation and release of peak flows from SWMF#1 will be completed by primary and secondary outlet structures. Attenuated peak flows will discharge from the pond and be conveyed to the tributary of Bear Creek.

6.4 STORMWATER QUALITY TREATMENT

Enhanced level stormwater quality control corresponding to 80% total suspended solids (TSS) removal is required for the developed areas of the site. A treatment train approach comprised of two (2) oil-grit separator (OGS) units for treatment and the dry pond are proposed. However, additional TSS removal is expected to occur due to sediment debris rows within proposed low-impact-development (LID) facilities and upstream catch basin (CB) shields.

6.5 NVCA EROSION CONTROL

As per NVCA requirements, erosion control through on-site retention of the first 5 mm of rainfall must be provided. The first 5 mm of rainfall across the impervious areas of the site is proposed to be retained on-site through the implementation of three (3) LID features. Pre-treatment of stormwater is provided by the sediment debris rows within the facilities and upstream CB shields.

6.6 WATER BALANCE

As per NVCA requirements, a site-specific water balance analysis is required to demonstrate that best efforts have been made to maintain pre-development annual infiltration rates.

GEI Consultants Ltd. (GEI) has prepared a water balance as part of their *Supplemental Hydrogeological Investigation* submitted under separate cover. As part of the assessment, annual runoff and infiltration volumes were calculated under pre- and post-development conditions. The proposed infiltration galleries within the LID facilities are expected to increase post-development infiltration and mitigate the annual infiltration deficit. Refer to the original report under separate cover for quantitative results.

6.7 PHOSPHORUS LOADING ASSESSMENT

A phosphorus loading assessment has been completed for the site using a spreadsheet method. Due to the proposed land use categories, the annual post-development phosphorus load will increase compared to pre-development conditions. A treatment train approach is proposed consisting of the three (3) LID facilities, two (2) OGS units, and SWMF#1. Best efforts are, therefore, demonstrated to reduce the post-development phosphorus loading rate.



6.8 SILTATION AND EROSION CONTROL

Siltation and erosion control will be implemented for all construction activities, including topsoil stripping, material stockpiling, building construction and grading operations. The basic principles that will be applied to minimize erosion and sedimentation and resultant negative environmental impacts. The proposed grading, servicing and building construction should be carried out in such a manner that a minimum amount of erosion occurs and such that sedimentation facilities control any erosion that does occur.

The dry pond SWMF#1 is proposed to be utilized as a temporary erosion and sediment control basin during construction to settle out sediment from surface runoff before it is released to the tributary to Bear Creek and will be decommissioned and converted to the proposed dry pond at the end of servicing and grading.

Regular inspection of control measures will be completed through a monitoring and mitigation plan, with regular repairs made as necessary.

7 Floodplain Hazard

In support of the proposed development, an existing channel which bisects the subject site was reconstructed in 2023/2024 as a natural channel which accommodates the floodplain within the channel corridor. Tatham previously prepared a separate *Natural Hazard Study,* dated July 2023, to establish the existing and proposed flood and erosion hazard limits and to support the natural channel design.

This study confirmed that the existing channel was to be reconstructed in support of the proposed development as a natural channel. These works have already been completed and provide the required conveyance and floodplain storage volume requirements. The hydraulic analysis determined that the reconstructed channel and floodplain configuration have no adverse impact to the flood elevations upstream of the subject site. The analysis also demonstrated the proposed development is safely beyond the post-reconstruction erosion hazard limit.

Further details are provided in the previously approved study under separate cover.

8 Roadways and Transportation

8.1 ROADWAYS

Roadways within the site will be designed in accordance with the City of Barrie's Right-of-Way Infrastructure Design Standard drawings. An access from Private Lane 'A' will connect the north block of the proposed development to Essa Road. A second access from the Hollyholme Farm Road extension to Private Lanes 'B' and 'I' will connect the North and future South Blocks to Mapleview Drive West. The internal roads will be private and assumed by the condominium corporation who will undertake routine maintenance and snowplowing activities. Refer to Figure 2 for a typical 6.5 m wide road cross section for a standard condominium.

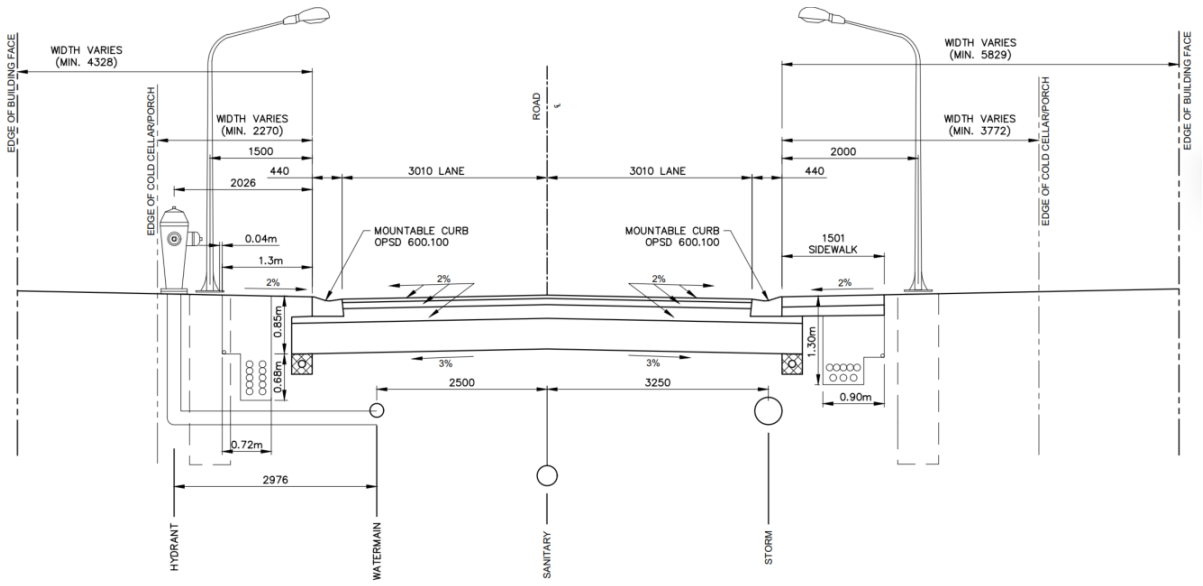


Figure 2: Private Road Cross Section for a Standard Condominium

8.2 TRAFFIC IMPACT STUDY ADDENDUM

A *Traffic Impact Study Addendum*, dated October 2024, has been prepared by Tatham under separate cover in support of SPA for the North Block and should be read in conjunction with this report. The *Addendum* builds on the *Traffic Impact Study* (TIS, dated December 2022) completed in support of the OPA/ZBA for the overall development site. In particular, the *Addendum* discusses the following:

- access to the North Block, including geometry and the need for traffic signals;
- circulation of vehicular and pedestrian traffic within the North Block;
- the number of new trips the North Block is likely to generate;

- the operations of the study area road system upon completion of the North Block;
- the resulting impacts and need for mitigating measures (if required) to ensure acceptable overall road operations; and
- comparisons to the findings of the initial TIS.

8.2.1 Addendum Summary

The key findings of the *Addendum* are as follows:

- the proposed changes to the development plan and corresponding increases in anticipated trip generation of the North Block do not result in meaningful additional impacts to the adjacent road network. The findings and recommendations of the TIS remain valid.
- the proposed 9.0 metre width of the North Access complies with industry guidelines for a commercial/high-volume residential access.
- traffic signals are not warranted at the North Access on Essa Road to accommodate the anticipated 2027 future total traffic volumes.

Refer to the *Addendum* under separate cover for further details.

9 Grading and Landscaping

9.1 GRADING

The overall site grading design maintains existing topography and drainage divides to the extent possible while matching into existing grades at property lines or limit of development area.

Internal road grading has been developed to ensure stormwater runoff is conveyed to proposed storm sewers. Proposed road grading will also provide sufficient overland flow routes contained within the road corridors.

Grading will be in accordance with the City's Engineering Standards:

- Minimum road slope 0.5%
- Maximum road slope 5%
- Minimum lot grade 2%
- Maximum lot grade 5%
- Minimize the need for retaining walls
- Minimize the volume of earth to be moved and balance on-site cut/fill
- Achieve drainage and SWM objectives

Refer to Appendix E for the Site Grading Plans.

9.2 LANDSCAPING

A detailed landscaping design has been completed as part of the detailed design stage and in accordance with the City's Urban Design Guidelines. Refer to the landscape drawings for further details.

10 Utilities

The following utility agencies provide services to the proposed development:

- Alectra Utilities Corporation;
- Enbridge Inc.;
- Bell Canada; and
- Rogers Communication Inc.

All utilities (electrical, gas, telecommunications) are expected to be available from Mapleview Drive West and Essa Road to service the proposed development. Utility coordination has been initiated.

11 Summary

In summary, this report demonstrates the proposed development can be adequately serviced with municipal water, sanitary, stormwater and utility infrastructure. The design of the required infrastructure, including coordination with utilities, will be refined as the project advances.

11.1 WATER SUPPLY AND DISTRIBUTION

The site will be serviced by 300 mm dia. watermains which will connect to the existing municipal water system from the existing 400 mm dia. watermain along Mapleview Drive West as well as from the 200 mm dia. watermain along Essa Road. The proposed internal water distribution system will provide an adequate supply of water for domestic use and fire protection for the development. The maximum required fire flow within the development is lower than the maximum available fire flow. The watermain will be looped through the site.

11.2 SANITARY SEWER COLLECTION

The site will be serviced via an internal 250 mm dia. to 300 mm dia. sanitary sewer network, which will discharge to the Mapleview Drive West trunk sewer.

The existing sections of 525 mm dia. sewer on Mapleview Drive will require replacement in the near future to accommodate continued growth. This replacement is necessary to accommodate the planned growth in the area immediately serviced by the Mapleview Drive trunk sewer and the area tributary to the Holly SPS, however, is not required in support of the development of the North Block.

The North Block is consistent with current growth projections allocated for the property and could proceed with marginal differences in sewage flows compared with planned growth for the property. Development of the North Block will have minimal impact on anticipated surcharge associated with the operation of the temporary SPS.

Development of the future South Block will be dependent on the noted sewer replacement, service life of the temporary SPS and growth in the Holly SPS tributary area contributing to its discharge rates.

While the combined North Block and future South Block development contributes toward the need to upgrade the sanitary infrastructure, it is not the trigger of the required upgrades nor does it appear to impact the limits of replacement or diameter of the sewer replacements compared with the upgrades already necessary to accommodate planned growth on Mapleview Drive.

11.3 STORMWATER MANAGEMENT

The *Stormwater Management Report* demonstrates the proposed SWM Plan for the North Block of Mapleview Village satisfies the criteria and requirements of the MECP, NVCA and City of Barrie.

Stormwater quantity control through peak flow attenuation and post- to pre-development peak flow matching for runoff from the subject site will be provided by the dry pond SWMF#1.

Stormwater quality treatment for the subject site will also be provided via a treatment train approach comprising of OGS units and the dry pond.

Minor storm flows will be collected and conveyed by the proposed internal storm sewer system to the proposed SWMF#1. Major flows will be conveyed overland through the internal road network to the proposed SWMF#1.

The implementation of the LID infiltration facilities will provide on-site retention of the first 5 mm of rainfall. Refer to the *Supplemental Hydrogeological Investigation* report for the detailed water budget analysis by GEI under separate cover.

Best efforts for phosphorus mitigation will be provided via the dry pond, OGS units, and the LID infiltration facilities.

Siltation and erosion control strategies will be implemented during site servicing, grading, and building construction to reduce the transportation of sediment from the site, improve stormwater quality, and mitigate any environmental impacts during construction activities.

11.4 FLOODPLAIN HAZARD

The *Natural Hazard Study* confirmed that the existing channel was to be reconstructed in support of the proposed development as a natural channel. These works have already been completed and provide the required conveyance and floodplain storage volume requirements. The hydraulic analysis determined that the reconstructed channel and floodplain configuration have no adverse impact to the flood elevations upstream of the subject site. The analysis also demonstrated the proposed development is safely beyond the post-reconstruction erosion hazard limit.

11.5 ROADWAYS AND TRANSPORTATION

The internal roads will be private and assumed by the condominium corporation. A separate *Traffic Impact Study Addendum* was completed and confirms that there will be minimal transportation impacts.

11.6 GRADING AND LANDSCAPING

The detailed grading design was prepared in accordance with the City's Engineering Standards to achieve the objectives of the SWM plan and tying into existing grades.

11.7 UTILITIES

Utilities are expected to be available to service the proposed development. Utility coordination and designs have been initiated.



Figure 1: Site Location Plan

Appendix A:
Site Plan

SITE STATISTICS

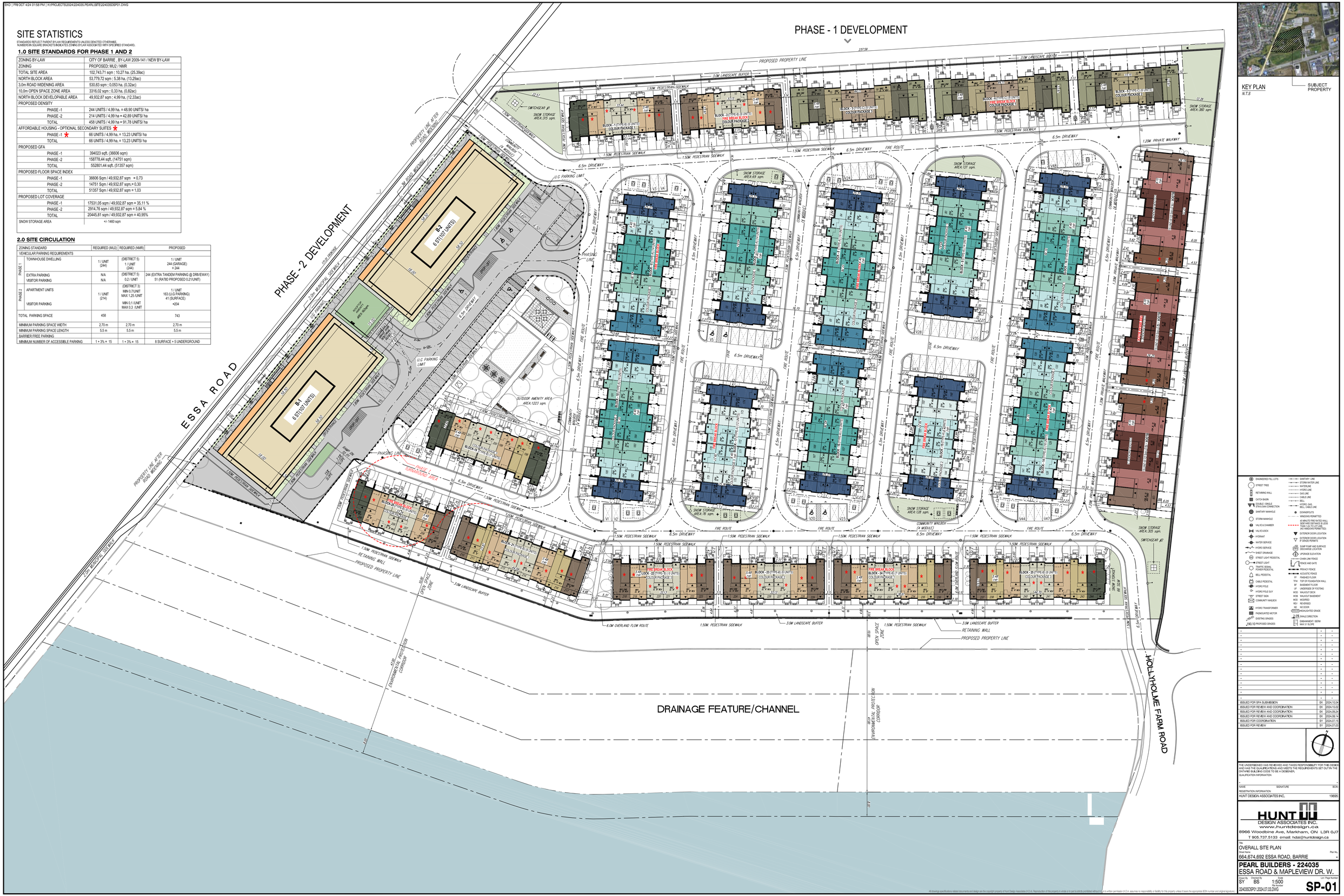
STANDARDS REFLECT PARENT BY-LAW REQUIREMENTS UNLESS DENOTED OTHERWISE.
NUMBERS IN SQUARE BRACKETS INDICATES ZONING BY-LAW ASSOCIATED WITH SPECIFIED STANDARD.

1.0 SITE STANDARDS FOR PHASE 1 AND 2

ZONING BY-LAW	CITY OF BARRIE , BY-LAW 2009-141 / NEW BY-LAW
ZONING	PROPOSED: MU2 / NMR
TOTAL SITE AREA	102,743.71 sqm ; 10,27 ha. (25,39ac)
NORTH BLOCK AREA	53,779.72 sqm ; 5,38 ha. (13,29ac)
3,0m ROAD WIDENING AREA	530,83 sqm ; 0,053 ha. (0,32ac)
10,0m OPEN SPACE ZONE AREA	3316,02 sqm ; 0,33 ha. (0,82ac)
NORTH BLOCK DEVELOPABLE AREA	49,932,87 sqm ; 4,99 ha. (12,33ac)
PROPOSED DENSITY	
PHASE -1	244 UNITS / 4,99 ha. = 48.90 UNITS/ ha
PHASE -2	214 UNITS / 4,99 ha = 42,89 UNITS/ ha
TOTAL	458 UNITS / 4,99 ha = 91.78 UNITS/ ha
AFFORDABLE HOUSING - OPTIONAL SECONDARY SUITES	
PHASE -1	66 UNITS / 4,99 ha. = 13,23 UNITS/ ha
TOTAL	66 UNITS / 4,99 ha. = 13,23 UNITS/ ha
PROPOSED GFA	
PHASE -1	394023 sqft. (36606 sqm)
PHASE -2	158778.44 sqft. (14751 sqm)
TOTAL	552801.44 sqft. (51357 sqm)
PROPOSED FLOOR SPACE INDEX	
PHASE -1	36606 Sqm / 49,932,87 sqm = 0,73
PHASE -2	14751 Sqm / 49,932,87 sqm,= 0,30
TOTAL	51357 Sqm / 49,932,87 sqm = 1,03
PROPOSED LOT COVERAGE	
PHASE -1	17531,05 sqm / 49,932,87 sqm = 35,11 %
PHASE -2	2914,76 sqm / 49,932,87 sqm = 5,84 %
TOTAL	20445,81 sqm / 49,932,87 sqm = 40,95%
SNOW STORAGE AREA	+\- 1460 sqm

2.0 SITE CIRCULATION

ZONING STANDARD		REQUIRED (MU2)	REQUIRED (NMR)	PROPOSED
VEHICULAR PARKING REQUIREMENTS				
PHASE 1	TOWNHOUSE DWELLING	1 / UNIT (244)	(DISTRICT 5) 1 / UNIT (244)	1 / UNIT 244 (GARAGE) + 244
	EXTRA PARKING	N/A	(DISTRICT 5) 0.2 / UNIT	244 (EXTRA TANDEM PARKING @ DRIVEWAY)
	VISITOR PARKING	N/A		51 (RATIO PROPOSED 0.21/UNIT)
PHASE 2	APARTMENT UNITS	1 / UNIT (214)	(DISTRICT 5) MIN 0.7/UNIT MAX 1.25 /UNIT	1 / UNIT 163 (U.G PARKING) 41 (SURFACE)
	VISITOR PARKING		MIN 0.1 /UNIT MAX 0.3 /UNIT	=204
TOTAL PARKING SPACE		458		743
MINIMUM PARKING SPACE WIDTH		2.70 m	2.70 m	2.70 m
MINIMUM PARKING SPACE LENGTH		5.5 m	5.5 m	5.5 m
BARRIER FREE PARKING				
MINIMUM NUMBER OF ACCESSIBLE PARKING		1 + 3% = 15	1 + 3% = 15	8 SURFACE + 5 UNDERGROUND



KEY PLAN
N.T.S

SUBJECT PROPERTY

ENGINEERED FILL (CITY)
STREET TREE
RETAINING WALL
CATCH BASIN
DOUBLE / SINGLE STM & SAN CONNECTION
SANITARY MANHOLE
STORM MANHOLE
VALVE & CHAMBER
VALVE & BOX
HYDRANT
WATER SERVICE
HYDRO SERVICE
SHEET DRAINAGE
STREET LIGHT
STREET LIGHT PEDESTAL
TRAFFIC SIGNAL POWER PEDESTAL
BELL PEDESTAL
CABLE PEDESTAL
HYDRO POLE
HYDRO POLE GUY
STREET SIGN
COMMUNITY MAILBOX
HYDRO TRANSFORMER
PADMOUNTED MOTOR
EXISTING GRADES
390.10 PROPOSED GRADES
SANITARY LINE
STORM WATER LINE
WATERLINE
HYDRO LINE
GAS LINE
CABLE LINE
BELL
HYDRO, GAS, BELL, CABLE LINE
DOWNSPOUTS
WINDOWS PERMITTED
45 MINUTE FIRE RATED WALL FOR LIMITING DIST. LESS THAN 1.2m TO LOT LINE (NO WINDOWS PERMITTED)
EXTERIOR DOOR LOCATION (F GRADE PERMITS)
EXTERIOR DOOR LOCATION (F GRADE PERMITS)
SUMP PUMP AND SURFACE DISCHARGE LOCATION
UPGRADE ELEVATION
CHAIN LINK FENCE
FENCE AND GATE
PRIVACY FENCE
ACOUSTIC FENCE
FF FINISHED FLOOR
TFW TOP OF FOUNDATION WALL
BD BASEMENT DOOR
UF UNDERSIDE OF FOOTING
WOD WALKOUT DECK
WOB WALKOUT BASEMENT
MOD MODIFIED
NEW NEW BUILD
NO NO DOOR
EXISTING/PUTTED GRADE
2.0% SWALE DIRECTION
EMBANKMENT / BERM MAX 3:1 SLOPE

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ISSUED FOR SPA SUBMISSION	EK	2024.10.04
ISSUED FOR REVIEW AND COORDINATION	EK	2024.10.02
ISSUED FOR REVIEW AND COORDINATION	EK	2024.09.24
ISSUED FOR REVIEW AND COORDINATION	EK	2024.08.14
ISSUED FOR COORDINATION	SY	2024.07.15
ISSUED FOR REVIEW	SY	2024.07.03

THE UNDERSIGNED HAS REVIEWED AND TAKES RESPONSIBILITY FOR THIS DESIGN AND HAS THE QUALIFICATIONS AND MEETS THE REQUIREMENTS SET OUT IN THE ONTARIO BUILDING CODE TO BE A DESIGNER.
QUALIFICATION INFORMATION
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NAME SIGNATURE BCIN
REGISTRATION INFORMATION
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HUNT DESIGN ASSOCIATES INC.
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Title
OVERALL SITE PLAN
Street Name Plan No.
664,674,692 ESSA ROAD, BARRIE -

PEARL BUILDERS - 224035
ESSA ROAD & MAPLEVIEW DR. W.

Drawn By SY | Checked By BS | Scale 1:500 | File Number 224035DSP01 2024.07.03.DWG | Dwg / Page Number **SP-01**

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1.0 SITE STANDARDS FOR PHASE - 1

PHASE 1 DEVELOPABLE AREA	43,431.03 sqm / 4.34 ha. (10.72ac)
PROPOSED DENSITY	244 UNITS / 4.34 ha. = 56.22 UNITS/ ha
TOTAL GFA	394023 sqft. (36606 sqm)
FLOOR SPACE INDEX	36606 Sqm / 43,431.03 sqm = 0.84
LOT COVERAGE PHASE-1	
TYPE 'A' LOT COVERAGE - 144	9288.06 sqm / 43,431.03 sqm = 21.39%
TYPE 'B' LOT COVERAGE - 60	4864.19 sqm / 43,431.03 sqm = 11.20%
TYPE 'C' LOT COVERAGE - 22	1596.42 sqm / 43,431.03 sqm = 3.68%
TYPE 'D' LOT COVERAGE - 18	1782.38 sqm / 43,431.03 sqm = 4.10%
TOTAL LOT COVERAGE FOR PHASE-1	17531.05 sqm / 43,431.03 sqm = 40.37 %

PHASE -1 UNIT COUNT - GROSS FLOOR AREA	NUMBER OF UNITS	GFA
TYPE 'A' - 3 STOREY, 6.40M BACK TO BACK TOWNHOUSE BLOCKS 8 - 10 & 14 - 18 +/- 1,560 sqft. (PER MODULE)	144 UNITS	209088 sqft. (19332 sqm)
TYPE 'B' - 3 STOREY, 5.40 M DUAL FRONTAGE TOWNS BLOCKS 1 - 2 & 19 - 25 +/- 1,806 sqft. (PER MODULE)	60 UNITS	113085 sqft. (10506 sqm)
TYPE 'C' - 3 STOREY, 5.40 M FRONT LOADED TOWNS BLOCKS 3 - 5 +/- 1,806 sqft. (PER MODULE)	22 UNITS	40752 sqft. (3786 sqm)
TYPE 'D' - 2 STOREY, 6.10 M FRONT LOADED TOWNS BLOCKS 11 - 13 +/- 1,813 sqft. (PER MODULE)	18 UNITS	32098 sqft. (2982 sqm)
TOTAL UNITS (PHASE - 1)	244 UNITS	394023 sqft. (36606 sqm)

2.0 ZONING STANDARDS FOR PHASE 1

ZONING STANDARD	REQUIRED (MU2)	REQUIRED (NMR)	PROPOSED
MINIMUM LOT FRONTAGE	N/A	35m	368.34m.
NORTH BLOCK LOT FRONTAGE	N/A	35m	171.01m
MINIMUM LOT AREA	N/A	N/A	N/A
MAXIMUM BUILDING LENGTH	N/A	65m	51.76m
MINIMUM BUILDING HEIGHT	7.5m	5 STOREYS (17.5m)	8.70m
MAXIMUM BUILDING HEIGHT	16.5m 25.5m (W/ GRD FLR COMMERCIAL)	12 STOREYS (42m)	12.15m
MAXIMUM LOT COVERAGE	N/A	50%	35.11%
MIN. FRONT FACADE STEP-BACK	45 deg. ANGULAR PLANE AT HEIGHT ABOVE 80% EQUIVALENT RIGHT OF WAY USING 3m MIN. STEP-BACKS	N/A	N/A
MIN. SIDE FACADE STEP-BACK	IF ADJACENT TO MN OS ZONE, 0.6M AT HEIGHT ABOVE 80% EQUIVALENT OF RIGHT OF WAY	N/A	N/A
MIN. REAR FACADE STEP-BACK	45 deg. ANGULAR PLANE ABOVE 7.5M USING USING 3m MIN. STEP-BACKS	N/A	N/A
MIN. GROUND LEVEL FLR HEIGHT	4.5m	N/A	2.760m
MIN. FRONT YARD	MIN. 75% of FRONTAGE WITHIN 1m.	3m	22.57m
MAX. FRONT YARD	MAX. 25% of FRONTAGE WITHIN 5m.	7m	22.57m
MIN. INTERIOR SIDE YARD	3m MIN. ABUTTING STREET OR LANE	3m	4.78m
MAX. INTERIOR SIDE YARD	3.0 m	N/A	8.16m
MIN. REAR YARD	1.5m MIN. A BUTTING ST., OR LANE 7m MIN. A BUTTING RES, OS, OR EP	5m	6.0m
MIN. EXTERIOR SIDE YARD	N/A	3m	N/A
MIN. DRIVEWAYS	N/A	2.7m x 6.0m	2.7m x 5.6m
PERMITTED ENCROACHMENTS - REAR YARD	DECK - 0.6m SETBACK	DECK - 1.2m SETBACK	DECK - 4.5m SETBACK
MIN. SEPARATION DISTANCE - FACING DISTANCE	N/A	9m (1-2 STRY), 11m (3-4 STRY)	14.42m
MIN. LANDSCAPE AREA	N/A	20%	15% - PHASE 1 & 2
AMENITY AREA REQUIRED	12 sqm. / UNIT	COMMON AMENITY - 12 sqm. / UNIT	NOT COMPLYING
		PRIVATE AMENITY - 5 sqm. / UNIT	PRIVATE AMENITY - 5 sqm. / UNIT
WINDOW TO WALL RATIO	N/A	MAX OF 60% OF WINDOW TO WALL RATIO, AS MEASURED ACROSS ALL BUILDING FACADES MIN OF 15% OF FACADE ABUTTING A STREET, OPEN SPACE OR AMENITY SHALL BE WINDOWS, OPENINGS OR SIMILAR	20% 8%

3.0 SITE CIRCULATION FOR PHASE 1

ZONING STANDARD		REQUIRED (MU2)	REQUIRED (NMR) (DISTRICT 5)	PROPOSED
VEHICULAR PARKING REQUIREMENTS				
PHASE 1	TOWNHOUSE DWELLING	1 / UNIT (244)	1 / UNIT (244)	1 / UNIT 244 (GARAGE) = 244
	EXTRA PARKING	N/A	0.2 / UNIT	244 (EXTRA TANDEM PARKING @ DRIVEWAY)
	VISITOR PARKING	N/A		51 (RATIO PROPOSED 0.21/UNIT)
TOTAL PARKING SPACE		244	244	295
MINIMUM PARKING SPACE WIDTH		2.70 m	2.70 m	2.70 m
MINIMUM PARKING SPACE LENGTH		5.5 m	5.5 m	5.5 m
MINIMUM NUMBER OF ACCESSIBLE PARKING		3	3	4
BICYCLE PARKING (FOR A BUILDING CONTAINING 10 OR MORE DWELLING UNITS)		N/A	LONG TERM 1.8m x 0.6m (DISTRICT 5) L.T. - MIN 0.5/UNIT S.T. - MIN 0.1/UNIT	BICYCLE PARKING IN PRIVATE GARAGES

PHASE - 1 DEVELOPMENT



LEGEND

21' BACK TO BACK TOWNS - TYPE A

2101(8) 2102(34) 2103(30) 2104(32) 2105 END(12) 2105 COR(28)

TOTAL - 144 UNITS

18' DUAL FRONTAGE TOWNS - TYPE B

1811(18) 1812(18) 1813(6) 1813 END(13) 1813 COR(5)

TOTAL - 60 UNITS

18' FRONT LOADED TOWNS - TYPE C

1801(4) 1802(6) 1803(6) 1804 END(6)

TOTAL - 22 UNITS

20' FRONT LOADED TOWNS - TYPE D

2001(6) 2002(6) 2002 END(4) 2002 COR(2)

TOTAL - 18 UNITS

GRAND TOTAL - 244 UNITS

KEY PLAN N.T.S — SUBJECT PROPERTY

ENGINEERED FILL (CITY)
STREET TREE
RETAINING WALL
CATCH BASIN
DOUBLE / SINGLE STM & SAN CONNECTION
SANITARY MANHOLE
STORM MANHOLE
VALVE & CHAMBER
VALVE & BOX
HYDRANT
HYDRO SERVICE
HYDRO SERVICE
SHEET DRAINAGE
STREET LIGHT
TRAFFIC SIGNAL POWER PEDESTAL
BELL PEDESTAL
CABLE PEDESTAL
HYDRO POLE
HYDRO POLE GUY
STREET SIGN
COMMUNITY MAILBOX
HYDRO TRANSFORMER
PADMOUNTED MOTOR
EXISTING GRADES
90.10 PROPOSED GRADES
SANITARY LINE
STORM WATER LINE
WATERLINE
HYDRO LINE
GAS LINE
CABLE LINE
BELL
HYDRO, GAS, BELL, CABLE LINE
DOWNSPOUTS
WINDOWS PERMITTED
4.0 MINUTE FIRE RATED WALL SIDEYARD DISTANCE IS LESS THAN 1.2m (NO WINDOWS PERMITTED)
EXTERIOR DOOR LOCATION
EXTERIOR DOOR LOCATION IF GRADE PERMITS
SUMP PUMP AND SURFACE DISCHARGE LOCATION
UPGRADE ELEVATION
CHAIN LINK FENCE
FENCE AND GATE
PRIVACY FENCE
ACOUSTIC FENCE
FF FINISHED FLOOR
TFW TOP OF FOUNDATION WALL
BF BASEMENT FLOOR
UF UNDERSIDE OF FOOTING
WOD WALKOUT DECK
WOB WALKOUT BASEMENT
MOD MODIFIED
REV REVERSED
ND NO DOOR
EXCAVATED GRADE
2.0% SWALE DIRECTION
EMBANKMENT - BERM MAX 3:1 SLOPE

-	-	-
ISSUED FOR SPA SUBMISSION	SY	2024.10.04
ISSUED FOR REVIEW AND COORDINATION	SY	2024.10.02
ISSUED FOR REVIEW AND COORDINATION	SY	2024.09.24
ISSUED FOR REVIEW AND COORDINATION	SY	2024.08.14
ISSUED FOR COORDINATION	SY	2024.01.15
ISSUED FOR REVIEW	SY	2024.01.03

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Title: SITE PLAN - PHASE 1
Street Name: 664,674,692 ESSA ROAD, BARRIE
Plan No. -

PEARL BUILDERS - 224035
ESSA ROAD & MAPLEVIEW DR. W.

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PHASE - 1 DEVELOPMENT

PHASE - 2 DEVELOPMENT

PROPOSED PROPERTY LINE

PROPERTY LINE AFTER ROAD WIDENING

3M ROAD WIDENING

2.0m MUNICIPAL SIDEWALK

B-2
6 ST(107 UNITS)

B-1
6 ST(107 UNITS)

ROOFTOP AMENITY AREA:163sqm.

OUTDOOR AMENITY AREA AREA:1223 sqm.

SWITCHGEAR #1

SNOW STORAGE AREA:315 sqm.

SNOW STORAGE AREA:380 sqm.

SNOW STORAGE AREA:671 sqm.

SNOW STORAGE AREA:305 sqm.

SNOW STORAGE AREA:128 sqm.

SNOW STORAGE AREA:76 sqm.

SWITCHGEAR #2

COMMUNITY MAILBOX (4 MODULE)

BLOCK - 1 (TYPE-B) (6 UNITS)
COLOUR PACKAGE 1

BLOCK - 2 (TYPE-B) (8 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 2

BLOCK - 3 (TYPE-C) (8 UNITS)
COLOUR PACKAGE 3

BLOCK - 4 (TYPE-C) (8 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 1

BLOCK - 5 (TYPE-C) (8 UNITS)
COLOUR PACKAGE 2

BLOCK - 6 (TYPE-A) (16 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 1

BLOCK - 7 (TYPE-A) (14 UNITS)
COLOUR PACKAGE 2

BLOCK - 8 (TYPE-A) (16 UNITS)
COLOUR PACKAGE 3

BLOCK - 9 (TYPE-A) (16 UNITS)
COLOUR PACKAGE 1

BLOCK - 10 (TYPE-A) (16 UNITS)
COLOUR PACKAGE 2

BLOCK - 11 (TYPE-D) (8 UNITS)
COLOUR PACKAGE 3

BLOCK - 12 (TYPE-D) (8 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 1

BLOCK - 13 (TYPE-D) (8 UNITS)
COLOUR PACKAGE 2

BLOCK - 14 (TYPE-D) (8 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 3

BLOCK - 15 (TYPE-A) (16 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 1

BLOCK - 16 (TYPE-A) (14 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 2

BLOCK - 17 (TYPE-A) (12 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 3

BLOCK - 18 (TYPE-A) (16 UNITS)
COLOUR PACKAGE 1

BLOCK - 19 (TYPE-B) (7 UNITS)
COLOUR PACKAGE 2

BLOCK - 20 (TYPE-B) (8 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 3

BLOCK - 21 (TYPE-B) (8 UNITS)
COLOUR PACKAGE 1

BLOCK - 22 (TYPE- B) (6 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 3

BLOCK - 23 (TYPE-B) (6 UNITS)
COLOUR PACKAGE 2

BLOCK - 24 (TYPE-B) (7 UNITS)
FIRE BREAK BLOCK
COLOUR PACKAGE 1

BLOCK - 25 (TYPE-B) (6 UNITS)
COLOUR PACKAGE 3

1.50M PEDESTRIAN SIDEWALK

3.0M LANDSCAPE BUFFER

6.5m DRIVEWAY

1.20M PRIVATE WALKWAY

FIRE ROUTE

U.G PARKING LIMIT

PHASING LINE

PHASE TURNAROUND AREA

RAMP-5% SLOPE

7.5% SLOPE

15% SLOPE

RETAINING WALL

OPEN SPACE ZONE

6.0M OVERLAND FLOW ROUTE

ENVIRONMENTAL PROTECTION CORRIDOR

DRAINAGE FEATURE/CHANNEL

HOLLYHOLME FARM

KEY PLAN
N.T.S

SUBJECT PROPERTY

ENGINEERED FILL LOTS
STREET TREE
RETAINING WALL
CATCH BASIN
DOUBLE / SINGLE STM & SAN CONNECTION
SANITARY MANHOLE
STORM MANHOLE
VALVE & CHAMBER
HYDRANT
WATER SERVICE
HYDRO SERVICE
SWEET DRAINAGE
STREET LIGHT PEDESTAL
STREET LIGHT
TRAFFIC SIGNAL POWER PEDESTAL
BELL PEDESTAL
CABLE PEDESTAL
HYDRO POLE
HYDRO POLE GUY
"STOP" STREET SIGN
COMMUNITY MAILBOX
HYDRO TRANSFORMER
PADMOUNTED MOTOR
EXISTING GRADES
100.10 PROPOSED GRADES
SANITARY LINE
STORM WATER LINE
WATER LINE
HYDRO LINE
GAS LINE
CABLE LINE
BELL
HYDRO, GAS, BELL, CABLE LINE
DOWNSPOUTS
WINDOWS PERMITTED
45 MINUTE FIRE RATED WALL SIDEYARD DISTANCE IS LESS THAN 1.2m TO LOT LINE (NO WINDOWS PERMITTED)
EXTERIOR DOOR LOCATION
EXTERIOR DOOR LOCATION IF GRADE PERMITS
SUMP PUMP AND SURFACE DISCHARGE LOCATION
UPGRADE ELEVATION
CHAIN LINK FENCE
FENCE AND GATE
PRIVACY FENCE
ACOUSTIC FENCE
TFF TWINSTEP FLOOR
TFW TOP OF FOUNDATION WALL
BF BASEMENT FLOOR
UF UNDERSIDE OF FOOTING
WO WALKOUT BASEMENT
MOD MODIFIED
REV REVERSED
ND NO DOOR
HIGHLIGHTED GRADE
2.0% SWALE DIRECTION
EMBANKMENT - BERM MAX 3:1 SLOPE

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ISSUED FOR SPA SUBMISSION	EK	2024.10.04
ISSUED FOR REVIEW AND COORDINATION	EK	2024.10.02
ISSUED FOR REVIEW AND COORDINATION	EK	2024.09.23
ISSUED FOR REVIEW AND COORDINATION	EK	2024.06.14
ISSUED FOR COORDINATION	SY	2024.01.15
ISSUED FOR REVIEW	EK	2024.01.02

THE UNDERSIGNED HAS REVIEWED AND TAKES RESPONSIBILITY FOR THIS DESIGN AND HAS THE QUALIFICATIONS AND MEETS THE REQUIREMENTS SET OUT IN THE ONTARIO BUILDING CODE TO BE A DESIGNER.
QUALIFICATION INFORMATION

NAME | SIGNATURE | BCIN
REGISTRATION INFORMATION
HUNT DESIGN ASSOCIATES INC. | 19695

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T 905.737.5133 email: hda@huntdesign.ca

SITING AND GRADING PLAN - PHASE 1
Drawing Name | Plan No.
664,674,692 ESSA ROAD, BARRIE

PEARL BUILDERS - 224035
ESSA ROAD & MAPLEVIEW DR. W.

Drawn By: SY | Checked By: BS | Scale: 1:400 | File Number: 2240355SP01.2024.07.03.DWG | Ltr / Page Number: **SP-03**

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Appendix B: WaterCAD Analysis of Water Distribution System

TATHAM ENGINEERING

Enhancing our communities



Mapleview Village – North Block

HYDRAULIC ANALYSIS OF WATER DISTRIBUTION SYSTEM

Pearl Builders

File 422433 | October 8, 2024

Document Control

File:

422433

Date:

October 8, 2024

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Issue	Date	Description
1	October 8, 2024	Issued for 1st SPA Submission

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1 Introduction

1.1 BACKGROUND

Tatham Engineering Limited (Tatham) was retained by Pearl Builders (Pearl) to complete a hydraulic analysis of the proposed water distribution system for the Mapleview Village – North Block development using Bentley's WaterCAD software. This report presents the results of the hydraulic analysis and simulations completed to evaluate the impact of the proposed development on the existing water distribution system to confirm sufficient system capacity required to service the development.

The proposed development is located on the north-east corner of the intersection of Mapleview Drive West and Essa Road. The site is bounded by the existing Mapleview Community Church on the east, Holy Spirit Parish on the north, residential homes on the west, and commercial buildings on the south, in the City of Barrie (City).

The entire site has a total area of approximately 10.3 ha with a proposed zoning of Mixed Use MU2 under the City of Barrie By-Law 2009-141. The North Block of the site is approximately 5.32 ha in area and located immediately north of the newly reconstructed Bear Creek channel corridor (approximately 1.63 ha in area). The lands immediately south of the Bear Creek channel corridor are designated as Future South Block and will be developed as mixed-use under a separate SPA submission. Refer to Figure 1 for the Site Location Plan.

For the purposes of the hydraulic analysis, the South Block concept was based on the maximum potential unit density of mixed-use apartment buildings. It should be noted that the purpose of the current analysis is to evaluate the impact of the North Block on the existing system. The south Block demands and infrastructure was included as part of the analysis to be thorough. However, no recommendations are provided for the servicing of the South Block development. The detailed South Block assessment and hydraulic analysis will need to be carried out separately as part of a future application.

Construction of the watermains within the development site will be completed at once in the North Block, and later in the future South Block.



Figure 1: Proposed Development Blocks

1.2 WATER SERVICING

Existing distribution watermains are located along the roads surrounding the site which includes a 400 mm diameter PVC watermain along Mapleview Drive, a 200 mm diameter PVC watermain along Essa Road, and a 200 mm diameter PVC watermain around the two churches.

The proposed development will only consist of 5.32 ha as part of the North Block, with the remaining developable area in the future South Block. The North Block development will be further split into two phases:

- Phase 1:
  - 244 medium density residential units (144 back-to-back townhouses, 60 dual-frontage townhouses and 40 front-loaded townhouses)
  - 66 medium density optional secondary suites
- Phase 2: two mid-rise apartment buildings with 107 units each (combined total of 214 apartment units).

The future South Block would consist of a maximum of 1,921 high density residential units and 1,400 m^2 of commercial retail space.

The water service around the proposed development will consist of 300 mm diameter PVC distribution watermains which will provide domestic use and fire protection water to each of the townhouses and apartment buildings. Water servicing will be from the existing 400 mm diameter watermain on Mapleview Drive and the existing 200 mm diameter watermain on Essa Road. One connection on Mapleview Drive and one connection on Essa Road will feed the network of 300 mm diameter watermains within the development. The proposed watermains within the development will be looped where possible to minimize dead ends.

A future second connection may be required to the 400 mm dia. Mapleview Drive West watermain to support the future South Block development.

Currently, the existing watermain on Essa Road ends approximately 90 m south of the proposed entrance to the development. Extension of a 300 mm diameter watermain on Essa Road to the development will be included in the proposed water works, at the updated watermain alignment per the future Essa Road reconstruction works. In the future, the City plans to replace the 200 mm diameter Essa Road watermain with a 300 mm diameter watermain to complete the loop in the municipal distribution system, as part of Essa Road upgrade works.

Refer to Drawing SS-1 for further details.

2 Model Setup

Tatham received the hydraulic model from the City in December 2023, with existing average day demand (ADD) and maximum day demand (MDD) scenarios. The model results were confirmed with the City prior to proceeding with the analysis.

The development was built into the WaterCAD model, as shown in Figure 2. Elevations for each of the junction nodes were retrieved from the latest site grading plan and each proposed building within the development was assigned a junction node.

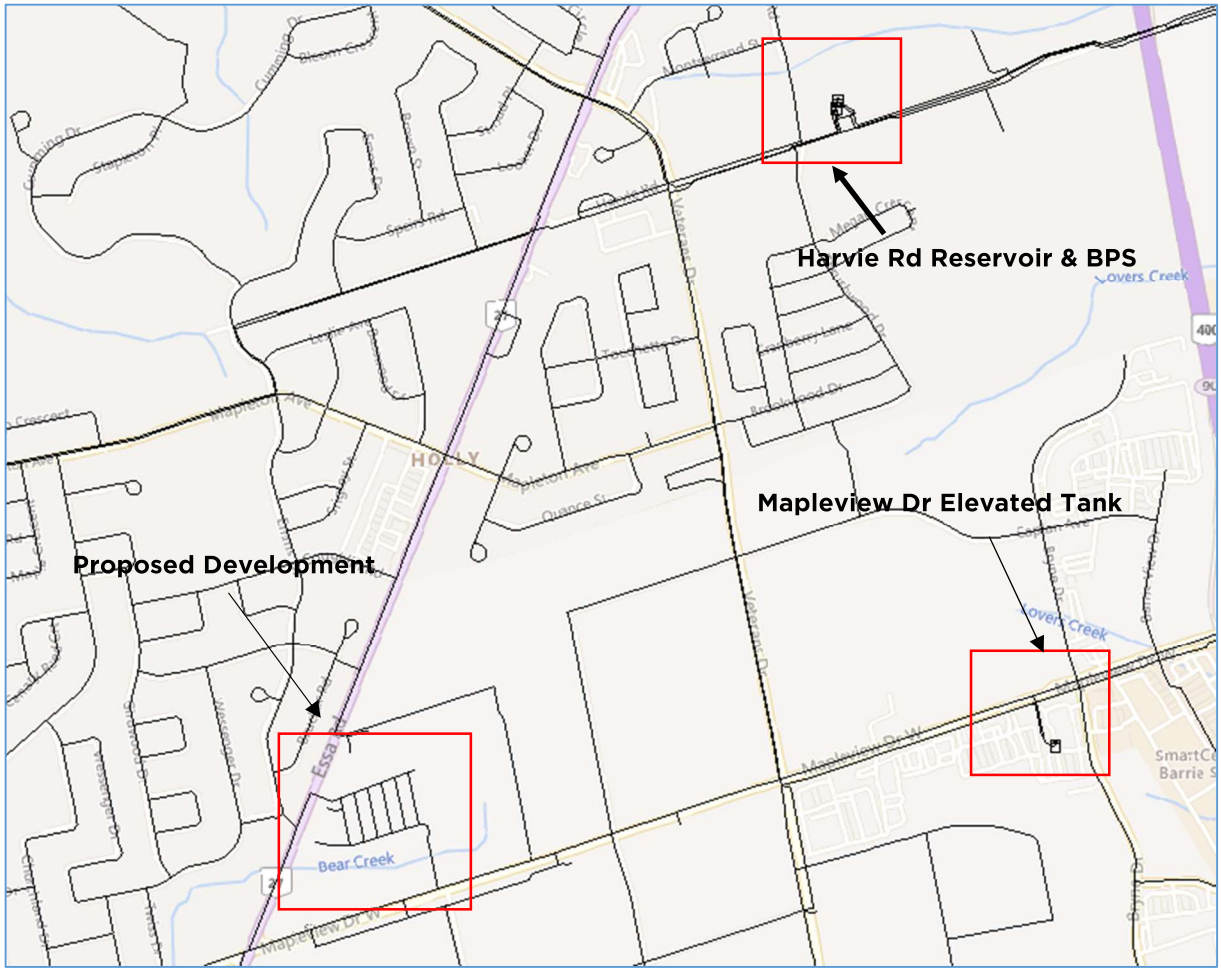


Figure 2: WaterCAD Model Network

The pre-development conditions are presented in Figure 3. The identified junctions have been used to compare the impact of the development onto the existing water distribution system.

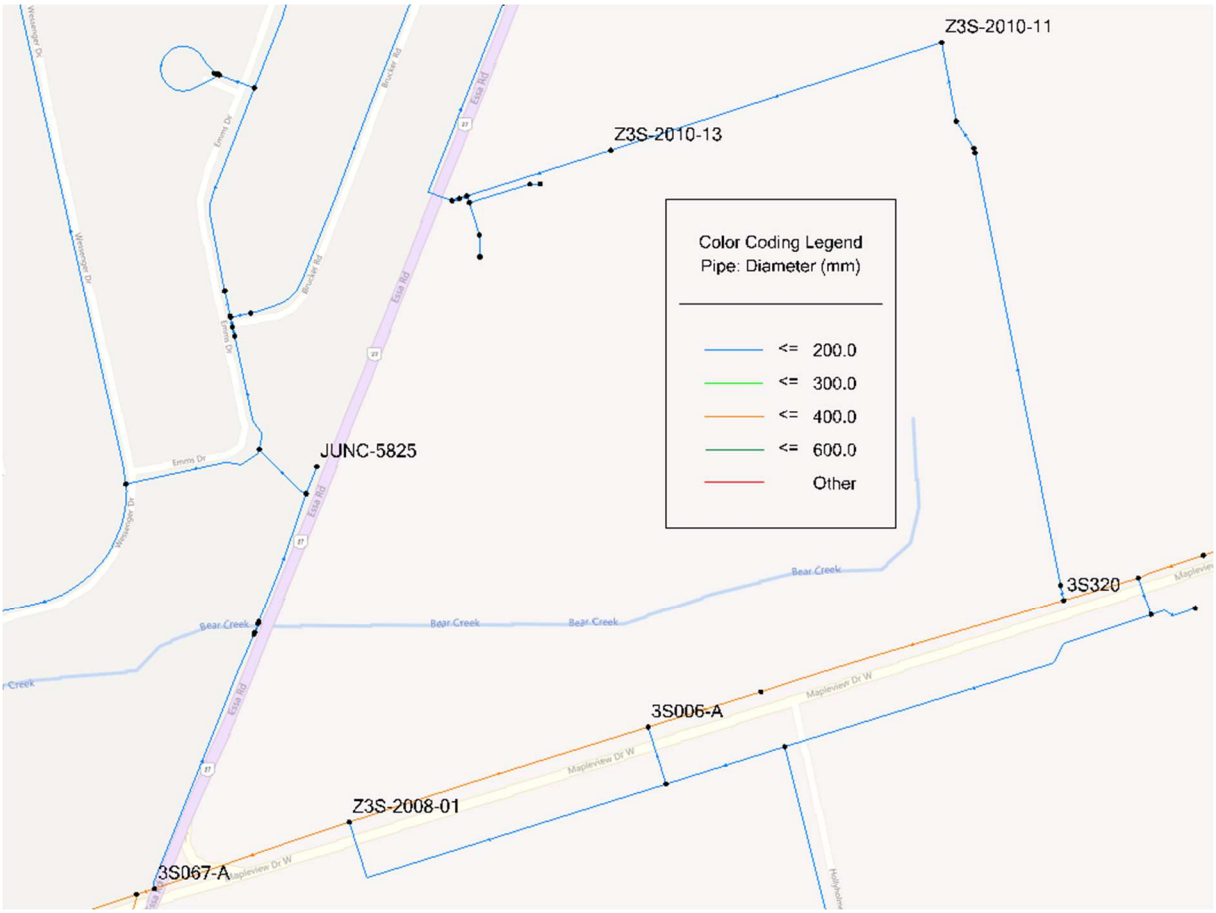


Figure 3: Existing Pre-development Conditions in WaterCAD

2.1 MODEL VALIDATION

The model was first validated against the hydrant test that was completed by Vipond Incorporated on March 31, 2020 at 9:20 AM on the intersection of Mapleview Drive West and Hollyholme Farm Road. The hydrant flow test report is provided in Appendix A. The field measurements showed a static pressure of 56 psi, a residual pressure of 54 psi at 94.7 L/s with both nozzles open, and a calculated available fire flow (AFF) of 451 L/s at the residual pressure of 20 psi.

Hydrant H-2 was created in the model at the approximate location of the test hydrant and a test hydrant flow curve was generated. Figure 4 shows the comparison between the field measurements from the hydrant flow test and the model simulated results for hydrant H-2. The simulated static pressure of 54.8 psi is within 2.1% from the field measured static pressure of 56 psi. The residual pressure of the hydrant flow tests and extrapolated flow at 20 psi is higher than the simulated results as intended since the model is required to be more conservative than field measurements.

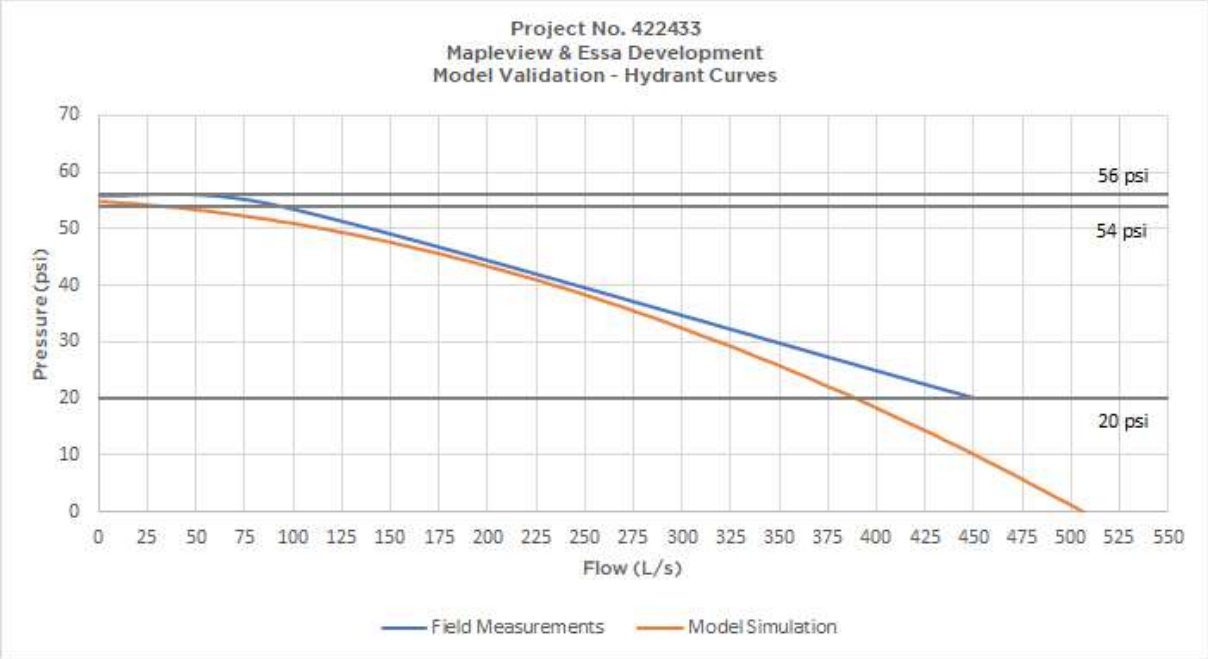


Figure 4: Comparison between Hydrant Test Data and Model Simulation Results

3 Design Criteria and Water Demands

The water demands were calculated based on the design criteria from the City of Barrie Drinking Water Infrastructure Design Standard (April 2024) and the MECP Guidelines for Drinking Water Systems. The design criteria are summarized in Table 1 below.

Table 1: Water Demand Design Criteria

CRITERIA	UNIT	VALUE	SOURCE
Medium-Density Residential Population per Unit (Townhouses, Walk-Up Apartments)	ppu	2.57	City Standard (April 2024)
Residential Average Water Consumption Rate	L/capita/day	225	City Standard (April 2024)
Maximum Day Factor (Phase 1)	-	2.75	MECP Design Guidelines Table 3-1
Maximum Day Factor (Phase 2)	-	2.50	MECP Design Guidelines Table 3-1

The demands were calculated for each residential block and totalized for each phase. Table 2 below summarizes the totalized water demands determined for each stage.

Table 2: Water Demand Allocation by Development Phase

DEVELOPMENT PHASE	UNITS	POPULATION	ADD (L/s)	MDD (L/s)
Phase 1 – Townhouses	310	797	2.07	5.71
Phase 2 - Apartments	214	550	1.43	3.58
North Block Build-Out	**524**	**1,347**	**3.51**	**9.29**
North Block + Future South Block Build-Out	2,445	4,555	11.91	26.09

The City standards and MECP Design Guidelines note normal operating pressures should be within the 40 psi to 100 psi (275 kPa to 700 kPa) range, where preferred normal operating pressures are between 50 psi to 70 psi (350 kPa to 485 kPa). A minimum pressure of 20 psi must be maintained during MDD plus fire flow conditions. The City standards also note that the maximum velocity within the pipes under fire flow conditions should not exceed 5.0 m/s.

4 WaterCAD Model Results

Following model validation, several simulations were completed with and without the demands from the proposed development during ADD and MDD scenarios to present the impact of the development on the rest of the water distribution system. A fire flow analysis under MDD conditions was conducted to determine the AFF while maintaining a minimum residual pressure of 20 psi.

Four infrastructure scenarios were simulated to establish the effect of the development onto the existing water distribution system:

1. Existing conditions which include all existing infrastructure in the distribution system.
2. Phase 1 conditions which includes all existing infrastructure and the construction of the townhouses within the development.
3. Phase 2 conditions which includes all existing infrastructure, Phase 1 townhouses, and construction of the two apartment buildings.
4. North + Future South Block conditions including all infrastructure from existing conditions, Phase 1, Phase 2, and two nodes to simulate conceptual buildings in the future South Block.

The ADD and MDD scenarios were modelled for each of the four scenarios to properly assess the impact of the development at either phase in construction on the existing water distribution system. The MDD plus fire flow condition was also modelled for all four scenarios to assess the available flow at the junctions to provide the required fire flow at all phases of development.

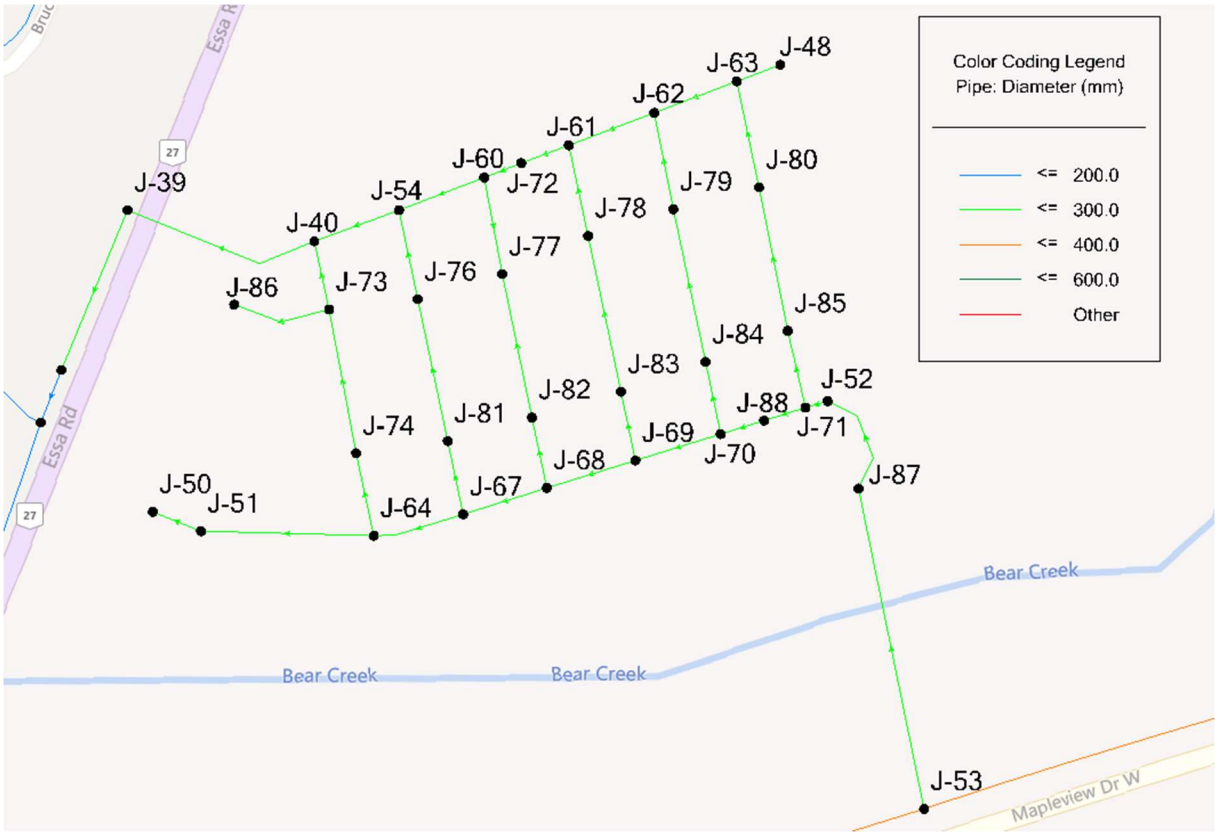


Figure 5: Proposed Development Layout in WaterCAD

Junctions located around the proposed development is used to compare the results of pre-development and post-development conditions, as identified and shown in Figure 3. The results of the comparison between the two conditions, under ADD, MDD, and MDD plus fire flow conditions are provided in Table 3, Table 4, and Table 5, respectively.

The water demands and model results for each node within the proposed development under each of the conditions are provided in Appendix B.

Table 3: Development Impact on ADD Scenario for Each Phase

Node ID	Elev. (m)	EXISTING			PHASE 1			PHASE 2		
		HGL (m)	Pressure		HGL (m)	Pressure		HGL (m)	Pressure	
			psi	kPa		psi	kPa		psi	kPa
3S067-A	307.2	347.6	57	395	347.6	57	395	347.6	57	395
Z3S-2008-01	307.1	347.6	57	396	347.6	57	396	347.6	57	396
3S006-A	307.0	347.7	58	398	347.6	58	398	347.6	58	397
3S320	306.0	347.7	59	408	347.7	59	408	347.6	59	408
Z3S-2010-11	309.0	347.6	55	378	347.6	55	378	347.6	55	378
Z3S-2010-13	311.0	347.5	52	358	347.6	52	358	347.5	52	358
JUNC-5825	306.5	347.5	58	401	347.6	58	402	347.6	58	402

Table 4: Development Impact on MDD Scenario for Each Phase

Node ID	Elev. (m)	EXISTING			PHASE 1			PHASE 2		
		HGL (m)	Pressure		HGL (m)	Pressure		HGL (m)	Pressure	
			psi	kPa		psi	kPa		psi	kPa
3S067-A	307.2	346.9	56	388	346.8	56	387	346.8	56	387
Z3S-2008-01	307.1	346.9	56	389	346.9	56	389	346.8	56	388
3S006-A	307.0	347.0	57	391	346.9	57	391	346.9	57	390
3S320	306.0	347.1	58	402	347.0	58	401	346.9	58	401
Z3S-2010-11	309.0	346.9	54	371	346.9	54	371	346.8	54	370
Z3S-2010-13	311.0	346.8	51	351	346.8	51	350	346.8	51	350
JUNC-5825	306.5	346.7	57	394	346.8	57	395	346.8	57	394

Table 5: Development Impact on MDD plus Fire Flow for Each Phase

Node ID	EXISTING				PHASE 1				PHASE 2			
	HGL (m)	Pressure		AFF (L/s)	HGL (m)	Pressure		AFF (L/s)	HGL (m)	Pressure		AFF (L/s)
		psi	kPa			psi	kPa			psi	kPa	
3S067-A	347.27	57	392	533.5	347.23	57	392	534.3	347.19	57	391	531.6
Z3S-2008-01	347.32	57	393	566.7	347.27	57	393	564.8	347.23	57	392	561.9
3S006-A	347.39	57	395	619.4	347.31	57	395	613.4	347.27	57	394	610
3S320	347.46	59	406	711	347.39	59	405	703.9	347.35	59	405	699.9
Z3S-2010-11	347.33	54	375	186.2	347.29	54	375	186.2	347.25	54	374	185.9
Z3S-2010-13	347.25	51	355	175.9	347.23	51	355	176.2	347.19	51	354	175.9
JUNC-5825	347.18	58	398	247.3	347.25	58	399	452.9	347.20	58	398	450.1

The South Block was modelled with two nodes with each representing half of the residential population and commercial retail space. To remain conservative with the model, the anticipated impact of the future South Block was also considered under the MDD and MDD plus Fire Flow scenarios as shown in Table 6 and Table 7, respectively.

Table 6: Future South Block Impact on MDD Scenario

Node ID	Elev. (m)	EXISTING			NORTH			NORTH + SOUTH		
		HGL (m)	Pressure		HGL (m)	Pressure		HGL (m)	Pressure	
			psi	kPa		psi	kPa		psi	kPa
3S067-A	307.2	346.9	56	388	346.8	56	387	346.5	56	384
Z3S-2008-01	307.1	346.9	56	389	346.8	56	388	346.6	56	386
3S006-A	307.0	347.0	57	391	346.9	57	390	346.6	56	388
3S320	306.0	347.1	58	402	346.9	58	401	346.7	58	399
Z3S-2010-11	309.0	346.9	54	371	346.8	54	370	346.6	53	368
Z3S-2010-13	311.0	346.8	51	351	346.8	51	350	346.5	50	348
JUNC-5825	306.5	346.7	57	394	346.8	57	394	346.5	57	392

Table 7: Future South Block Impact on MDD plus Fire Flow Scenario

Node ID	EXISTING				NORTH				NORTH + SOUTH			
	HGL (m)	Pressure		AFF (L/s)	HGL (m)	Pressure		AFF (L/s)	HGL (m)	Pressure		AFF (L/s)
		psi	kPa			psi	kPa			psi	kPa	
3S067-A	347.27	57	392	533.5	347.19	57	391	531.6	346.95	56	389	522.0
Z3S-2008-01	347.32	57	393	566.7	347.23	57	392	561.9	346.98	57	390	552.6
3S006-A	347.39	57	395	619.4	347.27	57	394	610	347.03	57	392	597.4
3S320	347.46	59	406	711	347.35	59	405	699.9	347.15	58	403	679.0
Z3S-2010-11	347.33	54	375	186.2	347.25	54	374	185.9	347.05	54	372	184.3
Z3S-2010-13	347.25	51	355	175.9	347.19	51	354	175.9	346.99	51	352	174.4
JUNC-5825	347.18	58	398	247.3	347.20	58	398	450.1	346.96	57	396	449.1

All pressures under each condition of the existing infrastructure are predicted to be within the pressure range outlined in the City of Barrie standards (April 2024). The model predicts that the impact of the proposed development on the system is negligible, as the junction pressures have not changed between any of the simulated conditions.

Under existing normal conditions, the impact of the development increases the AFF at the entry node (JUNC-5825) due to inclusion of a 300 mm diameter pipe network branching off Mapleview Drive and reconnecting back at Essa Road. The AFF pre and post development are shown in Figure 6 and Figure 7, respectively.

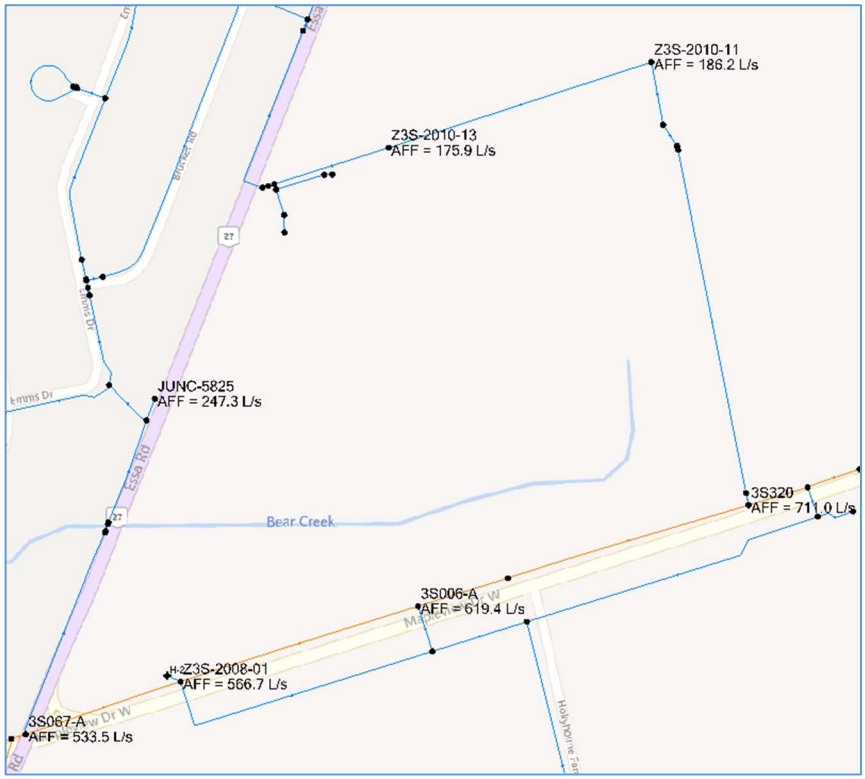


Figure 6: AFF - Existing Conditions

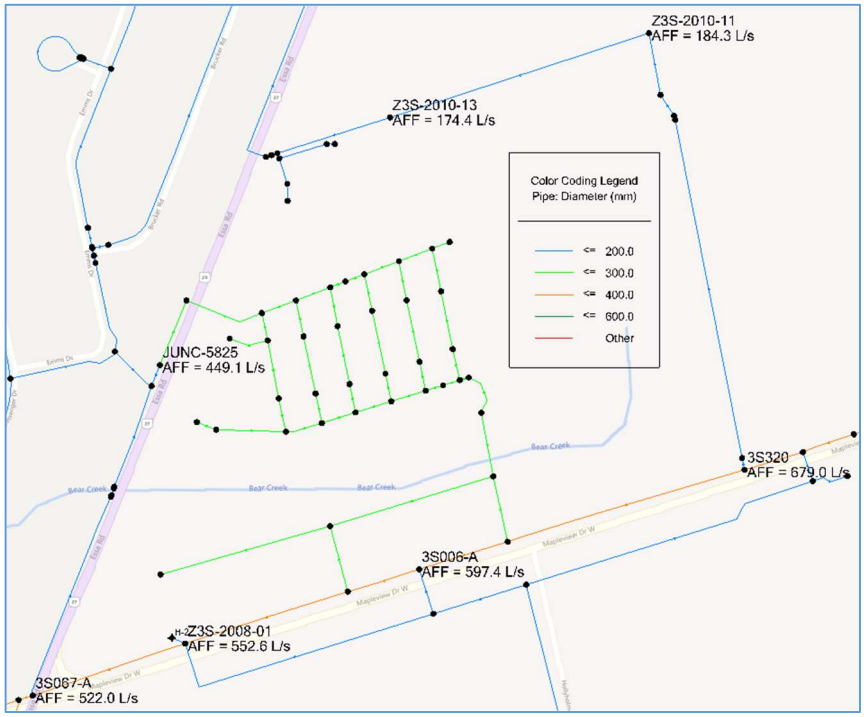


Figure 7: AFF - North Block + Future South Block Impacts

The calculated minimum required fire flows for each of the buildings, through FUS Guidelines (2020) methodology are provided in Appendix C. The available fire flows predicted by the model are generally higher than the required flows. This confirms that the proposed water distribution network in the development with the existing water distribution system will be able to supply sufficient flows to meet required fire flow demand.

As the maximum velocity within the watermain under fire flow conditions is 5 m/s, per City's standards, the theoretical maximum AFF through 300 mm diameter piping is 353 L/s. The maximum required fire flow within the development is 367 L/s, which is lower than the maximum available fire flow. At 367 L/s this equates to a maximum velocity within the 300 mm dia. watermain of 5.2 m/s. As the flows are theoretical and conservative, the velocity of 5.2 m/s within the watermain is generally consistent with the City standards and is deemed sufficient.

5 Conclusions

The model results predict that the existing and proposed watermains, including extension of the Essa Road watermain to the site entrance, will provide an adequate supply of water for domestic use and fire protection for the development. Extension of the Essa Road watermain beyond the development site is not needed to service the site.

The proposed water distribution system is looped throughout the North Block with connections to Mapleview Drive and Essa Road so water age is not expected to be a concern, and no auto-flushers are proposed. Booster pumps may be needed for the multi-storey buildings.

The South Block pipe network should be updated and available pressures and flows assessed as part of the design works when that future development advances.

It is understood that the City is undertaking the model calibration and update efforts. The system upgrades recommended as part of such an exercise should improve the capacity and bottlenecks for further development.

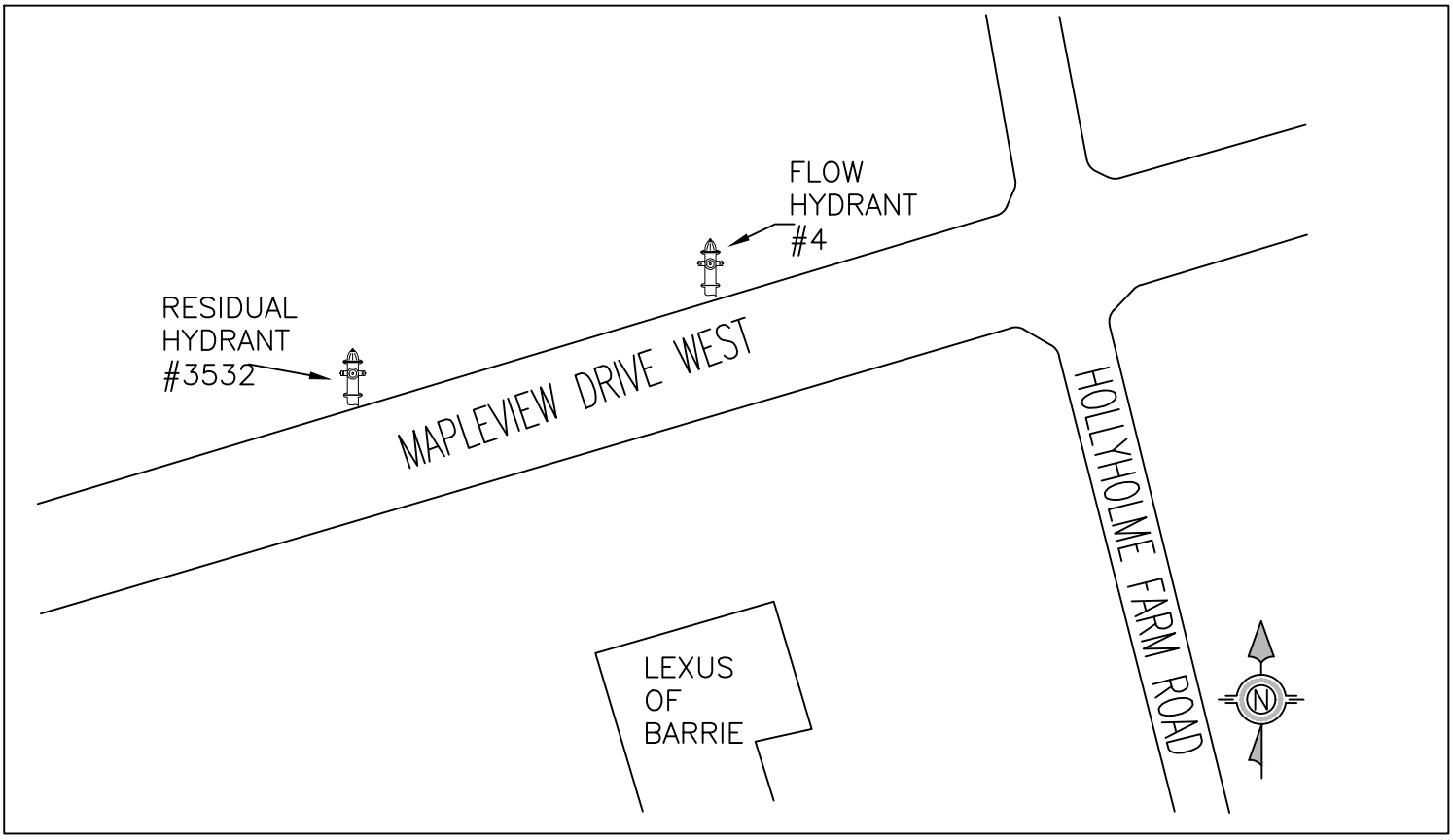
Appendix A:
Hydrant Flow Test Report

FLOW TEST RESULTS

DATE : TUESDAY MARCH 31, 2020 TIME : 9:20 AM

LOCATION : MAPLEVIEW DRIVE WEST
BARRIE
ONTARIO

TEST BY : VIPOND FIRE PROTECTION AND LOCAL PUC



STATIC PRESSURE : 56 PSI UNDERGROUND TYPE & SIZE: 10" PVC

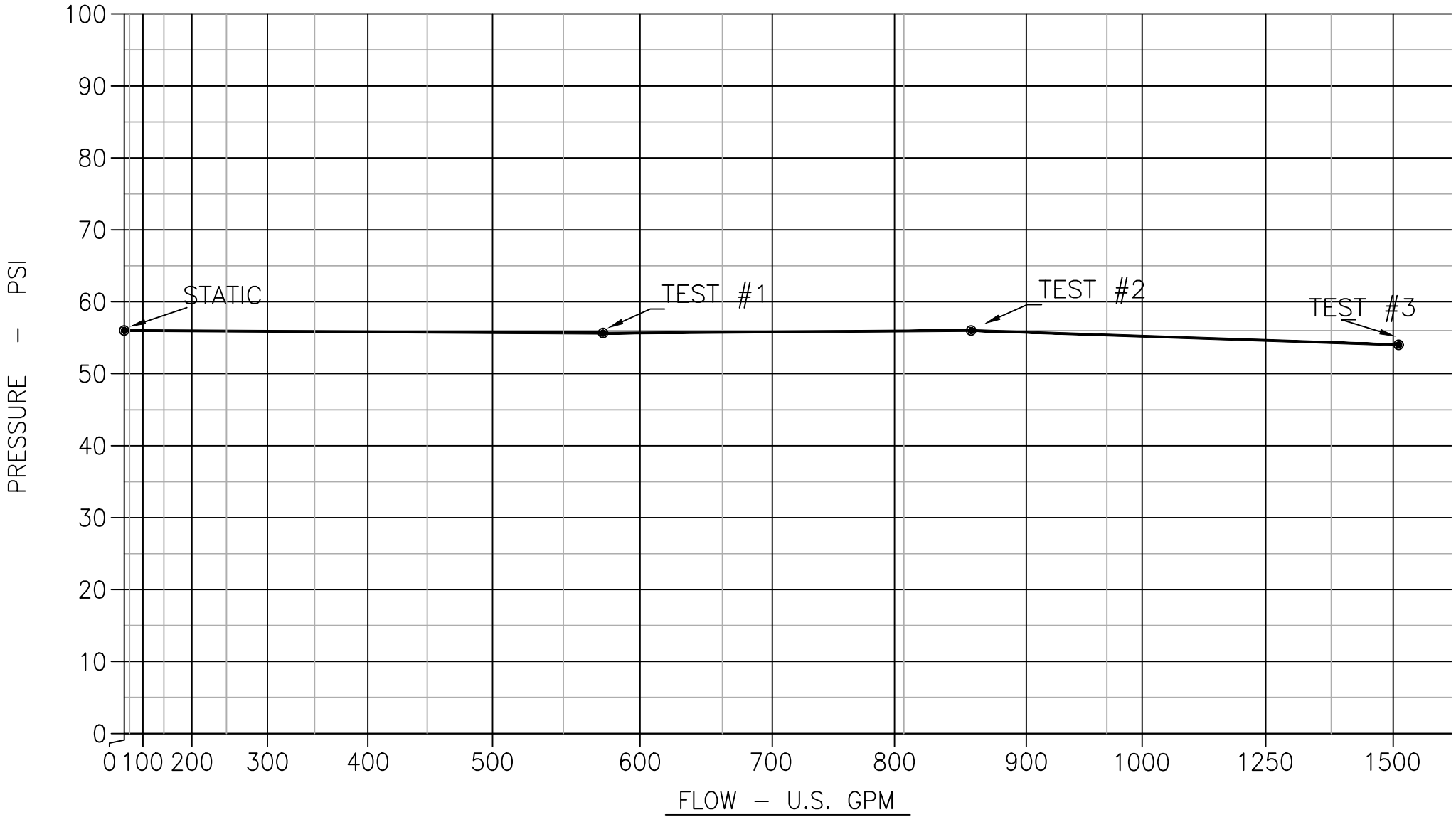
TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1 3/4	0.995	55	40	575
2	1	2 1/2	0.9	56	26	856
3	2	2 1/2	0.9	54	20	1501

FIRST FOR FIRE PROTECTION
VIPOND INC
est. 1945

VIPOND FIRE PROTECTION
A DIVISION OF VIPOND INC.

MAPLEVIEW DRIVE WEST	BY : LEN K.
BARRIE	OFFICE : BARRIE
ONTARIO	TEST BY : VIPOND & PUC
	DATE : MARCH 31, 2020

STATIC:		RESIDUAL:		FLOW:
56 PSI	TEST#1	55 PSI	@	575 GPM
	TEST#2	56 PSI	@	856 GPM
	TEST#3	54 PSI	@	1501 GPM



Appendix B:
Model Demands and Results

Design Demand Criteria

From the City of Barrie Drinking Water Infrastructure Design Standard (2024):

Category	Value	Unit
Low-density Residential PPU (single detached, duplexed or semi-detached dwellings)	3.25	ppu
Medium-density Residential PPU (triplexes and fourplexes, cluster and/or block townhouses, street townhouses, walk-up apartments)	2.57	ppu
High-density Residential PPU (apartment dwellings)	1.67	ppu
Residential Average Water Consumption Rate	225	L/capita/day
Commercial / Institutional Average Water Consumption Rate	28,000	L/ha/day
Industrial Average Water Consumption Rate	35,000	L/ha/day

From MECP Design Guidelines for Drinking Water Systems, Table 3-1 (2008):

Population	Minimum Hour Factor	Maximum Day Factor	Peak Hour Factor
500 - 1,000	0.40	2.75	4.13
1,001 - 2,000	0.45	2.50	3.75
2,001 - 3,000	0.45	2.25	3.38
3,001 - 10,000	0.50	2.00	3.00
10,001 - 25,000	0.60	1.90	2.85
25,001 - 50,000	0.65	1.80	2.70
50,001 - 75,000	0.65	1.75	2.62
75,001 - 150,000	0.70	1.65	2.48
greater than 150,000	0.80	1.50	2.25

Water Distribution System Design Criteria

From the City of Barrie Drinking Water Infrastructure Design Standard (2024):

Hazen-Williams C Factors / Pipe Friction Coefficients

Pipe Diameter (mm)	Hazen-Williams C Factor
150	100
200 - 250	110
300 - 600	120
≥ 600	130

Maximum watermain velocity under avg day and max day	1.5 m/s
Maximum watermain velocity under fire flow	5.0 m/s

Maximum normal operating pressure	700 kPa
Normal operating pressure threshold for requiring PRVs	550 kPa
Preferred maximum normal operating pressure	485 kPa
Preferred minimum normal operating pressure	350 kPa
Minimum normal operating pressure	275 kPa
Minimum pressure under max day demand plus fire flow	140 kPa

Design Demands Note: North - All Blocks & Buildings are Townhouses (Med-Density). South - High Density

Phase	Building	Units	Pop.	ICI Area m^2	ADD		MDD		PHD	
					m^3/d	L/s	m^3/d	L/s	m^3/d	L/s
Phase 1	Block 1	12	31	0	6.9	0.08	19.1	0.22	28.7	0.33
	Block 2	12	31	0	6.9	0.08	19.1	0.22	28.7	0.33
	Block 3	8	21	0	4.6	0.05	12.7	0.15	19.1	0.22
	Block 4	8	21	0	4.6	0.05	12.7	0.15	19.1	0.22
	Block 5	6	15	0	3.5	0.04	9.5	0.11	14.3	0.17
	Block 6	14	36	0	8.1	0.09	22.3	0.26	33.4	0.39
	Block 7	14	36	0	8.1	0.09	22.3	0.26	33.4	0.39
	Block 8	16	41	0	9.3	0.11	25.4	0.29	38.2	0.44
	Block 9	14	36	0	8.1	0.09	22.3	0.26	33.4	0.39
	Block 10	16	41	0	9.3	0.11	25.4	0.29	38.2	0.44
	Block 11	8	21	0	4.6	0.05	12.7	0.15	19.1	0.22
	Block 12	8	21	0	4.6	0.05	12.7	0.15	19.1	0.22
	Block 13	8	21	0	4.6	0.05	12.7	0.15	19.1	0.22
	Block 14	16	41	0	9.3	0.11	25.4	0.29	38.2	0.44
	Block 15	12	31	0	6.9	0.08	19.1	0.22	28.7	0.33
	Block 16	14	36	0	8.1	0.09	22.3	0.26	33.4	0.39
	Block 17	12	31	0	6.9	0.08	19.1	0.22	28.7	0.33
	Block 18	16	41	0	9.3	0.11	25.4	0.29	38.2	0.44
	Block 19	14	36	0	8.1	0.09	22.3	0.26	33.4	0.39
	Block 20	12	31	0	6.9	0.08	19.1	0.22	28.7	0.33
	Block 21	16	41	0	9.3	0.11	25.4	0.29	38.2	0.44
	Block 22	12	31	0	6.9	0.08	19.1	0.22	28.7	0.33
	Block 23	12	31	0	6.9	0.08	19.1	0.22	28.7	0.33
	Block 24	14	36	0	8.1	0.09	22.3	0.26	33.4	0.39
	Block 25	16	41	0	9.3	0.11	25.4	0.29	38.2	0.44
	Total	310	797	0	179	2.07	493.0	5.71	740.3	8.57
Phase 2	B-1	107	275	0	61.9	0.72	154.7	1.79	232.0	2.69
	B-2	107	275	0	61.9	0.72	154.7	1.79	232.0	2.69
	Total	214	550	0	124	1.43	309.4	3.58	464.0	5.37
North Total		**524**	**1,347**	**0**	**303**	**3.51**	**802.3**	**9.29**	**1204.4**	**13.94**
South Block		1,921	3,208	1,400	725.7	8.40	1451.5	16.80	2177.2	25.20
North + South Total		**2445**	**4,555**	**1,400**	**1029**	**11.91**	**2253.8**	**26.09**	**3381.6**	**39.14**

WaterCAD Design Demand Inputs Note: Blocks have been split btwn East (E) & West (W) to be realistic

Node	Block(s)	Units	Pop.	ADD		MDD		PHD	
				m^3/d	L/s	m^3/d	L/s	m^3/d	L/s
J-40	Block 1	12	31	6.94	0.08	19.08	0.22	28.66	0.33
J-54	Block 2	12	31	6.94	0.08	19.08	0.22	28.66	0.33
J-72	Block 3	8	21	4.63	0.05	12.72	0.15	19.11	0.22
J-62	Block 4	8	21	4.63	0.05	12.72	0.15	19.11	0.22
J-63	Block 5	6	15	3.47	0.04	9.54	0.11	14.33	0.17
J-73	Block 6W	7	18	4.05	0.05	11.13	0.13	16.72	0.19
J-76	Block 6E	7	18	4.05	0.05	11.13	0.13	16.72	0.19
	Block 7W	7	18	4.05	0.05	11.13	0.13	16.72	0.19
J-77	Block 7E	7	18	4.05	0.05	11.13	0.13	16.72	0.19
	Block 8W	8	21	4.63	0.05	12.72	0.15	19.11	0.22
J-78	Block 8E	8	21	4.63	0.05	12.72	0.15	19.11	0.22
	Block 9W	7	18	4.05	0.05	11.13	0.13	16.72	0.19
J-79	Block 9E	7	18	4.05	0.05	11.13	0.13	16.72	0.19
	Block 10W	8	21	4.63	0.05	12.72	0.15	19.11	0.22
J-80	Block 10E	8	21	4.63	0.05	12.72	0.15	19.11	0.22
	Block 11	8	21	4.63	0.05	12.72	0.15	19.11	0.22
J-85	Block 12	8	21	4.63	0.05	12.72	0.15	19.11	0.22
	Block 13	8	21	4.63	0.05	12.72	0.15	19.11	0.22
	Block 14E	8	21	4.63	0.05	12.72	0.15	19.11	0.22
J-84	Block 14W	8	21	4.63	0.05	12.72	0.15	19.11	0.22
	Block 15E	6	15	3.47	0.04	9.54	0.11	14.33	0.17
J-83	Block 15W	6	15	3.47	0.04	9.54	0.11	14.33	0.17
	Block 16E	7	18	4.05	0.05	11.13	0.13	16.72	0.19
J-82	Block 16W	7	18	4.05	0.05	11.13	0.13	16.72	0.19
	Block 17E	6	15	3.47	0.04	9.54	0.11	14.33	0.17
J-81	Block 17W	6	15	3.47	0.04	9.54	0.11	14.33	0.17
	Block 18E	8	21	4.63	0.05	12.72	0.15	19.11	0.22
J-74	Block 18W	8	21	4.63	0.05	12.72	0.15	19.11	0.22
J-51	Block 19	14	36	8.10	0.09	22.26	0.26	33.43	0.39
	Block 20	12	31	6.94	0.08	19.08	0.22	28.66	0.33
J-64	Block 21	16	41	9.25	0.11	25.44	0.29	38.21	0.44
J-67	Block 22	12	31	6.94	0.08	19.08	0.22	28.66	0.33
J-68	Block 23	12	31	6.94	0.08	19.08	0.22	28.66	0.33
J-69	Block 24	14	36	8.10	0.09	22.26	0.26	33.43	0.39
J-88	Block 25	16	41	9.25	0.11	25.44	0.29	38.21	0.44
J-50	B-1	107	275	61.87	0.72	154.68	1.79	232.02	2.69
J-86	B-2	107	275	61.87	0.72	154.68	1.79	232.02	2.69
J-96	South - 1	961	1,604	362.87	4.20	725.74	8.40	1088.60	12.60
J-97	South - 2	961	1,604	362.87	4.20	725.74	8.40	1088.60	12.60

Model Validation

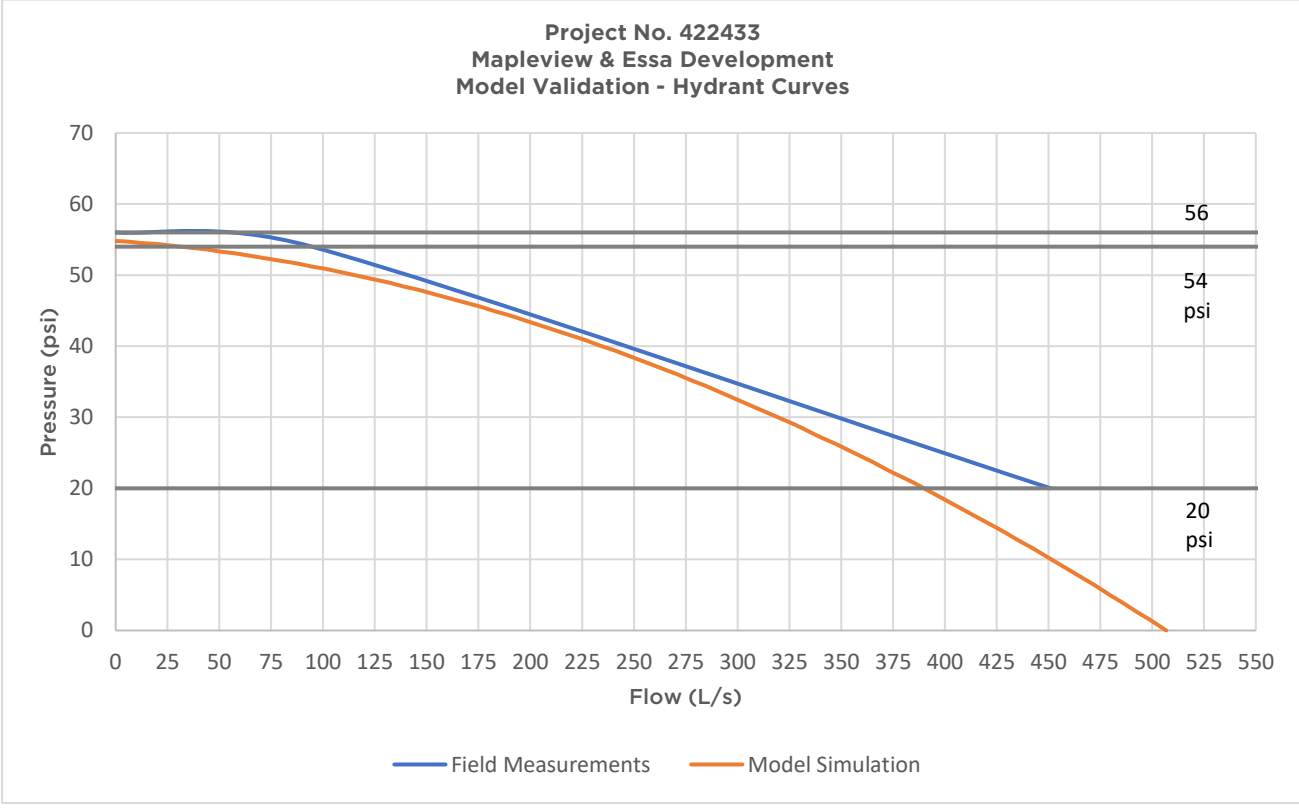
Vipond Inc. conducted hydrant tests on March 31, 2020. The results are as follows:

Mapleview Dr W& Hollyholme Farm Static: 56 psi

Test	Nozzles	Residual Pressure (psi)	Flow (gpm)	Flow (L/s)
1	1	55	575	36.3
2	1	56	856	54.0
3	2	54	1501	94.7

	Flow (L/s)	Pressure (psi)
Static:	0	56
Residual:	94.7	54
AFF @ 20psi:	451.0	20

Modeled Hydrant Flow Curves



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EXISTING CONDITIONS (PRE-DEVELOPMENT)

Average Day Demand (ADD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
3S067-A	307.2	347.6	57	395
Z3S-2008-01	307.1	347.6	57	396
3S006-A	307.0	347.7	58	398
3S320	306.0	347.7	59	408
Z3S-2010-11	309.0	347.6	55	378
Z3S-2010-13	311.0	347.5	52	358
JUNC-5825	306.5	347.5	58	401

Maximum Day Demand (MDD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
3S067-A	307.2	346.9	56	388
Z3S-2008-01	307.1	346.9	56	389
3S006-A	307.0	347.0	57	391
3S320	306.0	347.1	58	402
Z3S-2010-11	309.0	346.9	54	371
Z3S-2010-13	311.0	346.8	51	351
JUNC-5825	306.5	346.7	57	394

Available Fire Flow (AFF) under MDD

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa	AFF (L/s)
3S067-A	307.2	347.27	57	392	533.5
Z3S-2008-01	307.1	347.32	57	393	566.7
3S006-A	307.0	347.39	57	395	619.4
3S320	306.0	347.46	59	406	711
Z3S-2010-11	309.0	347.33	54	375	186.2
Z3S-2010-13	311.0	347.25	51	355	175.9
JUNC-5825	306.5	347.18	58	398	247.3

PHASE 1 CONDITIONS

Note: all piping within the development has been assumed to be 300 mm dia.

Average Day Demand (ADD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
J-40	308.6	347.59	55	382
J-54	308.7	347.59	55	380
J-72	308.9	347.59	55	379
J-62	308.7	347.59	55	381
J-63	308.7	347.59	55	381
J-73	308.4	347.59	56	384
J-76	308.5	347.59	56	383
J-77	308.6	347.59	55	382
J-78	308.5	347.59	55	383
J-79	308.4	347.59	56	384
J-80	308.4	347.60	56	384
J-85	308.0	347.60	56	387
J-84	307.9	347.59	56	389
J-83	308.0	347.59	56	388
J-82	308.1	347.59	56	386
J-81	308.0	347.59	56	388
J-74	307.9	347.59	56	388
J-51	308.1	347.59	56	386
J-64	307.7	347.59	57	391
J-67	307.7	347.59	57	390
J-68	307.9	347.59	56	388
J-69	307.7	347.59	57	391
J-88	307.7	347.60	57	391

Maximum Day Demand (MDD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
J-40	308.6	346.84	54	374
J-54	308.7	346.84	54	373
J-72	308.9	346.84	54	371
J-62	308.7	346.84	54	373
J-63	308.7	346.84	54	373
J-73	308.4	346.84	55	377
J-76	308.5	346.84	54	376
J-77	308.6	346.84	54	374
J-78	308.5	346.84	54	375
J-79	308.4	346.84	55	377
J-80	308.4	346.85	55	376
J-85	308.0	346.85	55	380
J-84	307.9	346.84	55	382
J-83	308.0	346.84	55	380
J-82	308.1	346.84	55	379
J-81	308.0	346.84	55	380
J-74	307.9	346.84	55	381
J-51	308.1	346.84	55	379
J-64	308.7	346.84	54	374
J-67	307.7	346.84	56	383
J-68	307.9	346.84	55	381
J-69	307.7	346.84	56	383
J-88	307.7	346.85	56	383

Available Fire Flow (AFF) under MDD

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa	AFF (L/s)
J-40	308.6	347.25	55	378	453.6
J-54	308.7	347.25	55	377	452.9
J-72	308.9	347.26	54	376	452
J-62	308.7	347.26	55	377	455.6
J-63	308.7	347.26	55	377	444.8
J-73	308.4	347.25	55	381	443.4
J-76	308.5	347.25	55	380	441.9
J-77	308.6	347.26	55	378	442.1
J-78	308.5	347.26	55	379	445.7
J-79	308.4	347.26	55	381	448.3
J-80	308.4	347.26	55	380	445.4
J-85	308.0	347.26	56	384	461.6
J-84	307.9	347.26	56	386	459
J-83	308.0	347.26	56	384	454
J-82	308.1	347.26	56	383	448.8
J-81	308.0	347.25	56	384	446.6
J-74	307.9	347.25	56	385	440
J-51	308.1	347.25	56	383	378.7
J-64	308.7	347.25	55	378	436.1
J-67	307.7	347.25	56	387	452.3
J-68	307.9	347.26	56	385	461.8
J-69	307.7	347.26	56	387	465.7
J-88	307.7	347.26	56	388	474.3

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PHASE 2 CONDITIONS Note: all piping within the development has been assumed to be 300 mm dia.

Average Day Demand (ADD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
J-40	308.6	347.57	55	382
J-54	308.7	347.57	55	380
J-72	308.9	347.57	55	379
J-62	308.7	347.57	55	380
J-63	308.7	347.57	55	381
J-73	308.4	347.57	56	384
J-76	308.5	347.57	56	383
J-77	308.6	347.57	55	382
J-78	308.5	347.57	55	382
J-79	308.4	347.57	56	384
J-80	308.4	347.58	56	383
J-85	308.0	347.58	56	387
J-84	307.9	347.57	56	389
J-83	308.0	347.57	56	388
J-82	308.1	347.57	56	386
J-81	308.0	347.57	56	388
J-74	307.9	347.57	56	388
J-51	308.1	347.57	56	386
J-64	307.7	347.57	57	391
J-67	307.7	347.57	57	390
J-68	307.9	347.57	56	388
J-69	307.7	347.57	57	390
J-88	307.7	347.58	57	391
J-50	308.2	347.57	56	385
J-86	308.5	347.57	55	382

Maximum Day Demand (MDD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
J-40	308.6	346.77	54	374
J-54	308.7	346.77	54	372
J-72	308.9	346.78	54	371
J-62	308.7	346.78	54	373
J-63	308.7	346.78	54	373
J-73	308.4	346.77	55	376
J-76	308.5	346.77	54	375
J-77	308.6	346.77	54	374
J-78	308.5	346.78	54	375
J-79	308.4	346.78	55	376
J-80	308.4	346.78	54	376
J-85	308.0	346.78	55	379
J-84	307.9	346.78	55	381
J-83	308.0	346.78	55	380
J-82	308.1	346.77	55	378
J-81	308.0	346.77	55	380
J-74	307.9	346.77	55	380
J-51	308.1	346.77	55	378
J-64	308.7	346.77	54	373
J-67	307.7	346.77	55	382
J-68	307.9	346.77	55	380
J-69	307.7	346.78	55	383
J-88	307.7	346.78	56	383
J-50	308.2	346.77	55	377
J-86	308.5	346.77	54	374

Available Fire Flow (AFF) under MDD

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa	AFF (L/s)
J-40	308.6	347.19	55	378	450.1
J-54	308.7	347.20	55	377	449.4
J-72	308.9	347.20	54	375	448.6
J-62	308.7	347.20	55	377	452.3
J-63	308.7	347.20	55	377	441.6
J-73	308.4	347.19	55	380	437.9
J-76	308.5	347.20	55	379	438.6
J-77	308.6	347.20	55	378	438.8
J-78	308.5	347.20	55	379	442.5
J-79	308.4	347.20	55	380	445.1
J-80	308.4	347.21	55	380	442.3
J-85	308.0	347.21	56	384	458.4
J-84	307.9	347.20	56	385	455.7
J-83	308.0	347.20	56	384	450.7
J-82	308.1	347.20	55	382	445.5
J-81	308.0	347.20	56	384	443.2
J-74	307.9	347.19	56	384	436.6
J-51	308.1	347.19	55	383	374.5
J-64	308.7	347.20	55	377	432.6
J-67	307.7	347.20	56	386	448.7
J-68	307.9	347.20	56	385	458.1
J-69	307.7	347.20	56	387	462.1
J-88	307.7	347.21	56	387	470.7
J-50	308.2	347.19	55	381	360.3
J-86	308.5	347.19	55	378	397.9

Maximum AFF through 300mm dia. pipe with a 5 m/s velocity cap = 353.43 L/s

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ULTIMATE BUILD-OUT CONDITIONS (incl. South Block)

Average Day Demand (ADD)

ADD Scenario is not considered for South Block development as part of this analysis. Future hydraulic analysis will be required for the South Block once details are sorted out.

Maximum Day Demand (MDD)

Node ID	Elev. (m)	HGL (m)	Pressure	
			psi	kPa
J-40	308.6	346.53	54	371
J-54	308.7	346.53	54	370
J-72	308.9	346.53	53	368
J-62	308.7	346.54	54	370
J-63	308.7	346.54	54	370
J-73	308.4	346.53	54	374
J-76	308.5	346.53	54	373
J-77	308.6	346.53	54	371
J-78	308.5	346.53	54	372
J-79	308.4	346.54	54	374
J-80	308.4	346.54	54	373
J-85	308.0	346.54	55	377
J-84	307.9	346.54	55	379
J-83	308.0	346.53	55	377
J-82	308.1	346.53	55	376
J-81	308.0	346.53	55	377
J-74	307.9	346.53	55	378
J-51	308.1	346.53	55	376
J-64	308.7	346.53	54	371
J-67	307.7	346.53	55	380
J-68	307.9	346.53	55	378
J-69	307.7	346.53	55	380
J-88	307.7	346.54	55	380
J-50	308.2	346.53	54	375
J-86	308.5	346.53	54	372
J-96	307.2	346.57	56	385
J-97	307.3	346.55	56	385

Available Fire Flow (AFF) under MDD

Node ID	Elev. (m)	HGL (m)	Pressure		AFF (L/s)
			psi	kPa	
J-40	308.6	346.97	54	376	454.4
J-54	308.7	346.97	54	374	454.5
J-72	308.9	346.97	54	373	454.4
J-62	308.7	346.97	54	374	458.9
J-63	308.7	346.98	54	375	447.9
J-73	308.4	346.97	55	378	441.9
J-76	308.5	346.97	55	377	443.0
J-77	308.6	346.97	54	376	443.7
J-78	308.5	346.97	55	376	448.0
J-79	308.4	346.97	55	378	451.2
J-80	308.4	346.98	55	377	448.7
J-85	308.0	346.98	55	381	466.0
J-84	307.9	346.97	56	383	462.4
J-83	308.0	346.97	55	382	456.6
J-82	308.1	346.97	55	380	450.7
J-81	308.0	346.97	55	382	447.9
J-74	307.9	346.97	55	382	440.7
J-51	308.1	346.97	55	380	376.3
J-64	308.7	346.97	54	375	436.8
J-67	307.7	346.97	56	384	453.8
J-68	307.9	346.97	55	382	464.0
J-69	307.7	346.97	56	385	469.0
J-88	307.7	346.98	56	385	479.0
J-50	308.2	346.97	55	379	361.7
J-86	308.5	346.97	55	376	400.3
J-96	307.2	347.00	56	389	583.8
J-97	307.3	346.99	56	389	359.9

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IMPACT ON EXISTING DRINKING WATER SYSTEM UNDER PHASE 1 & PHASE 2 CONDITIONS

PHASE 1 CONDITIONS

Average Day Demand (ADD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
3S067-A	307.2	347.6	57	395
Z3S-2008-01	307.1	347.6	57	396
3S006-A	307.0	347.6	58	398
3S320	306.0	347.7	59	408
Z3S-2010-11	309.0	347.6	55	378
Z3S-2010-13	311.0	347.6	52	358
JUNC-5825	306.5	347.6	58	402

Maximum Day Demand (MDD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
3S067-A	307.2	346.8	56	387
Z3S-2008-01	307.1	346.9	56	389
3S006-A	307.0	346.9	57	391
3S320	306.0	347.0	58	401
Z3S-2010-11	309.0	346.9	54	371
Z3S-2010-13	311.0	346.8	51	350
JUNC-5825	306.5	346.8	57	395

Available Fire Flow (AFF) under MDD

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa	AFF (L/s)
3S067-A	307.2	347.23	57	392	534.3
Z3S-2008-01	307.1	347.27	57	393	564.8
3S006-A	307.0	347.31	57	395	613.4
3S320	306.0	347.39	59	405	703.9
Z3S-2010-11	309.0	347.29	54	375	186.2
Z3S-2010-13	311.0	347.23	51	355	176.2
JUNC-5825	306.5	347.3	58	399	452.9

PHASE 2 CONDITIONS

Average Day Demand (ADD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
3S067-A	307.2	347.6	57	395
Z3S-2008-01	307.1	347.6	57	396
3S006-A	307.0	347.6	58	397
3S320	306.0	347.6	59	408
Z3S-2010-11	309.0	347.6	55	378
Z3S-2010-13	311.0	347.5	52	358
JUNC-5825	306.5	347.6	58	402

Maximum Day Demand (MDD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
3S067-A	307.2	346.8	56	387
Z3S-2008-01	307.1	346.8	56	388
3S006-A	307.0	346.9	57	390
3S320	306.0	346.9	58	401
Z3S-2010-11	309.0	346.8	54	370
Z3S-2010-13	311.0	346.8	51	350
JUNC-5825	306.5	346.8	57	394

Available Fire Flow (AFF) under MDD

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa	AFF (L/s)
3S067-A	307.2	347.19	57	391	531.6
Z3S-2008-01	307.1	347.23	57	392	561.9
3S006-A	307.0	347.27	57	394	610.0
3S320	306.0	347.35	59	405	699.9
Z3S-2010-11	309.0	347.25	54	374	185.9
Z3S-2010-13	311.0	347.19	51	354	175.9
JUNC-5825	306.5	347.20	58	398	450.1

ULTIMATE BUILD-OUT (incl. South Block) CONDITIONS

Average Day Demand (ADD)

Impact of South Block on ADD Scenario is not considered at this time. MDD scenario depicts the maximum impact of the development onto the existing DWS.

Maximum Day Demand (MDD)

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa
3S067-A	307.2	346.5	56	384
Z3S-2008-01	307.1	346.6	56	386
3S006-A	307.0	346.6	56	388
3S320	306.0	346.7	58	399
Z3S-2010-11	309.0	346.6	53	368
Z3S-2010-13	311.0	346.5	50	348
JUNC-5825	306.5	346.5	57	392

Available Fire Flow (AFF) under MDD

Node ID	Elev. (m)	HGL (m)	Pressure psi	Pressure kPa	AFF (L/s)
3S067-A	307.2	346.95	56	389	522.0
Z3S-2008-01	307.1	346.98	57	390	552.6
3S006-A	307.0	347.03	57	392	597.4
3S320	306.0	347.15	58	403	679.0
Z3S-2010-11	309.0	347.05	54	372	184.3
Z3S-2010-13	311.0	346.99	51	352	174.4
JUNC-5825	306.5	346.96	57	396	449.1

Appendix C:
Required Fire Flow Calculations

TATHAM ENGINEERING

PROJECT	Mapleview & Essa Development	FILE	422433
		DATE	August 30, 2024
SUBJECT	FUS Summary	NAME	EP
		PAGE	1 OF 1

BUILDING	TYPE	UNITS	REQUIRED FIRE FLOW (L/s)
B-1	Apartment	107	250
B-2	Apartment	107	233
Block-1	Type B	6	200
Block-2	Type B	6	217
Block-3	Type C	8	250
Block-4	Type C	8	267
Block-5	Type C	6	183
Block-6	Type A	14	317
Block-7	Type A	14	333
Block-8	Type A	16	367
Block-9	Type A	14	333
Block-10	Type A	16	367
Block-11	Type D	6	217
Block-12	Type D	6	217
Block-13	Type D	6	217
Block-14	Type A	16	367
Block-15	Type A	12	300
Block-16	Type A	14	350
Block-17	Type A	12	300
Block-18	Type A	16	367
Block-19	Type B	7	233
Block-20	Type B	6	217
Block-21	Type B	8	267
Block-22	Type B	6	217
Block-23	Type B	6	217
Block-24	Type B	7	233
Block-25	Type B	8	233

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - B1	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**1229**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**6146**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**7376**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						28,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(4,200)	23,800
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			-0.5	%	######	11,900
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	Yes			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	Yes			
			c) Fully supervised system	-0.1	Yes			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (B2)	10.1 to 20.0 m	0.00	0.15	%	3,570	15,470
			East Side (Block 20)	10.1 to 20.0 m	0.15			
			South Side (Existing Commercial)	Greater than 30.0 m	0.00			
			West Side (Existing Residential)	Greater than 30.0 m	0.00			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	15,470
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						15,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						250
		Required Duration of Fire Flow of 15,000 L/min (hrs):						3
		Required volume for Fire Flow of 15,000 L/min (m^3):						2,700

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - B2	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**1229**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**6146**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**7376**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						28,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(4,200)	23,800
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			-0.5	%	######	11,900
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	Yes			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	Yes			
			c) Fully supervised system	-0.1	Yes			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 1)	20.1 to 30.0 m	0.10	0.1	%	2,380	14,280
			East Side (Block 6)	Greater than 30.0 m	0.00			
			South Side (B1)	10.1 to 20.0 m	0.00			
			West Side (Existing Residential)	Greater than 30.0 m	0.00			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	14,280
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						14,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						233
		Required Duration of Fire Flow of 14,000 L/min (hrs):						3
		Required volume for Fire Flow of 14,000 L/min (m^3):						2,520

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 1	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**336**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**671**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1007**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						10,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,500) 8,500
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 8,500
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Residential)	Greater than 30.0 m	0.00	0.45	%	3,825 12,325
			East Side (Block 2)	3.1 to 10.0 m	0.20			
			South Side (Block 6)	10.1 to 20.0 m	0.15			
			West Side (B2)	20.1 to 30.0 m	0.10			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 12,325
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						12,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						200
		Required Duration of Fire Flow of 12,000 L/min (hrs):						2.5
		Required volume for Fire Flow of 12,000 L/min (m^3):						1,800

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 2	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**336**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**671**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1007**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						10,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,500) 8,500
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 8,500
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Residential)	Greater than 30.0 m	0.00	0.55	%	4,675 13,175
			East Side (Block 3)	3.1 to 10.0 m	0.20			
			South Side (Block 7)	10.1 to 20.0 m	0.15			
			West Side (Block 1)	3.1 to 10.0 m	0.20			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 13,175
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						13,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						217
		Required Duration of Fire Flow of 13,000 L/min (hrs):						2.5
		Required volume for Fire Flow of 13,000 L/min (m^3):						1,950

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 3	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**447**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**895**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1342**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						12,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,800)	10,200
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	10,200
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Residential)	Greater than 30.0 m	0.00	0.5	%	5,100	15,300
			East Side (Block 4)	3.1 to 10.0 m	0.20				
			South Side (Block 8)	20.1 to 30.0 m	0.10				
			West Side (Block 2)	3.1 to 10.0 m	0.20				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	15,300
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								15,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						250
		Required Duration of Fire Flow of 15,000 L/min (hrs):						3
		Required volume for Fire Flow of 15,000 L/min (m^3):						2,700

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 4	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**447**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**895**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1342**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						12,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,800) 10,200
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 10,200
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Residential)	Greater than 30.0 m	0.00	0.55	%	5,610 15,810
			East Side (Block 5)	3.1 to 10.0 m	0.20			
			South Side (Block 9)	10.1 to 20.0 m	0.15			
			West Side (Block 3)	3.1 to 10.0 m	0.20			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 15,810
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						16,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						267
		Required Duration of Fire Flow of 16,000 L/min (hrs):						3.5
		Required volume for Fire Flow of 16,000 L/min (m^3):						3,360

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 5	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**336**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**671**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1007**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						10,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,500) 8,500
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 8,500
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Residential)	Greater than 30.0 m	0.00	0.35	%	2,975 11,475
			East Side (Existing Church)	Greater than 30.0 m	0.00			
			South Side (Block 11)	10.1 to 20.0 m	0.15			
			West Side (Block 4)	3.1 to 10.0 m	0.20			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 11,475
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						11,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						183
		Required Duration of Fire Flow of 11,000 L/min (hrs):						2
		Required volume for Fire Flow of 11,000 L/min (m^3):						1,320

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 6	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)	
1	Frame Use for Construction of Unit	**Framing Material**							
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A	
			Type IVA - Mass Timber Construction	0.8					
			Type IVB - Mass Timber Construction	0.9					
			Type IVC - Mass Timber Construction	1.0					
			Type IVD - Mass Timber Construction	1.5					
			Ordinary Construction	1.0					
			Non-combustible Construction	0.8					
			Fire Resistive Construction	0.6					
2	Total Effective Area	Largest Floor Area				**685**	m^2	N/A	
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**1370**			
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:							
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**				
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**				
		Total Effective Area				**2055**			
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						15,000	
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**							
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(2,250)	12,750
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	12,750
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 1)	10.1 to 20.0 m	0.15	0.5	%	6,375	19,125
			East Side (Block 7)	10.1 to 20.0 m	0.15				
			South Side (Block 18)	3.1 to 10.0 m	0.20				
			West Side (B2)	Greater than 30.0 m	0.00				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	19,125
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								19,000	
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						317	
		Required Duration of Fire Flow of 19,000 L/min (hrs):						4	
		Required volume for Fire Flow of 19,000 L/min (m^3):						4,560	

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 7	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**685**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**1370**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**2055**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						15,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(2,250)	12,750
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	12,750
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 2)	10.1 to 20.0 m	0.15	0.55	%	7,013	19,763
			East Side (Block 8)	10.1 to 20.0 m	0.15				
			South Side (Block 17)	20.1 to 30.0 m	0.10				
			West Side (Block 6)	10.1 to 20.0 m	0.15				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	19,763
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						20,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						333
		Required Duration of Fire Flow of 20,000 L/min (hrs):						4.5
		Required volume for Fire Flow of 20,000 L/min (m^3):						5,400

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 8	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**783**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**1566**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**2349**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						16,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(2,400)	13,600
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	13,600
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 3)	20.1 to 30.0 m	0.10	0.6	%	8,160	21,760
			East Side (Block 9)	10.1 to 20.0 m	0.15				
			South Side (Block 16)	3.1 to 10.0 m	0.20				
			West Side (Block 7)	10.1 to 20.0 m	0.15				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	21,760
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								22,000	
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						367	
		Required Duration of Fire Flow of 22,000 L/min (hrs):						5	
		Required volume for Fire Flow of 22,000 L/min (m^3):						6,600	

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 9	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**685**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**1370**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**2055**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						15,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(2,250)	12,750
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	12,750
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 4)	10.1 to 20.0 m	0.15	0.55	%	7,013	19,763
			East Side (Block 10)	10.1 to 20.0 m	0.15				
			South Side (Block 15)	20.1 to 30.0 m	0.10				
			West Side (Block 8)	10.1 to 20.0 m	0.15				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	19,763
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								20,000	
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						333	
		Required Duration of Fire Flow of 20,000 L/min (hrs):						4.5	
		Required volume for Fire Flow of 20,000 L/min (m^3):						5,400	

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 10	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**783**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**1566**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**2349**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						16,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(2,400)	13,600
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	13,600
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 4)	10.1 to 20.0 m	0.15	0.65	%	8,840	22,440
			East Side (Block 11)	10.1 to 20.0 m	0.15				
			South Side (Block 14)	3.1 to 10.0 m	0.20				
			West Side (Block 9)	10.1 to 20.0 m	0.15				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	22,440
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								22,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						367
		Required Duration of Fire Flow of 22,000 L/min (hrs):						5
		Required volume for Fire Flow of 22,000 L/min (m^3):						6,600

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 11	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**505**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**505**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1011**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						10,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,500) 8,500
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 8,500
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 5)	10.1 to 20.0 m	0.15	0.5	%	4,250 12,750
			East Side (Existing)	Greater than 30.0 m	0.00			
			South Side (Block 12)	3.1 to 10.0 m	0.20			
			West Side (Block 10)	10.1 to 20.0 m	0.15			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 12,750
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								13,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						217
		Required Duration of Fire Flow of 13,000 L/min (hrs):						2.5
		Required volume for Fire Flow of 13,000 L/min (m^3):						1,950

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 12	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**505**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**505**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1011**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						10,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,500) 8,500
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 8,500
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 11)	3.1 to 10.0 m	0.20	0.55	%	4,675 13,175
			East Side (Existing)	Greater than 30.0 m	0.00			
			South Side (Block 13)	3.1 to 10.0 m	0.20			
			West Side (Block 10 & 14)	10.1 to 20.0 m	0.15			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 13,175
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								13,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						217
		Required Duration of Fire Flow of 13,000 L/min (hrs):						2.5
		Required volume for Fire Flow of 13,000 L/min (m^3):						1,950

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 13	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**505**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**505**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1011**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						10,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,500) 8,500
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 8,500
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 12)	3.1 to 10.0 m	0.20	0.5	%	4,250 12,750
			East Side (Existing)	Greater than 30.0 m	0.00			
			South Side (Block 25)	10.1 to 20.0 m	0.15			
			West Side (Block 14)	10.1 to 20.0 m	0.15			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 12,750
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								13,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						217
		Required Duration of Fire Flow of 13,000 L/min (hrs):						2.5
		Required volume for Fire Flow of 13,000 L/min (m^3):						1,950

TATHAM ENGINEERING	Project: Mapleview & Essa Development	Date:	August 29, 2024
	File No.: 422433	Designed:	EP
	Subject: Fire Flow Calculations - Block 14	Checked	
	Revisions:		

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**783**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**1566**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**2349**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						16,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(2,400)	13,600
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	13,600
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 10)	3.1 to 10.0 m	0.20	0.65	%	8,840	22,440
			East Side (Block 13)	10.1 to 20.0 m	0.15				
			South Side (Block 25)	10.1 to 20.0 m	0.15				
			West Side (Block 15)	10.1 to 20.0 m	0.15				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	22,440
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						22,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						367
		Required Duration of Fire Flow of 22,000 L/min (hrs):						5
		Required volume for Fire Flow of 22,000 L/min (m^3):						6,600

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 15	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**587**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**1174**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1761**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						14,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(2,100)	11,900
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	11,900
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 9)	20.1 to 30.0 m	0.10	0.55	%	6,545	18,445
			East Side (Block 14)	10.1 to 20.0 m	0.15				
			South Side (Block 24)	10.1 to 20.0 m	0.15				
			West Side (Block 16)	10.1 to 20.0 m	0.15				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	18,445
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:							18,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:							300
		Required Duration of Fire Flow of 18,000 L/min (hrs):							4
		Required volume for Fire Flow of 18,000 L/min (m^3):							4,320

TATHAM ENGINEERING	Project: Mapleview & Essa Development	Date:	August 29, 2024
	File No.: 422433	Designed:	EP
	Subject: Fire Flow Calculations - Block 16	Checked	
	Revisions:		

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**685**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**1370**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**2055**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						15,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(2,250)	12,750
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	12,750
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 8)	3.1 to 10.0 m	0.20	0.65	%	8,288	21,038
			East Side (Block 15)	10.1 to 20.0 m	0.15				
			South Side (Block 24)	10.1 to 20.0 m	0.15				
			West Side (Block 17)	10.1 to 20.0 m	0.15				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	21,038
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						21,000	
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						350	
		Required Duration of Fire Flow of 21,000 L/min (hrs):						4.5	
		Required volume for Fire Flow of 21,000 L/min (m^3):						5,670	

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 17	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**587**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**1174**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1761**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						14,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(2,100)	11,900
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	11,900
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 7)	20.1 to 30.0 m	0.10	0.55	%	6,545	18,445
			East Side (Block 16)	10.1 to 20.0 m	0.15				
			South Side (Block 23)	10.1 to 20.0 m	0.15				
			West Side (Block 18)	10.1 to 20.0 m	0.15				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	18,445
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								18,000	
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						300	
		Required Duration of Fire Flow of 18,000 L/min (hrs):						4	
		Required volume for Fire Flow of 18,000 L/min (m^3):						4,320	

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 18	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**783**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**1566**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**2349**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						16,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(2,400)	13,600
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	13,600
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 6)	3.1 to 10.0 m	0.20	0.65	%	8,840	22,440
			East Side (Block 17)	10.1 to 20.0 m	0.15				
			South Side (Block 22)	10.1 to 20.0 m	0.15				
			West Side (Block 19)	10.1 to 20.0 m	0.15				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	22,440
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								22,000	
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						367	
		Required Duration of Fire Flow of 22,000 L/min (hrs):						5	
		Required volume for Fire Flow of 22,000 L/min (m^3):						6,600	

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 19	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)	
1	Frame Use for Construction of Unit	**Framing Material**							
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A	
			Type IVA - Mass Timber Construction	0.8					
			Type IVB - Mass Timber Construction	0.9					
			Type IVC - Mass Timber Construction	1.0					
			Type IVD - Mass Timber Construction	1.5					
			Ordinary Construction	1.0					
			Non-combustible Construction	0.8					
			Fire Resistive Construction	0.6					
2	Total Effective Area	Largest Floor Area				**391**	m^2	N/A	
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**783**			
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:							
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**				
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**				
		Total Effective Area				**1174**			
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						11,000	
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**							
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,650)	9,350
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	9,350
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 18)	10.1 to 20.0 m	0.15	0.55	%	5,143	14,493
			East Side (Block 18)	10.1 to 20.0 m	0.15				
			South Side (Block 20)	10.1 to 20.0 m	0.15				
			West Side (B1)	20.1 to 30.0 m	0.10				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	14,493
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								14,000	
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						233	
		Required Duration of Fire Flow of 14,000 L/min (hrs):						3	
		Required volume for Fire Flow of 14,000 L/min (m^3):						2,520	

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 20	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**336**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**671**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1007**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						10,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,500) 8,500
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 8,500
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 19)	10.1 to 20.0 m	0.15	0.5	%	4,250 12,750
			East Side (Block 21)	3.1 to 10.0 m	0.20			
			South Side (Existing)	Greater than 30.0 m	0.00			
			West Side (B1)	10.1 to 20.0 m	0.15			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 12,750
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						13,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						217
		Required Duration of Fire Flow of 13,000 L/min (hrs):						2.5
		Required volume for Fire Flow of 13,000 L/min (m^3):						1,950

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 21	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**447**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**895**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1342**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						12,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,800) 10,200
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 10,200
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 19)	10.1 to 20.0 m	0.15	0.55	%	5,610 15,810
			East Side (Block 22)	3.1 to 10.0 m	0.20			
			South Side (Existing)	Greater than 30.0 m	0.00			
			West Side (Block 20)	3.1 to 10.0 m	0.20			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 15,810
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						16,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						267
		Required Duration of Fire Flow of 16,000 L/min (hrs):						3.5
		Required volume for Fire Flow of 16,000 L/min (m^3):						3,360

TATHAM ENGINEERING	Project: Mapleview & Essa Development	Date:	August 29, 2024
	File No.: 422433	Designed:	EP
	Subject: Fire Flow Calculations - Block 22	Checked	
	Revisions:		

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**336**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**671**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1007**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						10,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,500) 8,500
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 8,500
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 17)	10.1 to 20.0 m	0.15	0.55	%	4,675 13,175
			East Side (Block 23)	3.1 to 10.0 m	0.20			
			South Side (Existing)	Greater than 30.0 m	0.00			
			West Side (Block 21)	3.1 to 10.0 m	0.20			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 13,175
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						13,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						217
		Required Duration of Fire Flow of 13,000 L/min (hrs):						2.5
		Required volume for Fire Flow of 13,000 L/min (m^3):						1,950

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 23	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**336**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**671**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1007**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						10,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,500) 8,500
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	- 8,500
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No			
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No			
			c) Fully supervised system	-0.1	No			
			None	0.0	No			
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 17)	10.1 to 20.0 m	0.15	0.55	%	4,675 13,175
			East Side (Block 24)	3.1 to 10.0 m	0.20			
			South Side (Existing)	Greater than 30.0 m	0.00			
			West Side (Block 22)	3.1 to 10.0 m	0.20			
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0 13,175
			Low risk of fire spread	2000				
			Moderate risk of fire spread	3000				
			High risk of fire spread	4000				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						13,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						217
		Required Duration of Fire Flow of 13,000 L/min (hrs):						2.5
		Required volume for Fire Flow of 13,000 L/min (m^3):						1,950

TATHAM ENGINEERING	Project: Mapleview & Essa Development	Date:	August 29, 2024
	File No.: 422433	Designed:	EP
	Subject: Fire Flow Calculations - Block 24	Checked	
	Revisions:		

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**391**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**783**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1174**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						11,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,650)	9,350
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	9,350
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 15)	10.1 to 20.0 m	0.15	0.55	%	5,143	14,493
			East Side (Block 25)	3.1 to 10.0 m	0.20				
			South Side (Existing)	Greater than 30.0 m	0.00				
			West Side (Block 23)	3.1 to 10.0 m	0.20				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	14,493
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						14,000
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						233
		Required Duration of Fire Flow of 14,000 L/min (hrs):						3
		Required volume for Fire Flow of 14,000 L/min (m^3):						2,520

Project:	Mapleview & Essa Development	Date:	August 29, 2024
File No.:	422433	Designed:	EP
Subject:	Fire Flow Calculations - Block 25	Checked	
Revisions:			

Fire Underwriters Survey Fire Flow Calculations

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Framing Material**						
		Coefficient related to type of construction (C)	Type V - Wood Frame Construction	1.5	Type V - Wood Frame Construction	**1.5**	%	N/A
			Type IVA - Mass Timber Construction	0.8				
			Type IVB - Mass Timber Construction	0.9				
			Type IVC - Mass Timber Construction	1.0				
			Type IVD - Mass Timber Construction	1.5				
			Ordinary Construction	1.0				
			Non-combustible Construction	0.8				
			Fire Resistive Construction	0.6				
2	Total Effective Area	Largest Floor Area				**447**	m^2	N/A
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5			**100%**	**895**		
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:						
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, **or**			**50%**			
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.			**25%**			
		Total Effective Area				**1342**		
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x $A^{0.5}$)						12,000
4	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**						
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(1,800)	10,200
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	10,200
			a) Automatic sprinkler protection designed and installed in accordance	-0.3	No				
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No				
			c) Fully supervised system	-0.1	No				
			None	0.0	No				
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side (Block 13)	10.1 to 20.0 m	0.15	0.35	%	3,570	13,770
			East Side (Existing)	Greater than 30.0 m	0.00				
			South Side (Existing)	Greater than 30.0 m	0.00				
			West Side (Block 24)	3.1 to 10.0 m	0.20				
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	13,770
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								14,000	
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						233	
		Required Duration of Fire Flow of 14,000 L/min (hrs):						3	
		Required volume for Fire Flow of 14,000 L/min (m^3):						2,520	

Appendix C: Capacity Review of Existing Sewers

TATHAM ENGINEERING

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File 422433

December 9, 2022
(Revised: October 8, 2024)

Stephanie Pasquale
Project Manager
Pearl Builders
25 Production Road
Brampton, Ontario L6T 4N8
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Re: Mapleview Village Development, City of Barrie
2041 and 2071 Horizon Year Capacity Review of Existing Sewage Infrastructure

Dear Stephanie:

In support of the development proposed at 664 Essa Road, 674 Essa Road, 692 Essa Road, 320 Mapleview Drive West and 364 Mapleview Drive West in the City of Barrie (City), we have revisited our previous review of the capacity of the existing municipal sanitary sewer infrastructure. This updated review is provided in response to the previous first and second ZBA submission comments provided by the City, subsequent communications with City staff, and to reflect changes to the proposed development since the previous submission. The intent of this review is to assess planned growth in the sewer system for the 2041 and 2071 horizon years, the impact of the planned growth on the existing trunk sewer infrastructure in terms of full flow capacity and infrastructure replacements. Incorporating the proposed development, we will then assess serviceability of the development and any impacts on planned infrastructure replacements.

This letter summarizes the results of our review.

SANITARY SEWER REVIEW

Sanitary sewer servicing of the subject development will be provided through connection to the existing trunk sewer on Mapleview Drive. From previous discussions with City staff, we understand the section of sewer between Essa Road and Veterans Drive has low grades, limiting its capacity. In support of the proposed development, the City requested a capacity review of this section of sewer to determine what impacts the proposed development may have, considering the projected growth in the service area.

Subsequent discussions and correspondence with City staff indicated there may be capacity constraints in the Mapleview Drive trunk sewers east of the Veterans Drive intersection, including potential for surcharge conditions. This is anticipated due to this proposed development and other developments elsewhere in the City utilizing this sewer, such as the Salem temporary pumping station. In this respect,

it is understood the City will consider the combined flows from this review in conjunction with the 2031 Horizon Year Sanitary Backwater Analysis (2031 HYBA), prepared under separate cover, with data provided from other developments to assess combined impacts to the sewer infrastructure.

The purpose of this report is to assess conveyance capacity of the sewers on Mapleview Drive from Essa Road to Veterans Drive. For discussion on potential backwater conditions or sewers downstream of Veterans Drive, please refer to the 2031 HYBA report.

EXISTING SEWER INFRASTRUCTURE

Referring to available as-built drawings and City GIS information, the trunk sewer on Mapleview Drive is a 525 mm diameter pipe from Essa Road to the approximate mid-point between Hollyholme Farm Road and Reid Drive (SAP33013). The average grade of this section is approximately 0.2%. From SAP33013 to Veterans Drive, the pipe diameter increases to 600 mm and the grade increases to 0.31%. The existing sewer configuration is illustrated on the attached Figure 1 – Sanitary Drainage Plan in Appendix A. The proposed development is in Area A5.

The Mapleview Drive trunk sewer between Essa Road and Veterans Drive services commercial, institutional and light industrial development properties extending 710 m to the north and 670 m to the south of Mapleview Drive, as well as an upstream residential area via the Holly pumping station (SPS). Most of the commercial and industrial properties are serviced by local sewers conveying sewage flows to the trunk sewer, though there are also 100 mm to 150 mm service connections for properties with frontage on Mapleview Drive.

The upstream service area directly connected to the trunk sewer consists of commercial and industrial properties on the west side of the intersection of Mapleview Drive with Essa Road. Sewage flows from a predominantly residential area west of Essa Road are conveyed to the trunk sewer via 350 mm and 400 mm diameter forcemains from the Holly SPS, whose capacity was increased from 123.3 L/s to 232.0 L/s, as per ECA 5921-ATUKKR and as noted in the City's CLI-ECA.

In support of further review and assessment of the sewer capacity, the City provided flow records from the operation of the Holly SPS. These records indicate the SPS currently operates at an average flow of 112 L/s, with peak flows of approximately 180 L/s. Subsequent correspondence with City staff indicated the SPS is anticipated to reach a peak discharge rate of 221 L/s. For the purposes of this review, the average flow of 112 L/s, current peak flow of 180 L/s and ultimate peak flow of 221 L/s were considered in assessing the capacity of the existing trunk sewer.

EXISTING LOCAL EQUIVALENT POPULATION SERVICED BY MAPLEVIEW TRUNK SEWER

The local equivalent population serviced by the Mapleview trunk sewer, as well as the peak flows discharged from the Holly SPS, have been determined utilizing information from the City's Wastewater

Collection Master Plan Update (WCMP, July 15, 2019). In this document, the local serviced populations are represented by areas 109 and 110 (see Figure 8-1 Traffic Zones and Wastewater Collection System Model Subcatchments in Appendix A). Based on current growth projections to 2041, combined residential and employment populations are expected to reach 4,010 in area 109, and 700 in area 110. Future growth to 2071 will see the population in area 109 increase to 4,449, and in area 110, increase to 793.

To estimate the distribution of the serviced population along the Mapleview trunk sewer in areas 109 and 110, we determined the approximate servicing area of each major connection to the trunk sewer. We proportionally distributed the projected equivalent populations from the WCMP based on the zoning within these subcatchments. Area A1 in Figure 1 is not included in the pro-rated populations as it is outside of Traffic Zones 109 and 110. Population distribution spreadsheets for establishing a base population distribution, and projections to 2041 and 2071 are attached in Appendix B.

PROPOSED DEVELOPMENT

The proposed development will be within Area A5, which has a total surface area of 10.20 ha. The current iteration of the proposed development consists of the following:

North Block

- 458 medium density residential units.
- 66 medium density optional secondary residential units.

Future South Block (Under future separate SPA application)

- 1,921 high density residential units in the second phase.
- 1,400 m^2 of commercial retail space in the second phase.

A total combined equivalent population of 4,453 was determined based on the following parameters:

- 2.34 persons per living unit in medium density dwellings.
- 1.67 persons per living unit in high density dwellings.
- Typical unit flow rates for non-residential developments based on land area per City standards, (28 m^3/ha/day), pro-rated to an equivalent residential population.

Combined, and accounting for an inflow and infiltration rate of 0.1 L/s/ha applied to the 10.2 ha site, the estimated peak sewage flow of the proposed development is approximately 44.0 L/s.

Based on preliminary development schedules, the North Block is anticipated to proceed to construction prior to 2031. The future South Block of the property, is anticipated to be developed under separate application with tentative construction by 2041. All sewage generated on the development site is

proposed to be connected to the Mapleview Drive sewers through connection at maintenance hole SAP33015.

For this assessment, we have reviewed impacts to the receiving sewers for both the North Block and the future South Block culminating in the full build-out condition based on 2041 growth figures. Where applicable, this will be applied to determine the extent to which the development of the North Block and future South Block may proceed before upgrades to the Mapleview Drive sewers may be required.

EXISTING INFRASTRUCTURE CAPACITY

A series of existing conditions Sanitary Design Sheets (SDS) have been created to understand the peak flows contributing to the Mapleview Drive sewers. For existing conditions, the design sheets conservatively apply the 2041 pro-rated populations described above, while future conditions are based on population projections to 2071. This allows for both short- and long-term performance assessments of any potential upgrades to the Mapleview Drive sewers.

Based on discussions with City staff, and subsequent reviews of flow data, three scenarios were considered with the only variable being the discharge rate from the Holly SPS, corresponding with the 112 L/s average flow, the 180 L/s current peak sewage flow and the 221 L/s ultimate peak flow described previously.

The as-built configuration of the sewers and points of interconnection with minor systems were configured in the attached City of Barrie sanitary sewer design sheets, in Appendix C.

Holly Sewage Pumping Station Generating 112 L/s Average Flow

With the Holly SPS discharging at 112 L/s, SDS No. 1 was assembled to assess impact to the receiving sewers based on the 2041 growth projections. Similarly, SDS No. 2 was assembled to assess impact to the receiving sewers based on 2071 growth projections. The results of both assessments are summarized in Table 1 below.

Table 1: Projected Sewer Capacity – Current Growth Projections with Holly SPS Flow of 112 L/s

PROJECTION YEAR	MAPLEVIEW SEWER SECTIONS		
	450 mm dia.	525 mm dia.	600 mm dia.
2041	42% of Max.	58% to 72% of Max.	42% to 50% of Max.
2071	42% of Max.	58% to 73% of Max.	42% to 51% of Max.

Considering growth to 2071, the pipe utilization increases by approximately 1% and remains below maximum capacity in all sections.

With the Holly SPS discharging at 112 L/s, the existing Mapleview Drive sewers have sufficient capacity to service the area without the need for upgrades. This applies under both existing conditions and in consideration of the current future growth projections.

Holly Sewage Pumping Station Generating 180 L/s Current Peak Flow

Increasing the discharge rate of the Holly SPS to the current peak flow rate of 180 L/s yields different results, as anticipated. Utilizing the 2041 and 2071 growth projections, as shown on SDS Nos. 3 and 4 respectively, the impact to receiving infrastructure is summarized in Table 2.

Table 2: Projected Sewer Capacity – Current Growth Projections with Holly SPS Flow of 180 L/s

PROJECTION YEAR	MAPLEVIEW SEWER SECTIONS		
	450 mm dia.	525 mm dia.	600 mm dia.
2041	66% of Max.	93% to 108% of Max.	61% to 71% of Max.
2071	66% of Max.	93% to 109% of Max.	62% to 72% of Max.

At this discharge flow rate, one section of the 525 mm diameter sewer reaches its maximum conveyance capacity while three additional sections marginally exceed this capacity. At 0.18% grade, the 525 mm diameter sewers affected have a maximum capacity of 190 L/s. The minor exceedance observed in the 525 mm diameter pipe capacity increases by approximately 1% moving from the 2041 to 2071 projections. The existing 600 mm diameter sewer further downstream continue to operate within their service capacity. The above figures presume peak discharge from the SPS occurs during design peak flow conditions in the receiving sewer, which would be an infrequent but possible occurrence.

While the 525 mm diameter sewer appears to be capable of accommodating the currently anticipated peak flows, sewer upgrades will be required to alleviate the minor surcharge which is anticipated to occur under this and additional expansion scenarios. Please refer to the 2031 HYBA for further information on potential surcharge in the receiving sewer.

Holly Sewage Pumping Station Generating 221 L/s Ultimate Peak Flow

Further increasing the discharge rate of the Holly SPS to its maximum anticipated rate of 221 L/s yields further reductions in available capacity, as anticipated. Utilizing the 2041 and 2071 growth projections, as shown on SDS Nos. 5 and 6 respectively, the impact to receiving infrastructure is summarized in Table 3.

If the SPS discharges at 221 L/s, the 525 mm diameter sections of the sewer have insufficient capacity to convey the combined peak flow under the 2041 and the 2071 growth projections. The existing 600 mm diameter sewers continue to have sufficient capacity to convey the maximum flow.

As in previous iterations, the increase in sewer capacity utilization from the 2041 to 2071 scenarios is approximately 1%. This configuration again presumes maximum discharge from the SPS occurs during design peak flow conditions in the receiving sewer.

Table 3: Projected Sewer Capacity – Current Growth Projections with Holly SPS Flow of 221 L/s

PROJECTION YEAR	MAPLEVIEW SEWER SECTION		
	450 mm dia.	525 mm dia.	600 mm dia.
2041	81% of Max.	113% to 130% of Max.	73% to 83% of Max.
2071	81% of Max.	113% to 131% of Max.	74% to 84% of Max.

To minimize the potential for surcharge in the 525 mm diameter sections of the sewer, replacements of the affected infrastructure should occur prior to the SPS reaching its maximum capacity. This could be accomplished through reducing the rate of growth upstream of the SPS so it does not reach maximum capacity prior to replacements taking place. Please refer to the 2031 HYBA report for additional information and discussion on the potential impact of surcharge in the receiving sewers.

Replacement Infrastructure

Referring to City design standards, new or replaced sections of sewers should be designed so capacity does not exceed 85% of the full pipe flow capacity. With this in mind, and referring to SDS Nos. 7 and 8, the 525 mm dia. sewers would need to be replaced with 600 mm and 675 mm diameter sewers. The change in pipe size would occur at maintenance hole SAP33018. The corresponding capacities, in consideration of replaced infrastructure, are summarized in Table 4.

Table 4: Projected Sewer Capacity – Current Growth Projections with Sewer Replacement

PROJECTION YEAR	MAPLEVIEW SEWER SECTION			
	Ex. 450 mm MAINTAINED	EX. 525 mm REPLACED WITH PROP. 600 mm	EX. 525 mm REPLACED WITH PROP. 675 mm	Ex. 600 mm MAINTAINED
2041	81% of Max.	79% to 83% of Max.	58% to 67% of Max.	73% to 83% of Max.
2071	81% of Max.	79% to 84% of Max.	58% to 67% of Max.	74% to 84% of Max.

Note: Table columns show upstream to downstream sewers between Essa and Veterans Drive.

The existing 600 mm diameter sewers have sufficient capacity to convey the sewage flows as they have steeper grades. As such, they have been shown as being maintained in their existing condition on SDS Nos. 7 and 8, though replacement to maintain the typical practice of upstream infrastructure not exceeding the size of downstream infrastructure is a consideration.

Referring to Figure 11-1 from the WCMP in Appendix A, two projects are currently considered for replacement of infrastructure on Mapleview Drive:

- Project No. WC2019-06, which is described as the replacement of 525 mm and 600 mm sewers from Veterans Drive to Highway 400 with 675 mm diameter pipes. The actual project limits, however, appear to extend to approximately midway between Hollyholme Farm Road and Reid Drive, which generally coincides with maintenance hole SAP33013. While scheduled for 2031 in the WCMP, this project is not in the current 10-year Capital Plan.
- Project No. WC2019-13, which will replace the section of 450 mm diameter sewer just west of Essa Road with a 525 mm diameter pipe. This project is scheduled for post-2031 and is not included in the current 10-year capital plan.

The pipes considered for replacement in the above two projects will approach their full flow capacities in future conditions. However, the existing 525 mm diameter sewers between the two projects appear to be the most critical in terms of capacity. Therefore, it is recommended the replacement of the 525 mm sewers be added in one of the two above noted projects.

Pump Station Flows

Referring to SDS Nos. 9 and 10, the most critical section of the sewer lies between maintenance holes SAP33014 and SAP33013. If flow from the Holly SPS could be reduced so flows through this critical section of pipe do not exceed 100% of design capacity, this could be achieved by reducing the flow to 164.7 L/s in the 2041 and 163.1 L/s in the 2071 growth projections. It is not currently understood however, if the Holly SPS can accommodate such adjustments to the peak rate of discharge.

As previously noted, these figures are based on conservative growth projections and peak flow design criteria. In actual practice, peak flows in the sewer are typically lower than design values, allowing the pump station to operate at higher discharge rates. This is evidenced by the flow data showing maximum discharge rates of the pump station reaching values of approximately 180 L/s while there do not appear to be indications of surcharge occurring in the receiving sewers.

IMPACT OF THE PROPOSED DEVELOPMENT ON SEWER INFRASTRUCTURE

To incorporate the proposed development at 664 Essa Road in the SDS, the projected population for Area A5 connected to the Mapleview Drive sewer between maintenance holes SAP33016 and SAP33015, was removed. In its place, the proposed development was added with a 300 mm diameter sewer connection

to maintenance hole SAP 33015. For the purposes of this review, the 0.4% design grade of this connection, coinciding with minimum grade per City design standards, is applied.

Development Phasing

The North Block is planned to proceed to construction prior to 2031 and is the subject of the current Site Plan application. The future South Block will be subject to a separate application and is anticipated to proceed between the 2031 and 2041 timeline. The two development phases are summarized in Table 5.

Table 5: Proposed Development Phasing

PHASE NO.	UNITS DEVELOPED	EQUIVALENT POPULATION
North Block	458 Medium Density Residential & 66 Medium Density Optional Secondary Suites	1,227
Future South Block	1,921 High Density Apartments & 1,400 m^2 of Commercial Retail Space	3,226
Full Build-Out (North Block + Future South Block)	458 Medium Density Townhomes, 66 Medium Density Optional Secondary Suites, 1,921 High Density Apartments & 1,400 m^2 of Commercial Retail Space	4,453

Individual SDS have been assembled for each phase of the development alongside the remaining growth projections and Holly SPS flows utilized in the review of the existing sewers. The SDS including the proposed development are attached in Appendix D.

Holly Sewage Pumping Station Generating 112 L/s Average Flow

With the Holly SPS discharging an average flow of 112 L/s, SDS Nos. 11 and 12 assess the impacts to the receiving sewer system for each phase of the development based on 2041 projected growth figures. SDS No. 13 illustrates full build-out condition alongside the 2071 growth figures. The results of these assessments are summarized in Table 6.

Table 6: Projected Sewer Capacity – Proposed Development with Holly SPS Flow of 112 L/s

PROJECTION TIMELINE	MAPLEVIEW SEWER SECTION		
	450 mm dia.	525 mm dia.	600 mm dia.
North Block	42% of Max. *(42% of Max.)*	58% to 76% of Max. *(58% to 72% of Max.)*	44% to 52% of Max. *(42% to 50% of Max.)*
2041 Full Build-Out	42% of Max. *(42% of Max.)*	58% to 90% of Max. *(58% to 72% of Max.)*	51% to 59% of Max. *(42% to 50% of Max.)*
2071 Full Build-Out	42% of Max. ***(42% of Max.)***	58% to 91% of Max. ***(58% to 73% of Max.)***	52% to 60% of Max. ***(42% to 51% of Max.)***

Note: *(42% of Max.)* – Denotes capacity under existing growth.

Based on the results, development of North Block represents a 4% increase in the maximum utilized capacity in the 525 mm diameter sewers and a 2% increase in the 600 mm diameter sewers compared with the current growth projections. Overall, the receiving sewers reach 76% of their maximum capacity which is sufficient to accept sewage flows from the North Block of the development and other growth when the Holly SPS discharges at a rate of 112 L/s.

Future development of South Block through to 2071 has a more substantial impact on the capacity of the receiving sewers. The maximum utilized capacity of the 525 mm diameter sewers increases by approximately 18% while the 600 mm diameter sewers see an increase of approximately 9% when compared with current projections. Overall, the receiving sewers reach 91% of their maximum capacity by 2071, which is sufficient to accept sewage flows from the future full build-out of the development and other growth when the Holly SPS discharges at a rate of 112 L/s.

Holly Sewage Pumping Station Generating 180 L/s Current Peak Flow

Increasing discharge from the Holly SPS to the current peak flow of 180 L/s, SDS Nos. 14 and 15 assess the impacts to the receiving sewer system for each phase of the development based on 2041 projected growth figures. SDS No. 16 illustrates full build-out condition alongside the 2071 growth figures. The results of these assessments are summarized in Table 7.

Table 7: Projected Sewer Capacity – Proposed Development with Holly SPS Flow of 180 L/s

PROJECTION TIMELINE	MAPLEVIEW SEWER SECTION		
	450 mm dia.	525 mm dia.	600 mm dia.
North Block	66% of Max. *(66% of Max.)*	93% to 113% of Max. *(93% to 108% of Max.)*	64% to 73% of Max. *(61% to 71% of Max.)*
2041 Full Build-Out	66% of Max. *(66% of Max.)*	93% to 126% of Max. *(93% to 108% of Max.)*	71% to 80% of Max. *(61% to 71% of Max.)*
2071 Full Build-Out	66% of Max. ***(66% of Max.)***	93% to 127% of Max. ***(93% to 109% of Max.)***	72% to 81% of Max. ***(62% to 72% of Max.)***

Note: *(66% of Max.)* – Denotes capacity under existing growth.

Based on the results, development of North Block represents a maximum capacity use increase of approximately 5% in the 525 mm diameter sewers and 2% in the 600 mm diameter sewers compared with the current growth projections. Overall, the receiving sewers reach 113% of their maximum capacity, which is anticipated to result in minor surcharging in affected pipe sections though only marginally more than would be experienced under current growth projections.

Recognizing this scenario anticipates peak flows in the local trunk sewer coinciding with those from the Holly SPS, surcharge is anticipated to be infrequent but possible. It is therefore anticipated North Block could still proceed under this configuration with minimal impact compared with currently anticipated growth. As previously noted, sewer upgrades will be required to alleviate the potential surcharge which may occur as growth continues. Please refer to the 2031 HYBA report for additional information and discussion on the potential impact of surcharge in the receiving sewers.

Future development of South Block through to 2071 again has a more substantial impact on the capacity of the receiving sewers. The maximum utilized capacity of the 525 mm diameter sewers increases by approximately 18% while the 600 mm diameter sewers see an increase of approximately 9% when compared with current projections. Overall, the receiving 525 mm diameter sewers would reach 127% of their capacity by 2071 with the development of South Block while the 600 mm diameter sewers would reach a maximum of 81%.

If the two sections of 525 mm diameter sewers downstream of the development site were to be replaced in accordance with previous recommendations, then the receiving infrastructure would have sufficient capacity to accommodate the full build-out of the development alongside the 180 L/s Holly SPS flows. Minimal surcharging may still occur upstream of the development site due to the existing capacity constraints. The impacts of the pipe replacements are illustrated on SDS Nos. 17 and 18 and Table 8 below.



Table 8: Projected Sewer Capacity – Proposed Development, Pipe Replacement & Holly SPS Flow of 180 L/s

PROJECTION TIMELINE	MAPLEVIEW SEWER SECTION			
	450 mm dia.	EX 525 mm MAINTAINED	EX 525 mm REPLACED WITH PROP 675 mm	EX. 600 mm MAINTAINED
2041 Full Build-Out	66% of Max.	63% to 101% of Max.	63% to 65% of Max	71% to 80% of Max.
2071 Full Build-Out	66% of Max.	63% to 101% of Max.	63% to 65% of Max	72% to 81% of Max.

Minimal surcharge would still be observed in the 525 mm diameter sewers upstream of the development due to the pump station flows and would not be affected by the proposed development in this configuration.

Holly Sewage Pumping Station Generating 221 L/s Ultimate Peak Flow

Further increasing the discharge of the Holly SPS to its maximum anticipated rate of 221 L/s yields further reductions in available capacity, as anticipated. Utilizing the proposed phasing and the 2041 and 2071 growth projections, as shown on SDS Nos. 19 through 21, the impact to the receiving sewers is summarized in Table 9.

Table 9: Projected Sewer Capacity – Proposed Development with Holly SPS Flow of 221 L/s

PROJECTION TIMELINE	MAPLEVIEW SEWER SECTION		
	450 mm dia.	525 mm dia.	600 mm dia.
North Block	81% of Max. *(81% of Max.)*	113% to 135% of Max. *(113% to 130% of Max.)*	76% to 85% of Max. *(73% to 83% of Max.)*
2041 Full Build-Out	81% of Max. *(81% of Max.)*	113% to 148% of Max. *(113% to 130% of Max.)*	83% to 92% of Max. *(73% to 83% of Max.)*
2071 Full Build-Out	81% of Max. ***(81% of Max.)***	113% to 149% of Max. ***(113% to 131% of Max.)***	84% to 93% of Max. ***(74% to 84% of Max.)***

Note: *(81% of Max.)* – Denotes capacity under existing growth.

As in previous iterations, development of the North Block results in a maximum capacity use increase of approximately 5% in the 525 mm diameter sewers and 2% in the 600 mm diameter sewers compared with current projections. Future development of the South Block through to 2071 growth projections result in a maximum capacity use increase of approximately 18% in the 525 mm diameter sewers and 9% in the 600 mm diameter sewers compared with current projections.



The sections of 525 mm diameter sewer will exceed their full flow capacities and will not have sufficient capacity to convey the full flow based on the combined peak flow and the maximum SPS discharge of 221 L/s. Replacement of these sections of sewer is therefore recommended prior to the Holly SPS reaching its ultimate design discharge rate.

The existing 600 mm diameter sewer will still operate within its maximum capacity however, in reaching 93% of its maximum capacity, replacement of the sewer may need to be considered should additional growth in other contributing properties be considered.

Replacement Infrastructure

Referring to SDS Nos. 22 and 23, upgrades to the 525 mm diameter sewer on Mapleview Drive were considered for the full build-out condition of the development alongside ultimate flows from the Holly SPS and the 2041 and 2071 growth projections. As a first step, upsizing the existing 525 mm diameter sewer to a combination of 600 mm and 675 mm diameter sewers was implemented. The change in size of the proposed replacements occur at maintenance hole SAP33018, as previously assessed. The corresponding capacities are summarized in Table 10 below.

Table 10: Projected Sewer Capacity with Proposed Development – Sewer Replacement

PROJECTION TIMELINE	MAPLEVIEW SEWER SECTION			
	EXISTING 450 mm SEWER MAINTAINED	EX. 525 mm REPLACED WITH PROP. 600 mm	EX. 525 mm REPLACED WITH PROP. 675 mm	EXISTING 600 mm SEWER MAINTAINED
2041	81% of Max. *(81% of Max.)*	79% to 83% of Max. *(79% to 83% of Max.)*	58% to 76% of Max. *(58% to 67% of Max.)*	83% to 92% of Max. *(73% to 83% of Max.)*
2071	81% of Max. ***(81% of Max.)***	79% to 84% of Max. ***(79% to 84% of Max.)***	58% to 76% of Max. ***(58% to 67% of Max.)***	84% to 93% of Max. ***(74% to 84% of Max.)***

Notes: Table columns show upstream to downstream sewers between Essa and Veterans Drive.
(81% of Max.) – Denotes capacity under existing growth.

Based on the foregoing, the above suggested sewer replacements intended to accommodate the maximum flow from the Holly SPS along with the peak flows from future growth projections, would also be sufficient to accommodate the full build-out condition of the development.

Compared with the previous growth projections, the capacity utilized in the proposed 675 mm diameter sewer and the existing 600 mm diameter sewer increases by approximately 9%. The existing 600 mm diameter sewer reaches 93% of its maximum capacity, which is sufficient to provide service but is nearing full capacity based on the conservative growth projections.

It is recommended the two planned sewer replacement projects on Mapleview Drive be expanded to include the 525 mm diameter sections between the two project limits.

Pump Station Flows

Until the existing sewers are upgraded, the maximum discharge rate of the Holly SPS would need to be maintained at current rates to ensure peak flows in the receiving sewers do not exceed 100% of their design capacity. Referring to SDS No. 24, the maximum Holly SPS discharge flows to maintain this capacity in the critical section of sewer between SAP33014 and SAP33013 alongside development of the North Block is 156.1 L/s. This represents a reduction of 8.5 L/s compared with the figures considered for the current growth projections. As this flow is very close to the figures presented for the current growth projections, the North Block could proceed with negligible impact to the receiving system.

Table 8.3 of the WCMP (Appendix A) indicates the Holly SPS was expected to reach a peak inflow of 81 L/s in 2021, increasing to 130 L/s by 2041. These peak flows are understood to include sewage flows and wet weather flow attributed to a 25-year storm event. Based on the recorded flows indicating the SPS already discharges flows of 180 L/s on occasion, growth upstream of the Holly SPS or wet weather flows are exceeding expectations by a significant margin, thus affecting growth opportunities for areas serviced by the receiving sewers.

Based strictly on the projected growth figures for the Holly SPS in Table 8.3 of the WCMP, and flow data provided in this report, it would appear full build-out of the proposed development could occur while also maintaining the existing sewers for a short time. Flow within the sewers would be within 100% of the design capacity of the pipe while the SPS is active up to the 2041 projection year (130 L/s). For continued growth beyond 2041, or flows in excess of 130 L/s, the sewer replacements would need to be completed to support further increases in sewage flows without surcharge. Once again, this is based strictly on the noted figures in the WCMP and this report.

Based on current conditions and flow data however, the Holly SPS is reaching discharge rates of 180 L/s. While currently an infrequent occurrence, these flows utilize nearly all the available capacity in the existing 525 mm dia. sewer, and it is anticipated flows of this magnitude will become more commonplace in the future. In this respect, and should growth upstream of the Holly SPS continue, it may be necessary to consider sewer replacements earlier than currently planned to accommodate this growth and future development of the South Block.

SUMMARY

The existing sections of 525 mm diameter sewer on Mapleview Drive will require replacement in the near future to accommodate continued growth. This replacement is necessary to accommodate the planned growth in the area immediately serviced by the Mapleview Drive trunk sewer and tributary to the Holly SPS. The 525 mm sewer currently conveys flows within 93% to 109% of its full flow capacity when the Holly SPS discharges 180 L/s.

The North Block is generally consistent with current growth projections allocated for the property and could proceed with marginal differences in sewage flows compared with planned growth for the property.

Development of the future South Block may require the noted sewer replacement, depending on the pace of growth in the Holly SPS tributary area contributing to the SPS discharge flow.

While the combined North Block and future South Block development contributes toward the need to upgrade the sanitary infrastructure, it is not the trigger of the required upgrades, nor does it appear to impact the limits of replacement or diameter of the sewer replacements compared with the upgrades already necessary to accommodate planned growth on Mapleview Drive.

Yours truly,
Tatham Engineering Limited



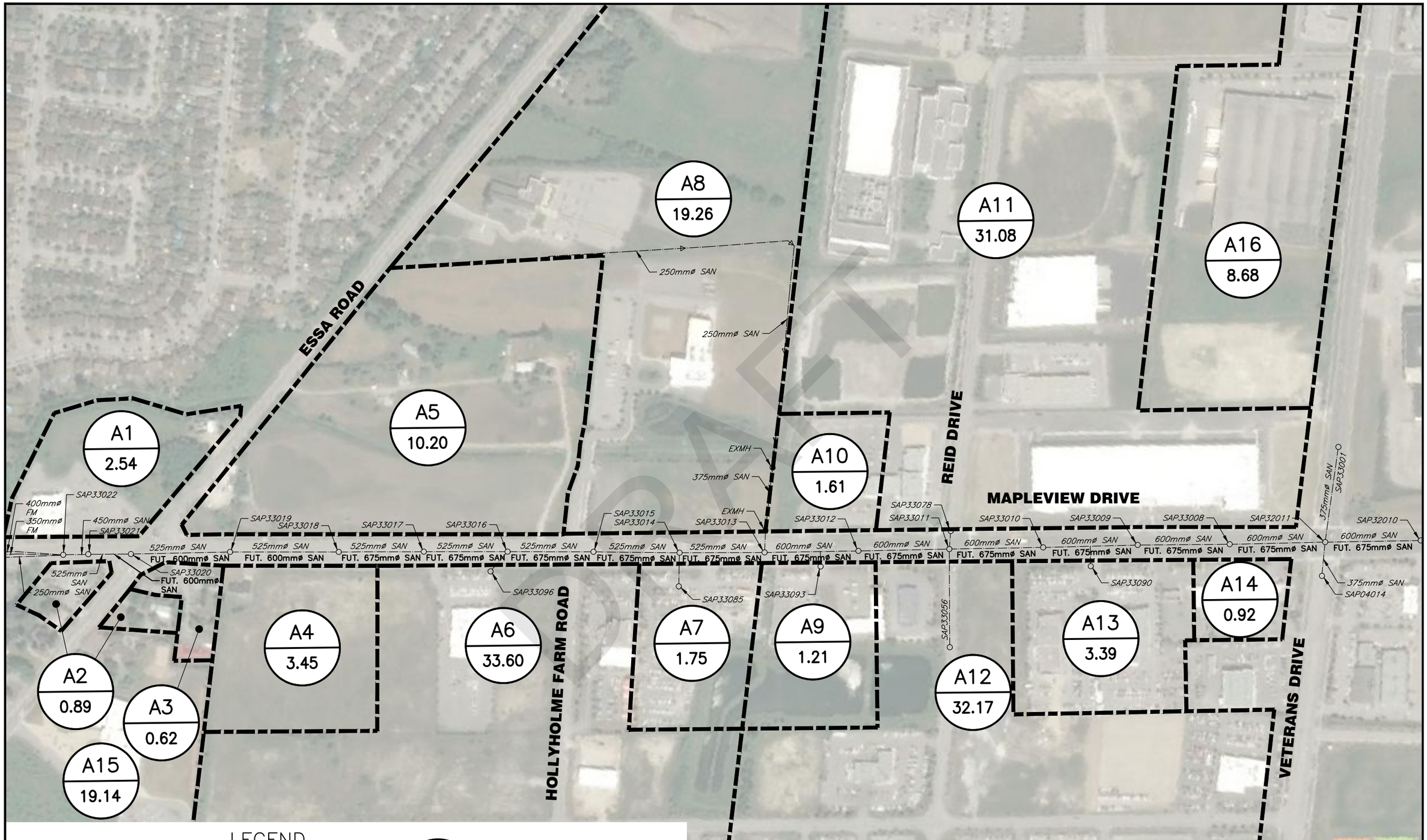
Joshua Nemisz, B.A.Sc., P.Eng.
Senior Engineer, Project Manager

Suzanne Troxler, P.Eng.
Senior Engineer

JN/ST:ha

Appendices:
A: Drawings and Figures
B: Population Projections
C: Current Growth Sewer Design Sheets
D: Proposed Growth Sewer Design Sheets

O:\Barrie\2022 PROJECTS\422433 - Mapleview & Essa Development - Barrie\Documents\Reports\SAN\02 - Capacity Review, Oct 2024\L - Pasquale - Capacity Review of Existing Sewers - Oct 2024.docx



LEGEND

DRAINAGE BOUNDARY

A5 / 10.20 — CATCHMENT ID / CATCHMENT AREA (ha)

NOTE:
PROPOSED SEWER SIZES AS PER CITY
PROJECT NO. WC2019-06 AND WC2019-13

TATHAM ENGINEERING

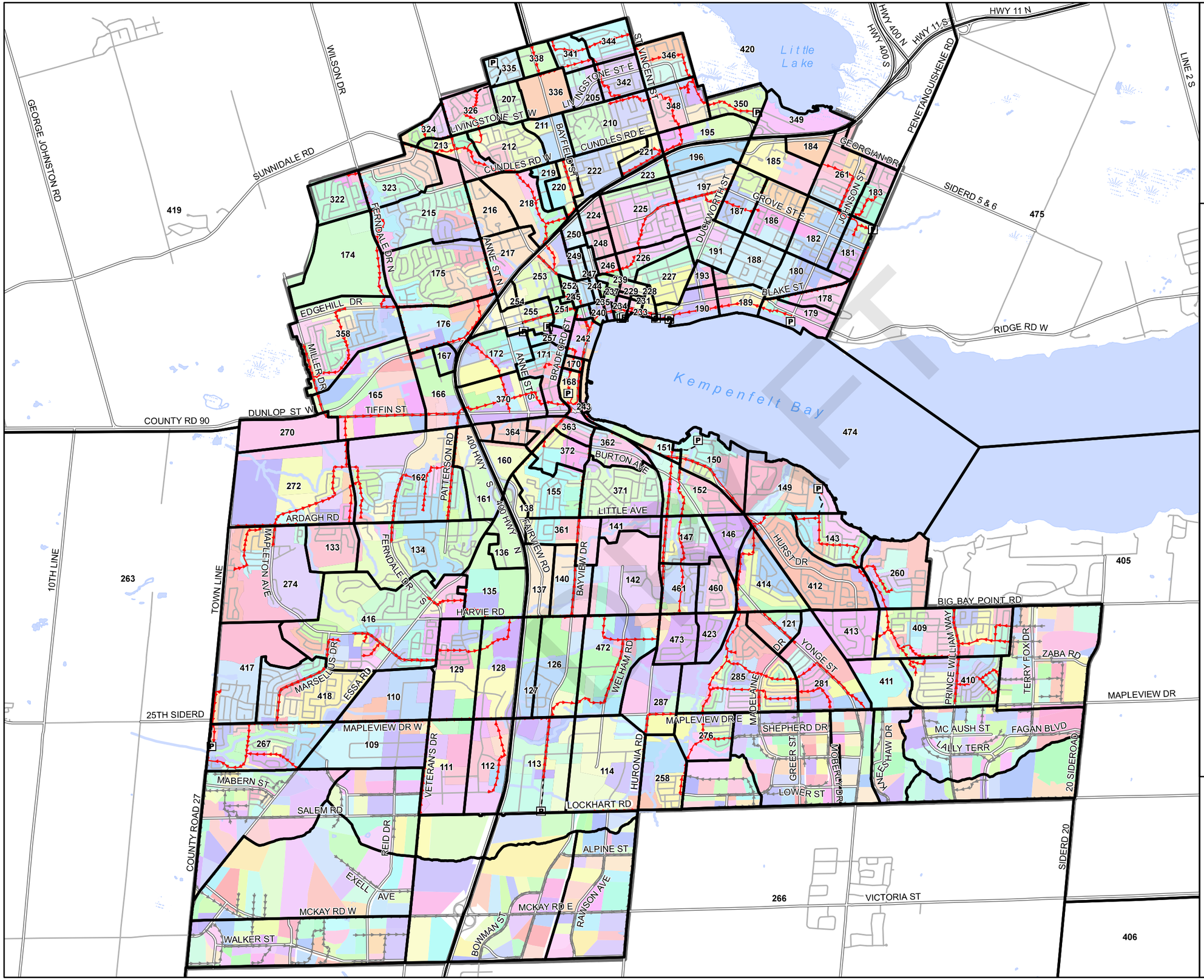
MAPLEVIEW DRIVE WEST & ESSA ROAD MIXED-USE DEVELOPMENT

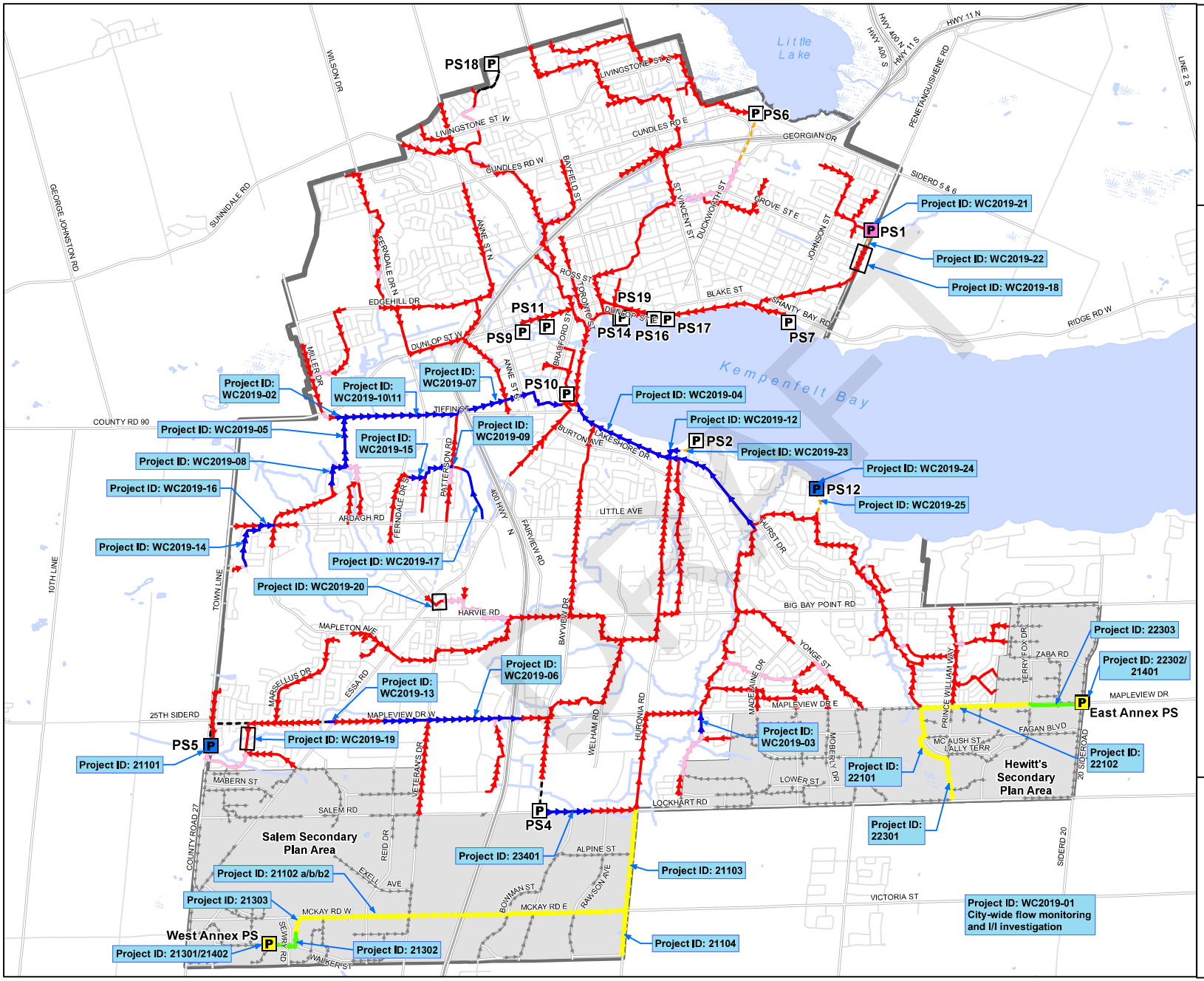
SANITARY DRAINAGE PLAN

DWG. No. **FIG. 1**

SCALE: 1:4,000	DRAWN: LCG/JLM	DATE: DEC/22	JOB NO. 422433

Figure 8-1
City of Barrie
Traffic Zones and Wastewater Collection System Model Subcatchments




PS18
PS6
PS1
PS11
PS9
PS19
PS14
PS16
PS17
PS7
PS10
PS2
PS12
PS5
PS4
East Annex PS
West Annex PS
Salem Secondary Plan Area
Hewitt's Secondary Plan Area
Project ID: WC2019-21
Project ID: WC2019-22
Project ID: WC2019-18
Project ID: WC2019-02
Project ID: WC2019-10\11
Project ID: WC2019-07
Project ID: WC2019-04
Project ID: WC2019-12
Project ID: WC2019-05
Project ID: WC2019-15
Project ID: WC2019-09
Project ID: WC2019-23
Project ID: WC2019-24
Project ID: WC2019-08
Project ID: WC2019-16
Project ID: WC2019-25
Project ID: WC2019-14
Project ID: WC2019-17
Project ID: WC2019-20
Project ID: 22303
Project ID: 22302/ 21401
Project ID: WC2019-06
Project ID: WC2019-13
Project ID: WC2019-19
Project ID: 21101
Project ID: WC2019-03
Project ID: 22101
Project ID: 22102
Project ID: 22301
Project ID: 23401
Project ID: 21102 a/b/b2
Project ID: 21303
Project ID: 21301/21402
Project ID: 21302
Project ID: 21103
Project ID: 21104
Project ID: WC2019-01 City-wide flow monitoring and I/I investigation
Little Lake
Kempenfelt Bay
LIVINGSTONE ST W
CUNDLES RD E
CUNDLES RD W
GEORGIAN DR
SIDERD 5 & 6
GROVE ST E
BLAKE ST
SHANTY BAY RD
RIDGE RD W
EDGEHILL DR
DUNLOP ST W
TIFFIN ST
COUNTY RD 90
ARDAGH RD
LITTLE AVE
BIG BAY POINT RD
HARVIE RD
MAPLETON AVE
MAPLEVIEW DR W
MAPLEVIEW DR E
MAPLEVIEW DR
25TH SIDERD
20 SIDEROAD
FAGAN BLVD
LOCKHART RD
MABERN ST
SALEM RD
MCKAY RD W
MCKAY RD E
VICTORIA ST
ALPINE ST
BOWMAN ST
RAWSON AVE
EXELL AVE
REID DR
WALKER ST
SEVERN RD
COUNTY ROAD 27
10TH LINE
TOWN LINE
WILSON DR
SUNNIDALE RD
GEORGE JOHNSTON RD
LINE 2 S
HWY 400 N
HWY 400 S
HWY 11 N
HWY 11 S
PENETANGUISHENE RD
LIVINGSTONE ST
CUNDLES RD
BAYFIELD ST
ANNE ST N
FERNDALE DR N
MILLER DR
ROSS ST
TORONTO ST
DUNLOP ST E
ST VINCENT ST
DUCKWORTH ST
JOHNSON ST
BRADFORD ST
BURTON AVE
LAKESHORE DR
PATTERSON RD
FERNDALE DR S
400 HWY N
FAIRVIEW RD
BAYVIEW DR
HURONIA RD
WELHAM RD
YONGE ST
DUNLOP ST
MADELAINE DR
MOBERLY DR
PRINCE WILLIAM WAY
TERRY FOX DR
ZABA RD
LALLY TERR
MC AUSH ST
LOWER ST
VETERANS DR
ESSA RD
MARSELLUS DR
BURTON AVE
BAYVIEW DR
DUNLOP ST
BRADFORD ST
ANNE ST N
DUNLOP ST W
BURTON AVE
LAKESHORE

SANITARY SEWER DESIGN

Land Use or Zoning Designation Basis (Non- Residential)

Population Distribution #1 (Base)

DESIGN SHEET Base Population Estimate

FILE NO 422433

CONTRACT / PROJECT

n ≥ 0.013 Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population in thousands) 225 litres/person/day.

$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	Land Use	Q (m3/day/ha)	Area (ha)	Q (m3/day)	Equivalent POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Area 1			C4	28	2.54	71	316	316																
Area 2			C4	28	0.89	25	111	427																
Area 3			C4	28	0.16	4	20	447																
			LI	35	0.46	16	72	518																
Area 4			LI	35	3.45	121	537	1055																
Area 5			LI	35	10.20	357	1587	2642																
Area 6			LI	35	33.60	1176	5227	7868																
Area 7			LI	35	1.75	61	272	8141																
Area8			LI	35	12.07	422	1878	10018																
			I	28	7.19	201	895	10913																
Area 9			LI	35	1.21	42	188	11101																
Area 10			BP	35	1.61	56	250	11352																
Area 11			BP	35	31.08	1088	4835	16186																
Area 12			LI	35	32.17	1126	5004	21190																
Area 13			LI	35	3.39	119	527	21718																
Area 14			LI	35	0.92	32	143	21861																
Area 15			LI	35	1.02	36	159	22020																
			I-E	28	18.12	507	2255	24274																
Area 16			BP	35	8.68	304	1350	25625																

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SANITARY SEWER DESIGN

Land Use or Zoning Designation Basis (Non- Residential)

Population Distribution #1 (Base)

DESIGN SHEET Base Population Estimate

FILE NO 422433

CONTRACT / PROJECT

n ≥ 0.013 Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population in thousands) 225 litres/person/day.

$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	Land Use	Q (m3/day/ha)	Area (ha)	Q (m3/day)	Equivalent POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Proposed Development																								
Medium Density Residential					4.85		1227	1227	4.800	3.741	4.800	15.336	4.85	0.485	15.821									
High Density Residential					5.00		3209	4436	3.712	3.293	3.712	42.878	9.85	0.985	43.863									
Retail			C	28	0.14	3.9	17	4453	3.709	3.291	3.709	43.012	9.99	0.999	44.011									
Community			I-E	28	0.00	0.0	0	4453	3.709	3.291	3.709	43.012	9.99	0.999	44.011									

DATE: CALCULATED BY: CHECKED BY:

Notes:

(1) without extraneous flow

(2) with extraneous flow

(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375

(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) Populations based off zoning classifications. This estimate is used to pro-rate the future populations and are not applied to sanitary design sheets

DRAFT

SANITARY SEWER DESIGN

Land Use or Zoning Designation Basis (Non- Residential)

Population Distribution #2 (2041 Pro-Rated)

DESIGN SHEET 2041 Pro-Rated Population

FILE NO 422433

CONTRACT / PROJECT

n ≥ 0.013 Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population in thousands) 1209.0083 litres/person/day.

$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	Land Use	Q (m3/day/ha)	Area (ha)	Q (m3/day)	Equivalent POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Area 1			C4	28	2.54	71	59	59																
Area 2			C4	28	0.89	25	21	21																
Area 3			C4	28	0.16	4	4	24																
			LI	35	0.46	16	13	38																
Area 4			LI	35	3.45	121	100	138																
Area 5			LI	35	10.20	357	295	433																
Area 6			LI	35	33.60	1176	973	1405																
Area 7			LI	35	1.75	61	51	1456																
Area8			LI	35	12.07	422	349	1806																
			I	28	7.19	201	167	1972																
Area 9			LI	35	1.21	42	35	2007																
Area 10			BP	35	1.61	56	47	2054																
Area 11			BP	35	31.08	1088	900	2953																
Area 12			LI	35	32.17	1126	931	3885																
Area 13			LI	35	3.39	119	98	3983																
Area 14			LI	35	0.92	32	27	4010																
Area 15			LI	35	1.02	36	30	4039																
			I-E	28	18.12	507	420	4459																
Area 16			BP	35	8.68	304	251	4710																

DATE: CALCULATED BY: CHECKED BY:

DRAFT

Notes:

(1) without extraneous flow

(2) with extraneous flow

(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375

(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) Base population pro-rated by manipulating per capita flow value to achieve total population as per WCMP for 2041

SANITARY SEWER DESIGN

Land Use or Zoning Designation Basis (Non- Residential)

Population Distribution #3 (2071 Pro-Rated)

DESIGN SHEET 2071 Pro-Rated Population

FILE NO 422433

CONTRACT / PROJECT

n ≥ 0.013 Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population in thousands) 1086.309 litres/person/day.

$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	Land Use	Q (m3/day/ha)	Area (ha)	Q (m3/day)	Equivalent POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Area 1			C4	28	2.54	71	65	65																
Area 2			C4	28	0.89	25	23	23																
Area 3			C4	28	0.16	4	4	27																
			LI	35	0.46	16	15	42																
Area 4			LI	35	3.45	121	111	153																
Area 5			LI	35	10.20	357	329	482																
Area 6			LI	35	33.60	1176	1083	1564																
Area 7			LI	35	1.75	61	56	1621																
Area8			LI	35	12.07	422	389	2010																
			I	28	7.19	201	185	2195																
Area 9			LI	35	1.21	42	39	2234																
Area 10			BP	35	1.61	56	52	2286																
Area 11			BP	35	31.08	1088	1001	3287																
Area 12			LI	35	32.17	1126	1036	4324																
Area 13			LI	35	3.39	119	109	4433																
Area 14			LI	35	0.92	32	30	4462																
Area 15			LI	35	1.02	36	33	4495																
			I-E	28	18.12	507	467	4962																
Area 16			BP	35	8.68	304	280	5242																

DATE: CALCULATED BY: CHECKED BY:

DRAFT

Notes:

(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) Base population pro-rated by manipulating per capita flow value to achieve total population as per WCMP for 2071

SANITARY SEWER DESIGN SHEET No. 1

Development Details Basis

2041 - Projections w/o Subject Site
DESIGN SHEET SPS at 112 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									112.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	113.350	2.54	2.5	0.254	113.604	28.01	450	0.92%	273.464	0.449	Ok	1.719	1.638	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	113.717	0.89	3.4	0.343	114.060	47.54	525	0.19%	187.460	0.563	Ok	0.866	0.907	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	114.005	0.62	4.1	0.405	114.410	110.70	525	0.19%	187.460	0.564	Ok	0.866	0.908	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	121.20	525	0.21%	197.079	0.546	Ok	0.910	0.943	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	94.88	525	0.18%	182.460	0.573	Ok	0.843	0.889	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	93.41	525	0.21%	197.079	0.546	Ok	0.910	0.943	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				295	492	5.763	3.978	5.763	119.378	10.20	17.7	1.770	121.148	95.92	525	0.18%	182.460	0.595	Ok	0.843	0.898	Ok
	SAP33015	SAP33014				0	492	5.763	3.978	5.763	119.378		17.7	1.770	121.148	95.89	525	0.18%	182.460	0.595	Ok	0.843	0.898	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	1464	4.633	3.687	4.633	129.666		51.3	5.130	134.796	94.93	525	0.19%	187.460	0.627	Ok	0.866	0.934	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2031	4.339	3.581	4.339	134.950		72.3	7.231	142.181	104.61	600	0.31%	341.867	0.449	Ok	1.209	1.137	Ok
Mapleview Drive	SAP33012	SAP33011				82	2113	4.305	3.567	4.305	135.686	2.82	75.1	7.513	143.199	101.56	600	0.30%	336.308	0.455	Ok	1.189	1.125	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	3944	3.800	3.339	3.800	151.026		138.4	13.838	164.864	104.68	600	0.30%	336.308	0.494	Ok	1.189	1.157	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4042	3.781	3.329	3.781	151.801		141.8	14.177	165.978	105.50	600	0.30%	336.308	0.496	Ok	1.189	1.159	Ok
Mapleview Drive	SAP33009	SAP33008				0	4042	3.781	3.329	3.781	151.801		141.8	14.177	165.978	102.65	600	0.31%	341.867	0.491	Ok	1.209	1.172	Ok
Mapleview Drive	SAP33008	SAP32011				27	4068	3.776	3.327	3.776	152.011	0.92	142.7	14.269	166.280	106.51	600	0.29%	330.655	0.501	Ok	1.169	1.145	Ok

DATE: CALCULATED BY: CHECKED BY:

Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records
(2) Design Sheet models the existing condition sewers w/ future population projections

DRAFT

SANITARY SEWER DESIGN SHEET No. 2

Development Details Basis

2071 - Projections w/o Subject Site
DESIGN SHEET SPS at 112 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									112.000													
	SAP33022	SAP33021				65	65	8.625	4.290	8.625	113.471	2.54	2.5	0.254	113.725	28.01	450	0.92%	273.464	0.449	Ok	1.719	1.639	Ok
	SAP33021	SAP33020				23	88	8.122	4.258	8.122	113.870	0.89	3.4	0.343	114.213	47.54	525	0.19%	187.460	0.563	Ok	0.866	0.907	Ok
	SAP33020	SAP33019				19	107	7.813	4.235	7.813	114.184	0.62	4.1	0.405	114.589	110.70	525	0.19%	187.460	0.564	Ok	0.866	0.908	Ok
	SAP33019	SAP33018				0	107	7.813	4.235	7.813	114.184		4.1	0.405	114.589	121.20	525	0.21%	197.079	0.547	Ok	0.910	0.944	Ok
	SAP33018	SAP33017				0	107	7.813	4.235	7.813	114.184		4.1	0.405	114.589	94.88	525	0.18%	182.460	0.574	Ok	0.843	0.889	Ok
	SAP33017	SAP33016				0	107	7.813	4.235	7.813	114.184		4.1	0.405	114.589	93.41	525	0.21%	197.079	0.547	Ok	0.910	0.944	Ok
281 Mapleview	SAP33096	SAP33016				111	111	7.759	4.231	7.759	2.246	3.45	3.5	0.345	2.591	29.05	375	0.41%	112.266	0.104	Ok	1.016	0.400	Check
Mapleview Drive	SAP33016	SAP33015				329	547	5.641	3.954	5.641	120.038	10.20	17.7	1.770	121.808	95.92	525	0.18%	182.460	0.597	Ok	0.843	0.899	Ok
	SAP33015	SAP33014				0	547	5.641	3.954	5.641	120.038		17.7	1.770	121.808	95.89	525	0.18%	182.460	0.597	Ok	0.843	0.899	Ok
251 Mapleview	SAP33085	SAP33014				1083	1083	4.921	3.778	4.921	13.874	33.60	33.6	3.360	17.234	18.71	250	1.50%	72.833	0.331	Ok	1.484	1.141	Ok
Mapleview Drive	SAP33014	SAP33013				0	1630	4.535	3.653	4.535	131.245		51.3	5.130	136.375	94.93	525	0.19%	187.460	0.632	Ok	0.866	0.937	Ok
300 Mapleview	EX MH	SAP33013				574	574	5.587	3.943	5.587	8.354	19.26	19.3	1.926	10.280	24.46	375	1.50%	214.735	0.148	Ok	1.944	0.937	Ok
231 Mapleview	SAP33093	SAP33013				56	56	8.887	4.304	8.887	1.305	1.75	1.8	0.175	1.480	24.46	375	1.50%	214.735	0.059	Ok	1.944	0.531	Check
Mapleview Drive	SAP33013	SAP33012				0	2260	4.248	3.544	4.248	137.002		72.3	7.231	144.233	104.61	600	0.31%	341.867	0.453	Ok	1.209	1.142	Ok
Mapleview Drive	SAP33012	SAP33011				91	2351	4.214	3.530	4.214	137.803	2.82	75.1	7.513	145.316	101.56	600	0.30%	336.308	0.459	Ok	1.189	1.129	Ok
Reid Drive North	SAP33078	SAP33011				1001	1001	4.999	3.800	4.999	13.035	31.08	31.1	3.108	16.143	20.17	375	0.38%	108.081	0.261	Ok	0.979	0.660	Ok
Reid Drive South	SAP33056	SAP33011				1036	1036	4.964	3.790	4.964	13.400	32.17	32.2	3.217	16.617	109.69	375	0.82%	158.768	0.218	Ok	1.438	0.874	Ok
Mapleview Drive	SAP33011	SAP33010				0	4389	3.720	3.297	3.720	154.514		138.4	13.838	168.352	104.68	600	0.30%	336.308	0.500	Ok	1.189	1.163	Ok
191 Mapleview	SAP33090	SAP33010				109	109	7.786	4.233	7.786	2.215	3.39	3.4	0.339	2.554	22.29	200	14.72%	125.837	0.098	Ok	4.006	1.524	Ok
Mapleview Drive	SAP33010	SAP33009				0	4498	3.701	3.287	3.701	155.358		141.8	14.177	169.535	105.50	600	0.30%	336.308	0.502	Ok	1.189	1.165	Ok
Mapleview Drive	SAP33009	SAP33008				0	4498	3.701	3.287	3.701	155.358		141.8	14.177	169.535	102.65	600	0.31%	341.867	0.497	Ok	1.209	1.179	Ok
Mapleview Drive	SAP33008	SAP32011				30	4528	3.697	3.285	3.697	155.587	0.92	142.7	14.269	169.856	106.51	600	0.29%	330.655	0.508	Ok	1.169	1.151	Ok

DATE: CALCULATED BY: CHECKED BY:

Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records
(2) Design Sheet models the existing condition sewers w/ future population projections

DRAFT

SANITARY SEWER DESIGN SHEET No. 3

Development Details Basis

2041 - Projections w/o Subject Site
DESIGN SHEET SPS at 180 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									180.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	181.350	2.54	2.5	0.254	181.604	28.01	450	0.92%	273.464	0.595	Ok	1.719	1.838	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	181.717	0.89	3.4	0.343	182.060	47.54	525	0.19%	187.460	0.794	Check	0.866	0.987	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	182.005	0.62	4.1	0.405	182.410	110.70	525	0.19%	187.460	0.796	Check	0.866	0.987	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	121.20	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	94.88	525	0.18%	182.460	0.819	Check	0.843	0.961	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	93.41	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				295	492	5.763	3.978	5.763	187.378	10.20	17.7	1.770	189.148	95.92	525	0.18%	182.460	0.857	Check	0.843	0.959	Ok
	SAP33015	SAP33014				0	492	5.763	3.978	5.763	187.378		17.7	1.770	189.148	95.89	525	0.18%	182.460	0.857	Check	0.843	0.959	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	1464	4.633	3.687	4.633	197.666		51.3	5.130	202.796	94.93	525	0.19%	187.460	1.000	Check	0.866	0.979	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2031	4.339	3.581	4.339	202.950		72.3	7.231	210.181	104.61	600	0.31%	341.867	0.566	Ok	1.209	1.260	Ok
Mapleview Drive	SAP33012	SAP33011				82	2113	4.305	3.567	4.305	203.686	2.82	75.1	7.513	211.199	101.56	600	0.30%	336.308	0.574	Ok	1.189	1.246	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	3944	3.800	3.339	3.800	219.026		138.4	13.838	232.864	104.68	600	0.30%	336.308	0.612	Ok	1.189	1.267	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4042	3.781	3.329	3.781	219.801		141.8	14.177	233.978	105.50	600	0.30%	336.308	0.613	Ok	1.189	1.268	Ok
Mapleview Drive	SAP33009	SAP33008				0	4042	3.781	3.329	3.781	219.801		141.8	14.177	233.978	102.65	600	0.31%	341.867	0.607	Ok	1.209	1.284	Ok
Mapleview Drive	SAP33008	SAP32011				27	4068	3.776	3.327	3.776	220.011	0.92	142.7	14.269	234.280	106.51	600	0.29%	330.655	0.621	Ok	1.169	1.251	Ok

DATE: CALCULATED BY: CHECKED BY:

Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 180 L/s per peak flows in provided records.
(2) Design Sheet models the existing condition sewers w/ future population projections

DRAFT

SANITARY SEWER DESIGN SHEET No. 4

Development Details Basis

2071 - Projections w/o Subject Site
DESIGN SHEET SPS at 180 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									180.000													
	SAP33022	SAP33021				65	65	8.625	4.290	8.625	181.471	2.54	2.5	0.254	181.725	28.01	450	0.92%	273.464	0.595	Ok	1.719	1.839	Ok
	SAP33021	SAP33020				23	88	8.122	4.258	8.122	181.870	0.89	3.4	0.343	182.213	47.54	525	0.19%	187.460	0.795	Check	0.866	0.987	Ok
	SAP33020	SAP33019				19	107	7.813	4.235	7.813	182.184	0.62	4.1	0.405	182.589	110.70	525	0.19%	187.460	0.797	Check	0.866	0.987	Ok
	SAP33019	SAP33018				0	107	7.813	4.235	7.813	182.184		4.1	0.405	182.589	121.20	525	0.21%	197.079	0.760	Check	0.910	1.033	Ok
	SAP33018	SAP33017				0	107	7.813	4.235	7.813	182.184		4.1	0.405	182.589	94.88	525	0.18%	182.460	0.820	Check	0.843	0.961	Ok
	SAP33017	SAP33016				0	107	7.813	4.235	7.813	182.184		4.1	0.405	182.589	93.41	525	0.21%	197.079	0.760	Check	0.910	1.033	Ok
281 Mapleview	SAP33096	SAP33016				111	111	7.759	4.231	7.759	2.246	3.45	3.5	0.345	2.591	29.05	375	0.41%	112.266	0.104	Ok	1.016	0.400	Check
Mapleview Drive	SAP33016	SAP33015				329	547	5.641	3.954	5.641	188.038	10.20	17.7	1.770	189.808	95.92	525	0.18%	182.460	0.861	Check	0.843	0.959	Ok
	SAP33015	SAP33014				0	547	5.641	3.954	5.641	188.038		17.7	1.770	189.808	95.89	525	0.18%	182.460	0.861	Check	0.843	0.959	Ok
251 Mapleview	SAP33085	SAP33014				1083	1083	4.921	3.778	4.921	13.874	33.60	33.6	3.360	17.234	18.71	250	1.50%	72.833	0.331	Ok	1.484	1.141	Ok
Mapleview Drive	SAP33014	SAP33013				0	1630	4.535	3.653	4.535	199.245		51.3	5.130	204.375	94.93	525	0.19%	187.460	1.000	Check	0.866	0.976	Ok
300 Mapleview	EX MH	SAP33013				574	574	5.587	3.943	5.587	8.354	19.26	19.3	1.926	10.280	24.46	375	1.50%	214.735	0.148	Ok	1.944	0.937	Ok
231 Mapleview	SAP33093	SAP33013				56	56	8.887	4.304	8.887	1.305	1.75	1.8	0.175	1.480	24.46	375	1.50%	214.735	0.059	Ok	1.944	0.531	Check
Mapleview Drive	SAP33013	SAP33012				0	2260	4.248	3.544	4.248	205.002		72.3	7.231	212.233	104.61	600	0.31%	341.867	0.570	Ok	1.209	1.264	Ok
Mapleview Drive	SAP33012	SAP33011				91	2351	4.214	3.530	4.214	205.803	2.82	75.1	7.513	213.316	101.56	600	0.30%	336.308	0.578	Ok	1.189	1.249	Ok
Reid Drive North	SAP33078	SAP33011				1001	1001	4.999	3.800	4.999	13.035	31.08	31.1	3.108	16.143	20.17	375	0.38%	108.081	0.261	Ok	0.979	0.660	Ok
Reid Drive South	SAP33056	SAP33011				1036	1036	4.964	3.790	4.964	13.400	32.17	32.2	3.217	16.617	109.69	375	0.82%	158.768	0.218	Ok	1.438	0.874	Ok
Mapleview Drive	SAP33011	SAP33010				0	4389	3.720	3.297	3.720	222.514		138.4	13.838	236.352	104.68	600	0.30%	336.308	0.618	Ok	1.189	1.271	Ok
191 Mapleview	SAP33090	SAP33010				109	109	7.786	4.233	7.786	2.215	3.39	3.4	0.339	2.554	22.29	200	14.72%	125.837	0.098	Ok	4.006	1.524	Ok
Mapleview Drive	SAP33010	SAP33009				0	4498	3.701	3.287	3.701	223.358		141.8	14.177	237.535	105.50	600	0.30%	336.308	0.620	Ok	1.189	1.272	Ok
Mapleview Drive	SAP33009	SAP33008				0	4498	3.701	3.287	3.701	223.358		141.8	14.177	237.535	102.65	600	0.31%	341.867	0.613	Ok	1.209	1.289	Ok
Mapleview Drive	SAP33008	SAP32011				30	4528	3.697	3.285	3.697	223.587	0.92	142.7	14.269	237.856	106.51	600	0.29%	330.655	0.627	Ok	1.169	1.256	Ok

DATE: CALCULATED BY: CHECKED BY:

Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 180 L/s per peak flows in provided records.
(2) Design Sheet models the existing condition sewers w/ future population projections

DRAFT

SANITARY SEWER DESIGN SHEET No. 5

Development Details Basis

2041 - Projections w/o Subject Site
DESIGN SHEET SPS at 221 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									221.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	222.350	2.54	2.5	0.254	222.604	28.01	450	0.92%	273.464	0.685	Ok	1.719	1.915	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	222.717	0.89	3.4	0.343	223.060	47.54	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	223.005	0.62	4.1	0.405	223.410	110.70	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	121.20	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	94.88	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	93.41	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				295	492	5.763	3.978	5.763	228.378	10.20	17.7	1.770	230.148	95.92	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
	SAP33015	SAP33014				0	492	5.763	3.978	5.763	228.378		17.7	1.770	230.148	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	1464	4.633	3.687	4.633	238.666		51.3	5.130	243.796	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2031	4.339	3.581	4.339	243.950		72.3	7.231	251.181	104.61	600	0.31%	341.867	0.637	Ok	1.209	1.313	Ok
Mapleview Drive	SAP33012	SAP33011				82	2113	4.305	3.567	4.305	244.686	2.82	75.1	7.513	252.199	101.56	600	0.30%	336.308	0.646	Ok	1.189	1.297	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	3944	3.800	3.339	3.800	260.026		138.4	13.838	273.864	104.68	600	0.30%	336.308	0.685	Ok	1.189	1.313	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4042	3.781	3.329	3.781	260.801		141.8	14.177	274.978	105.50	600	0.30%	336.308	0.687	Ok	1.189	1.314	Ok
Mapleview Drive	SAP33009	SAP33008				0	4042	3.781	3.329	3.781	260.801		141.8	14.177	274.978	102.65	600	0.31%	341.867	0.679	Ok	1.209	1.331	Ok
Mapleview Drive	SAP33008	SAP32011				27	4068	3.776	3.327	3.776	261.011	0.92	142.7	14.269	275.280	106.51	600	0.29%	330.655	0.696	Ok	1.169	1.296	Ok

DATE: CALCULATED BY: CHECKED BY:

Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 221 L/s per maximum pumping capacity
(2) Design Sheet models the existing condition sewers w/ future population projections

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SANITARY SEWER DESIGN SHEET No. 6

Development Details Basis

2071 - Projections w/o Subject Site
DESIGN SHEET SPS at 221 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									221.000													
	SAP33022	SAP33021				65	65	8.625	4.290	8.625	222.471	2.54	2.5	0.254	222.725	28.01	450	0.92%	273.464	0.685	Ok	1.719	1.916	Ok
	SAP33021	SAP33020				23	88	8.122	4.258	8.122	222.870	0.89	3.4	0.343	223.213	47.54	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33020	SAP33019				19	107	7.813	4.235	7.813	223.184	0.62	4.1	0.405	223.589	110.70	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33019	SAP33018				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	121.20	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
	SAP33018	SAP33017				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	94.88	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
	SAP33017	SAP33016				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	93.41	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
281 Mapleview	SAP33096	SAP33016				111	111	7.759	4.231	7.759	2.246	3.45	3.5	0.345	2.591	29.05	375	0.41%	112.266	0.104	Ok	1.016	0.400	Check
Mapleview Drive	SAP33016	SAP33015				329	547	5.641	3.954	5.641	229.038	10.20	17.7	1.770	230.808	95.92	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
	SAP33015	SAP33014				0	547	5.641	3.954	5.641	229.038		17.7	1.770	230.808	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				1083	1083	4.921	3.778	4.921	13.874	33.60	33.6	3.360	17.234	18.71	250	1.50%	72.833	0.331	Ok	1.484	1.141	Ok
Mapleview Drive	SAP33014	SAP33013				0	1630	4.535	3.653	4.535	240.245		51.3	5.130	245.375	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				574	574	5.587	3.943	5.587	8.354	19.26	19.3	1.926	10.280	24.46	375	1.50%	214.735	0.148	Ok	1.944	0.937	Ok
231 Mapleview	SAP33093	SAP33013				56	56	8.887	4.304	8.887	1.305	1.75	1.8	0.175	1.480	24.46	375	1.50%	214.735	0.059	Ok	1.944	0.531	Check
Mapleview Drive	SAP33013	SAP33012				0	2260	4.248	3.544	4.248	246.002		72.3	7.231	253.233	104.61	600	0.31%	341.867	0.640	Ok	1.209	1.316	Ok
Mapleview Drive	SAP33012	SAP33011				91	2351	4.214	3.530	4.214	246.803	2.82	75.1	7.513	254.316	101.56	600	0.30%	336.308	0.649	Ok	1.189	1.299	Ok
Reid Drive North	SAP33078	SAP33011				1001	1001	4.999	3.800	4.999	13.035	31.08	31.1	3.108	16.143	20.17	375	0.38%	108.081	0.261	Ok	0.979	0.660	Ok
Reid Drive South	SAP33056	SAP33011				1036	1036	4.964	3.790	4.964	13.400	32.17	32.2	3.217	16.617	109.69	375	0.82%	158.768	0.218	Ok	1.438	0.874	Ok
Mapleview Drive	SAP33011	SAP33010				0	4389	3.720	3.297	3.720	263.514		138.4	13.838	277.352	104.68	600	0.30%	336.308	0.692	Ok	1.189	1.316	Ok
191 Mapleview	SAP33090	SAP33010				109	109	7.786	4.233	7.786	2.215	3.39	3.4	0.339	2.554	22.29	200	14.72%	125.837	0.098	Ok	4.006	1.524	Ok
Mapleview Drive	SAP33010	SAP33009				0	4498	3.701	3.287	3.701	264.358		141.8	14.177	278.535	105.50	600	0.30%	336.308	0.694	Ok	1.189	1.317	Ok
Mapleview Drive	SAP33009	SAP33008				0	4498	3.701	3.287	3.701	264.358		141.8	14.177	278.535	102.65	600	0.31%	341.867	0.685	Ok	1.209	1.335	Ok
Mapleview Drive	SAP33008	SAP32011				30	4528	3.697	3.285	3.697	264.587	0.92	142.7	14.269	278.856	106.51	600	0.29%	330.655	0.703	Check	1.169	1.299	Ok

DATE: CALCULATED BY: CHECKED BY:

Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 221 L/s per maximum pumping capacity
(2) Design Sheet models the existing condition sewers w/ future population projections

DRAFT

SANITARY SEWER DESIGN SHEET No. 7

Development Details Basis

2041 - Projected Upgrades w/o Subject Site
DESIGN SHEET SPS at 221 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									221.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	222.350	2.54	2.5	0.254	222.604	28.01	450	0.92%	273.464	0.685	Ok	1.719	1.915	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	222.717	0.89	3.4	0.343	223.060	47.54	600	0.19%	267.641	0.697	Ok	0.947	1.059	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	223.005	0.62	4.1	0.405	223.410	110.70	600	0.19%	267.641	0.698	Ok	0.947	1.059	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	121.20	600	0.21%	281.375	0.672	Ok	0.995	1.103	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	94.88	675	0.18%	356.631	0.573	Ok	0.997	1.051	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	93.41	675	0.21%	385.206	0.546	Ok	1.076	1.116	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				295	492	5.763	3.978	5.763	228.378	10.20	17.7	1.770	230.148	95.92	675	0.18%	356.631	0.584	Ok	0.997	1.057	Ok
	SAP33015	SAP33014				0	492	5.763	3.978	5.763	228.378		17.7	1.770	230.148	95.89	675	0.18%	356.631	0.584	Ok	0.997	1.057	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	1464	4.633	3.687	4.633	238.666		51.3	5.130	243.796	94.93	675	0.19%	366.404	0.596	Ok	1.024	1.091	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2031	4.339	3.581	4.339	243.950		72.3	7.231	251.181	104.61	600	0.31%	341.867	0.637	Ok	1.209	1.313	Ok
Mapleview Drive	SAP33012	SAP33011				82	2113	4.305	3.567	4.305	244.686	2.82	75.1	7.513	252.199	101.56	600	0.30%	336.308	0.646	Ok	1.189	1.297	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	3944	3.800	3.339	3.800	260.026		138.4	13.838	273.864	104.68	600	0.30%	336.308	0.685	Ok	1.189	1.313	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4042	3.781	3.329	3.781	260.801		141.8	14.177	274.978	105.50	600	0.30%	336.308	0.687	Ok	1.189	1.314	Ok
Mapleview Drive	SAP33009	SAP33008				0	4042	3.781	3.329	3.781	260.801		141.8	14.177	274.978	102.65	600	0.31%	341.867	0.679	Ok	1.209	1.331	Ok
Mapleview Drive	SAP33008	SAP32011				27	4068	3.776	3.327	3.776	261.011	0.92	142.7	14.269	275.280	106.51	600	0.29%	330.655	0.696	Ok	1.169	1.296	Ok

DATE: CALCULATED BY: CHECKED BY:

Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 221 L/s per maximum pumping capacity
(2) Design Sheet Models proposed sewer upgrades w/ future population projections (w/o subject site)
(3) = upgraded sewer

SANITARY SEWER DESIGN SHEET No. 8

Development Details Basis

2071 - Projected Upgrades w/o Subject Site
DESIGN SHEET SPS at 221 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									221.000													
	SAP33022	SAP33021				65	65	8.625	4.290	8.625	222.471	2.54	2.5	0.254	222.725	28.01	450	0.92%	273.464	0.685	Ok	1.719	1.916	Ok
	SAP33021	SAP33020				23	88	8.122	4.258	8.122	222.870	0.89	3.4	0.343	223.213	47.54	600	0.19%	267.641	0.697	Ok	0.947	1.059	Ok
	SAP33020	SAP33019				19	107	7.813	4.235	7.813	223.184	0.62	4.1	0.405	223.589	110.70	600	0.19%	267.641	0.698	Ok	0.947	1.059	Ok
	SAP33019	SAP33018				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	121.20	600	0.21%	281.375	0.673	Ok	0.995	1.104	Ok
	SAP33018	SAP33017				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	94.88	675	0.18%	356.631	0.573	Ok	0.997	1.052	Ok
	SAP33017	SAP33016				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	93.41	675	0.21%	385.206	0.546	Ok	1.076	1.116	Ok
281 Mapleview	SAP33096	SAP33016				111	111	7.759	4.231	7.759	2.246	3.45	3.5	0.345	2.591	29.05	375	0.41%	112.266	0.104	Ok	1.016	0.400	Check
Mapleview Drive	SAP33016	SAP33015				329	547	5.641	3.954	5.641	229.038	10.20	17.7	1.770	230.808	95.92	675	0.18%	356.631	0.585	Ok	0.997	1.058	Ok
	SAP33015	SAP33014				0	547	5.641	3.954	5.641	229.038		17.7	1.770	230.808	95.89	675	0.18%	356.631	0.585	Ok	0.997	1.058	Ok
251 Mapleview	SAP33085	SAP33014				1083	1083	4.921	3.778	4.921	13.874	33.60	33.6	3.360	17.234	18.71	250	1.50%	72.833	0.331	Ok	1.484	1.141	Ok
Mapleview Drive	SAP33014	SAP33013				0	1630	4.535	3.653	4.535	240.245		51.3	5.130	245.375	94.93	675	0.19%	366.404	0.598	Ok	1.024	1.092	Ok
300 Mapleview	EX MH	SAP33013				574	574	5.587	3.943	5.587	8.354	19.26	19.3	1.926	10.280	24.46	375	1.50%	214.735	0.148	Ok	1.944	0.937	Ok
231 Mapleview	SAP33093	SAP33013				56	56	8.887	4.304	8.887	1.305	1.75	1.8	0.175	1.480	24.46	375	1.50%	214.735	0.059	Ok	1.944	0.531	Check
Mapleview Drive	SAP33013	SAP33012				0	2260	4.248	3.544	4.248	246.002		72.3	7.231	253.233	104.61	600	0.31%	341.867	0.640	Ok	1.209	1.316	Ok
Mapleview Drive	SAP33012	SAP33011				91	2351	4.214	3.530	4.214	246.803	2.82	75.1	7.513	254.316	101.56	600	0.30%	336.308	0.649	Ok	1.189	1.299	Ok
Reid Drive North	SAP33078	SAP33011				1001	1001	4.999	3.800	4.999	13.035	31.08	31.1	3.108	16.143	20.17	375	0.38%	108.081	0.261	Ok	0.979	0.660	Ok
Reid Drive South	SAP33056	SAP33011				1036	1036	4.964	3.790	4.964	13.400	32.17	32.2	3.217	16.617	109.69	375	0.82%	158.768	0.218	Ok	1.438	0.874	Ok
Mapleview Drive	SAP33011	SAP33010				0	4389	3.720	3.297	3.720	263.514		138.4	13.838	277.352	104.68	600	0.30%	336.308	0.692	Ok	1.189	1.316	Ok
191 Mapleview	SAP33090	SAP33010				109	109	7.786	4.233	7.786	2.215	3.39	3.4	0.339	2.554	22.29	200	14.72%	125.837	0.098	Ok	4.006	1.524	Ok
Mapleview Drive	SAP33010	SAP33009				0	4498	3.701	3.287	3.701	264.358		141.8	14.177	278.535	105.50	600	0.30%	336.308	0.694	Ok	1.189	1.317	Ok
Mapleview Drive	SAP33009	SAP33008				0	4498	3.701	3.287	3.701	264.358		141.8	14.177	278.535	102.65	600	0.31%	341.867	0.685	Ok	1.209	1.335	Ok
Mapleview Drive	SAP33008	SAP32011				30	4528	3.697	3.285	3.697	264.587	0.92	142.7	14.269	278.856	106.51	600	0.29%	330.655	0.703	Check	1.169	1.299	Ok

DATE: CALCULATED BY: CHECKED BY:

Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 221 L/s per maximum pumping capacity
(2) Design Sheet Models proposed sewer upgrades w/ future population projections (w/o subject site)
(3) = upgraded sewer

SANITARY SEWER DESIGN SHEET No. 9

Development Details Basis

2041 - Projections w/o Subject Site
DESIGN SHEET SPS Controlled
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									164.660													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	166.010	2.54	2.5	0.254	166.264	28.01	450	0.92%	273.464	0.562	Ok	1.719	1.802	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	166.377	0.89	3.4	0.343	166.720	47.54	525	0.19%	187.460	0.734	Check	0.866	0.978	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	166.665	0.62	4.1	0.405	167.070	110.70	525	0.19%	187.460	0.735	Check	0.866	0.978	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	166.665		4.1	0.405	167.070	121.20	525	0.21%	197.079	0.706	Check	0.910	1.021	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	166.665		4.1	0.405	167.070	94.88	525	0.18%	182.460	0.752	Check	0.843	0.956	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	166.665		4.1	0.405	167.070	93.41	525	0.21%	197.079	0.706	Check	0.910	1.021	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				295	492	5.763	3.978	5.763	172.038	10.20	17.7	1.770	173.808	95.92	525	0.18%	182.460	0.780	Check	0.843	0.959	Ok
	SAP33015	SAP33014				0	492	5.763	3.978	5.763	172.038		17.7	1.770	173.808	95.89	525	0.18%	182.460	0.780	Check	0.843	0.959	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	1464	4.633	3.687	4.633	182.326		51.3	5.130	187.456	94.93	525	0.19%	187.460	0.819	Check	0.866	0.987	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2031	4.339	3.581	4.339	187.610		72.3	7.231	194.841	104.61	600	0.31%	341.867	0.540	Ok	1.209	1.237	Ok
Mapleview Drive	SAP33012	SAP33011				82	2113	4.305	3.567	4.305	188.346	2.82	75.1	7.513	195.859	101.56	600	0.30%	336.308	0.548	Ok	1.189	1.223	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	3944	3.800	3.339	3.800	203.686		138.4	13.838	217.524	104.68	600	0.30%	336.308	0.585	Ok	1.189	1.246	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4042	3.781	3.329	3.781	204.461		141.8	14.177	218.638	105.50	600	0.30%	336.308	0.587	Ok	1.189	1.246	Ok
Mapleview Drive	SAP33009	SAP33008				0	4042	3.781	3.329	3.781	204.461		141.8	14.177	218.638	102.65	600	0.31%	341.867	0.581	Ok	1.209	1.263	Ok
Mapleview Drive	SAP33008	SAP32011				27	4068	3.776	3.327	3.776	204.671	0.92	142.7	14.269	218.940	106.51	600	0.29%	330.655	0.594	Ok	1.169	1.231	Ok

DATE: CALCULATED BY: CHECKED BY:

Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow reduced to maintain 100% capacity in sewers.
(2) Design Sheet models the existing condition sewers w/ future population projections

DRAFT

SANITARY SEWER DESIGN SHEET No. 10

Development Details Basis

2071 - Projections w/o Subject Site
DESIGN SHEET SPS Controlled
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									163.080													
	SAP33022	SAP33021				65	65	8.625	4.290	8.625	164.551	2.54	2.5	0.254	164.805	28.01	450	0.92%	273.464	0.559	Ok	1.719	1.798	Ok
	SAP33021	SAP33020				23	88	8.122	4.258	8.122	164.950	0.89	3.4	0.343	165.293	47.54	525	0.19%	187.460	0.729	Check	0.866	0.977	Ok
	SAP33020	SAP33019				19	107	7.813	4.235	7.813	165.264	0.62	4.1	0.405	165.669	110.70	525	0.19%	187.460	0.730	Check	0.866	0.977	Ok
	SAP33019	SAP33018				0	107	7.813	4.235	7.813	165.264		4.1	0.405	165.669	121.20	525	0.21%	197.079	0.702	Check	0.910	1.019	Ok
	SAP33018	SAP33017				0	107	7.813	4.235	7.813	165.264		4.1	0.405	165.669	94.88	525	0.18%	182.460	0.747	Check	0.843	0.954	Ok
	SAP33017	SAP33016				0	107	7.813	4.235	7.813	165.264		4.1	0.405	165.669	93.41	525	0.21%	197.079	0.702	Check	0.910	1.019	Ok
281 Mapleview	SAP33096	SAP33016				111	111	7.759	4.231	7.759	2.246	3.45	3.5	0.345	2.591	29.05	375	0.41%	112.266	0.104	Ok	1.016	0.400	Check
Mapleview Drive	SAP33016	SAP33015				329	547	5.641	3.954	5.641	171.118	10.20	17.7	1.770	172.888	95.92	525	0.18%	182.460	0.776	Check	0.843	0.958	Ok
	SAP33015	SAP33014				0	547	5.641	3.954	5.641	171.118		17.7	1.770	172.888	95.89	525	0.18%	182.460	0.776	Check	0.843	0.958	Ok
251 Mapleview	SAP33085	SAP33014				1083	1083	4.921	3.778	4.921	13.874	33.60	33.6	3.360	17.234	18.71	250	1.50%	72.833	0.331	Ok	1.484	1.141	Ok
Mapleview Drive	SAP33014	SAP33013				0	1630	4.535	3.653	4.535	182.325		51.3	5.130	187.455	94.93	525	0.19%	187.460	0.819	Check	0.866	0.987	Ok
300 Mapleview	EX MH	SAP33013				574	574	5.587	3.943	5.587	8.354	19.26	19.3	1.926	10.280	24.46	375	1.50%	214.735	0.148	Ok	1.944	0.937	Ok
231 Mapleview	SAP33093	SAP33013				56	56	8.887	4.304	8.887	1.305	1.75	1.8	0.175	1.480	24.46	375	1.50%	214.735	0.059	Ok	1.944	0.531	Check
Mapleview Drive	SAP33013	SAP33012				0	2260	4.248	3.544	4.248	188.082		72.3	7.231	195.313	104.61	600	0.31%	341.867	0.541	Ok	1.209	1.238	Ok
Mapleview Drive	SAP33012	SAP33011				91	2351	4.214	3.530	4.214	188.883	2.82	75.1	7.513	196.396	101.56	600	0.30%	336.308	0.548	Ok	1.189	1.224	Ok
Reid Drive North	SAP33078	SAP33011				1001	1001	4.999	3.800	4.999	13.035	31.08	31.1	3.108	16.143	20.17	375	0.38%	108.081	0.261	Ok	0.979	0.660	Ok
Reid Drive South	SAP33056	SAP33011				1036	1036	4.964	3.790	4.964	13.400	32.17	32.2	3.217	16.617	109.69	375	0.82%	158.768	0.218	Ok	1.438	0.874	Ok
Mapleview Drive	SAP33011	SAP33010				0	4389	3.720	3.297	3.720	205.594		138.4	13.838	219.432	104.68	600	0.30%	336.308	0.588	Ok	1.189	1.248	Ok
191 Mapleview	SAP33090	SAP33010				109	109	7.786	4.233	7.786	2.215	3.39	3.4	0.339	2.554	22.29	200	14.72%	125.837	0.098	Ok	4.006	1.524	Ok
Mapleview Drive	SAP33010	SAP33009				0	4498	3.701	3.287	3.701	206.438		141.8	14.177	220.615	105.50	600	0.30%	336.308	0.590	Ok	1.189	1.250	Ok
Mapleview Drive	SAP33009	SAP33008				0	4498	3.701	3.287	3.701	206.438		141.8	14.177	220.615	102.65	600	0.31%	341.867	0.584	Ok	1.209	1.265	Ok
Mapleview Drive	SAP33008	SAP32011				30	4528	3.697	3.285	3.697	206.667	0.92	142.7	14.269	220.936	106.51	600	0.29%	330.655	0.597	Ok	1.169	1.233	Ok

DATE: CALCULATED BY: CHECKED BY:

Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow reduced to maintain 100% capacity in sewers.
(2) Design Sheet models the existing condition sewers w/ future population projections

DRAFT

SANITARY SEWER DESIGN SHEET No. 11

Development Details Basis

DESIGN SHEET: Existing Conditions + Subject Site North Block
SPS at 112 L/s

FILE NO: 422433

CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.

$Q_i = I*A$ — (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									112.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	113.350	2.54	2.5	0.254	113.604	28.01	450	0.92%	273.464	0.449	Ok	1.719	1.638	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	113.717	0.89	3.4	0.343	114.060	47.54	525	0.19%	187.460	0.563	Ok	0.866	0.907	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	114.005	0.62	4.1	0.405	114.410	110.70	525	0.19%	187.460	0.564	Ok	0.866	0.908	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	121.20	525	0.21%	197.079	0.546	Ok	0.910	0.943	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	94.88	525	0.18%	182.460	0.573	Ok	0.843	0.889	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	93.41	525	0.21%	197.079	0.546	Ok	0.910	0.943	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	115.540		7.5	0.750	116.290	95.92	525	0.18%	182.460	0.579	Ok	0.843	0.892	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**0**	**0**	**1.67**	0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356									
Subject Site - Commercial		**SAP33015**				0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356	15.00	300	0.40%	61.159	0.353	Ok	0.865	0.719	Ok
	SAP33015	SAP33014				0	1423	4.659	3.696	4.659	129.270		17.7	1.770	131.040	95.89	525	0.18%	182.460	0.627	Ok	0.843	0.914	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	2396	4.198	3.523	4.198	138.196		51.3	5.130	143.326	94.93	525	0.19%	187.460	0.654	Ok	0.866	0.947	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2963	4.024	3.447	4.024	143.044		72.3	7.231	150.275	104.61	600	0.31%	341.867	0.463	Ok	1.209	1.155	Ok
Mapleview Drive	SAP33012	SAP33011				82	3044	4.002	3.437	4.002	143.727	2.82	75.1	7.513	151.240	101.56	600	0.30%	336.308	0.470	Ok	1.189	1.142	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	4875	3.642	3.255	3.642	158.242		138.4	13.838	172.080	104.68	600	0.30%	336.308	0.506	Ok	1.189	1.171	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4973	3.628	3.247	3.628	158.986		141.8	14.177	173.163	105.50	600	0.30%	336.308	0.508	Ok	1.189	1.172	Ok
Mapleview Drive	SAP33009	SAP33008				0	4973	3.628	3.247	3.628	158.986		141.8	14.177	173.163	102.65	600	0.31%	341.867	0.503	Ok	1.209	1.187	Ok
Mapleview Drive	SAP33008	SAP32011				27	5000	3.624	3.245	3.624	159.187	0.92	142.7	14.269	173.456	106.51	600	0.29%	330.655	0.514	Ok	1.169	1.158	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) This "existing" condition sheet conservatively applies the pro-rated 2041 population distribution + Subject Site Flows
(2) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records
(3) Design Sheet models the existing condition (existing sewers)

SANITARY SEWER DESIGN SHEET No. 12

Development Details Basis

DESIGN SHEET: 2041 - Projection + Full Subject Site SPS at 112 L/s

FILE NO: 422433

CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

Q_p = P*q*M/86400 — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.

Q_i = I*A — (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									112.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	113.350	2.54	2.5	0.254	113.604	28.01	450	0.92%	273.464	0.449	Ok	1.719	1.638	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	113.717	0.89	3.4	0.343	114.060	47.54	525	0.19%	187.460	0.563	Ok	0.866	0.907	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	114.005	0.62	4.1	0.405	114.410	110.70	525	0.19%	187.460	0.564	Ok	0.866	0.908	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	121.20	525	0.21%	197.079	0.546	Ok	0.910	0.943	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	94.88	525	0.18%	182.460	0.573	Ok	0.843	0.889	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	93.41	525	0.21%	197.079	0.546	Ok	0.910	0.943	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	115.540		7.5	0.750	116.290	95.92	525	0.18%	182.460	0.579	Ok	0.843	0.892	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.009		10.2	1.020	44.029	15.00	300	0.40%	61.159	0.628	Check	0.865	0.937	Ok
	SAP33015	SAP33014				0	4649	3.677	3.274	3.677	156.520		17.7	1.770	158.290	95.89	525	0.18%	182.460	0.719	Check	0.843	0.947	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	5622	3.540	3.197	3.540	163.827		51.3	5.130	168.957	94.93	525	0.19%	187.460	0.742	Check	0.866	0.976	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	6189	3.473	3.158	3.473	167.965		72.3	7.231	175.196	104.61	600	0.31%	341.867	0.507	Ok	1.209	1.203	Ok
Mapleview Drive	SAP33012	SAP33011				82	6270	3.463	3.153	3.463	168.555	2.82	75.1	7.513	176.068	101.56	600	0.30%	336.308	0.513	Ok	1.189	1.189	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	8101	3.290	3.045	3.290	181.420		138.4	13.838	195.258	104.68	600	0.30%	336.308	0.547	Ok	1.189	1.212	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	8199	3.283	3.040	3.283	182.092		141.8	14.177	196.269	105.50	600	0.30%	336.308	0.548	Ok	1.189	1.213	Ok
Mapleview Drive	SAP33009	SAP33008				0	8199	3.283	3.040	3.283	182.092		141.8	14.177	196.269	102.65	600	0.31%	341.867	0.543	Ok	1.209	1.228	Ok
Mapleview Drive	SAP33008	SAP32011				27	8226	3.280	3.038	3.280	182.274	0.92	142.7	14.269	196.543	106.51	600	0.29%	330.655	0.555	Ok	1.169	1.197	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:

(1) without extraneous flow

(2) with extraneous flow

(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375

(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records

(2) Design Sheet models the existing condition sewers w/ future population projections + Subject Site

SANITARY SEWER DESIGN SHEET No. 13

Development Details Basis

DESIGN SHEET: 2071 - Projection + Full Subject Site SPS at 112 L/s
FILE NO: 422433
CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations
M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

Q_p = P*q*M/86400 — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.
Q_i = I*A — (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									112.000													
	SAP33022	SAP33021				65	65	8.625	4.290	8.625	113.471	2.54	2.5	0.254	113.725	28.01	450	0.92%	273.464	0.449	Ok	1.719	1.639	Ok
	SAP33021	SAP33020				23	88	8.122	4.258	8.122	113.870	0.89	3.4	0.343	114.213	47.54	525	0.19%	187.460	0.563	Ok	0.866	0.907	Ok
	SAP33020	SAP33019				19	107	7.813	4.235	7.813	114.184	0.62	4.1	0.405	114.589	110.70	525	0.19%	187.460	0.564	Ok	0.866	0.908	Ok
	SAP33019	SAP33018				0	107	7.813	4.235	7.813	114.184		4.1	0.405	114.589	121.20	525	0.21%	197.079	0.547	Ok	0.910	0.944	Ok
	SAP33018	SAP33017				0	107	7.813	4.235	7.813	114.184		4.1	0.405	114.589	94.88	525	0.18%	182.460	0.574	Ok	0.843	0.889	Ok
	SAP33017	SAP33016				0	107	7.813	4.235	7.813	114.184		4.1	0.405	114.589	93.41	525	0.21%	197.079	0.547	Ok	0.910	0.944	Ok
281 Mapleview	SAP33096	SAP33016				111	111	7.759	4.231	7.759	2.246	3.45	3.5	0.345	2.591	29.05	375	0.41%	112.266	0.104	Ok	1.016	0.400	Check
Mapleview Drive	SAP33016	SAP33015				0	219	6.778	4.134	6.778	115.857		7.5	0.750	116.607	95.92	525	0.18%	182.460	0.580	Ok	0.843	0.892	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.009		10.2	1.020	44.029	15.00	300	0.40%	61.159	0.628	Check	0.865	0.937	Ok
	SAP33015	SAP33014				0	4672	3.673	3.272	3.673	156.689		17.7	1.770	158.459	95.89	525	0.18%	182.460	0.720	Check	0.843	0.947	Ok
251 Mapleview	SAP33085	SAP33014				1083	1083	4.921	3.778	4.921	13.874	33.60	33.6	3.360	17.234	18.71	250	1.50%	72.833	0.331	Ok	1.484	1.141	Ok
Mapleview Drive	SAP33014	SAP33013				0	5754	3.524	3.188	3.524	164.798		51.3	5.130	169.928	94.93	525	0.19%	187.460	0.746	Check	0.866	0.977	Ok
300 Mapleview	EX MH	SAP33013				574	574	5.587	3.943	5.587	8.354	19.26	19.3	1.926	10.280	24.46	375	1.50%	214.735	0.148	Ok	1.944	0.937	Ok
231 Mapleview	SAP33093	SAP33013				56	56	8.887	4.304	8.887	1.305	1.75	1.8	0.175	1.480	24.46	375	1.50%	214.735	0.059	Ok	1.944	0.531	Check
Mapleview Drive	SAP33013	SAP33012				0	6385	3.451	3.145	3.451	169.379		72.3	7.231	176.610	104.61	600	0.31%	341.867	0.509	Ok	1.209	1.206	Ok
Mapleview Drive	SAP33012	SAP33011				91	6476	3.441	3.139	3.441	170.031	2.82	75.1	7.513	177.544	101.56	600	0.30%	336.308	0.516	Ok	1.189	1.192	Ok
Reid Drive North	SAP33078	SAP33011				1001	1001	4.999	3.800	4.999	13.035	31.08	31.1	3.108	16.143	20.17	375	0.38%	108.081	0.261	Ok	0.979	0.660	Ok
Reid Drive South	SAP33056	SAP33011				1036	1036	4.964	3.790	4.964	13.400	32.17	32.2	3.217	16.617	109.69	375	0.82%	158.768	0.218	Ok	1.438	0.874	Ok
Mapleview Drive	SAP33011	SAP33010				0	8513	3.258	3.024	3.258	184.231		138.4	13.838	198.069	104.68	600	0.30%	336.308	0.551	Ok	1.189	1.216	Ok
191 Mapleview	SAP33090	SAP33010				109	109	7.786	4.233	7.786	2.215	3.39	3.4	0.339	2.554	22.29	200	14.72%	125.837	0.098	Ok	4.006	1.524	Ok
Mapleview Drive	SAP33010	SAP33009				0	8623	3.250	3.018	3.250	184.971		141.8	14.177	199.148	105.50	600	0.30%	336.308	0.553	Ok	1.189	1.217	Ok
Mapleview Drive	SAP33009	SAP33008				0	8623	3.250	3.018	3.250	184.971		141.8	14.177	199.148	102.65	600	0.31%	341.867	0.548	Ok	1.209	1.233	Ok
Mapleview Drive	SAP33008	SAP32011				30	8652	3.247	3.017	3.247	185.172	0.92	142.7	14.269	199.441	106.51	600	0.29%	330.655	0.560	Ok	1.169	1.202	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records
(2) Design Sheet models the existing condition sewers w/ future population projections + Subject Site

DRAFT

SANITARY SEWER DESIGN SHEET No. 14

Development Details Basis

DESIGN SHEET: Existing Conditions + Subject Site North Block SPS at 180 L/s
FILE NO: 422433
CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations
M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

Q_p = P*q*M/86400 — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.
Q_i = I*A — (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									180.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	181.350	2.54	2.5	0.254	181.604	28.01	450	0.92%	273.464	0.595	Ok	1.719	1.838	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	181.717	0.89	3.4	0.343	182.060	47.54	525	0.19%	187.460	0.794	Check	0.866	0.987	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	182.005	0.62	4.1	0.405	182.410	110.70	525	0.19%	187.460	0.796	Check	0.866	0.987	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	121.20	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	94.88	525	0.18%	182.460	0.819	Check	0.843	0.961	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	93.41	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	183.540		7.5	0.750	184.290	95.92	525	0.18%	182.460	0.829	Check	0.843	0.961	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**0**	**0**	**1.67**	0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356									
Subject Site - Commercial		**SAP33015**				0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356	15.00	300	0.40%	61.159	0.353	Ok	0.865	0.719	Ok
	SAP33015	SAP33014				0	1423	4.659	3.696	4.659	197.270		17.7	1.770	199.040	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	2396	4.198	3.523	4.198	206.196		51.3	5.130	211.326	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2963	4.024	3.447	4.024	211.044		72.3	7.231	218.275	104.61	600	0.31%	341.867	0.580	Ok	1.209	1.272	Ok
Mapleview Drive	SAP33012	SAP33011				82	3044	4.002	3.437	4.002	211.727	2.82	75.1	7.513	219.240	101.56	600	0.30%	336.308	0.588	Ok	1.189	1.257	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	4875	3.642	3.255	3.642	226.242		138.4	13.838	240.080	104.68	600	0.30%	336.308	0.624	Ok	1.189	1.276	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4973	3.628	3.247	3.628	226.986		141.8	14.177	241.163	105.50	600	0.30%	336.308	0.626	Ok	1.189	1.276	Ok
Mapleview Drive	SAP33009	SAP33008				0	4973	3.628	3.247	3.628	226.986		141.8	14.177	241.163	102.65	600	0.31%	341.867	0.619	Ok	1.209	1.293	Ok
Mapleview Drive	SAP33008	SAP32011				27	5000	3.624	3.245	3.624	227.187	0.92	142.7	14.269	241.456	106.51	600	0.29%	330.655	0.634	Ok	1.169	1.260	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) This "existing" condition sheet conservatively applies the pro-rated 2041 population distribution + Subject Site Flows
(2) Holly SPS flow assumed to be 180 L/s per maximum pumping capacity
(3) Design Sheet models the existing condition (existing sewers)

SANITARY SEWER DESIGN SHEET No. 15

Development Details Basis

DESIGN SHEET: 2041 - Projection + Full Subject Site SPS at 180 L/s

FILE NO: 422433

CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.

$Q_i = I*A$ — (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									180.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	181.350	2.54	2.5	0.254	181.604	28.01	450	0.92%	273.464	0.595	Ok	1.719	1.838	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	181.717	0.89	3.4	0.343	182.060	47.54	525	0.19%	187.460	0.794	Check	0.866	0.987	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	182.005	0.62	4.1	0.405	182.410	110.70	525	0.19%	187.460	0.796	Check	0.866	0.987	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	121.20	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	94.88	525	0.18%	182.460	0.819	Check	0.843	0.961	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	93.41	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	183.540		7.5	0.750	184.290	95.92	525	0.18%	182.460	0.829	Check	0.843	0.961	Ok
Subject Site - Medium Density Res.	**SAP33015**		**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.	**SAP33015**		**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial	**SAP33015**					17	4453	3.709	3.291	3.709	43.009		10.2	1.020	44.029	15.00	300	0.40%	61.159	0.628	Check	0.865	0.937	Ok
	SAP33015	SAP33014				0	4649	3.677	3.274	3.677	224.520		17.7	1.770	226.290	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	5622	3.540	3.197	3.540	231.827		51.3	5.130	236.957	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	6189	3.473	3.158	3.473	235.965		72.3	7.231	243.196	104.61	600	0.31%	341.867	0.623	Ok	1.209	1.304	Ok
Mapleview Drive	SAP33012	SAP33011				82	6270	3.463	3.153	3.463	236.555	2.82	75.1	7.513	244.068	101.56	600	0.30%	336.308	0.631	Ok	1.189	1.288	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	8101	3.290	3.045	3.290	249.420		138.4	13.838	263.258	104.68	600	0.30%	336.308	0.665	Ok	1.189	1.302	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	8199	3.283	3.040	3.283	250.092		141.8	14.177	264.269	105.50	600	0.30%	336.308	0.667	Ok	1.189	1.303	Ok
Mapleview Drive	SAP33009	SAP33008				0	8199	3.283	3.040	3.283	250.092		141.8	14.177	264.269	102.65	600	0.31%	341.867	0.660	Ok	1.209	1.320	Ok
Mapleview Drive	SAP33008	SAP32011				27	8226	3.280	3.038	3.280	250.274	0.92	142.7	14.269	264.543	106.51	600	0.29%	330.655	0.676	Ok	1.169	1.286	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:

(1) without extraneous flow

(2) with extraneous flow

(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375

(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) Holly SPS flow assumed to be 180 L/s per maximum pumping capacity

(2) Design Sheet models the existing condition sewers w/ future population projections + Subject Site

SANITARY SEWER DESIGN SHEET No. 16

Development Details Basis

2071 - Projection + Full Subject Site
DESIGN SHEET SPS at 180 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013 — Numbers in blue or text in red are equations
M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

Q_p = P*q*M/86400 — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.
Q_i = I*A — (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									180.000													
	SAP33022	SAP33021				65	65	8.625	4.290	8.625	181.471	2.54	2.5	0.254	181.725	28.01	450	0.92%	273.464	0.595	Ok	1.719	1.839	Ok
	SAP33021	SAP33020				23	88	8.122	4.258	8.122	181.870	0.89	3.4	0.343	182.213	47.54	525	0.19%	187.460	0.795	Check	0.866	0.987	Ok
	SAP33020	SAP33019				19	107	7.813	4.235	7.813	182.184	0.62	4.1	0.405	182.589	110.70	525	0.19%	187.460	0.797	Check	0.866	0.987	Ok
	SAP33019	SAP33018				0	107	7.813	4.235	7.813	182.184		4.1	0.405	182.589	121.20	525	0.21%	197.079	0.760	Check	0.910	1.033	Ok
	SAP33018	SAP33017				0	107	7.813	4.235	7.813	182.184		4.1	0.405	182.589	94.88	525	0.18%	182.460	0.820	Check	0.843	0.961	Ok
	SAP33017	SAP33016				0	107	7.813	4.235	7.813	182.184		4.1	0.405	182.589	93.41	525	0.21%	197.079	0.760	Check	0.910	1.033	Ok
281 Mapleview	SAP33096	SAP33016				111	111	7.759	4.231	7.759	2.246	3.45	3.5	0.345	2.591	29.05	375	0.41%	112.266	0.104	Ok	1.016	0.400	Check
Mapleview Drive	SAP33016	SAP33015				0	219	6.778	4.134	6.778	183.857		7.5	0.750	184.607	95.92	525	0.18%	182.460	0.830	Check	0.843	0.961	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.009		10.2	1.020	44.029	15.00	300	0.40%	61.159	0.628	Check	0.865	0.937	Ok
	SAP33015	SAP33014				0	4672	3.673	3.272	3.673	224.689		17.7	1.770	226.459	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				1083	1083	4.921	3.778	4.921	13.874	33.60	33.6	3.360	17.234	18.71	250	1.50%	72.833	0.331	Ok	1.484	1.141	Ok
Mapleview Drive	SAP33014	SAP33013				0	5754	3.524	3.188	3.524	232.798		51.3	5.130	237.928	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				574	574	5.587	3.943	5.587	8.354	19.26	19.3	1.926	10.280	24.46	375	1.50%	214.735	0.148	Ok	1.944	0.937	Ok
231 Mapleview	SAP33093	SAP33013				56	56	8.887	4.304	8.887	1.305	1.75	1.8	0.175	1.480	24.46	375	1.50%	214.735	0.059	Ok	1.944	0.531	Check
Mapleview Drive	SAP33013	SAP33012				0	6385	3.451	3.145	3.451	237.379		72.3	7.231	244.610	104.61	600	0.31%	341.867	0.625	Ok	1.209	1.306	Ok
Mapleview Drive	SAP33012	SAP33011				91	6476	3.441	3.139	3.441	238.031	2.82	75.1	7.513	245.544	101.56	600	0.30%	336.308	0.634	Ok	1.189	1.290	Ok
Reid Drive North	SAP33078	SAP33011				1001	1001	4.999	3.800	4.999	13.035	31.08	31.1	3.108	16.143	20.17	375	0.38%	108.081	0.261	Ok	0.979	0.660	Ok
Reid Drive South	SAP33056	SAP33011				1036	1036	4.964	3.790	4.964	13.400	32.17	32.2	3.217	16.617	109.69	375	0.82%	158.768	0.218	Ok	1.438	0.874	Ok
Mapleview Drive	SAP33011	SAP33010				0	8513	3.258	3.024	3.258	252.231		138.4	13.838	266.069	104.68	600	0.30%	336.308	0.671	Ok	1.189	1.305	Ok
191 Mapleview	SAP33090	SAP33010				109	109	7.786	4.233	7.786	2.215	3.39	3.4	0.339	2.554	22.29	200	14.72%	125.837	0.098	Ok	4.006	1.524	Ok
Mapleview Drive	SAP33010	SAP33009				0	8623	3.250	3.018	3.250	252.971		141.8	14.177	267.148	105.50	600	0.30%	336.308	0.673	Ok	1.189	1.306	Ok
Mapleview Drive	SAP33009	SAP33008				0	8623	3.250	3.018	3.250	252.971		141.8	14.177	267.148	102.65	600	0.31%	341.867	0.665	Ok	1.209	1.323	Ok
Mapleview Drive	SAP33008	SAP32011				30	8652	3.247	3.017	3.247	253.172	0.92	142.7	14.269	267.441	106.51	600	0.29%	330.655	0.682	Ok	1.169	1.288	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 180 L/s per maximum pumping capacity
(2) Design Sheet models the existing condition sewers w/ future population projections + Subject Site

SANITARY SEWER DESIGN SHEET No. 17

Development Details Basis

DESIGN SHEET: 2041 - Projected Upgrades + Full Subject Site SPS at 180 L/s
FILE NO: 422433
CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations
M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

Q_p = P*q*M/86400 — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.
Q_i = I*A — (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									180.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	181.350	2.54	2.5	0.254	181.604	28.01	450	0.92%	273.464	0.595	Ok	1.719	1.838	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	181.717	0.89	3.4	0.343	182.060	47.54	525	0.19%	187.460	0.794	Check	0.866	0.987	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	182.005	0.62	4.1	0.405	182.410	110.70	525	0.19%	187.460	0.796	Check	0.866	0.987	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	121.20	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	94.88	525	0.18%	182.460	0.819	Check	0.843	0.961	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	93.41	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	183.540		7.5	0.750	184.290	95.92	525	0.18%	182.460	0.829	Check	0.843	0.961	Ok
Subject Site - Medium Density Res.	**SAP33015**		**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.	**SAP33015**		**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial	**SAP33015**					17	4453	3.709	3.291	3.709	43.009		10.2	1.020	44.029	15.00	300	0.40%	61.159	0.628	Check	0.865	0.937	Ok
	SAP33015	SAP33014				0	4649	3.677	3.274	3.677	224.520		17.7	1.770	226.290	95.89	675	0.18%	356.631	0.578	Ok	0.997	1.053	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	5622	3.540	3.197	3.540	231.827		51.3	5.130	236.957	94.93	675	0.19%	366.404	0.585	Ok	1.024	1.083	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	6189	3.473	3.158	3.473	235.965		72.3	7.231	243.196	104.61	600	0.31%	341.867	0.623	Ok	1.209	1.304	Ok
Mapleview Drive	SAP33012	SAP33011				82	6270	3.463	3.153	3.463	236.555	2.82	75.1	7.513	244.068	101.56	600	0.30%	336.308	0.631	Ok	1.189	1.288	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	8101	3.290	3.045	3.290	249.420		138.4	13.838	263.258	104.68	600	0.30%	336.308	0.665	Ok	1.189	1.302	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	8199	3.283	3.040	3.283	250.092		141.8	14.177	264.269	105.50	600	0.30%	336.308	0.667	Ok	1.189	1.303	Ok
Mapleview Drive	SAP33009	SAP33008				0	8199	3.283	3.040	3.283	250.092		141.8	14.177	264.269	102.65	600	0.31%	341.867	0.660	Ok	1.209	1.320	Ok
Mapleview Drive	SAP33008	SAP32011				27	8226	3.280	3.038	3.280	250.274	0.92	142.7	14.269	264.543	106.51	600	0.29%	330.655	0.676	Ok	1.169	1.286	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 180 L/s per maximum pumping capacity
(2) Design Sheet Models proposed sewer upgrades w/ future population projections + Subject Site
(3) = upgraded sewer

SANITARY SEWER DESIGN SHEET No. 18

Development Details Basis

DESIGN SHEET: 2071 - Projected Upgrades + Full Subject Site SPS at 180 L/s

FILE NO: 422433

CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

Q_p = P*q*M/86400 — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.

Q_i = I*A — (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									180.000													
	SAP33022	SAP33021				65	65	8.625	4.290	8.625	181.471	2.54	2.5	0.254	181.725	28.01	450	0.92%	273.464	0.595	Ok	1.719	1.839	Ok
	SAP33021	SAP33020				23	88	8.122	4.258	8.122	181.870	0.89	3.4	0.343	182.213	47.54	525	0.19%	187.460	0.795	Check	0.866	0.987	Ok
	SAP33020	SAP33019				19	107	7.813	4.235	7.813	182.184	0.62	4.1	0.405	182.589	110.70	525	0.19%	187.460	0.797	Check	0.866	0.987	Ok
	SAP33019	SAP33018				0	107	7.813	4.235	7.813	182.184		4.1	0.405	182.589	121.20	525	0.21%	197.079	0.760	Check	0.910	1.033	Ok
	SAP33018	SAP33017				0	107	7.813	4.235	7.813	182.184		4.1	0.405	182.589	94.88	525	0.18%	182.460	0.820	Check	0.843	0.961	Ok
	SAP33017	SAP33016				0	107	7.813	4.235	7.813	182.184		4.1	0.405	182.589	93.41	525	0.21%	197.079	0.760	Check	0.910	1.033	Ok
281 Mapleview	SAP33096	SAP33016				111	111	7.759	4.231	7.759	2.246	3.45	3.5	0.345	2.591	29.05	375	0.41%	112.266	0.104	Ok	1.016	0.400	Check
Mapleview Drive	SAP33016	SAP33015				0	219	6.778	4.134	6.778	183.857		7.5	0.750	184.607	95.92	525	0.18%	182.460	0.830	Check	0.843	0.961	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.009		10.2	1.020	44.029	15.00	300	0.40%	61.159	0.628	Check	0.865	0.937	Ok
	SAP33015	SAP33014				0	4672	3.673	3.272	3.673	224.689		17.7	1.770	226.459	95.89	675	0.18%	356.631	0.578	Ok	0.997	1.053	Ok
251 Mapleview	SAP33085	SAP33014				1083	1083	4.921	3.778	4.921	13.874	33.60	33.6	3.360	17.234	18.71	250	1.50%	72.833	0.331	Ok	1.484	1.141	Ok
Mapleview Drive	SAP33014	SAP33013				0	5754	3.524	3.188	3.524	232.798		51.3	5.130	237.928	94.93	675	0.19%	366.404	0.586	Ok	1.024	1.084	Ok
300 Mapleview	EX MH	SAP33013				574	574	5.587	3.943	5.587	8.354	19.26	19.3	1.926	10.280	24.46	375	1.50%	214.735	0.148	Ok	1.944	0.937	Ok
231 Mapleview	SAP33093	SAP33013				56	56	8.887	4.304	8.887	1.305	1.75	1.8	0.175	1.480	24.46	375	1.50%	214.735	0.059	Ok	1.944	0.531	Check
Mapleview Drive	SAP33013	SAP33012				0	6385	3.451	3.145	3.451	237.379		72.3	7.231	244.610	104.61	600	0.31%	341.867	0.625	Ok	1.209	1.306	Ok
Mapleview Drive	SAP33012	SAP33011				91	6476	3.441	3.139	3.441	238.031	2.82	75.1	7.513	245.544	101.56	600	0.30%	336.308	0.634	Ok	1.189	1.290	Ok
Reid Drive North	SAP33078	SAP33011				1001	1001	4.999	3.800	4.999	13.035	31.08	31.1	3.108	16.143	20.17	375	0.38%	108.081	0.261	Ok	0.979	0.660	Ok
Reid Drive South	SAP33056	SAP33011				1036	1036	4.964	3.790	4.964	13.400	32.17	32.2	3.217	16.617	109.69	375	0.82%	158.768	0.218	Ok	1.438	0.874	Ok
Mapleview Drive	SAP33011	SAP33010				0	8513	3.258	3.024	3.258	252.231		138.4	13.838	266.069	104.68	600	0.30%	336.308	0.671	Ok	1.189	1.305	Ok
191 Mapleview	SAP33090	SAP33010				109	109	7.786	4.233	7.786	2.215	3.39	3.4	0.339	2.554	22.29	200	14.72%	125.837	0.098	Ok	4.006	1.524	Ok
Mapleview Drive	SAP33010	SAP33009				0	8623	3.250	3.018	3.250	252.971		141.8	14.177	267.148	105.50	600	0.30%	336.308	0.673	Ok	1.189	1.306	Ok
Mapleview Drive	SAP33009	SAP33008				0	8623	3.250	3.018	3.250	252.971		141.8	14.177	267.148	102.65	600	0.31%	341.867	0.665	Ok	1.209	1.323	Ok
Mapleview Drive	SAP33008	SAP32011				30	8652	3.247	3.017	3.247	253.172	0.92	142.7	14.269	267.441	106.51	600	0.29%	330.655	0.682	Ok	1.169	1.288	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:

(1) without extraneous flow

(2) with extraneous flow

(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375

(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) Holly SPS flow assumed to be 180 L/s per maximum pumping capacity

(2) Design Sheet Models proposed sewer upgrades w/ future population projections + Subject Site

(3) = upgraded sewer

SANITARY SEWER DESIGN SHEET No. 19

Development Details Basis

DESIGN SHEET: Existing Conditions + Subject Site North Block SPS at 221 L/s

FILE NO: 422433

CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

Q_p = P*q*M/86400 — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.

Q_i = I*A — (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									221.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	222.350	2.54	2.5	0.254	222.604	28.01	450	0.92%	273.464	0.685	Ok	1.719	1.915	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	222.717	0.89	3.4	0.343	223.060	47.54	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	223.005	0.62	4.1	0.405	223.410	110.70	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	121.20	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	94.88	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	93.41	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	224.540		7.5	0.750	225.290	95.92	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**0**	**0**	**1.67**	0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356									
Subject Site - Commercial		**SAP33015**				0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356	15.00	300	0.40%	61.159	0.353	Ok	0.865	0.719	Ok
	SAP33015	SAP33014				0	1423	4.659	3.696	4.659	238.270		17.7	1.770	240.040	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	2396	4.198	3.523	4.198	247.196		51.3	5.130	252.326	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2963	4.024	3.447	4.024	252.044		72.3	7.231	259.275	104.61	600	0.31%	341.867	0.651	Ok	1.209	1.322	Ok
Mapleview Drive	SAP33012	SAP33011				82	3044	4.002	3.437	4.002	252.727	2.82	75.1	7.513	260.240	101.56	600	0.30%	336.308	0.660	Ok	1.189	1.306	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	4875	3.642	3.255	3.642	267.242		138.4	13.838	281.080	104.68	600	0.30%	336.308	0.699	Ok	1.189	1.320	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4973	3.628	3.247	3.628	267.986		141.8	14.177	282.163	105.50	600	0.30%	336.308	0.701	Check	1.189	1.320	Ok
Mapleview Drive	SAP33009	SAP33008				0	4973	3.628	3.247	3.628	267.986		141.8	14.177	282.163	102.65	600	0.31%	341.867	0.692	Ok	1.209	1.338	Ok
Mapleview Drive	SAP33008	SAP32011				27	5000	3.624	3.245	3.624	268.187	0.92	142.7	14.269	282.456	106.51	600	0.29%	330.655	0.710	Check	1.169	1.302	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:

(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) This "existing" condition sheet conservatively applies the pro-rated 2041 population distribution + Subject Site Flows
(2) Holly SPS flow assumed to be 221 L/s per maximum pumping capacity
(3) Design Sheet models the existing condition (existing sewers)

SANITARY SEWER DESIGN SHEET No. 20

Development Details Basis

DESIGN SHEET: 2041 - Projection + Full Subject Site SPS at 221 L/s
FILE NO: 422433
CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations
M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.
$Q_i = I*A$ — (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									221.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	222.350	2.54	2.5	0.254	222.604	28.01	450	0.92%	273.464	0.685	Ok	1.719	1.915	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	222.717	0.89	3.4	0.343	223.060	47.54	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	223.005	0.62	4.1	0.405	223.410	110.70	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	121.20	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	94.88	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	93.41	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	224.540		7.5	0.750	225.290	95.92	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.009		10.2	1.020	44.029	15.00	300	0.40%	61.159	0.628	Check	0.865	0.937	Ok
	SAP33015	SAP33014				0	4649	3.677	3.274	3.677	265.520		17.7	1.770	267.290	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	5622	3.540	3.197	3.540	272.827		51.3	5.130	277.957	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	6189	3.473	3.158	3.473	276.965		72.3	7.231	284.196	104.61	600	0.31%	341.867	0.696	Ok	1.209	1.346	Ok
Mapleview Drive	SAP33012	SAP33011				82	6270	3.463	3.153	3.463	277.555	2.82	75.1	7.513	285.068	101.56	600	0.30%	336.308	0.706	Check	1.189	1.329	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	8101	3.290	3.045	3.290	290.420		138.4	13.838	304.258	104.68	600	0.30%	336.308	0.744	Check	1.189	1.338	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	8199	3.283	3.040	3.283	291.092		141.8	14.177	305.269	105.50	600	0.30%	336.308	0.747	Check	1.189	1.339	Ok
Mapleview Drive	SAP33009	SAP33008				0	8199	3.283	3.040	3.283	291.092		141.8	14.177	305.269	102.65	600	0.31%	341.867	0.736	Check	1.209	1.358	Ok
Mapleview Drive	SAP33008	SAP32011				27	8226	3.280	3.038	3.280	291.274	0.92	142.7	14.269	305.543	106.51	600	0.29%	330.655	0.758	Check	1.169	1.320	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) Holly SPS flow assumed to be 221 L/s per maximum pumping capacity
(2) Design Sheet models the existing condition sewers w/ future population projections + Subject Site

SANITARY SEWER DESIGN SHEET No. 21

Development Details Basis

DESIGN SHEET: 2071 - Projection + Full Subject Site SPS at 221 L/s

FILE NO: 422433

CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.

$Q_i = I*A$ — (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									221.000													
	SAP33022	SAP33021				65	65	8.625	4.290	8.625	222.471	2.54	2.5	0.254	222.725	28.01	450	0.92%	273.464	0.685	Ok	1.719	1.916	Ok
	SAP33021	SAP33020				23	88	8.122	4.258	8.122	222.870	0.89	3.4	0.343	223.213	47.54	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33020	SAP33019				19	107	7.813	4.235	7.813	223.184	0.62	4.1	0.405	223.589	110.70	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33019	SAP33018				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	121.20	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
	SAP33018	SAP33017				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	94.88	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
	SAP33017	SAP33016				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	93.41	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
281 Mapleview	SAP33096	SAP33016				111	111	7.759	4.231	7.759	2.246	3.45	3.5	0.345	2.591	29.05	375	0.41%	112.266	0.104	Ok	1.016	0.400	Check
Mapleview Drive	SAP33016	SAP33015				0	219	6.778	4.134	6.778	224.857		7.5	0.750	225.607	95.92	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.009		10.2	1.020	44.029	15.00	300	0.40%	61.159	0.628	Check	0.865	0.937	Ok
	SAP33015	SAP33014				0	4672	3.673	3.272	3.673	265.689		17.7	1.770	267.459	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				1083	1083	4.921	3.778	4.921	13.874	33.60	33.6	3.360	17.234	18.71	250	1.50%	72.833	0.331	Ok	1.484	1.141	Ok
Mapleview Drive	SAP33014	SAP33013				0	5754	3.524	3.188	3.524	273.798		51.3	5.130	278.928	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				574	574	5.587	3.943	5.587	8.354	19.26	19.3	1.926	10.280	24.46	375	1.50%	214.735	0.148	Ok	1.944	0.937	Ok
231 Mapleview	SAP33093	SAP33013				56	56	8.887	4.304	8.887	1.305	1.75	1.8	0.175	1.480	24.46	375	1.50%	214.735	0.059	Ok	1.944	0.531	Check
Mapleview Drive	SAP33013	SAP33012				0	6385	3.451	3.145	3.451	278.379		72.3	7.231	285.610	104.61	600	0.31%	341.867	0.698	Ok	1.209	1.347	Ok
Mapleview Drive	SAP33012	SAP33011				91	6476	3.441	3.139	3.441	279.031	2.82	75.1	7.513	286.544	101.56	600	0.30%	336.308	0.709	Check	1.189	1.330	Ok
Reid Drive North	SAP33078	SAP33011				1001	1001	4.999	3.800	4.999	13.035	31.08	31.1	3.108	16.143	20.17	375	0.38%	108.081	0.261	Ok	0.979	0.660	Ok
Reid Drive South	SAP33056	SAP33011				1036	1036	4.964	3.790	4.964	13.400	32.17	32.2	3.217	16.617	109.69	375	0.82%	158.768	0.218	Ok	1.438	0.874	Ok
Mapleview Drive	SAP33011	SAP33010				0	8513	3.258	3.024	3.258	293.231		138.4	13.838	307.069	104.68	600	0.30%	336.308	0.750	Check	1.189	1.340	Ok
191 Mapleview	SAP33090	SAP33010				109	109	7.786	4.233	7.786	2.215	3.39	3.4	0.339	2.554	22.29	200	14.72%	125.837	0.098	Ok	4.006	1.524	Ok
Mapleview Drive	SAP33010	SAP33009				0	8623	3.250	3.018	3.250	293.971		141.8	14.177	308.148	105.50	600	0.30%	336.308	0.753	Check	1.189	1.341	Ok
Mapleview Drive	SAP33009	SAP33008				0	8623	3.250	3.018	3.250	293.971		141.8	14.177	308.148	102.65	600	0.31%	341.867	0.742	Check	1.209	1.359	Ok
Mapleview Drive	SAP33008	SAP32011				30	8652	3.247	3.017	3.247	294.172	0.92	142.7	14.269	308.441	106.51	600	0.29%	330.655	0.765	Check	1.169	1.321	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:

(1) without extraneous flow

(2) with extraneous flow

(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375

(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) Holly SPS flow assumed to be 221 L/s per maximum pumping capacity

(2) Design Sheet models the existing condition sewers w/ future population projections + Subject Site

SANITARY SEWER DESIGN SHEET No. 22

Development Details Basis

DESIGN SHEET: 2041 - Projected Upgrades + Full Subject Site SPS at 221 L/s

FILE NO: 422433

CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.

$Q_i = I*A$ — (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									221.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	222.350	2.54	2.5	0.254	222.604	28.01	450	0.92%	273.464	0.685	Ok	1.719	1.915	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	222.717	0.89	3.4	0.343	223.060	47.54	600	0.19%	267.641	0.697	Ok	0.947	1.059	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	223.005	0.62	4.1	0.405	223.410	110.70	600	0.19%	267.641	0.698	Ok	0.947	1.059	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	121.20	600	0.21%	281.375	0.672	Ok	0.995	1.103	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	94.88	675	0.18%	356.631	0.573	Ok	0.997	1.051	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	223.005		4.1	0.405	223.410	93.41	675	0.21%	385.206	0.546	Ok	1.076	1.116	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	224.540		7.5	0.750	225.290	95.92	675	0.18%	356.631	0.576	Ok	0.997	1.053	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.009		10.2	1.020	44.029	15.00	300	0.40%	61.159	0.628	Check	0.865	0.937	Ok
	SAP33015	SAP33014				0	4649	3.677	3.274	3.677	265.520		17.7	1.770	267.290	95.89	675	0.18%	356.631	0.645	Ok	0.997	1.092	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	5622	3.540	3.197	3.540	272.827		51.3	5.130	277.957	94.93	675	0.19%	366.404	0.651	Ok	1.024	1.122	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	6189	3.473	3.158	3.473	276.965		72.3	7.231	284.196	104.61	600	0.31%	341.867	0.696	Ok	1.209	1.346	Ok
Mapleview Drive	SAP33012	SAP33011				82	6270	3.463	3.153	3.463	277.555	2.82	75.1	7.513	285.068	101.56	600	0.30%	336.308	0.706	Check	1.189	1.329	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	8101	3.290	3.045	3.290	290.420		138.4	13.838	304.258	104.68	600	0.30%	336.308	0.744	Check	1.189	1.338	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	8199	3.283	3.040	3.283	291.092		141.8	14.177	305.269	105.50	600	0.30%	336.308	0.747	Check	1.189	1.339	Ok
Mapleview Drive	SAP33009	SAP33008				0	8199	3.283	3.040	3.283	291.092		141.8	14.177	305.269	102.65	600	0.31%	341.867	0.736	Check	1.209	1.358	Ok
Mapleview Drive	SAP33008	SAP32011				27	8226	3.280	3.038	3.280	291.274	0.92	142.7	14.269	305.543	106.51	600	0.29%	330.655	0.758	Check	1.169	1.320	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:

(1) without extraneous flow

(2) with extraneous flow

(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375

(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) Holly SPS flow assumed to be 221 L/s per maximum pumping capacity

(2) Design Sheet Models proposed sewer upgrades w/ future population projections + Subject Site

(3) = upgraded sewer

SANITARY SEWER DESIGN SHEET No. 23

Development Details Basis

DESIGN SHEET: 2071 - Projected Upgrades + Full Subject Site SPS at 221 L/s

FILE NO: 422433

CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations

M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

Q_p = P*q*M/86400 — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.

Q_i = I*A — (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									221.000													
	SAP33022	SAP33021				65	65	8.625	4.290	8.625	222.471	2.54	2.5	0.254	222.725	28.01	450	0.92%	273.464	0.685	Ok	1.719	1.916	Ok
	SAP33021	SAP33020				23	88	8.122	4.258	8.122	222.870	0.89	3.4	0.343	223.213	47.54	600	0.19%	267.641	0.697	Ok	0.947	1.059	Ok
	SAP33020	SAP33019				19	107	7.813	4.235	7.813	223.184	0.62	4.1	0.405	223.589	110.70	600	0.19%	267.641	0.698	Ok	0.947	1.059	Ok
	SAP33019	SAP33018				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	121.20	600	0.21%	281.375	0.673	Ok	0.995	1.104	Ok
	SAP33018	SAP33017				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	94.88	675	0.18%	356.631	0.573	Ok	0.997	1.052	Ok
	SAP33017	SAP33016				0	107	7.813	4.235	7.813	223.184		4.1	0.405	223.589	93.41	675	0.21%	385.206	0.546	Ok	1.076	1.116	Ok
281 Mapleview	SAP33096	SAP33016				111	111	7.759	4.231	7.759	2.246	3.45	3.5	0.345	2.591	29.05	375	0.41%	112.266	0.104	Ok	1.016	0.400	Check
Mapleview Drive	SAP33016	SAP33015				0	219	6.778	4.134	6.778	224.857		7.5	0.750	225.607	95.92	675	0.18%	356.631	0.577	Ok	0.997	1.053	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.009		10.2	1.020	44.029	15.00	300	0.40%	61.159	0.628	Check	0.865	0.937	Ok
	SAP33015	SAP33014				0	4672	3.673	3.272	3.673	265.689		17.7	1.770	267.459	95.89	675	0.18%	356.631	0.646	Ok	0.997	1.092	Ok
251 Mapleview	SAP33085	SAP33014				1083	1083	4.921	3.778	4.921	13.874	33.60	33.6	3.360	17.234	18.71	250	1.50%	72.833	0.331	Ok	1.484	1.141	Ok
Mapleview Drive	SAP33014	SAP33013				0	5754	3.524	3.188	3.524	273.798		51.3	5.130	278.928	94.93	675	0.19%	366.404	0.652	Ok	1.024	1.123	Ok
300 Mapleview	EX MH	SAP33013				574	574	5.587	3.943	5.587	8.354	19.26	19.3	1.926	10.280	24.46	375	1.50%	214.735	0.148	Ok	1.944	0.937	Ok
231 Mapleview	SAP33093	SAP33013				56	56	8.887	4.304	8.887	1.305	1.75	1.8	0.175	1.480	24.46	375	1.50%	214.735	0.059	Ok	1.944	0.531	Check
Mapleview Drive	SAP33013	SAP33012				0	6385	3.451	3.145	3.451	278.379		72.3	7.231	285.610	104.61	600	0.31%	341.867	0.698	Ok	1.209	1.347	Ok
Mapleview Drive	SAP33012	SAP33011				91	6476	3.441	3.139	3.441	279.031	2.82	75.1	7.513	286.544	101.56	600	0.30%	336.308	0.709	Check	1.189	1.330	Ok
Reid Drive North	SAP33078	SAP33011				1001	1001	4.999	3.800	4.999	13.035	31.08	31.1	3.108	16.143	20.17	375	0.38%	108.081	0.261	Ok	0.979	0.660	Ok
Reid Drive South	SAP33056	SAP33011				1036	1036	4.964	3.790	4.964	13.400	32.17	32.2	3.217	16.617	109.69	375	0.82%	158.768	0.218	Ok	1.438	0.874	Ok
Mapleview Drive	SAP33011	SAP33010				0	8513	3.258	3.024	3.258	293.231		138.4	13.838	307.069	104.68	600	0.30%	336.308	0.750	Check	1.189	1.340	Ok
191 Mapleview	SAP33090	SAP33010				109	109	7.786	4.233	7.786	2.215	3.39	3.4	0.339	2.554	22.29	200	14.72%	125.837	0.098	Ok	4.006	1.524	Ok
Mapleview Drive	SAP33010	SAP33009				0	8623	3.250	3.018	3.250	293.971		141.8	14.177	308.148	105.50	600	0.30%	336.308	0.753	Check	1.189	1.341	Ok
Mapleview Drive	SAP33009	SAP33008				0	8623	3.250	3.018	3.250	293.971		141.8	14.177	308.148	102.65	600	0.31%	341.867	0.742	Check	1.209	1.359	Ok
Mapleview Drive	SAP33008	SAP32011				30	8652	3.247	3.017	3.247	294.172	0.92	142.7	14.269	308.441	106.51	600	0.29%	330.655	0.765	Check	1.169	1.321	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:

(1) without extraneous flow

(2) with extraneous flow

(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375

(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) Holly SPS flow assumed to be 221 L/s per maximum pumping capacity

(2) Design Sheet Models proposed sewer upgrades w/ future population projections + Subject Site

(3) = upgraded sewer

SANITARY SEWER DESIGN SHEET No. 24

Development Details Basis

DESIGN SHEET: Existing Conditions + Subject Site North Block SPS Controlled
FILE NO: 422433
CONTRACT / PROJECT:

n ≥ 0.013 — Numbers in blue or text in red are equations
M = 5/P^0.2 Babbit — (Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

Q_p = P*q*M/86400 — (Peak population flow where; q = 225 L/day/person; P = population) — 225 litres/person/day.
Q_i = I*A — (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ — (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									156.130													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	157.480	2.54	2.5	0.254	157.734	28.01	450	0.92%	273.464	0.544	Ok	1.719	1.779	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	157.847	0.89	3.4	0.343	158.190	47.54	525	0.19%	187.460	0.704	Check	0.866	0.971	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	158.135	0.62	4.1	0.405	158.540	110.70	525	0.19%	187.460	0.705	Check	0.866	0.971	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	158.135		4.1	0.405	158.540	121.20	525	0.21%	197.079	0.679	Ok	0.910	1.012	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	158.135		4.1	0.405	158.540	94.88	525	0.18%	182.460	0.720	Check	0.843	0.949	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	158.135		4.1	0.405	158.540	93.41	525	0.21%	197.079	0.679	Ok	0.910	1.012	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	159.670		7.5	0.750	160.420	95.92	525	0.18%	182.460	0.727	Check	0.843	0.950	Ok
Subject Site - Medium Density Res.		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**0**	**0**	**1.67**	0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356									
Subject Site - Commercial		**SAP33015**				0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356	15.00	300	0.40%	61.159	0.353	Ok	0.865	0.719	Ok
	SAP33015	SAP33014				0	1423	4.659	3.696	4.659	173.400		17.7	1.770	175.170	95.89	525	0.18%	182.460	0.785	Check	0.843	0.959	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	2396	4.198	3.523	4.198	182.326		51.3	5.130	187.456	94.93	525	0.19%	187.460	0.819	Check	0.866	0.987	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2963	4.024	3.447	4.024	187.174		72.3	7.231	194.405	104.61	600	0.31%	341.867	0.540	Ok	1.209	1.236	Ok
Mapleview Drive	SAP33012	SAP33011				82	3044	4.002	3.437	4.002	187.857	2.82	75.1	7.513	195.370	101.56	600	0.30%	336.308	0.547	Ok	1.189	1.222	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	4875	3.642	3.255	3.642	202.372		138.4	13.838	216.210	104.68	600	0.30%	336.308	0.583	Ok	1.189	1.244	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4973	3.628	3.247	3.628	203.116		141.8	14.177	217.293	105.50	600	0.30%	336.308	0.585	Ok	1.189	1.245	Ok
Mapleview Drive	SAP33009	SAP33008				0	4973	3.628	3.247	3.628	203.116		141.8	14.177	217.293	102.65	600	0.31%	341.867	0.578	Ok	1.209	1.260	Ok
Mapleview Drive	SAP33008	SAP32011				27	5000	3.624	3.245	3.624	203.317	0.92	142.7	14.269	217.586	106.51	600	0.29%	330.655	0.591	Ok	1.169	1.229	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) This "existing" condition sheet conservatively applies the pro-rated 2041 population distribution + Subject Site Flows
(2) Holly SPS flow reduced to maintain 100% capacity in sewers
(3) Design Sheet models the existing condition (existing sewers)

DRAFT

Appendix D:
2031 Horizon Year Sanitary Backwater Analysis

TATHAM ENGINEERING

645 Veterans Drive, Unit D
Barrie, Ontario L4N 9H8

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File 422433

October 8, 2024

Stephanie Pasquale
Project Manager
Pearl Builders
25 Production Road
Brampton, Ontario L6T 4N8
stephanie@pearlbuilders.com

Re: Mapleview Village Development, City of Barrie
2031 Horizon Year Sanitary Backwater Analysis

Dear Stephanie:

In support of the Mapleview Village Development proposed at 664 Essa Road, 674 Essa Road, 692 Essa Road, 320 Mapleview Drive West and 364 Mapleview Drive West in the City of Barrie (City) we have prepared this 2031 Horizon Year Sanitary Backwater Analysis to reflect recent changes to the site plan. As per the Terms of Reference submitted to the City on February 24, 2023, the Mapleview Drive sanitary backwater analysis was completed to address the City's concerns regarding the capacity of the sanitary sewer along Mapleview Drive and the potential for backwater conditions to form. The results of this analysis are summarized below.

EXISTING SEWER INFRASTRUCTURE

The upstream limit of the analysis is maintenance hole SAP33022, where the forcemain from the Holly sewage pumping station (SPS) connects to the Mapleview Drive trunk sewer. SAP33022 outlets to a 450 mm dia. sewer at a 0.9% grade, which then increases to a 525 mm dia. sewer at SAP33021 and maintains this diameter to the approximate mid-point between Hollyholme Farm Road and Reid Drive (SAP33013). The average grade of this section is approximately 0.2%. From SAP33013 to Veterans Drive, the pipe diameter increases to 600 mm dia. and the grade increases to 0.31%. The invert elevations, rim elevations and pipe sizes of sewers and maintenance holes were obtained from City GIS data and as-built drawings. For more information on the sanitary sewer between Essa Road and Veteran's Drive, please refer to the 2041 and 2071 Horizon Year Capacity Review of Existing Infrastructure (Capacity Review, Tatham, October 2024), prepared under separate cover.

The City provided information for the Mapleview Drive trunk sewer downstream of Veteran's Drive from their sanitary PCSWMM model. The information provided is included in Appendix A for reference. The 600

mm dia. sewer continues from Veteran's Drive to Highway 400 at an average grade of 0.3%. At Barrie View Drive (SAP32002) there is a 5.44 m drop between inlet and outlet pipes. The flows in this section were provided by the City and included a constant flow of 85 L/s from the Salem temporary pumping station, among other contributors connecting to the system between Veteran's Drive and Barrie View Drive. The flows provided by the City exclude any contribution from the Mapleview Drive trunk sewer upstream of Veteran's Drive. These upstream flows were therefore estimated based on figures derived in the Capacity Review (Tatham, October 2024) and included in the analysis.

HYDRAULIC GRADE LINE BACKWATER ANALYSIS

A baseline PCSWMM model was developed to perform a hydraulic grade line (HGL) analysis to determine the extent of the backwater conditions and surcharge potential within the sanitary sewer under existing conditions. The existing pipe and maintenance hole configuration previously outlined were used, and three different Holly SPS flow scenarios were considered, as specified in the Backwater Analysis Terms of Reference: the typical flow under current conditions of 112 L/s, peak operating flow of 180 L/s, and maximum SPS flow of 232 L/s (as per ECA 5921-ATUKKR and as noted in the City's CLI-ECA). Subsequent correspondence with the City indicated the SPS is anticipated to reach a peak discharge rate of 221 L/s, however the analysis was conducted using the 232 L/s flow to assess the maximum surcharge potential. After the baseline scenarios were assessed, the incoming flows at SAP33015 were changed to represent two stages of the proposed Mapleview Village Development. The first stage includes flows after the construction of the North Block, and the second stage adds flows from the construction of the future South Block. The PCSWMM model layout is illustrated on Figure 1 enclosed for reference. Digital copies of the nine different scenarios are included in Appendix C of this submission. The results of this analysis are summarized in the following sections.

Existing Conditions Analysis

The existing conditions were modelled using flows from the City sanitary sewer design sheets and the City PCSWMM model results included in Appendix A. Under existing conditions, the flow is maintained in the pipes without surcharge while Holly SPS flows of 112 L/s are maintained, with the exception of SAP32002 at Barrie View Drive. During 180 L/s SPS flow, surcharging is observed in all maintenance holes from Veteran's Drive to Barrie View Drive (SAP33011 to SAP32002). There is surcharge to all maintenance holes during the SPS 232 L/s flows. The maximum surcharge height occurs at SAP33022, where it reaches a depth of 1.67 m in the maintenance hole and leaves 0.34 m of clearance to the rim. The results of the existing conditions analysis are summarized in Table 1. PCSWMM hydraulic model results and profiles are included in Appendix B for reference.

Table 1 Existing Conditions HGL Analysis Results

NODE	INVERT ELEVATION (m)	PIPE OBVERT ELEVATION (m)	RIM ELEVATION (m)	MAXIMUM HGL ELEVATION (m)		
				112 L/s	180 L/s	232 L/s
SAP33022	303.11	303.56	305.57	303.39	303.47	305.23
SAP33021	302.85	303.38	306.10	303.14	303.26	305.05
SAP33020	302.73	303.26	307.10	303.04	303.16	304.91
SAP33019	302.51	303.04	307.86	302.81	302.91	304.58
SAP33018	302.19	302.72	307.56	302.49	302.60	304.22
SAP33017	301.96	302.49	307.27	302.25	302.35	303.93
SAP33016	301.71	302.24	307.00	302.03	302.14	303.66
SAP33015	301.45	301.98	306.71	301.77	301.88	303.36
SAP33014	301.23	301.76	306.42	301.56	301.67	303.05
SAP33013	300.98	301.58	306.14	301.25	301.34	302.72
SAP33012	300.65	301.25	306.39	300.92	301.24	302.53
SAP33011	300.34	300.94	306.40	300.64	301.13	302.34
SAP33010	300.02	300.62	306.71	300.31	300.98	302.12
SAP33009	299.69	300.29	306.85	299.99	300.82	301.89
SAP33008	299.37	299.97	306.97	299.66	300.67	301.67



NODE	INVERT ELEVATION (m)	PIPE OBVERT ELEVATION (m)	RIM ELEVATION (m)	MAXIMUM HGL ELEVATION (m)		
				112 L/s	180 L/s	232 L/s
SAP32011	299.02	299.62	307.23	299.52	300.52	301.44
MAPLEVIEW2	298.67	299.27	308.60	299.19	300.05	300.84
SAP32009	298.32	298.92	309.50	298.83	299.54	300.19
SAP32008	297.98	298.58	308.80	298.49	299.06	299.59
SAP32007	297.63	298.23	308.30	298.14	298.56	298.96
SAP32006	297.29	297.89	307.80	297.81	298.08	298.35
SAP32005	296.94	297.54	306.10	297.44	297.57	297.70
SAP32004	296.07	296.67	304.30	296.59	296.77	297.09
SAP32003	295.66	296.26	303.10	296.17	296.32	296.45
SAP32002	289.92	290.52	302.33	290.88	291.20	291.48



Proposed Conditions Analysis

The proposed conditions were modelled using the same three SPS flow scenarios for the Holly SPS and updated to include the proposed flows from two stages of development (North Block construction, and the addition of the future South Block) from the sanitary sewer design sheets. Inflows downstream of Veteran's Drive were maintained at the rates from the City's PCSWMM model. The sanitary sewer design sheets and output from the City's PCSWMM model are included in Appendix A for reference. The results of the analysis for each phase of the proposed development are described in the following sections. All HGL elevation increases described below are relative to existing conditions.

North Block

The construction of the North Block causes slight HGL elevation increases from existing conditions in all scenarios, and the results are summarized in Table 2. In the 112 L/s scenario, no additional maintenance holes are surcharging due to the development and HGL elevations increase by an average of 0.01 m. In the 180 L/s scenario, there is surcharging of 0.17 m into one additional maintenance hole (SAP33012) and an average HGL elevation increase of 0.07 m is observed. In the 232 L/s scenario, all maintenance holes with surcharging under existing conditions experience an average HGL elevation increase of 0.15 m from existing conditions. The maximum surcharge height occurs at SAP33022, where it surcharges 1.91 m into the maintenance hole and leaves 0.10 m of clearance to the rim.

North and Future South Block

The construction of the future South Block in addition to the North Block causes slight HGL elevation increases in all scenarios, and the results are summarized in Table 3. In the 112 L/s scenario, four additional maintenance holes are surcharging due to the development (SAP32011 through SAP32008) and HGL elevations increase by an average of 0.06 m from existing conditions. In the 180 L/s scenario, all maintenance holes are surcharging (11 more than existing) and there is an average HGL elevation increase of 0.51 m, which results in a minimum clearance of 1.70 m at SAP33022, 2.35 m at SAP33021 and greater than 3.40 m of clearance at all downstream maintenance holes. In the 232 L/s scenario, all maintenance holes with surcharging under existing conditions experience an average HGL elevation increase of 0.81 m and surcharging above the maintenance hole rim occurs at SAP33022 and SAP33021. The Salem temporary SPS flows are included in this scenario to maintain a conservative modelling approach, however it is possible that this SPS will be decommissioned prior to the South Block Construction, as it is anticipated to be decommissioned by 2031.

Table 2 North Block HGL Analysis Results

NODE	INVERT ELEVATION (m)	PIPE OBVERT ELEVATION (m)	RIM ELEVATION (m)	MAXIMUM HGL ELEVATION (m)					
				112 L/s		180 L/s		232 L/s	
SAP33022	303.11	303.56	305.57	303.39	*(303.39)*	303.47	*(303.47)*	305.47	*(305.23)*
SAP33021	302.85	303.38	306.10	303.14	*(303.14)*	303.26	*(303.26)*	305.28	*(305.05)*
SAP33020	302.73	303.26	307.10	303.04	*(303.04)*	303.16	*(303.16)*	305.14	*(304.91)*
SAP33019	302.51	303.04	307.86	302.81	*(302.81)*	302.91	*(302.91)*	304.81	*(304.58)*
SAP33018	302.19	302.72	307.56	302.49	*(302.49)*	302.60	*(302.60)*	304.45	*(304.22)*
SAP33017	301.96	302.49	307.27	302.25	*(302.25)*	302.35	*(302.35)*	304.17	*(303.93)*
SAP33016	301.71	302.24	307.00	302.02	*(302.03)*	302.13	*(302.14)*	303.89	*(303.66)*
SAP33015	301.45	301.98	306.71	301.78	*(301.77)*	301.92	*(301.88)*	303.61	*(303.36)*
SAP33014	301.23	301.76	306.42	301.57	*(301.56)*	301.73	*(301.67)*	303.28	*(303.05)*
SAP33013	300.98	301.58	306.14	301.26	*(301.25)*	301.53	*(301.34)*	302.92	*(302.72)*
SAP33012	300.65	301.25	306.39	300.93	*(300.92)*	301.42	*(301.24)*	302.72	*(302.53)*
SAP33011	300.34	300.94	306.40	300.64	*(300.64)*	301.29	*(301.13)*	302.52	*(302.34)*
SAP33010	300.02	300.62	306.71	300.32	*(300.31)*	301.13	*(300.98)*	302.29	*(302.12)*
SAP33009	299.69	300.29	306.85	299.99	*(299.99)*	300.97	*(300.82)*	302.04	*(301.89)*
SAP33008	299.37	299.97	306.97	299.67	*(299.66)*	300.81	*(300.67)*	301.81	*(301.67)*



NODE	INVERT ELEVATION (m)	PIPE OBVERT ELEVATION (m)	RIM ELEVATION (m)	MAXIMUM HGL ELEVATION (m)					
				112 L/s		180 L/s		232 L/s	
SAP32011	299.02	299.62	307.23	299.53	*(299.52)*	300.64	*(300.52)*	301.57	*(301.44)*
MAPLEVIEW2	298.67	299.27	308.60	299.20	*(299.19)*	300.16	*(300.05)*	300.95	*(300.84)*
SAP32009	298.32	298.92	309.50	298.84	*(298.83)*	299.63	*(299.54)*	300.29	*(300.19)*
SAP32008	297.98	298.58	308.80	298.51	*(298.49)*	299.14	*(299.06)*	299.67	*(299.59)*
SAP32007	297.63	298.23	308.30	298.15	*(298.14)*	298.62	*(298.56)*	299.02	*(298.96)*
SAP32006	297.29	297.89	307.80	297.82	*(297.81)*	298.12	*(298.08)*	298.39	*(298.35)*
SAP32005	296.94	297.54	306.10	297.45	*(297.44)*	297.59	*(297.57)*	297.72	*(297.70)*
SAP32004	296.07	296.67	304.30	296.61	*(296.59)*	296.80	*(296.77)*	297.12	*(297.09)*
SAP32003	295.66	296.26	303.10	296.18	*(296.17)*	296.34	*(296.32)*	296.47	*(296.45)*
SAP32002	289.92	290.52	302.33	290.91	*(290.88)*	291.24	*(291.20)*	291.52	*(291.48)*

Note: Values in parentheses are Existing Conditions HGL elevations.

Table 3 North and Future South Block HGL analysis results

NODE	INVERT ELEVATION (m)	PIPE OBVERT ELEVATION (m)	RIM ELEVATION (m)	MAXIMUM HGL ELEVATION (m)					
				112 L/s		180 L/s		232 L/s	
SAP33022	303.11	303.56	305.57	303.39	*(303.39)*	303.87	*(303.47)*	306.45	*(305.23)*
SAP33021	302.85	303.38	306.10	303.14	*(303.14)*	303.75	*(303.26)*	306.27	*(305.05)*
SAP33020	302.73	303.26	307.10	303.04	*(303.04)*	303.67	*(303.16)*	306.13	*(304.91)*
SAP33019	302.51	303.04	307.86	302.81	*(302.81)*	303.47	*(302.91)*	305.80	*(304.58)*
SAP33018	302.19	302.72	307.56	302.49	*(302.49)*	303.25	*(302.60)*	305.44	*(304.22)*
SAP33017	301.96	302.49	307.27	302.25	*(302.25)*	303.08	*(302.35)*	305.16	*(303.93)*
SAP33016	301.71	302.24	307.00	302.02	*(302.03)*	302.91	*(302.14)*	304.88	*(303.66)*
SAP33015	301.45	301.98	306.71	301.83	*(301.77)*	302.74	*(301.88)*	304.59	*(303.36)*
SAP33014	301.23	301.76	306.42	301.61	*(301.56)*	302.47	*(301.67)*	304.19	*(303.05)*
SAP33013	300.98	301.58	306.14	301.29	*(301.25)*	302.18	*(301.34)*	303.76	*(302.72)*
SAP33012	300.65	301.25	306.39	300.96	*(300.92)*	302.02	*(301.24)*	303.52	*(302.53)*
SAP33011	300.34	300.94	306.40	300.67	*(300.64)*	301.86	*(301.13)*	303.28	*(302.34)*
SAP33010	300.02	300.62	306.71	300.35	*(300.31)*	301.66	*(300.98)*	303.01	*(302.12)*
SAP33009	299.69	300.29	306.85	300.02	*(299.99)*	301.47	*(300.82)*	302.73	*(301.89)*
SAP33008	299.37	299.97	306.97	299.87	*(299.66)*	301.27	*(300.67)*	302.45	*(301.67)*



NODE	INVERT ELEVATION (m)	PIPE OBVERT ELEVATION (m)	RIM ELEVATION (m)	MAXIMUM HGL ELEVATION (m)					
				112 L/s		180 L/s		232 L/s	
SAP32011	299.02	299.62	307.23	299.78	*(299.52)*	301.07	*(300.52)*	302.17	*(301.44)*
MAPLEVIEW2	298.67	299.27	308.60	299.39	*(299.19)*	300.52	*(300.05)*	301.49	*(300.84)*
SAP32009	298.32	298.92	309.50	298.97	*(298.83)*	299.93	*(299.54)*	300.76	*(300.19)*
SAP32008	297.98	298.58	308.80	298.60	*(298.49)*	299.38	*(299.06)*	300.08	*(299.59)*
SAP32007	297.63	298.23	308.30	298.22	*(298.14)*	298.81	*(298.56)*	299.37	*(298.96)*
SAP32006	297.29	297.89	307.80	297.87	*(297.81)*	298.24	*(298.08)*	298.67	*(298.35)*
SAP32005	296.94	297.54	306.10	297.48	*(297.44)*	297.65	*(297.57)*	297.94	*(297.70)*
SAP32004	296.07	296.67	304.30	296.65	*(296.59)*	296.98	*(296.77)*	297.25	*(297.09)*
SAP32003	295.66	296.26	303.10	296.22	*(296.17)*	296.40	*(296.32)*	296.53	*(296.45)*
SAP32002	289.92	290.52	302.33	291.01	*(290.88)*	291.36	*(291.20)*	291.65	*(291.48)*

Notes: Values in parentheses are the Existing Conditions HGL elevations.

HGL values in red are surcharging above maintenance hole rim.

Proposed Infrastructure Improvements

Due to the increase in surcharging observed, a scenario with the proposed sewer improvements described in the Capacity Review (Tatham, October 2024) was created to determine whether the upsized sewers would alleviate the backwater conditions observed under the full development scenario (North and future South Blocks) with Holly SPS flows of 232 L/s and maintaining inflow from the Salem temporary SPS. The proposed sanitary sewer upgrades include upsizing to 675 mm dia. between SAP33018 and SAP32001, 600 mm dia. between SAP33021 and SAP33018, and 525 mm dia. between SAP33022 and SAP33021 (refer to Figure 1 enclosed for maintenance hole locations). It was determined that with the proposed improvements in place, all pipes would have the capacity to convey sanitary flows in this scenario with minor surcharging (max 0.02 m at MH MAPLEVIEW2) to maintenance holes. The results of the analysis are summarized in Table 4, and the PCSWMM profile output is included in Appendix B for reference. The digital PCSWMM model file for this scenario is also included in Appendix C for reference.

Table 4 Proposed Sewer Improvements HGL Analysis Results

NODE	INVERT ELEVATION (m)	PIPE OBVERT ELEVATION (m)	RIM ELEVATION (m)	MAXIMUM HGL ELEVATION (m) 232 L/S
SAP33022	303.11	303.56	305.57	303.48
SAP33021	302.85	303.38	306.10	303.28
SAP33020	302.73	303.26	307.10	303.18
SAP33019	302.51	303.04	307.86	302.93
SAP33018	302.19	302.72	307.56	302.58
SAP33017	301.96	302.49	307.27	302.34
SAP33016	301.71	302.24	307.00	302.11
SAP33015	301.45	301.98	306.71	301.89
SAP33014	301.23	301.76	306.42	301.67
SAP33013	300.98	301.58	306.14	301.37
SAP33012	300.65	301.25	306.39	301.05
SAP33011	300.34	300.94	306.40	300.75

NODE	INVERT ELEVATION (m)	PIPE OBVERT ELEVATION (m)	RIM ELEVATION (m)	MAXIMUM HGL ELEVATION (m) 232 L/S
SAP33010	300.02	300.62	306.71	300.43
SAP33009	299.69	300.29	306.85	300.10
SAP33008	299.37	299.97	306.97	299.78
SAP32011	299.02	299.62	307.23	299.62
MAPLEVIEW2	298.67	299.27	308.60	299.29
SAP32009	298.32	298.92	309.50	298.92
SAP32008	297.98	298.58	308.80	298.59
SAP32007	297.63	298.23	308.30	298.24
SAP32006	297.29	297.89	307.80	297.90
SAP32005	296.94	297.54	306.10	297.51
SAP32004	296.07	296.67	304.30	296.67
SAP32003	295.66	296.26	303.10	296.25
SAP32002	289.92	290.52	302.33	290.88

Review of Basement Surcharge Potential

The hydraulic model results were reviewed to confirm that the basements of directly connected buildings, including those of the proposed development, are not at a substantial risk of damage from the backwater conditions.

It is anticipated that no basements within the proposed development will be at risk of sanitary backwater surcharge. Within the proposed North Block, the minimum elevation of the top of basement slab is 306.14 m according to the site grading plan. Three of the proposed sanitary maintenance holes in the North Block (SAN MH1, SAN MH7 and SAN MH20,) were included in the PCSWMM models with 232 L/s SPS flow scenarios to verify the risk of basement surcharge (see Figure 2 enclosed). After construction of the North Block, the minimum clearance to basement elevations is anticipated to be 2.07 m. Under full build-out (North and future South Blocks) when the proposed sewer upgrades have occurred, the backwater effects are alleviated and the sanitary sewers will operate under free flow conditions resulting in a minimum

clearance of 2.12 m. A review of the basement surcharge potential for the future South Block was not conducted and should be completed during the future South Block detailed design.

Six existing buildings in the study area between SAP33022 and SAP33019 are susceptible to potential basement surcharging, located at 380, 371, 369 and 365 Mapleview Drive West, and 717 Essa Road. It is important to note that in the area potentially susceptible to basement surcharging the HGL elevation under existing conditions with 232 L/s SPS flow is already within 0.34 m, 1.05 m and 2.19 m of structure rims at SAP33022, SAP33021 and SAP33020 respectively, and therefore there is potential for surcharging to occur at these buildings under existing conditions if basements are present. The construction of the North Block increases the HGL elevation with 232 L/s SPS flows by a maximum of 0.15 m, and the SPS would remain the primary cause of potential surcharging at these buildings. During 112 L/s SPS flows, sanitary flows are contained within the sewer in the susceptible area with no surcharging to maintenance holes in both phasing scenarios. During 180 L/s SPS flows, the HGL is contained within the sewer in the susceptible area after the North Block is constructed. After future South Block construction, the 180 L/s SPS flows are below the basement elevations (assumed 3.0m below maintenance hole rims) without the Mapleview Drive sewer upgrades. After the proposed Mapleview Drive sewer improvements, under all SPS flows, the backwater conditions will be alleviated, thereby eliminating the potential for basement surcharging.

As recommended in the Capacity Review, the development can proceed with the North Block construction with marginal capacity impacts compared with planned growth. Regardless of the Mapleview Village development, the proposed improvements to the Mapleview Drive sanitary sewer are required to accommodate the growth and associated increase in flows in the Holly SPS tributary area. The Mapleview Drive sewer upgrades should occur to alleviate backwater conditions depending on the pace of growth in the Holly SPS tributary area. This may also impact the development of future phases.

SUMMARY

As discussed in the Capacity Review, while the proposed development contributes toward the need to upgrade the sanitary infrastructure, it is not the trigger of the required upgrades nor does it require upgrades beyond what is already necessary to accommodate planned growth on Mapleview Drive.

Under the Holly SPS peak operating flow of 180 L/s, the construction of the North Block has a marginal impact on the current Mapleview sanitary sewer system. Therefore, the proposed development can proceed with construction of the North Block without causing adverse effects.

The sewer improvements may be required prior to the construction of the future South Block depending on the timing of growth in the Holly SPS area, and decommissioning of the Salem temporary SPS. The sewer capacity should be reassessed and discussed with the City closer to the time of construction of the South Block with regards to the state of development in the Holly SPS area, and the decommissioning of the Salem temporary SPS.

Yours truly,
Tatham Engineering Limited



Jonathan Paul, B.A.Sc.
Engineering Intern

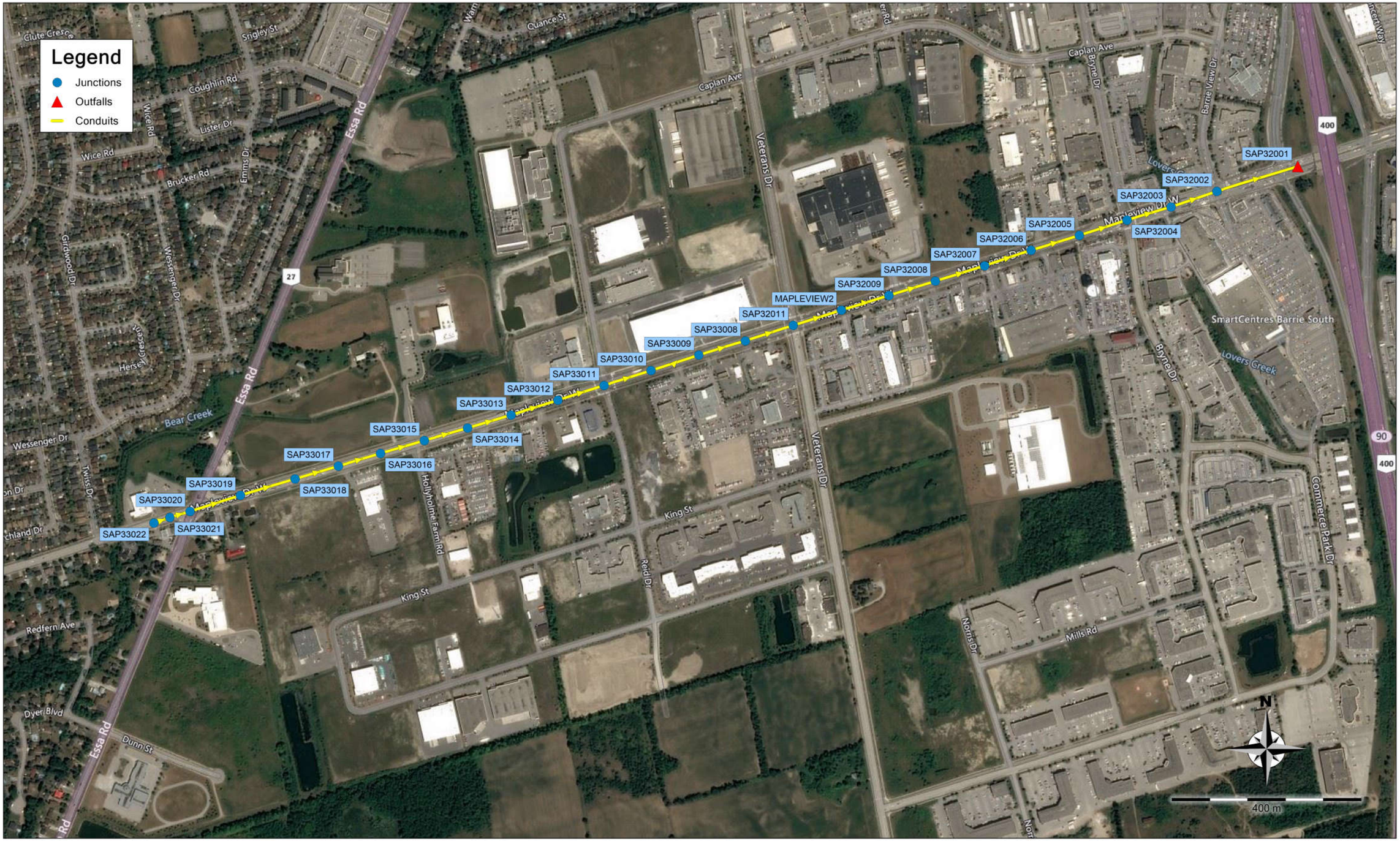
Jacob Macdonald, B.A.Sc., P.Eng.
Engineer

JP/JM: rlh

Appendices: A: Sanitary Sewer Design Sheets
B: PCSWMM Profiles and Output
C: Digital PCSWMM Models

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Legend
Junctions
Outfalls
Conduits
SAP32001
SAP32002
SAP32003
SAP32004
SAP32005
SAP32006
SAP32007
SAP32008
SAP32009
MAPLEVIEW2
SAP32011
SAP33008
SAP33009
SAP33010
SAP33011
SAP33012
SAP33013
SAP33014
SAP33015
SAP33016
SAP33017
SAP33018
SAP33019
SAP33020
SAP33021
SAP33022
Caplan Ave
Veterans Dr
Essa Rd
Bear Creek
King St
Reid Dr
Hollyholme Farm Rd
Wessenger Dr
Wice Rd
Brucker Rd
Coughlin Rd
Lister Dr
Emms Dr
Srigley St
Quance St
Girdwood Dr
Twiss Dr
Redfern Ave
Dyer Blvd
Dunn St
Barrie View Dr
Byrne Dr
SmartCentres Barrie South
Lovers Creek
Commerce Park Dr
Norris Dr
Mills Rd
400
27
90
N
400 m


Legend
Junctions
Outfalls
Conduits
SAN_MH1
SAN_MH20
SAN_MH7
SAP33014
SAP33015
SAP33016
SAP33017
SAP33018
SAP33019
SAP33020
SAP33022
Bear Creek
Bear Creek
Essa Rd
Emms Dr
Emms Dr
Wessenger Dr
27
27
Hollyholme Fa
N
100 m

Appendix A:
Sanitary Sewer Design Sheets

SANITARY SEWER DESIGN SHEET No. 12

Development Details Basis

Existing Conditions + Subject Site North Block - SPS
DESIGN SHEET at 112 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									112.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	113.350	2.54	2.5	0.254	113.604	28.01	450	0.92%	273.464	0.449	Ok	1.719	1.638	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	113.717	0.89	3.4	0.343	114.060	47.54	525	0.19%	187.460	0.563	Ok	0.866	0.907	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	114.005	0.62	4.1	0.405	114.410	110.70	525	0.19%	187.460	0.564	Ok	0.866	0.908	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	121.20	525	0.21%	197.079	0.546	Ok	0.910	0.943	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	94.88	525	0.18%	182.460	0.573	Ok	0.843	0.889	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	93.41	525	0.21%	197.079	0.546	Ok	0.910	0.943	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	115.540		7.5	0.750	116.290	95.92	525	0.18%	182.460	0.579	Ok	0.843	0.892	Ok
Subject Site - Medium Density Res		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**0**	**0**	**1.67**	0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356									
Subject Site - Commercial		**SAP33015**				0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356	15.00	250	0.40%	37.611	0.461	Ok	0.766	0.727	Ok
	SAP33015	SAP33014				0	1423	4.659	3.696	4.659	129.270		17.7	1.770	131.040	95.89	525	0.18%	182.460	0.627	Ok	0.843	0.914	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	2396	4.198	3.523	4.198	138.196		51.3	5.130	143.326	94.93	525	0.19%	187.460	0.654	Ok	0.866	0.947	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2963	4.024	3.447	4.024	143.044		72.3	7.231	150.275	104.61	600	0.31%	341.867	0.463	Ok	1.209	1.155	Ok
Mapleview Drive	SAP33012	SAP33011				82	3044	4.002	3.437	4.002	143.727	2.82	75.1	7.513	151.240	101.56	600	0.30%	336.308	0.470	Ok	1.189	1.142	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	4875	3.642	3.255	3.642	158.242		138.4	13.838	172.080	104.68	600	0.30%	336.308	0.506	Ok	1.189	1.171	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4973	3.628	3.247	3.628	158.986		141.8	14.177	173.163	105.50	600	0.30%	336.308	0.508	Ok	1.189	1.172	Ok
Mapleview Drive	SAP33009	SAP33008				0	4973	3.628	3.247	3.628	158.986		141.8	14.177	173.163	102.65	600	0.31%	341.867	0.503	Ok	1.209	1.187	Ok
Mapleview Drive	SAP33008	SAP32011				27	5000	3.624	3.245	3.624	159.187	0.92	142.7	14.269	173.456	106.51	600	0.29%	330.655	0.514	Ok	1.169	1.158	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) This "existing" condition sheet conservatively applies the pro-rated 2041 population distribution + Subject Site Flows
(2) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records
(3) Design Sheet models the existing condition (existing sewers)

SANITARY SEWER DESIGN SHEET No. 12

Development Details Basis

Existing Conditions + Subject Site North Block - SPS
DESIGN SHEET at 180 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									180.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	181.350	2.54	2.5	0.254	181.604	28.01	450	0.92%	273.464	0.595	Ok	1.719	1.838	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	181.717	0.89	3.4	0.343	182.060	47.54	525	0.19%	187.460	0.794	Check	0.866	0.987	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	182.005	0.62	4.1	0.405	182.410	110.70	525	0.19%	187.460	0.796	Check	0.866	0.987	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	121.20	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	94.88	525	0.18%	182.460	0.819	Check	0.843	0.961	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	93.41	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	183.540		7.5	0.750	184.290	95.92	525	0.18%	182.460	0.829	Check	0.843	0.961	Ok
Subject Site - Medium Density Res		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**0**	**0**	**1.67**	0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356									
Subject Site - Commercial		**SAP33015**				0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356	15.00	250	0.40%	37.611	0.461	Ok	0.766	0.727	Ok
	SAP33015	SAP33014				0	1423	4.659	3.696	4.659	197.270		17.7	1.770	199.040	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	2396	4.198	3.523	4.198	206.196		51.3	5.130	211.326	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2963	4.024	3.447	4.024	211.044		72.3	7.231	218.275	104.61	600	0.31%	341.867	0.580	Ok	1.209	1.272	Ok
Mapleview Drive	SAP33012	SAP33011				82	3044	4.002	3.437	4.002	211.727	2.82	75.1	7.513	219.240	101.56	600	0.30%	336.308	0.588	Ok	1.189	1.257	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	4875	3.642	3.255	3.642	226.242		138.4	13.838	240.080	104.68	600	0.30%	336.308	0.624	Ok	1.189	1.276	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4973	3.628	3.247	3.628	226.986		141.8	14.177	241.163	105.50	600	0.30%	336.308	0.626	Ok	1.189	1.276	Ok
Mapleview Drive	SAP33009	SAP33008				0	4973	3.628	3.247	3.628	226.986		141.8	14.177	241.163	102.65	600	0.31%	341.867	0.619	Ok	1.209	1.293	Ok
Mapleview Drive	SAP33008	SAP32011				27	5000	3.624	3.245	3.624	227.187	0.92	142.7	14.269	241.456	106.51	600	0.29%	330.655	0.634	Ok	1.169	1.260	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) This "existing" condition sheet conservatively applies the pro-rated 2041 population distribution + Subject Site Flows
(2) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records
(3) Design Sheet models the existing condition (existing sewers)

SANITARY SEWER DESIGN SHEET No. 12

Development Details Basis

Existing Conditions + Subject Site North Block - SPS
DESIGN SHEET at 232 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									232.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	233.350	2.54	2.5	0.254	233.604	28.01	450	0.92%	273.464	0.710	Check	1.719	1.931	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	233.717	0.89	3.4	0.343	234.060	47.54	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	234.005	0.62	4.1	0.405	234.410	110.70	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	234.005		4.1	0.405	234.410	121.20	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	234.005		4.1	0.405	234.410	94.88	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	234.005		4.1	0.405	234.410	93.41	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	235.540		7.5	0.750	236.290	95.92	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
Subject Site - Medium Density Res		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**0**	**0**	**1.67**	0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356									
Subject Site - Commercial		**SAP33015**				0	1227	4.800	3.741	4.800	15.336		10.2	1.020	16.356	15.00	250	0.40%	37.611	0.461	Ok	0.766	0.727	Ok
	SAP33015	SAP33014				0	1423	4.659	3.696	4.659	249.270		17.7	1.770	251.040	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	2396	4.198	3.523	4.198	258.196		51.3	5.130	263.326	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	2963	4.024	3.447	4.024	263.044		72.3	7.231	270.275	104.61	600	0.31%	341.867	0.670	Ok	1.209	1.333	Ok
Mapleview Drive	SAP33012	SAP33011				82	3044	4.002	3.437	4.002	263.727	2.82	75.1	7.513	271.240	101.56	600	0.30%	336.308	0.680	Ok	1.189	1.316	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	4875	3.642	3.255	3.642	278.242		138.4	13.838	292.080	104.68	600	0.30%	336.308	0.720	Check	1.189	1.329	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	4973	3.628	3.247	3.628	278.986		141.8	14.177	293.163	105.50	600	0.30%	336.308	0.722	Check	1.189	1.330	Ok
Mapleview Drive	SAP33009	SAP33008				0	4973	3.628	3.247	3.628	278.986		141.8	14.177	293.163	102.65	600	0.31%	341.867	0.713	Check	1.209	1.348	Ok
Mapleview Drive	SAP33008	SAP32011				27	5000	3.624	3.245	3.624	279.187	0.92	142.7	14.269	293.456	106.51	600	0.29%	330.655	0.733	Check	1.169	1.311	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) This "existing" condition sheet conservatively applies the pro-rated 2041 population distribution + Subject Site Flows
(2) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records
(3) Design Sheet models the existing condition (existing sewers)

SANITARY SEWER DESIGN SHEET No. 12

Development Details Basis

DESIGN SHEET: Existing Conditions + Subject Site North and South Blocks - SPS at 112 L/s

FILE NO: 422433

CONTRACT / PROJECT:

n ≥ 0.013

M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations

(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.

$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)

$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									112.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	113.350	2.54	2.5	0.254	113.604	28.01	450	0.92%	273.464	0.449	Ok	1.719	1.638	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	113.717	0.89	3.4	0.343	114.060	47.54	525	0.19%	187.460	0.563	Ok	0.866	0.907	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	114.005	0.62	4.1	0.405	114.410	110.70	525	0.19%	187.460	0.564	Ok	0.866	0.908	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	121.20	525	0.21%	197.079	0.546	Ok	0.910	0.943	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	94.88	525	0.18%	182.460	0.573	Ok	0.843	0.889	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	114.005		4.1	0.405	114.410	93.41	525	0.21%	197.079	0.546	Ok	0.910	0.943	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	115.540		7.5	0.750	116.290	95.92	525	0.18%	182.460	0.579	Ok	0.843	0.892	Ok
Subject Site - Medium Density Res		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.012		10.2	1.020	44.032	15.00	250	0.40%	37.611	1.000	Check	0.766	0.766	Ok
	SAP33015	SAP33014				0	4650	3.677	3.274	3.677	156.523		17.7	1.770	158.293	95.89	525	0.18%	182.460	0.719	Check	0.843	0.947	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	5622	3.540	3.197	3.540	163.830		51.3	5.130	168.960	94.93	525	0.19%	187.460	0.742	Check	0.866	0.976	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	6189	3.473	3.158	3.473	167.968		72.3	7.231	175.199	104.61	600	0.31%	341.867	0.507	Ok	1.209	1.203	Ok
Mapleview Drive	SAP33012	SAP33011				82	6271	3.463	3.152	3.463	168.558	2.82	75.1	7.513	176.071	101.56	600	0.30%	336.308	0.513	Ok	1.189	1.189	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	8102	3.290	3.045	3.290	181.423		138.4	13.838	195.261	104.68	600	0.30%	336.308	0.547	Ok	1.189	1.212	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	8200	3.283	3.040	3.283	182.095		141.8	14.177	196.272	105.50	600	0.30%	336.308	0.548	Ok	1.189	1.213	Ok
Mapleview Drive	SAP33009	SAP33008				0	8200	3.283	3.040	3.283	182.095		141.8	14.177	196.272	102.65	600	0.31%	341.867	0.543	Ok	1.209	1.228	Ok
Mapleview Drive	SAP33008	SAP32011				27	8227	3.280	3.038	3.280	182.277	0.92	142.7	14.269	196.546	106.51	600	0.29%	330.655	0.555	Ok	1.169	1.197	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:

(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:

(1) This "existing" condition sheet conservatively applies the pro-rated 2041 population distribution + Subject Site Flows
(2) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records
(3) Design Sheet models the existing condition (existing sewers)

SANITARY SEWER DESIGN SHEET No. 12

Development Details Basis

Existing Conditions + Subject Site North and South
DESIGN SHEET Blocks - SPS at 180 L/s
FILE NO 422433
CONTRACT / PROJECT

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									180.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	181.350	2.54	2.5	0.254	181.604	28.01	450	0.92%	273.464	0.595	Ok	1.719	1.838	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	181.717	0.89	3.4	0.343	182.060	47.54	525	0.19%	187.460	0.794	Check	0.866	0.987	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	182.005	0.62	4.1	0.405	182.410	110.70	525	0.19%	187.460	0.796	Check	0.866	0.987	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	121.20	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	94.88	525	0.18%	182.460	0.819	Check	0.843	0.961	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	182.005		4.1	0.405	182.410	93.41	525	0.21%	197.079	0.759	Check	0.910	1.033	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	183.540		7.5	0.750	184.290	95.92	525	0.18%	182.460	0.829	Check	0.843	0.961	Ok
Subject Site - Medium Density Res		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.012		10.2	1.020	44.032	15.00	250	0.40%	37.611	1.000	Check	0.766	0.766	Ok
	SAP33015	SAP33014				0	4650	3.677	3.274	3.677	224.523		17.7	1.770	226.293	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	5622	3.540	3.197	3.540	231.830		51.3	5.130	236.960	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	6189	3.473	3.158	3.473	235.968		72.3	7.231	243.199	104.61	600	0.31%	341.867	0.623	Ok	1.209	1.304	Ok
Mapleview Drive	SAP33012	SAP33011				82	6271	3.463	3.152	3.463	236.558	2.82	75.1	7.513	244.071	101.56	600	0.30%	336.308	0.631	Ok	1.189	1.288	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	8102	3.290	3.045	3.290	249.423		138.4	13.838	263.261	104.68	600	0.30%	336.308	0.666	Ok	1.189	1.302	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	8200	3.283	3.040	3.283	250.095		141.8	14.177	264.272	105.50	600	0.30%	336.308	0.667	Ok	1.189	1.303	Ok
Mapleview Drive	SAP33009	SAP33008				0	8200	3.283	3.040	3.283	250.095		141.8	14.177	264.272	102.65	600	0.31%	341.867	0.660	Ok	1.209	1.320	Ok
Mapleview Drive	SAP33008	SAP32011				27	8227	3.280	3.038	3.280	250.277	0.92	142.7	14.269	264.546	106.51	600	0.29%	330.655	0.676	Ok	1.169	1.286	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

Tatham Notes:
(1) This "existing" condition sheet conservatively applies the pro-rated 2041 population distribution + Subject Site Flows
(2) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records
(3) Design Sheet models the existing condition (existing sewers)

SANITARY SEWER DESIGN SHEET No. 12

Development Details Basis

DESIGN SHEET: Existing Conditions + Subject Site North and South Blocks - SPS at 232 L/s
FILE NO: 422433
CONTRACT / PROJECT:

n ≥ 0.013
M = 5/P^0.2 Babbit

Numbers in blue or text in red are equations
(Harmon or Babbitt peaking factor where; M ≥ 2), the greater of the two is used in the spreadsheet. Please refer to Section 3.3.1.1 of the Barrie Sanitary Design Guidelines for additional guidance on which peaking factor to use.

$Q_p = P*q*M/86400$ (Peak population flow where; q = 225 L/day/person; P = population) 225 litres/person/day.
$Q_i = I*A$ (Peak extraneous flow: I= 0.1L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

STREET / AREA	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	DWELL UNITS	DWELL (ACC) UNITS	DENSITY P.P.U.	POP. (P)	POP. (ACC)	M PEAKING FACTOR BABBIT	M PEAKING FACTOR HARMON	Max PEAKING FACTOR	Q_p (l/s)	AREA (ha)	AREA (ACC) (ha)	Q_i (l/s)	Q_{tot} (l/s)	L (m)	D (mm)	S (%)	Qf FULL (l/s)	d/D[2]	d/D[3] >0.5 or >0.70	Velocity FULL (m/s)	Velocity Partial[1] (m/s)	Velocity[4] > 0.6 (m/s)
Mapleview Drive	Forcemain	SAP33022									232.000													
	SAP33022	SAP33021				59	59	8.812	4.300	8.812	233.350	2.54	2.5	0.254	233.604	28.01	450	0.92%	273.464	0.710	Check	1.719	1.931	Ok
	SAP33021	SAP33020				21	79	8.298	4.270	8.298	233.717	0.89	3.4	0.343	234.060	47.54	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33020	SAP33019				17	96	7.982	4.248	7.982	234.005	0.62	4.1	0.405	234.410	110.70	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
	SAP33019	SAP33018				0	96	7.982	4.248	7.982	234.005		4.1	0.405	234.410	121.20	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
	SAP33018	SAP33017				0	96	7.982	4.248	7.982	234.005		4.1	0.405	234.410	94.88	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
	SAP33017	SAP33016				0	96	7.982	4.248	7.982	234.005		4.1	0.405	234.410	93.41	525	0.21%	197.079	1.000	Check	0.910	0.910	Ok
281 Mapleview	SAP33096	SAP33016				100	100	7.926	4.244	7.926	2.062	3.45	3.5	0.345	2.407	29.05	375	0.41%	112.266	0.101	Ok	1.016	0.392	Check
Mapleview Drive	SAP33016	SAP33015				0	196	6.924	4.151	6.924	235.540		7.5	0.750	236.290	95.92	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
Subject Site - Medium Density Res		**SAP33015**	**524**	**524**	**2.34**	1227	1227	4.800	3.741	4.800	15.336	10.20	10.2	1.020	16.356									
Subject Site - High Density Res.		**SAP33015**	**1921**	**1921**	**1.67**	3209	4436	3.712	3.293	3.712	42.878		10.2	1.020	43.898									
Subject Site - Commercial		**SAP33015**				17	4453	3.709	3.291	3.709	43.012		10.2	1.020	44.032	15.00	250	0.40%	37.611	1.000	Check	0.766	0.766	Ok
	SAP33015	SAP33014				0	4650	3.677	3.274	3.677	276.523		17.7	1.770	278.293	95.89	525	0.18%	182.460	1.000	Check	0.843	0.843	Ok
251 Mapleview	SAP33085	SAP33014				973	973	5.028	3.808	5.028	12.736	33.60	33.6	3.360	16.096	18.71	250	1.50%	72.833	0.319	Ok	1.484	1.115	Ok
Mapleview Drive	SAP33014	SAP33013				0	5622	3.540	3.197	3.540	283.830		51.3	5.130	288.960	94.93	525	0.19%	187.460	1.000	Check	0.866	0.866	Ok
300 Mapleview	EX MH	SAP33013				516	516	5.708	3.967	5.708	7.669	19.26	19.3	1.926	9.595	24.46	375	1.50%	214.735	0.144	Ok	1.944	0.915	Ok
231 Mapleview	SAP33093	SAP33013				51	51	9.079	4.314	9.079	1.198	1.75	1.8	0.175	1.373	24.46	375	1.50%	214.735	0.057	Ok	1.944	0.519	Check
Mapleview Drive	SAP33013	SAP33012				0	6189	3.473	3.158	3.473	287.968		72.3	7.231	295.199	104.61	600	0.31%	341.867	0.717	Check	1.209	1.355	Ok
Mapleview Drive	SAP33012	SAP33011				82	6271	3.463	3.152	3.463	288.558	2.82	75.1	7.513	296.071	101.56	600	0.30%	336.308	0.728	Check	1.189	1.337	Ok
Reid Drive North	SAP33078	SAP33011				900	900	5.107	3.829	5.107	11.966	31.08	31.1	3.108	15.074	20.17	375	0.38%	108.081	0.252	Ok	0.979	0.643	Ok
Reid Drive South	SAP33056	SAP33011				931	931	5.072	3.820	5.072	12.300	32.17	32.2	3.217	15.517	109.69	375	0.82%	158.768	0.211	Ok	1.438	0.852	Ok
Mapleview Drive	SAP33011	SAP33010				0	8102	3.290	3.045	3.290	301.423		138.4	13.838	315.261	104.68	600	0.30%	336.308	0.768	Check	1.189	1.345	Ok
191 Mapleview	SAP33090	SAP33010				98	98	7.954	4.246	7.954	2.033	3.39	3.4	0.339	2.372	22.29	200	14.72%	125.837	0.095	Ok	4.006	1.481	Ok
Mapleview Drive	SAP33010	SAP33009				0	8200	3.283	3.040	3.283	302.095		141.8	14.177	316.272	105.50	600	0.30%	336.308	0.770	Check	1.189	1.346	Ok
Mapleview Drive	SAP33009	SAP33008				0	8200	3.283	3.040	3.283	302.095		141.8	14.177	316.272	102.65	600	0.31%	341.867	0.759	Check	1.209	1.365	Ok
Mapleview Drive	SAP33008	SAP32011				27	8227	3.280	3.038	3.280	302.277	0.92	142.7	14.269	316.546	106.51	600	0.29%	330.655	0.783	Check	1.169	1.326	Ok

DATE: CALCULATED BY: CHECKED BY:

Design Sheet Notes:
(1) without extraneous flow
(2) with extraneous flow
(3) d/D>0.5 for pipes 375 and less, d/D>0.70 for pipes greater than 375
(4) Velocity check based on the lesser of full flow or partial velocity

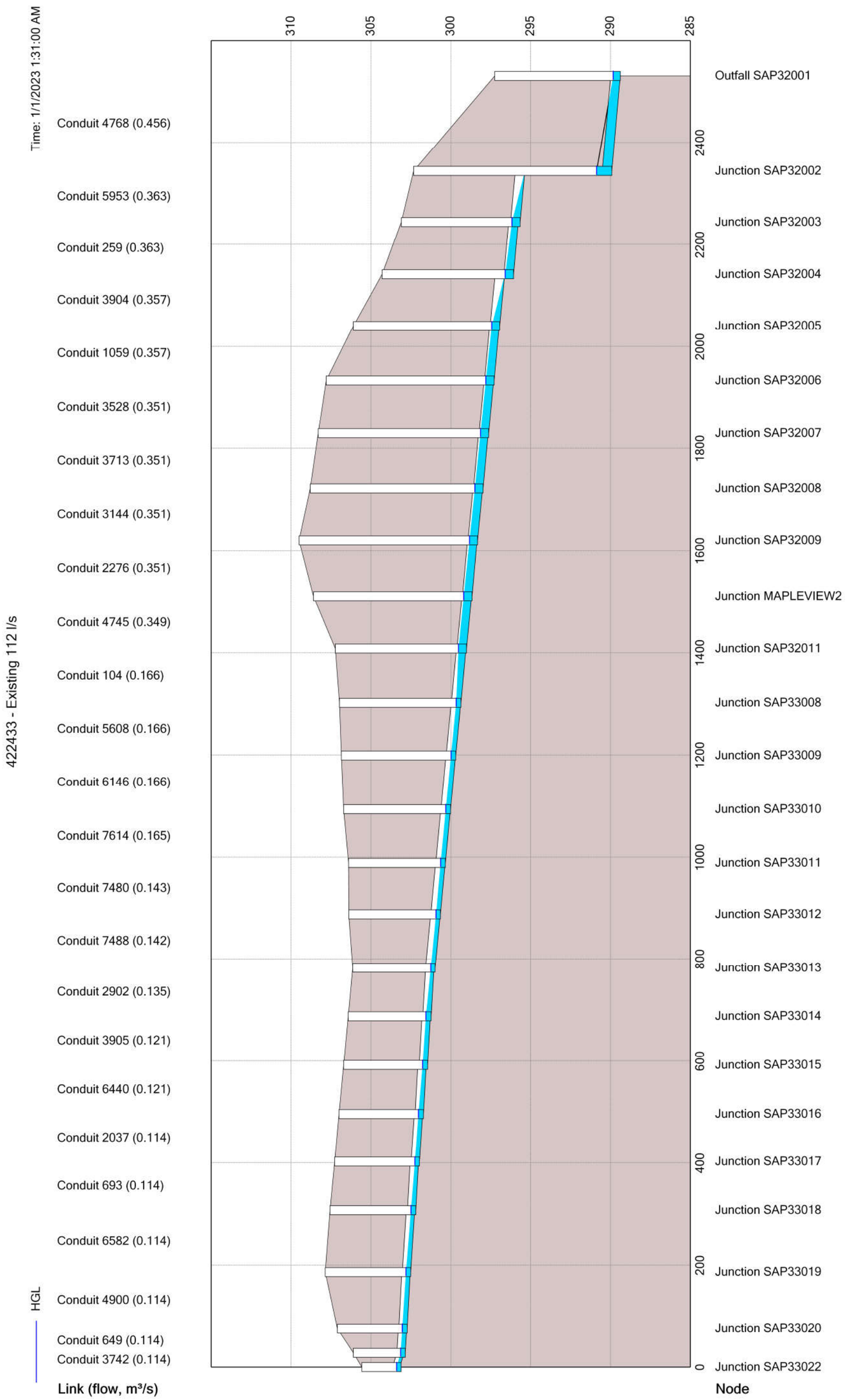
Tatham Notes:
(1) This "existing" condition sheet conservatively applies the pro-rated 2041 population distribution + Subject Site Flows
(2) Holly SPS flow assumed to be 112 L/s as per average flow in provided flow records
(3) Design Sheet models the existing condition (existing sewers)

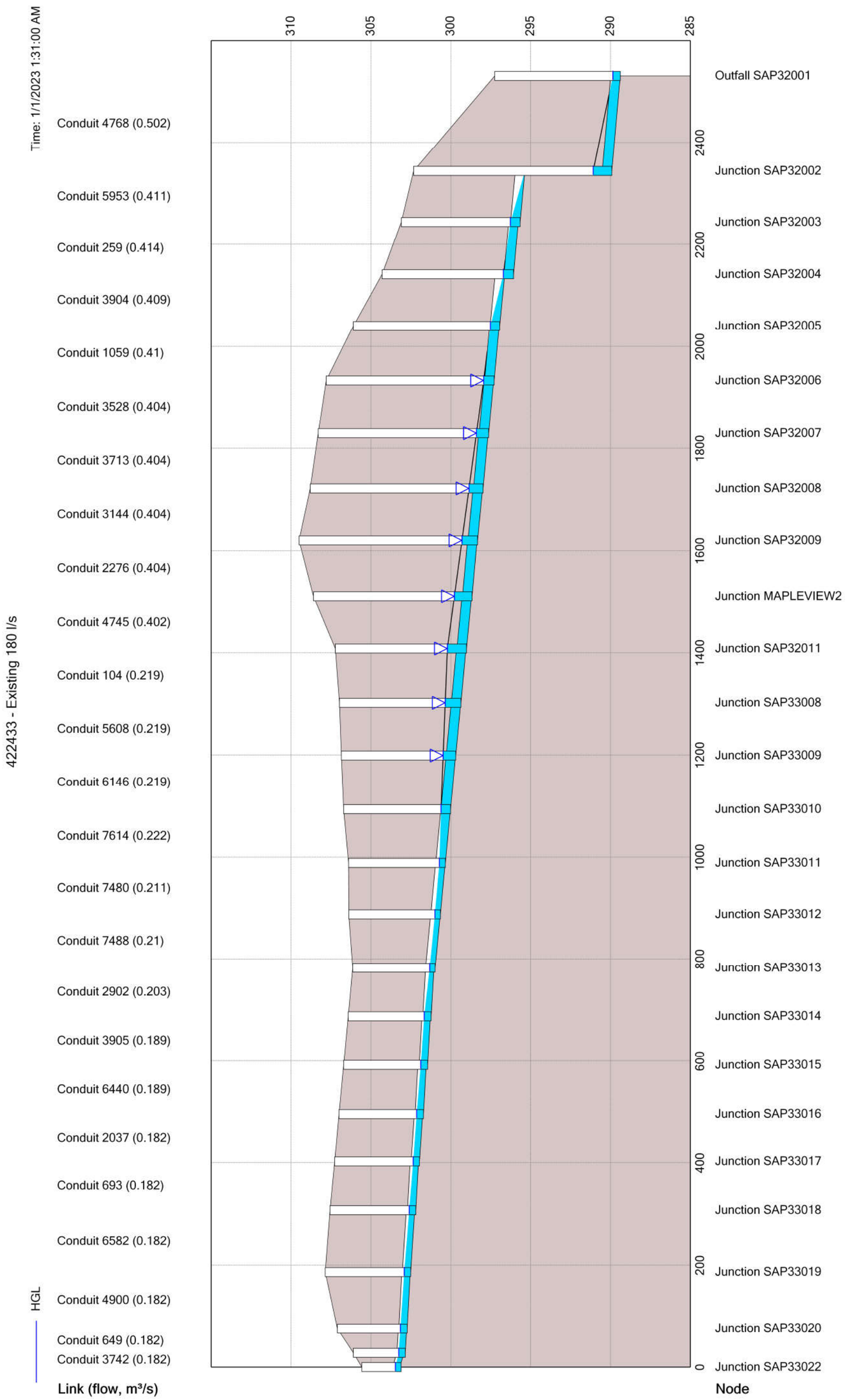
PCSWMM Model: SSO-Interim-WWF-With Temp Pumping Station - With PS4 - No loadings west of Veterans - per Mar 17 2021 RVA memo

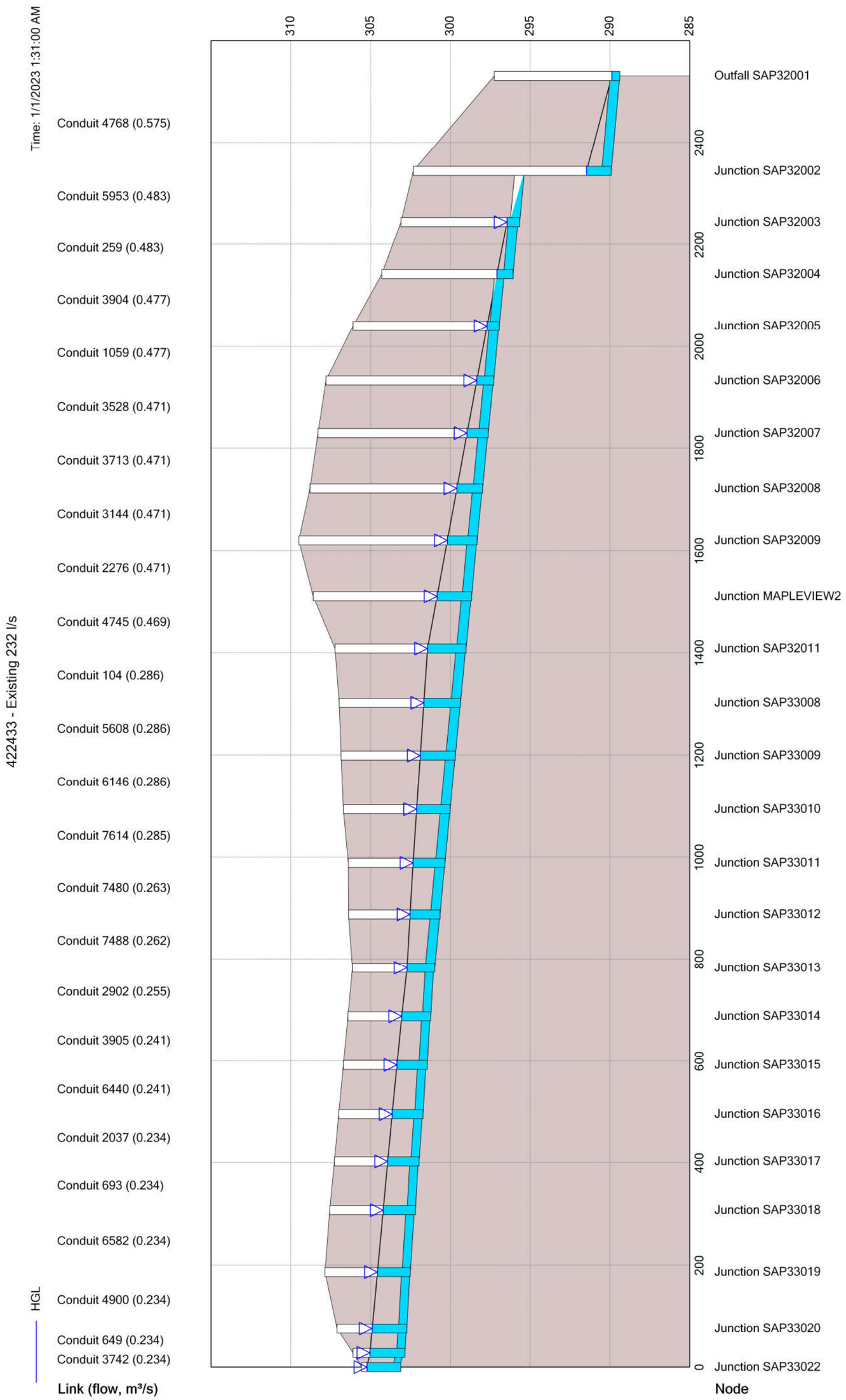
Junction	Invert Elev. (m)	Rim Elev. (m)	max HGL (m)
SAP32001	289.39	297.25	289.66
SAP32002	289.92	302.33	290.21
SAP32003	295.66	303.1	295.99
SAP32004	296.07	304.3	296.4
SAP32005	296.94	306.1	297.26
SAP32006	297.29	307.8	297.61
SAP32007	297.63	308.3	297.95
SAP32008	297.98	308.8	298.3
SAP32009	298.32	309.5	298.64
MAPLEVIEW2	298.67	308.6	298.99
SAP32011	299.02	307.23	299.35

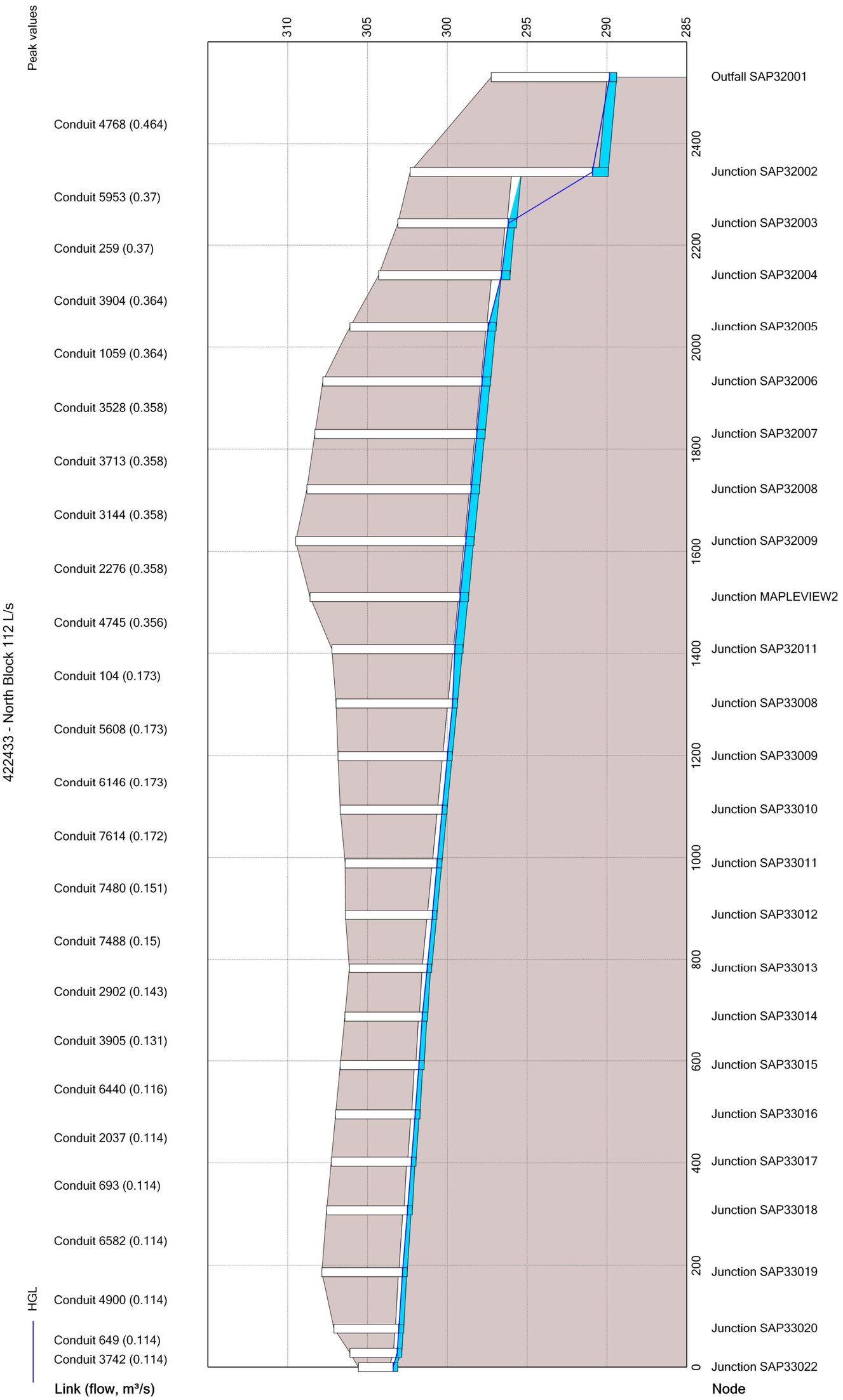
Name	Inlet Node	Outlet Node	Length (m)	Roughness	Inlet Offset (m)	Outlet Offset (m)	Slope (m/m)	Max. |Flow| (m^3/s)	Max. |Velocity| (m/s)	Max/Full Flow	Max/Full Depth
S74	SAP32001	SAP12028	186.06	0.013	0	0.06	0.00328	0.288	1.09	0.07	0.21
S745	SAP32002	SAP32001	186.06	0.013	0	0	0.00285	0.289	1.26	0.08	0.19
S75	SAP32003	SAP32002	99.99	0.013	0	5.44	0.003	0.195	1.33	0.56	0.5
S76	SAP32004	SAP32003	102.52	0.013	0	0.12	0.00283	0.196	1.32	0.57	0.51
S77	SAP32005	SAP32004	101.22	0.013	0	0.55	0.00316	0.19	1.34	0.53	0.49
S78	SAP32006	SAP32005	106.93	0.013	0	0.03	0.00299	0.19	1.3	0.54	0.5
S79	SAP32007	SAP32006	103.76	0.013	0	0.03	0.00299	0.184	1.26	0.53	0.5
S80	SAP32008	SAP32007	107.55	0.013	0	0.03	0.00298	0.184	1.28	0.53	0.5
S81	SAP32009	SAP32008	101.87	0.013	0	0.03	0.00304	0.185	1.28	0.52	0.49
S82	MAPLEVIEW2	SAP32009	109.45	0.013	0	0.03	0.00292	0.185	1.28	0.53	0.5
S83	SAP32011	MAPLEVIEW2	102.52	0.013	0	0.03	0.00312	0.183	1.23	0.51	0.51

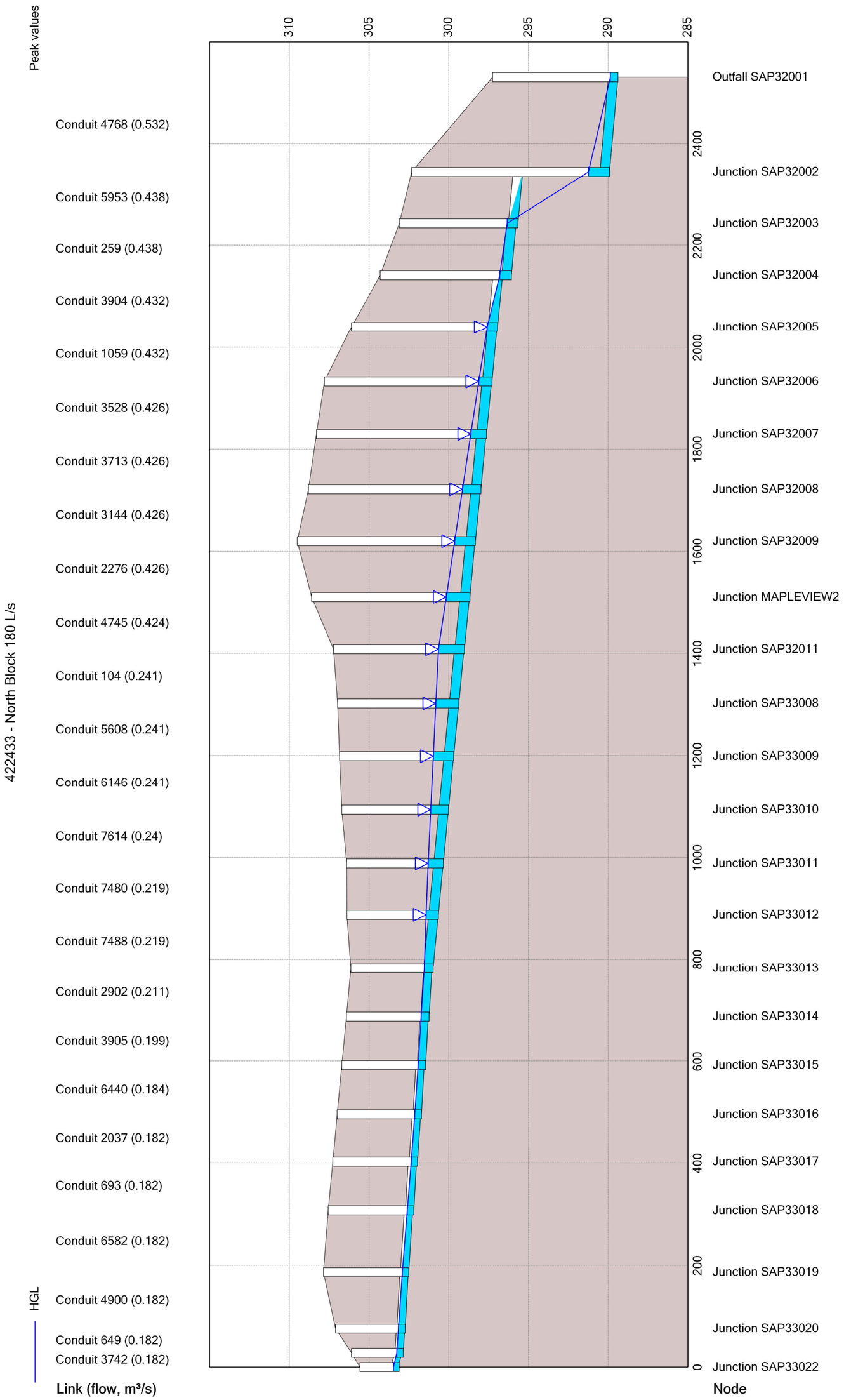
Appendix B:
PCSWMM Profiles and Output

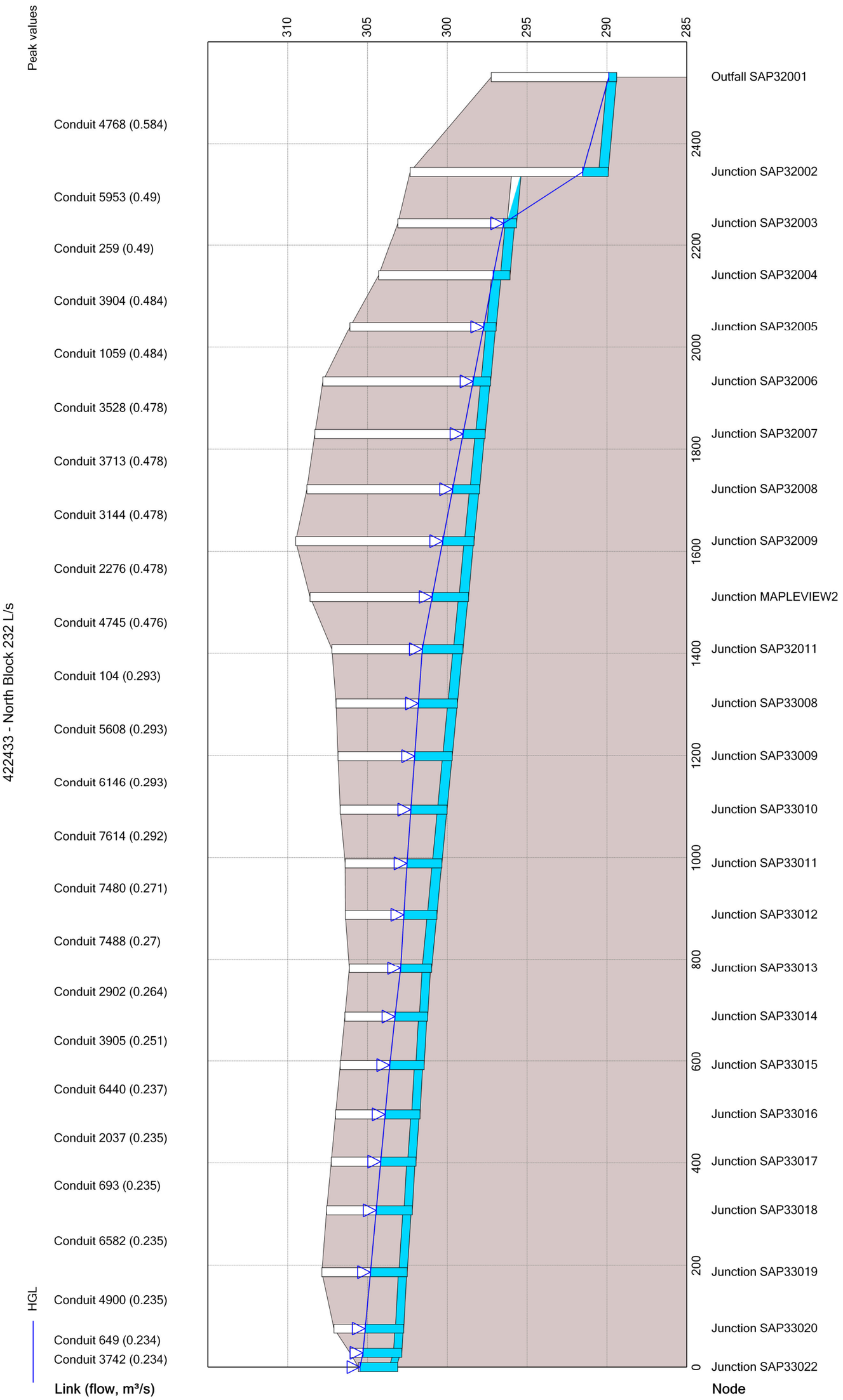

Time: 1/1/2023 1:31:00 AM
422433 - Existing 112 l/s
310
305
300
295
290
285
Conduit 4768 (0.456)
Conduit 5953 (0.363)
Conduit 259 (0.363)
Conduit 3904 (0.357)
Conduit 1059 (0.357)
Conduit 3528 (0.351)
Conduit 3713 (0.351)
Conduit 3144 (0.351)
Conduit 2276 (0.351)
Conduit 4745 (0.349)
Conduit 104 (0.166)
Conduit 5608 (0.166)
Conduit 6146 (0.166)
Conduit 7614 (0.165)
Conduit 7480 (0.143)
Conduit 7488 (0.142)
Conduit 2902 (0.135)
Conduit 3905 (0.121)
Conduit 6440 (0.121)
Conduit 2037 (0.114)
Conduit 693 (0.114)
Conduit 6582 (0.114)
Conduit 4900 (0.114)
Conduit 649 (0.114)
Conduit 3742 (0.114)
HGL
Link (flow, m³/s)
Outfall SAP32001
Junction SAP32002
Junction SAP32003
Junction SAP32004
Junction SAP32005
Junction SAP32006
Junction SAP32007
Junction SAP32008
Junction SAP32009
Junction MAPLEVIEW2
Junction SAP32011
Junction SAP33008
Junction SAP33009
Junction SAP33010
Junction SAP33011
Junction SAP33012
Junction SAP33013
Junction SAP33014
Junction SAP33015
Junction SAP33016
Junction SAP33017
Junction SAP33018
Junction SAP33019
Junction SAP33020
Junction SAP33022
Node
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0


Time: 1/1/2023 1:31:00 AM
422433 - Existing 180 l/s
HGL
Link (flow, m³/s)
Node
310
305
300
295
290
285
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Conduit 4768 (0.502)
Conduit 5953 (0.411)
Conduit 259 (0.414)
Conduit 3904 (0.409)
Conduit 1059 (0.41)
Conduit 3528 (0.404)
Conduit 3713 (0.404)
Conduit 3144 (0.404)
Conduit 2276 (0.404)
Conduit 4745 (0.402)
Conduit 104 (0.219)
Conduit 5608 (0.219)
Conduit 6146 (0.219)
Conduit 7614 (0.222)
Conduit 7480 (0.211)
Conduit 7488 (0.21)
Conduit 2902 (0.203)
Conduit 3905 (0.189)
Conduit 6440 (0.189)
Conduit 2037 (0.182)
Conduit 693 (0.182)
Conduit 6582 (0.182)
Conduit 4900 (0.182)
Conduit 649 (0.182)
Conduit 3742 (0.182)
Outfall SAP32001
Junction SAP32002
Junction SAP32003
Junction SAP32004
Junction SAP32005
Junction SAP32006
Junction SAP32007
Junction SAP32008
Junction SAP32009
Junction MAPLEVIEW2
Junction SAP32011
Junction SAP33008
Junction SAP33009
Junction SAP33010
Junction SAP33011
Junction SAP33012
Junction SAP33013
Junction SAP33014
Junction SAP33015
Junction SAP33016
Junction SAP33017
Junction SAP33018
Junction SAP33019
Junction SAP33020
Junction SAP33022


Time: 1/1/2023 1:31:00 AM
422433 - Existing 232 l/s
HGL
Link (flow, m³/s)
Node
310
305
300
295
290
285
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Conduit 4768 (0.575)
Conduit 5953 (0.483)
Conduit 259 (0.483)
Conduit 3904 (0.477)
Conduit 1059 (0.477)
Conduit 3528 (0.471)
Conduit 3713 (0.471)
Conduit 3144 (0.471)
Conduit 2276 (0.471)
Conduit 4745 (0.469)
Conduit 104 (0.286)
Conduit 5608 (0.286)
Conduit 6146 (0.286)
Conduit 7614 (0.285)
Conduit 7480 (0.263)
Conduit 7488 (0.262)
Conduit 2902 (0.255)
Conduit 3905 (0.241)
Conduit 6440 (0.241)
Conduit 2037 (0.234)
Conduit 693 (0.234)
Conduit 6582 (0.234)
Conduit 4900 (0.234)
Conduit 649 (0.234)
Conduit 3742 (0.234)
Outfall SAP32001
Junction SAP32002
Junction SAP32003
Junction SAP32004
Junction SAP32005
Junction SAP32006
Junction SAP32007
Junction SAP32008
Junction SAP32009
Junction MAPLEVIEW2
Junction SAP32011
Junction SAP33008
Junction SAP33009
Junction SAP33010
Junction SAP33011
Junction SAP33012
Junction SAP33013
Junction SAP33014
Junction SAP33015
Junction SAP33016
Junction SAP33017
Junction SAP33018
Junction SAP33019
Junction SAP33020
Junction SAP33022


Peak values
422433 - North Block 112 L/s
310
305
300
295
290
285
Conduit 4768 (0.464)
Conduit 5953 (0.37)
Conduit 259 (0.37)
Conduit 3904 (0.364)
Conduit 1059 (0.364)
Conduit 3528 (0.358)
Conduit 3713 (0.358)
Conduit 3144 (0.358)
Conduit 2276 (0.358)
Conduit 4745 (0.356)
Conduit 104 (0.173)
Conduit 5608 (0.173)
Conduit 6146 (0.173)
Conduit 7614 (0.172)
Conduit 7480 (0.151)
Conduit 7488 (0.15)
Conduit 2902 (0.143)
Conduit 3905 (0.131)
Conduit 6440 (0.116)
Conduit 2037 (0.114)
Conduit 693 (0.114)
Conduit 6582 (0.114)
Conduit 4900 (0.114)
Conduit 649 (0.114)
Conduit 3742 (0.114)
HGL
Link (flow, m³/s)
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Outfall SAP32001
Junction SAP32002
Junction SAP32003
Junction SAP32004
Junction SAP32005
Junction SAP32006
Junction SAP32007
Junction SAP32008
Junction SAP32009
Junction MAPLEVIEW2
Junction SAP32011
Junction SAP33008
Junction SAP33009
Junction SAP33010
Junction SAP33011
Junction SAP33012
Junction SAP33013
Junction SAP33014
Junction SAP33015
Junction SAP33016
Junction SAP33017
Junction SAP33018
Junction SAP33019
Junction SAP33020
Junction SAP33022
Node


Peak values
422433 - North Block 180 L/s
310
305
300
295
290
285
Outfall SAP32001
Junction SAP32002
Junction SAP32003
Junction SAP32004
Junction SAP32005
Junction SAP32006
Junction SAP32007
Junction SAP32008
Junction SAP32009
Junction MAPLEVIEW2
Junction SAP32011
Junction SAP33008
Junction SAP33009
Junction SAP33010
Junction SAP33011
Junction SAP33012
Junction SAP33013
Junction SAP33014
Junction SAP33015
Junction SAP33016
Junction SAP33017
Junction SAP33018
Junction SAP33019
Junction SAP33020
Junction SAP33022
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Conduit 4768 (0.532)
Conduit 5953 (0.438)
Conduit 259 (0.438)
Conduit 3904 (0.432)
Conduit 1059 (0.432)
Conduit 3528 (0.426)
Conduit 3713 (0.426)
Conduit 3144 (0.426)
Conduit 2276 (0.426)
Conduit 4745 (0.424)
Conduit 104 (0.241)
Conduit 5608 (0.241)
Conduit 6146 (0.241)
Conduit 7614 (0.24)
Conduit 7480 (0.219)
Conduit 7488 (0.219)
Conduit 2902 (0.211)
Conduit 3905 (0.199)
Conduit 6440 (0.184)
Conduit 2037 (0.182)
Conduit 693 (0.182)
Conduit 6582 (0.182)
Conduit 4900 (0.182)
Conduit 649 (0.182)
Conduit 3742 (0.182)
HGL
Link (flow, m³/s)
Node


Peak values
422433 - North Block 232 L/s
310
305
300
295
290
285
Outfall SAP32001
Junction SAP32002
Junction SAP32003
Junction SAP32004
Junction SAP32005
Junction SAP32006
Junction SAP32007
Junction SAP32008
Junction SAP32009
Junction MAPLEVIEW2
Junction SAP32011
Junction SAP33008
Junction SAP33009
Junction SAP33010
Junction SAP33011
Junction SAP33012
Junction SAP33013
Junction SAP33014
Junction SAP33015
Junction SAP33016
Junction SAP33017
Junction SAP33018
Junction SAP33019
Junction SAP33020
Junction SAP33022
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Conduit 4768 (0.584)
Conduit 5953 (0.49)
Conduit 259 (0.49)
Conduit 3904 (0.484)
Conduit 1059 (0.484)
Conduit 3528 (0.478)
Conduit 3713 (0.478)
Conduit 3144 (0.478)
Conduit 2276 (0.478)
Conduit 4745 (0.476)
Conduit 104 (0.293)
Conduit 5608 (0.293)
Conduit 6146 (0.293)
Conduit 7614 (0.292)
Conduit 7480 (0.271)
Conduit 7488 (0.27)
Conduit 2902 (0.264)
Conduit 3905 (0.251)
Conduit 6440 (0.237)
Conduit 2037 (0.235)
Conduit 693 (0.235)
Conduit 6582 (0.235)
Conduit 4900 (0.235)
Conduit 649 (0.234)
Conduit 3742 (0.234)
HGL
Link (flow, m³/s)
Node

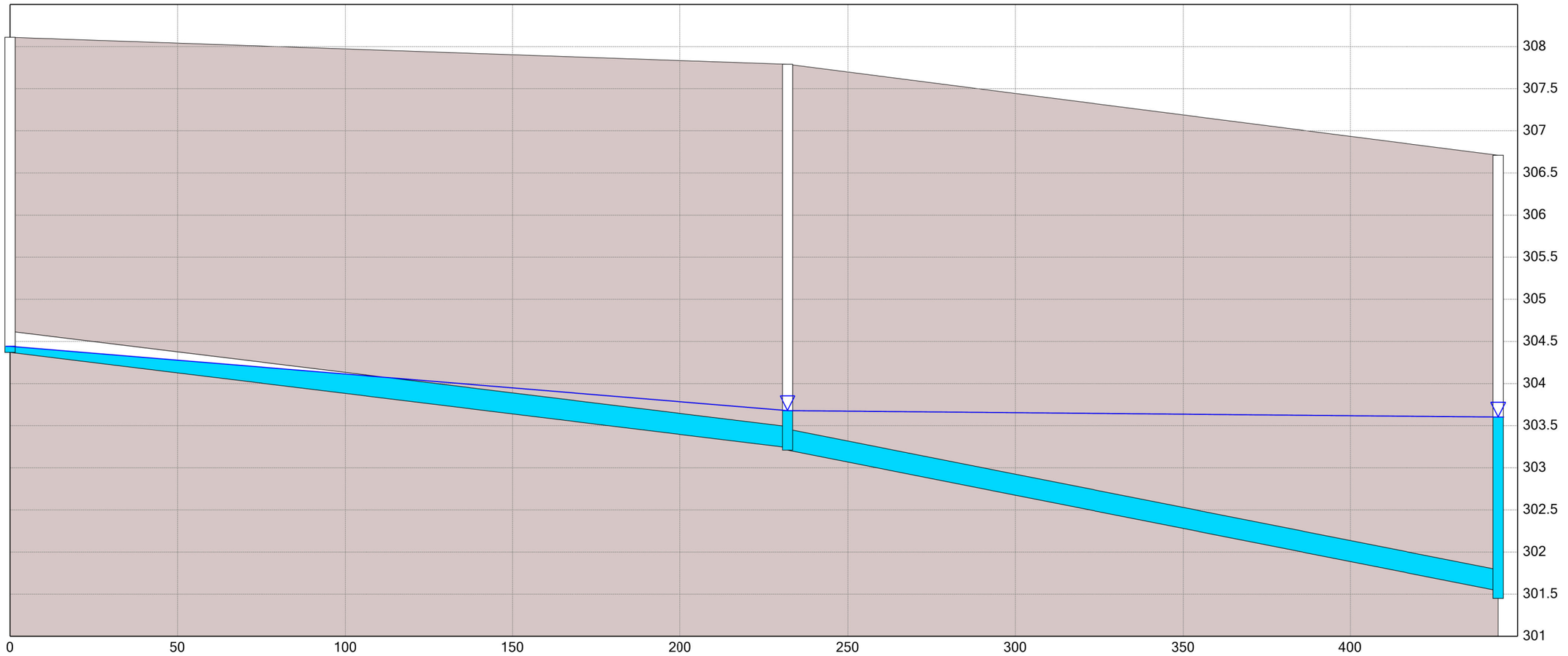
422433 - North Block 232 L/s

HGL

Peak values

Conduit 1
Flow = 0.008 m³/s
Length = 232 m
Depth = 0.25 m
Velocity = 0.657 m/s
Slope = 0.00487 m/m
Invert1 = 304.37 m
Invert2 = 303.24 m

Conduit 3
Flow = 0.015 m³/s
Length = 212 m
Depth = 0.25 m
Velocity = 0.594 m/s
Slope = 0.00788 m/m
Invert1 = 303.21 m
Invert2 = 301.54 m



Junction SAN_MH20
Max. CWSEL = 304.4423 m
Rim Elev. = 308.11 m
Invert Elev. = 304.37 m
01/01/2023 01:17AM

Junction SAN_MH7
Max. CWSEL = 303.6789 m
Rim Elev. = 307.79 m
Invert Elev. = 303.21 m
01/01/2023 03:59AM

Junction SAP33015
Max. CWSEL = 303.6026 m
Rim Elev. = 306.71 m
Invert Elev. = 301.45 m
01/01/2023 03:59AM

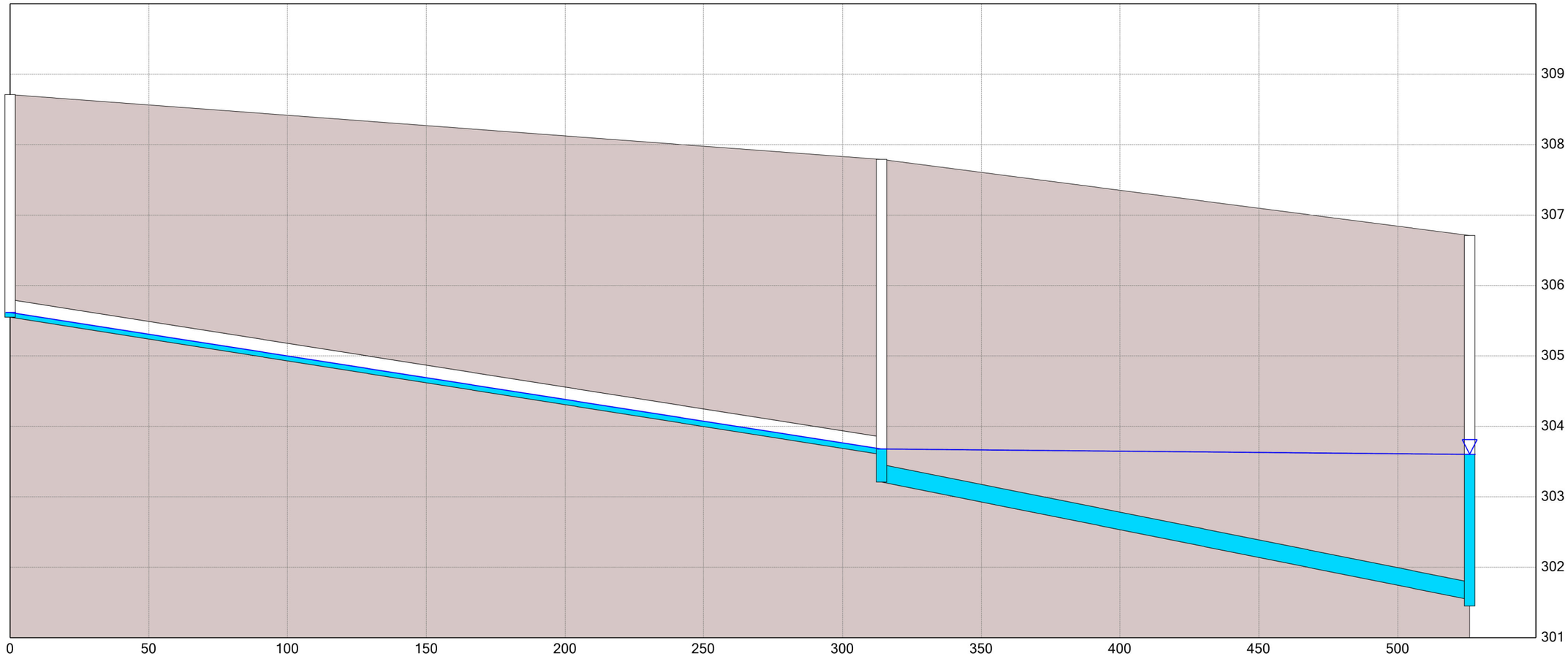
422433 - North Block 232 L/s

HGL

Peak values

Conduit 2
Flow = 0.007 m³/s
Length = 314 m
Depth = 0.25 m
Velocity = 0.696 m/s
Slope = 0.00621 m/m
Invert1 = 305.55 m
Invert2 = 303.6 m

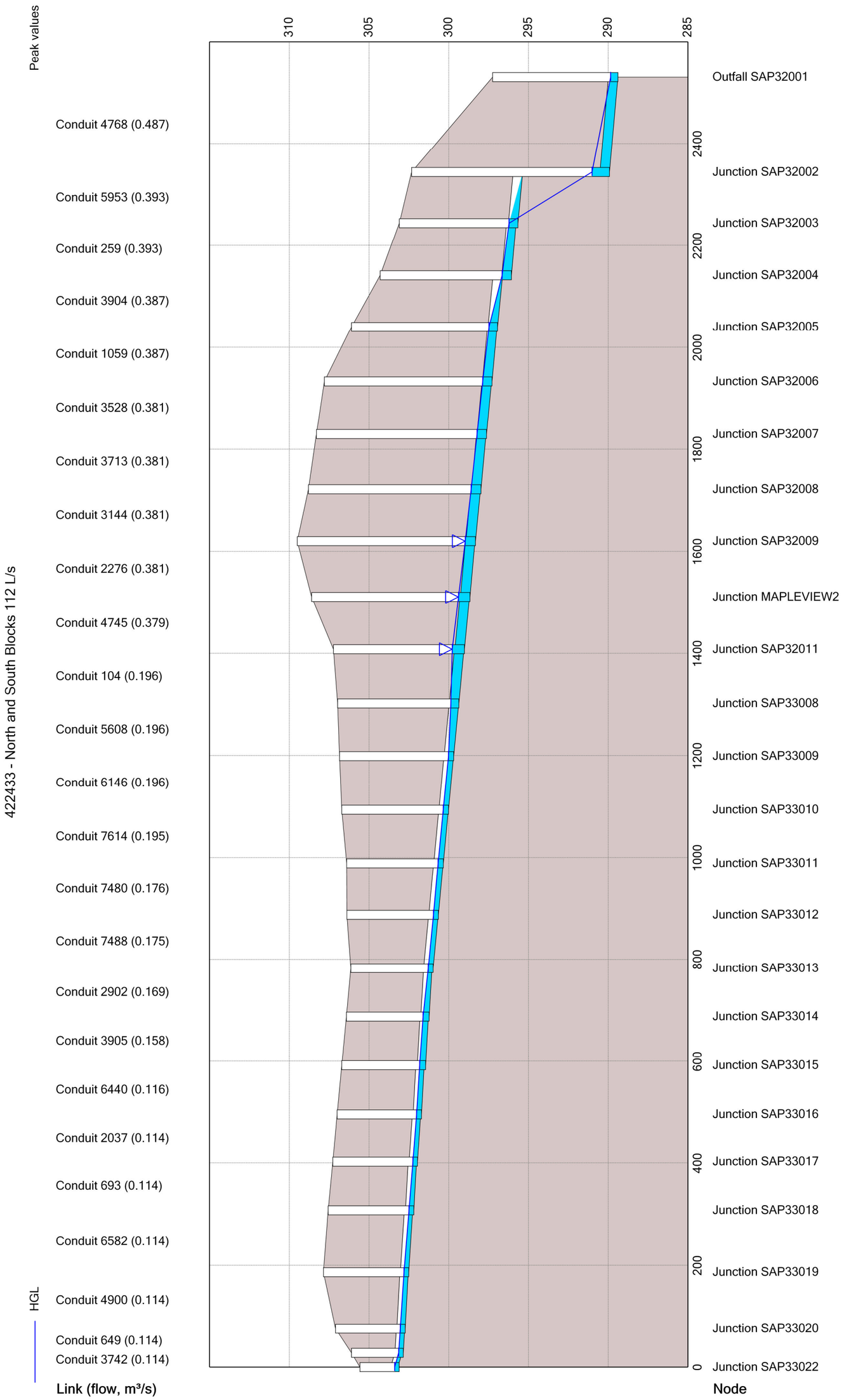
Conduit 3
Flow = 0.015 m³/s
Length = 212 m
Depth = 0.25 m
Velocity = 0.594 m/s
Slope = 0.00788 m/m
Invert1 = 303.21 m
Invert2 = 301.54 m

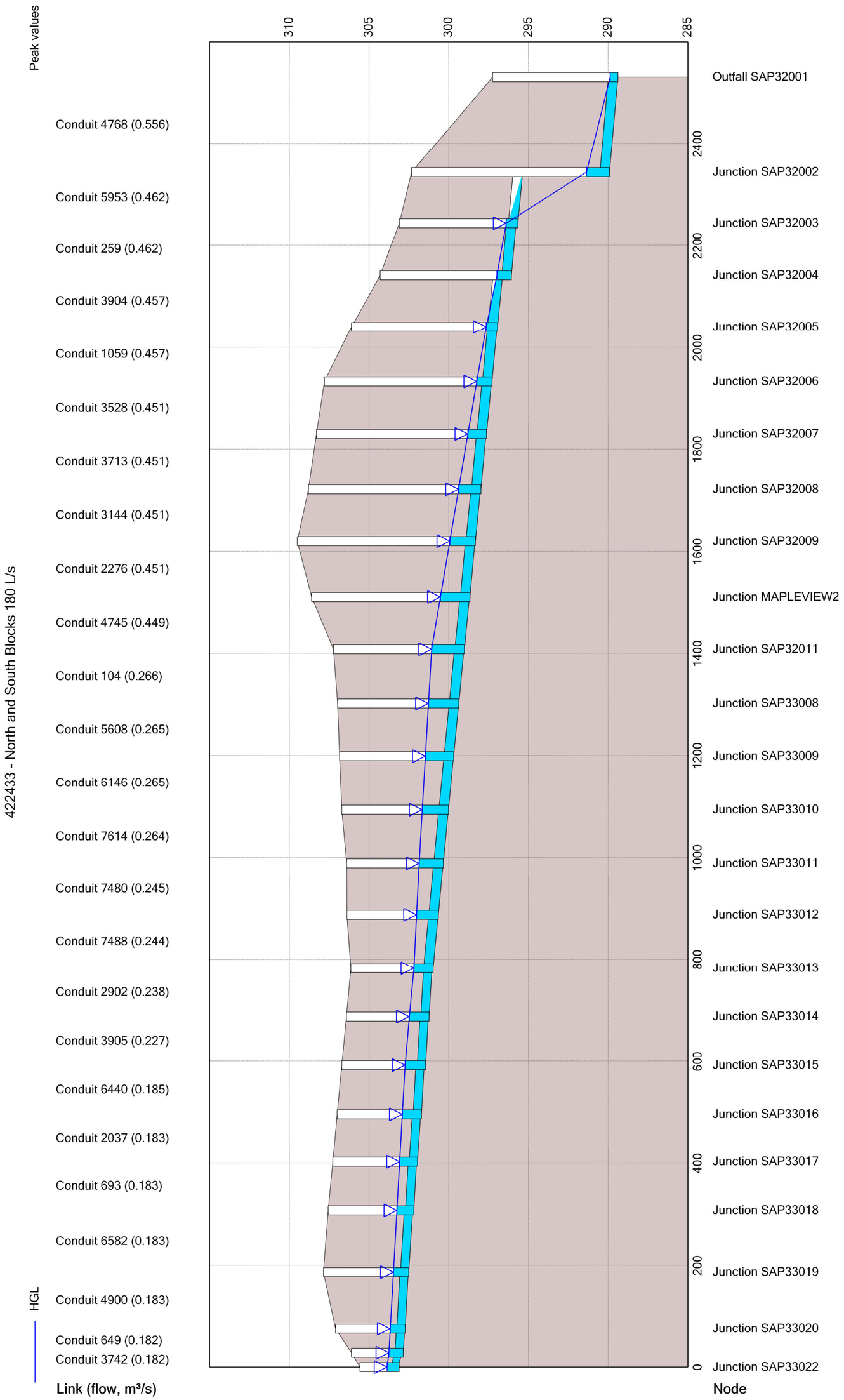


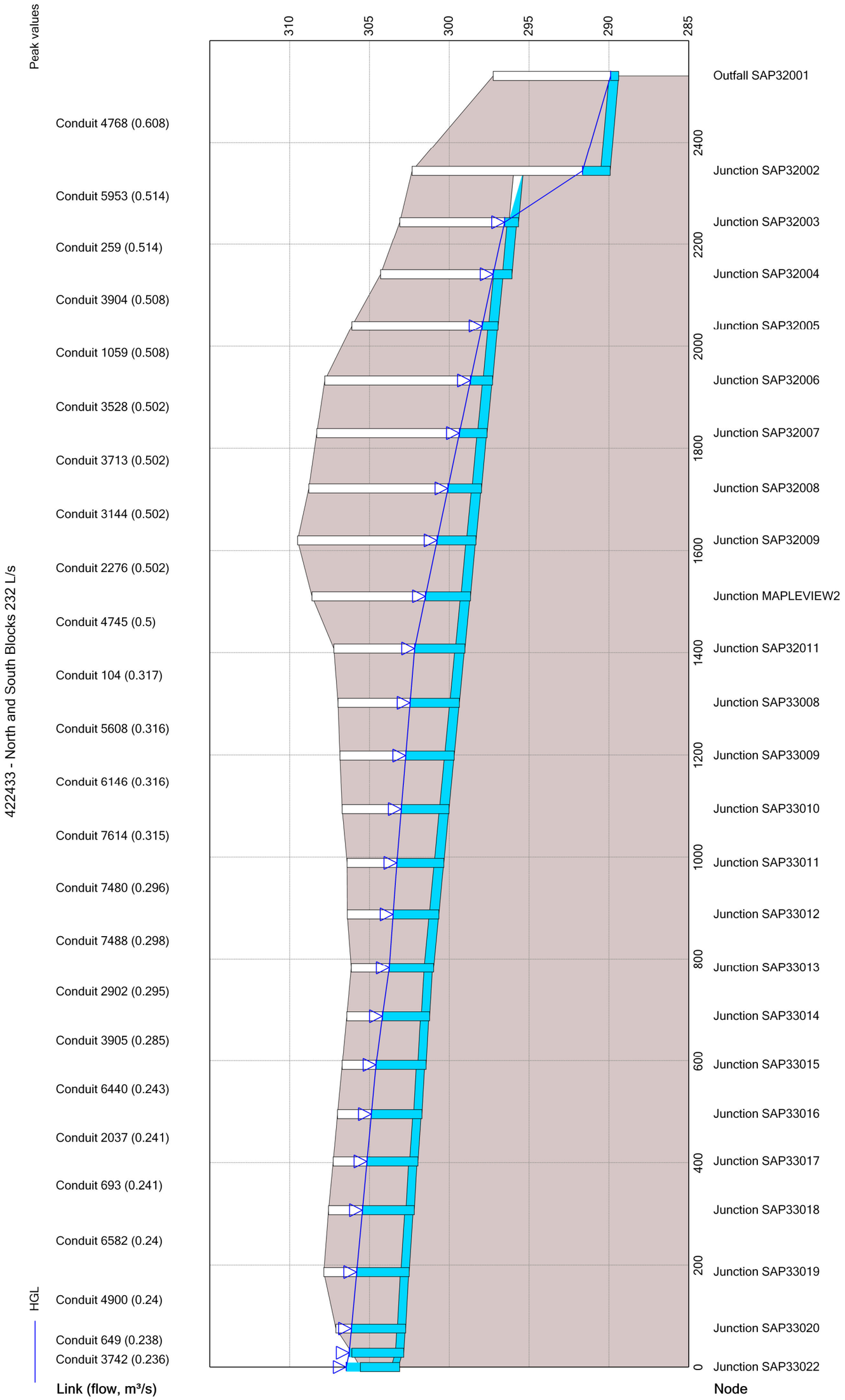
Junction SAN_MH1
Max. CWSEL = 305.617 m
Rim Elev. = 308.71 m
Invert Elev. = 305.55 m
01/01/2023 01:29AM

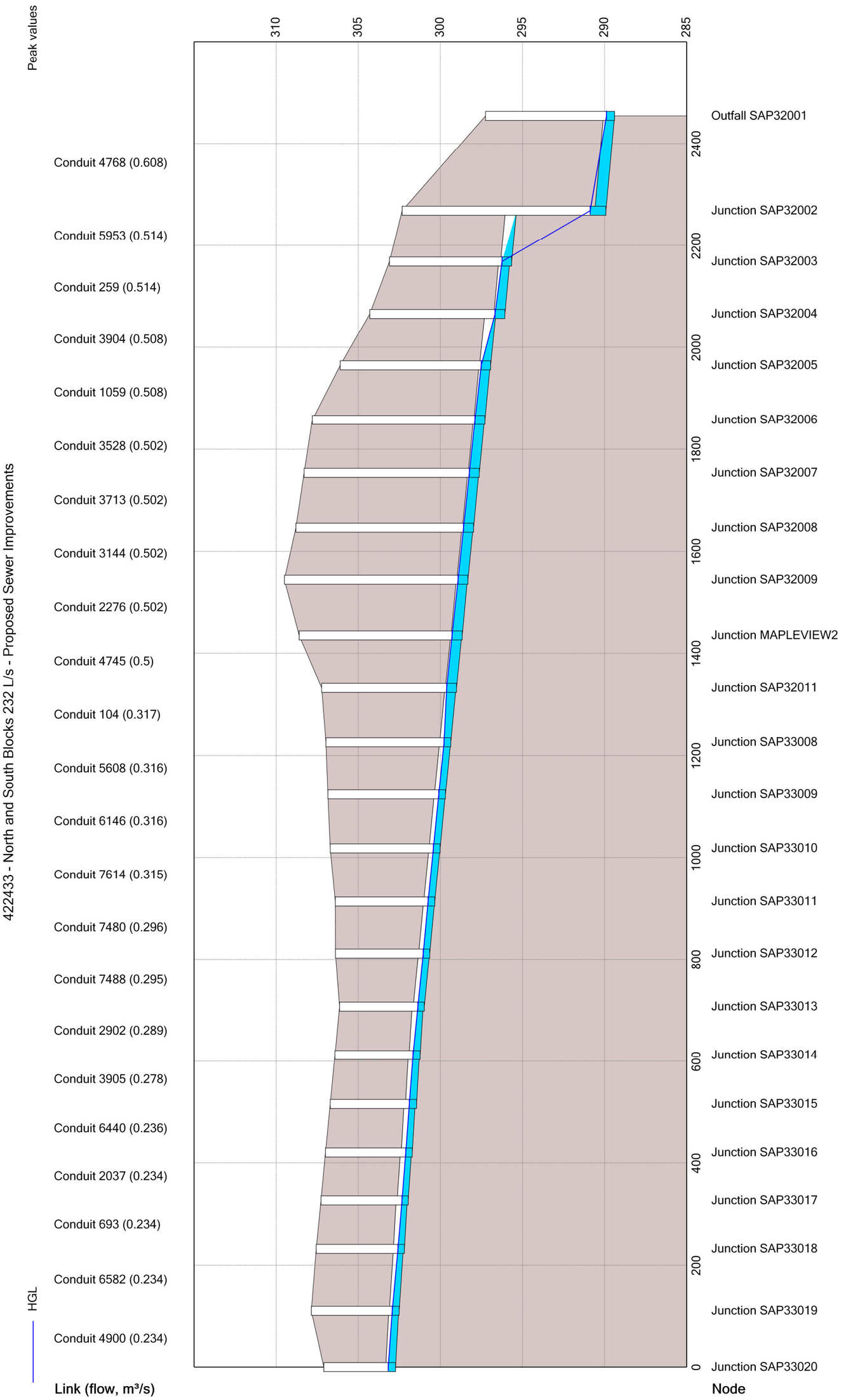
Junction SAN_MH7
Max. CWSEL = 303.6789 m
Rim Elev. = 307.79 m
Invert Elev. = 303.21 m
01/01/2023 03:59AM

Junction SAP33015
Max. CWSEL = 303.6026 m
Rim Elev. = 306.71 m
Invert Elev. = 301.45 m
01/01/2023 03:59AM


Peak values
422433 - North and South Blocks 112 L/s
HGL
Conduit 4768 (0.487)
Conduit 5953 (0.393)
Conduit 259 (0.393)
Conduit 3904 (0.387)
Conduit 1059 (0.387)
Conduit 3528 (0.381)
Conduit 3713 (0.381)
Conduit 3144 (0.381)
Conduit 2276 (0.381)
Conduit 4745 (0.379)
Conduit 104 (0.196)
Conduit 5608 (0.196)
Conduit 6146 (0.196)
Conduit 7614 (0.195)
Conduit 7480 (0.176)
Conduit 7488 (0.175)
Conduit 2902 (0.169)
Conduit 3905 (0.158)
Conduit 6440 (0.116)
Conduit 2037 (0.114)
Conduit 693 (0.114)
Conduit 6582 (0.114)
Conduit 4900 (0.114)
Conduit 649 (0.114)
Conduit 3742 (0.114)
Link (flow, m³/s)
310
305
300
295
290
285
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
Outfall SAP32001
Junction SAP32002
Junction SAP32003
Junction SAP32004
Junction SAP32005
Junction SAP32006
Junction SAP32007
Junction SAP32008
Junction SAP32009
Junction MAPLEVIEW2
Junction SAP32011
Junction SAP33008
Junction SAP33009
Junction SAP33010
Junction SAP33011
Junction SAP33012
Junction SAP33013
Junction SAP33014
Junction SAP33015
Junction SAP33016
Junction SAP33017
Junction SAP33018
Junction SAP33019
Junction SAP33020
Junction SAP33022
Node


Peak values
422433 - North and South Blocks 180 L/s
310
305
300
295
290
285
Conduit 4768 (0.556)
Conduit 5953 (0.462)
Conduit 259 (0.462)
Conduit 3904 (0.457)
Conduit 1059 (0.457)
Conduit 3528 (0.451)
Conduit 3713 (0.451)
Conduit 3144 (0.451)
Conduit 2276 (0.451)
Conduit 4745 (0.449)
Conduit 104 (0.266)
Conduit 5608 (0.265)
Conduit 6146 (0.265)
Conduit 7614 (0.264)
Conduit 7480 (0.245)
Conduit 7488 (0.244)
Conduit 2902 (0.238)
Conduit 3905 (0.227)
Conduit 6440 (0.185)
Conduit 2037 (0.183)
Conduit 693 (0.183)
Conduit 6582 (0.183)
Conduit 4900 (0.183)
Conduit 649 (0.182)
Conduit 3742 (0.182)
HGL
Link (flow, m³/s)
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Outfall SAP32001
Junction SAP32002
Junction SAP32003
Junction SAP32004
Junction SAP32005
Junction SAP32006
Junction SAP32007
Junction SAP32008
Junction SAP32009
Junction MAPLEVIEW2
Junction SAP32011
Junction SAP33008
Junction SAP33009
Junction SAP33010
Junction SAP33011
Junction SAP33012
Junction SAP33013
Junction SAP33014
Junction SAP33015
Junction SAP33016
Junction SAP33017
Junction SAP33018
Junction SAP33019
Junction SAP33020
Junction SAP33022
Node


Peak values
422433 - North and South Blocks 232 L/s
HGL
Link (flow, m³/s)
Conduit 4768 (0.608)
Conduit 5953 (0.514)
Conduit 259 (0.514)
Conduit 3904 (0.508)
Conduit 1059 (0.508)
Conduit 3528 (0.502)
Conduit 3713 (0.502)
Conduit 3144 (0.502)
Conduit 2276 (0.502)
Conduit 4745 (0.5)
Conduit 104 (0.317)
Conduit 5608 (0.316)
Conduit 6146 (0.316)
Conduit 7614 (0.315)
Conduit 7480 (0.296)
Conduit 7488 (0.298)
Conduit 2902 (0.295)
Conduit 3905 (0.285)
Conduit 6440 (0.243)
Conduit 2037 (0.241)
Conduit 693 (0.241)
Conduit 6582 (0.24)
Conduit 4900 (0.24)
Conduit 649 (0.238)
Conduit 3742 (0.236)
310
305
300
295
290
285
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Outfall SAP32001
Junction SAP32002
Junction SAP32003
Junction SAP32004
Junction SAP32005
Junction SAP32006
Junction SAP32007
Junction SAP32008
Junction SAP32009
Junction MAPLEVIEW2
Junction SAP32011
Junction SAP33008
Junction SAP33009
Junction SAP33010
Junction SAP33011
Junction SAP33012
Junction SAP33013
Junction SAP33014
Junction SAP33015
Junction SAP33016
Junction SAP33017
Junction SAP33018
Junction SAP33019
Junction SAP33020
Junction SAP33022
Node


Peak values
422433 - North and South Blocks 232 L/s - Proposed Sewer Improvements
310
305
300
295
290
285
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Outfall SAP32001
Junction SAP32002
Junction SAP32003
Junction SAP32004
Junction SAP32005
Junction SAP32006
Junction SAP32007
Junction SAP32008
Junction SAP32009
Junction MAPLEVIEW2
Junction SAP32011
Junction SAP33008
Junction SAP33009
Junction SAP33010
Junction SAP33011
Junction SAP33012
Junction SAP33013
Junction SAP33014
Junction SAP33015
Junction SAP33016
Junction SAP33017
Junction SAP33018
Junction SAP33019
Junction SAP33020
Conduit 4768 (0.608)
Conduit 5953 (0.514)
Conduit 259 (0.514)
Conduit 3904 (0.508)
Conduit 1059 (0.508)
Conduit 3528 (0.502)
Conduit 3713 (0.502)
Conduit 3144 (0.502)
Conduit 2276 (0.502)
Conduit 4745 (0.5)
Conduit 104 (0.317)
Conduit 5608 (0.316)
Conduit 6146 (0.316)
Conduit 7614 (0.315)
Conduit 7480 (0.296)
Conduit 7488 (0.295)
Conduit 2902 (0.289)
Conduit 3905 (0.278)
Conduit 6440 (0.236)
Conduit 2037 (0.234)
Conduit 693 (0.234)
Conduit 6582 (0.234)
Conduit 4900 (0.234)
HGL
Link (flow, m³/s)
Node

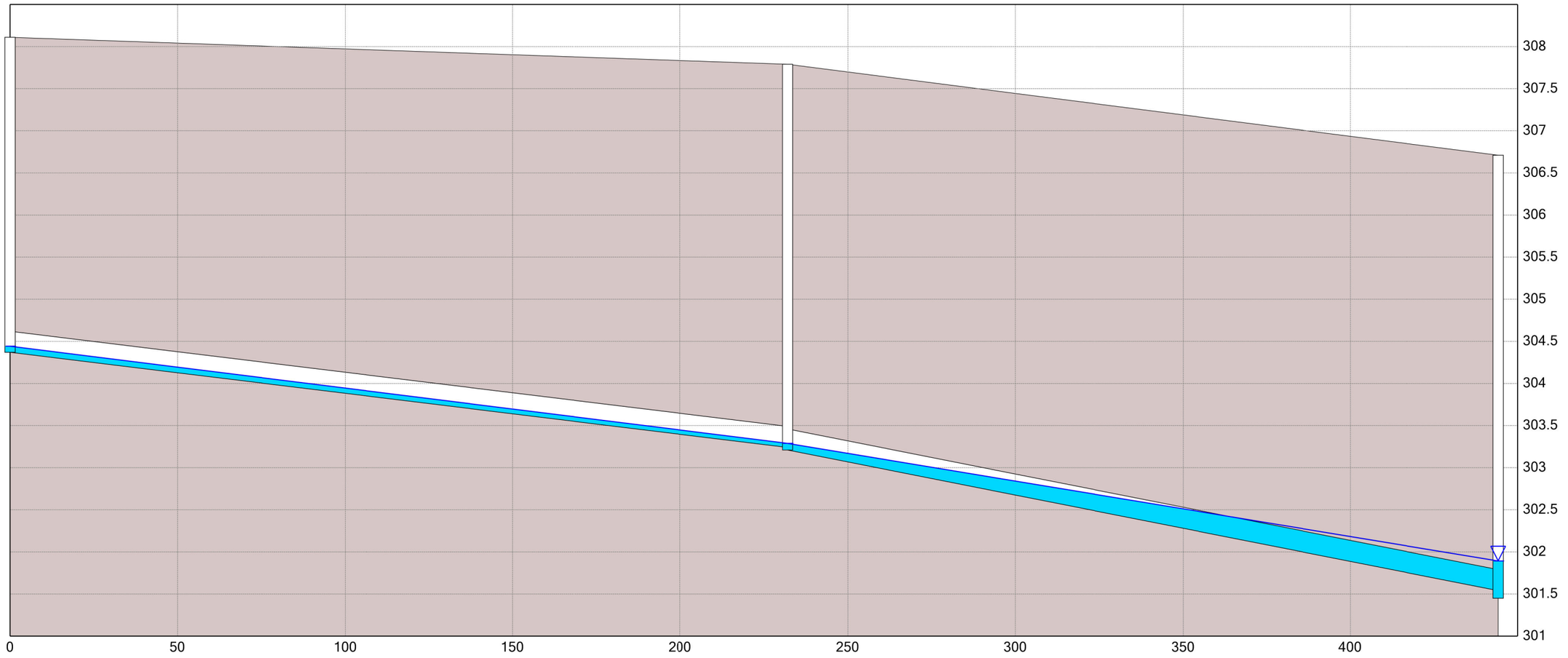
422433 - North and South Blocks 232 L/s - Proposed Sewer Improvements

HGL

Peak values

Conduit 1
Flow = 0.007 m³/s
Length = 232 m
Depth = 0.25 m
Velocity = 0.657 m/s
Slope = 0.00487 m/m
Invert1 = 304.37 m
Invert2 = 303.24 m

Conduit 3
Flow = 0.015 m³/s
Length = 212 m
Depth = 0.25 m
Velocity = 0.568 m/s
Slope = 0.00788 m/m
Invert1 = 303.21 m
Invert2 = 301.54 m



Junction SAN_MH20
Max. CWSEL = 304.4424 m
Rim Elev. = 308.11 m
Invert Elev. = 304.37 m
01/01/2023 01:20AM

Junction SAN_MH7
Max. CWSEL = 303.2887 m
Rim Elev. = 307.79 m
Invert Elev. = 303.21 m
01/01/2023 01:27AM

Junction SAP33015
Max. CWSEL = 301.8924 m
Rim Elev. = 306.71 m
Invert Elev. = 301.45 m
01/01/2023 01:22AM

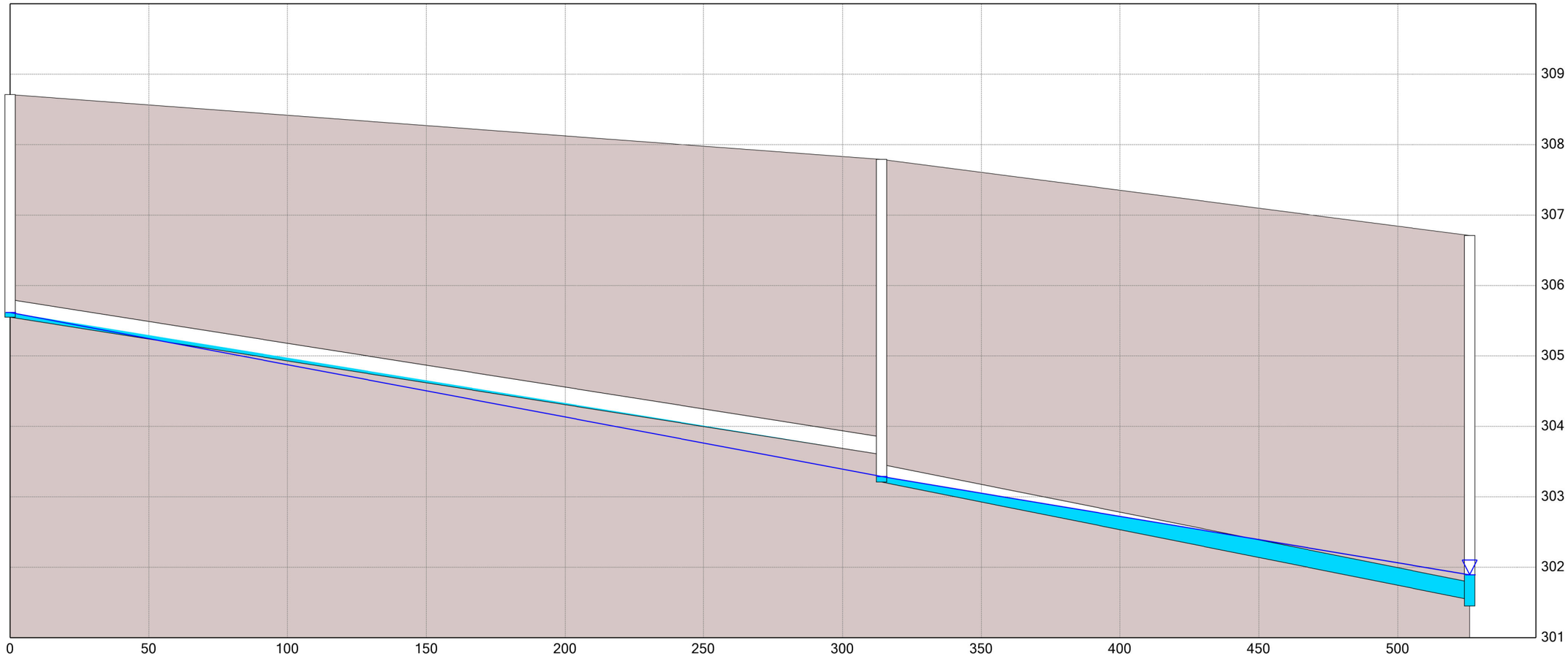
422433 - North and South Blocks 232 L/s - Proposed Sewer Improvements

HGL

Peak values

Conduit 2
Flow = 0.007 m³/s
Length = 314 m
Depth = 0.25 m
Velocity = 0.696 m/s
Slope = 0.00621 m/m
Invert1 = 305.55 m
Invert2 = 303.6 m

Conduit 3
Flow = 0.015 m³/s
Length = 212 m
Depth = 0.25 m
Velocity = 0.568 m/s
Slope = 0.00788 m/m
Invert1 = 303.21 m
Invert2 = 301.54 m



Junction SAN_MH1
Max. CWSEL = 305.617 m
Rim Elev. = 308.71 m
Invert Elev. = 305.55 m
01/01/2023 01:29AM

Junction SAN_MH7
Max. CWSEL = 303.2887 m
Rim Elev. = 307.79 m
Invert Elev. = 303.21 m
01/01/2023 01:27AM

Junction SAP33015
Max. CWSEL = 301.8924 m
Rim Elev. = 306.71 m
Invert Elev. = 301.45 m
01/01/2023 01:22AM

Existing Sewer with 112 L/s Holly SPS Flow

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

****
Element Count
****
Number of rain gages 0
Number of subcatchments ... 0
Number of nodes 26
Number of links 25
Number of pollutants 0
Number of land uses 0

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
MAPLEVIEW2	JUNCTION	298.67	9.93	0.0	Yes
SAP32002	JUNCTION	289.92	12.41	0.0	Yes
SAP32003	JUNCTION	295.66	7.44	0.0	Yes
SAP32004	JUNCTION	296.07	8.23	0.0	Yes
SAP32005	JUNCTION	296.94	9.16	0.0	Yes
SAP32006	JUNCTION	297.29	10.51	0.0	Yes
SAP32007	JUNCTION	297.63	10.67	0.0	Yes
SAP32008	JUNCTION	297.98	10.82	0.0	Yes
SAP32009	JUNCTION	298.32	11.18	0.0	Yes
SAP32011	JUNCTION	299.02	8.21	0.0	Yes
SAP33008	JUNCTION	299.37	7.61	0.0	Yes
SAP33009	JUNCTION	299.69	7.16	0.0	Yes
SAP33010	JUNCTION	300.01	6.70	0.0	Yes
SAP33011	JUNCTION	300.34	6.06	0.0	Yes
SAP33012	JUNCTION	300.65	5.74	0.0	Yes
SAP33013	JUNCTION	300.98	5.16	0.0	Yes
SAP33014	JUNCTION	301.23	5.19	0.0	Yes
SAP33015	JUNCTION	301.45	5.26	0.0	Yes
SAP33016	JUNCTION	301.71	5.29	0.0	Yes
SAP33017	JUNCTION	301.96	5.31	0.0	Yes
SAP33018	JUNCTION	302.19	5.37	0.0	Yes
SAP33019	JUNCTION	302.51	5.35	0.0	Yes

SAP33020	JUNCTION	302.73	4.37	0.0	Yes
SAP33021	JUNCTION	302.85	3.25	0.0	Yes
SAP33022	JUNCTION	303.11	2.46	0.0	Yes
SAP32001	OUTFALL	289.39	0.60	0.0	Yes

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
104	SAP33008	SAP32011	CONDUIT	106.5	0.2986	0.0130
1059	SAP32006	SAP32005	CONDUIT	106.9	0.2946	0.0130
2037	SAP33017	SAP33016	CONDUIT	93.4	0.2141	0.0130
2276	MAPLEVIEW2	SAP32009	CONDUIT	109.5	0.2878	0.0130
259	SAP32004	SAP32003	CONDUIT	102.5	0.2877	0.0130
2902	SAP33014	SAP33013	CONDUIT	94.9	0.1896	0.0130
3144	SAP32009	SAP32008	CONDUIT	101.9	0.3092	0.0130
3528	SAP32007	SAP32006	CONDUIT	103.8	0.3036	0.0130
3713	SAP32008	SAP32007	CONDUIT	107.5	0.2957	0.0130
3742	SAP33022	SAP33021	CONDUIT	28.0	0.9283	0.0130
3904	SAP32005	SAP32004	CONDUIT	101.2	0.3161	0.0130
3905	SAP33015	SAP33014	CONDUIT	95.9	0.1773	0.0130
4745	SAP32011	MAPLEVIEW2	CONDUIT	102.5	0.3102	0.0130
4768	SAP32002	SAP32001	CONDUIT	186.1	0.2849	0.0130
4900	SAP33020	SAP33019	CONDUIT	110.7	0.1716	0.0130
5608	SAP33009	SAP33008	CONDUIT	102.6	0.3069	0.0130
5953	SAP32003	SAP32002	CONDUIT	100.0	0.3000	0.0130
6146	SAP33010	SAP33009	CONDUIT	105.5	0.2986	0.0130
6440	SAP33016	SAP33015	CONDUIT	95.9	0.1772	0.0130
649	SAP33021	SAP33020	CONDUIT	47.5	0.1893	0.0130
6582	SAP33019	SAP33018	CONDUIT	121.2	0.2063	0.0130
693	SAP33018	SAP33017	CONDUIT	94.9	0.1792	0.0130
7480	SAP33012	SAP33011	CONDUIT	101.6	0.2964	0.0130
7488	SAP33013	SAP33012	CONDUIT	104.6	0.3059	0.0130
7614	SAP33011	SAP33010	CONDUIT	104.7	0.3000	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
104	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34

1059	CIRCULAR	0.60	0.28	0.15	0.60	1	0.33
2037	CIRCULAR	0.53	0.22	0.13	0.53	1	0.20
2276	CIRCULAR	0.60	0.28	0.15	0.60	1	0.33
259	CIRCULAR	0.60	0.28	0.15	0.60	1	0.33
2902	CIRCULAR	0.53	0.22	0.13	0.53	1	0.19
3144	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34
3528	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34
3713	CIRCULAR	0.60	0.28	0.15	0.60	1	0.33
3742	CIRCULAR	0.45	0.16	0.11	0.45	1	0.27
3904	CIRCULAR	0.60	0.28	0.15	0.60	1	0.35
3905	CIRCULAR	0.53	0.22	0.13	0.53	1	0.18
4745	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34
4768	CIRCULAR	0.60	0.28	0.15	0.60	1	0.33
4900	CIRCULAR	0.53	0.22	0.13	0.53	1	0.18
5608	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34
5953	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34
6146	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34
6440	CIRCULAR	0.53	0.22	0.13	0.53	1	0.18
649	CIRCULAR	0.53	0.22	0.13	0.53	1	0.19
6582	CIRCULAR	0.53	0.22	0.13	0.53	1	0.20
693	CIRCULAR	0.53	0.22	0.13	0.53	1	0.18
7480	CIRCULAR	0.60	0.28	0.15	0.60	1	0.33
7488	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34
7614	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34

```
**********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
**********************************************************

****************
Analysis Options
****************
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... NO
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
```

```
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 01/01/2023 00:00:00
Ending Date .............. 01/01/2023 04:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 6
Head Tolerance ........... 0.001500 m
```

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.576	5.762
External Outflow	0.532	5.320
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.001	0.009
Final Stored Volume	0.045	0.454
Continuity Error (%)	-0.048	

```
*************************
Highest Continuity Errors
*************************
Node SAP33019 (1.20%)


***************************
Time-Step Critical Elements
***************************
None


*******************************
Highest Flow Instability Indexes
*******************************
```

All links are stable.

****
Routing Time Step Summary
****

Minimum Time Step	:	3.50 sec
Average Time Step	:	5.00 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
5.000 - 3.155 sec	:	100.00 %
3.155 - 1.991 sec	:	0.00 %
1.991 - 1.256 sec	:	0.00 %
1.256 - 0.792 sec	:	0.00 %
0.792 - 0.500 sec	:	0.00 %

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
MAPLEVIEW2	JUNCTION	0.45	0.52	299.19	0 03:46	0.52
SAP32002	JUNCTION	0.76	0.96	290.88	0 03:15	0.96
SAP32003	JUNCTION	0.42	0.51	296.17	0 03:04	0.51
SAP32004	JUNCTION	0.43	0.52	296.59	0 03:02	0.52
SAP32005	JUNCTION	0.41	0.50	297.44	0 02:44	0.50
SAP32006	JUNCTION	0.44	0.52	297.81	0 03:44	0.52
SAP32007	JUNCTION	0.43	0.51	298.14	0 02:49	0.51
SAP32008	JUNCTION	0.44	0.52	298.49	0 03:23	0.52
SAP32009	JUNCTION	0.43	0.50	298.83	0 03:24	0.50
SAP32011	JUNCTION	0.43	0.50	299.52	0 03:18	0.50
SAP33008	JUNCTION	0.25	0.30	299.66	0 03:13	0.30
SAP33009	JUNCTION	0.25	0.30	299.99	0 02:05	0.30
SAP33010	JUNCTION	0.26	0.30	300.31	0 03:11	0.30
SAP33011	JUNCTION	0.26	0.30	300.64	0 03:11	0.30
SAP33012	JUNCTION	0.23	0.27	300.92	0 02:16	0.27
SAP33013	JUNCTION	0.23	0.27	301.25	0 02:12	0.27

SAP33014	JUNCTION	0.28	0.33	301.56	0	03:00	0.33
SAP33015	JUNCTION	0.27	0.32	301.77	0	02:24	0.32
SAP33016	JUNCTION	0.27	0.32	302.03	0	02:40	0.32
SAP33017	JUNCTION	0.25	0.29	302.25	0	02:50	0.29
SAP33018	JUNCTION	0.27	0.30	302.49	0	03:54	0.30
SAP33019	JUNCTION	0.26	0.30	302.81	0	03:54	0.30
SAP33020	JUNCTION	0.28	0.31	303.04	0	01:10	0.31
SAP33021	JUNCTION	0.27	0.29	303.14	0	01:03	0.29
SAP33022	JUNCTION	0.26	0.28	303.39	0	01:00	0.28
SAP32001	OUTFALL	0.40	0.44	289.83	0	02:51	0.44

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
MAPLEVIEW2	JUNCTION	0.002	0.351	0	02:44	0.0252	4.23	0.604
SAP32002	JUNCTION	0.094	0.457	0	02:34	1.18	5.36	0.747
SAP32003	JUNCTION	0.000	0.363	0	03:19	0	4.2	0.622
SAP32004	JUNCTION	0.006	0.363	0	03:50	0.0756	4.23	0.639
SAP32005	JUNCTION	0.000	0.357	0	03:16	0	4.18	0.703
SAP32006	JUNCTION	0.006	0.357	0	03:29	0.0756	4.21	0.629
SAP32007	JUNCTION	0.000	0.351	0	03:53	0	4.15	0.580
SAP32008	JUNCTION	0.000	0.351	0	02:49	0	4.18	0.587
SAP32009	JUNCTION	0.000	0.351	0	03:08	0	4.2	0.575
SAP32011	JUNCTION	0.183	0.349	0	01:52	2.3	4.23	0.752
SAP33008	JUNCTION	0.000	0.166	0	03:12	0.00378	1.94	0.525
SAP33009	JUNCTION	0.000	0.166	0	03:23	0	1.95	0.647
SAP33010	JUNCTION	0.001	0.166	0	02:51	0.014	1.96	0.650
SAP33011	JUNCTION	0.022	0.165	0	01:49	0.273	1.96	0.831
SAP33012	JUNCTION	0.001	0.143	0	03:08	0.0128	1.7	0.507
SAP33013	JUNCTION	0.007	0.142	0	02:29	0.0931	1.69	0.536
SAP33014	JUNCTION	0.014	0.135	0	03:51	0.172	1.62	0.976
SAP33015	JUNCTION	0.000	0.121	0	02:41	0	1.46	0.656
SAP33016	JUNCTION	0.007	0.121	0	02:40	0.0849	1.47	1.000
SAP33017	JUNCTION	0.000	0.114	0	03:55	0	1.39	0.632
SAP33018	JUNCTION	0.000	0.114	0	03:54	0	1.41	0.898
SAP33019	JUNCTION	0.000	0.114	0	01:11	0	1.42	1.219
SAP33020	JUNCTION	0.000	0.114	0	01:03	0.00441	1.43	0.816

SAP33021	JUNCTION	0.000	0.114	0	01:00	0.00579	1.43	0.283
SAP33022	JUNCTION	0.114	0.114	0	01:00	1.43	1.43	0.132
SAP32001	OUTFALL	0.000	0.458	0	02:51	0.00365	5.32	0.000

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
SAP32001	99.41	0.372	0.458	5.320
System	99.41	0.372	0.458	5.320

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
104	CONDUIT	0.166	0	01:52	0.87	0.50	0.64
1059	CONDUIT	0.357	0	03:16	1.44	1.07	0.82
2037	CONDUIT	0.114	0	02:40	0.99	0.57	0.53

2276	CONDUIT	0.351	0	03:08	1.41	1.07	0.83
259	CONDUIT	0.363	0	03:19	1.56	1.10	0.77
2902	CONDUIT	0.135	0	02:29	1.11	0.72	0.55
3144	CONDUIT	0.351	0	02:49	1.41	1.03	0.82
3528	CONDUIT	0.351	0	03:29	1.40	1.04	0.84
3713	CONDUIT	0.351	0	03:53	1.41	1.05	0.83
3742	CONDUIT	0.114	0	01:00	1.59	0.41	0.46
3904	CONDUIT	0.357	0	03:50	1.60	1.03	0.74
3905	CONDUIT	0.121	0	03:51	0.96	0.67	0.57
4745	CONDUIT	0.349	0	02:44	1.40	1.02	0.83
4768	CONDUIT	0.457	0	02:51	1.75	1.40	0.87
4900	CONDUIT	0.114	0	01:11	0.94	0.64	0.55
5608	CONDUIT	0.166	0	03:12	1.21	0.49	0.49
5953	CONDUIT	0.363	0	02:34	1.58	1.08	0.76
6146	CONDUIT	0.166	0	03:23	1.21	0.49	0.49
6440	CONDUIT	0.121	0	02:41	1.06	0.67	0.52
649	CONDUIT	0.114	0	01:03	0.95	0.61	0.55
6582	CONDUIT	0.114	0	03:54	1.05	0.59	0.51
693	CONDUIT	0.114	0	03:55	1.04	0.63	0.51
7480	CONDUIT	0.143	0	01:49	1.10	0.43	0.47
7488	CONDUIT	0.142	0	03:08	1.16	0.42	0.45
7614	CONDUIT	0.165	0	02:51	1.20	0.49	0.49

****
Flow Classification Summary
****

	Adjusted	Fraction of Time in Flow Class								
Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
104	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.99	0.00
1059	1.00	0.00	0.00	0.00	0.80	0.00	0.00	0.20	0.00	0.00
2037	1.00	0.03	0.00	0.00	0.86	0.00	0.00	0.11	0.00	0.00
2276	1.00	0.00	0.00	0.00	0.83	0.00	0.00	0.17	0.00	0.00
259	1.00	0.00	0.00	0.00	0.66	0.00	0.00	0.34	0.00	0.00
2902	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
3144	1.00	0.00	0.00	0.00	0.83	0.00	0.00	0.17	0.00	0.00
3528	1.00	0.02	0.00	0.00	0.83	0.00	0.00	0.15	0.00	0.00
3713	1.00	0.01	0.00	0.00	0.83	0.00	0.00	0.16	0.00	0.00
3742	1.00	0.01	0.00	0.00	0.00	0.79	0.00	0.20	0.00	0.00
3904	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
3905	1.00	0.00	0.00	0.00	0.86	0.00	0.00	0.13	0.00	0.00

4745	1.00	0.00	0.00	0.00	0.85	0.00	0.00	0.15	0.00	0.00
4768	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.00
4900	1.00	0.00	0.00	0.00	0.90	0.00	0.00	0.10	0.00	0.00
5608	1.00	0.01	0.00	0.00	0.84	0.00	0.00	0.15	0.00	0.00
5953	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
6146	1.00	0.00	0.00	0.00	0.84	0.00	0.00	0.15	0.00	0.00
6440	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
649	1.00	0.00	0.00	0.00	0.93	0.00	0.00	0.06	0.00	0.00
6582	1.00	0.01	0.00	0.00	0.76	0.00	0.00	0.23	0.00	0.00
693	1.00	0.02	0.00	0.00	0.74	0.00	0.00	0.24	0.00	0.00
7480	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.94	0.00
7488	1.00	0.00	0.00	0.00	0.87	0.00	0.00	0.13	0.00	0.00
7614	1.00	0.00	0.00	0.00	0.86	0.00	0.00	0.14	0.00	0.00

****
Conduit Surcharge Summary
****

	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
1059	0.01	0.01	0.01	2.87	0.01
2276	0.01	0.01	0.01	2.91	0.01
259	0.01	0.01	0.01	2.88	0.01
3144	0.01	0.01	0.01	2.80	0.01
3528	0.01	0.01	0.01	2.80	0.01
3713	0.01	0.01	0.01	2.85	0.01
3904	0.01	0.01	0.01	2.75	0.01
4745	0.01	0.01	0.01	2.81	0.01
4768	0.01	2.98	0.01	3.06	0.01
5953	0.01	0.01	0.01	2.82	0.01

Analysis begun on: Wed Mar 29 13:09:04 2023
Analysis ended on: Wed Mar 29 13:09:04 2023
Total elapsed time: < 1 sec

Maintenance Hole Summary - Existing with Holly SPS 112 L/s

Name	Invert Elev. (m)	Rim Elev. (m)	Max. HGL (m)	Max. Total Inflow (m^3/s)
SAP33022	303.11	305.57	303.39	0.114
SAP33021	302.85	306.10	303.14	0.114
SAP33020	302.73	307.10	303.04	0.114
SAP33019	302.51	307.86	302.81	0.114
SAP33018	302.19	307.56	302.49	0.114
SAP33017	301.96	307.27	302.25	0.114
SAP33016	301.71	307.00	302.03	0.121
SAP33015	301.45	306.71	301.77	0.121
SAP33014	301.23	306.42	301.56	0.135
SAP33013	300.98	306.14	301.25	0.142
SAP33012	300.65	306.39	300.92	0.143
SAP33011	300.34	306.40	300.64	0.165
SAP33010	300.02	306.71	300.31	0.166
SAP33009	299.69	306.85	299.99	0.166
SAP33008	299.37	306.97	299.66	0.166
SAP32011	299.02	307.23	299.52	0.349
MAPLEVIEW2	298.67	308.60	299.19	0.351
SAP32009	298.32	309.50	298.83	0.351
SAP32008	297.98	308.80	298.49	0.351
SAP32007	297.63	308.30	298.14	0.351
SAP32006	297.29	307.80	297.81	0.357
SAP32005	296.94	306.10	297.44	0.357
SAP32004	296.07	304.30	296.59	0.363
SAP32003	295.66	303.10	296.17	0.363
SAP32002	289.92	302.33	290.88	0.457

Maintenance Hole Summary - Existing with Holly SPS 180 L/s

Name	Invert Elev. (m)	Rim Elev. (m)	Max. HGL (m)	Max. Total Inflow (m^3/s)
SAP33022	303.11	305.57	303.47	0.182
SAP33021	302.85	306.10	303.26	0.182
SAP33020	302.73	307.10	303.16	0.182
SAP33019	302.51	307.86	302.91	0.182
SAP33018	302.19	307.56	302.60	0.182
SAP33017	301.96	307.27	302.35	0.182
SAP33016	301.71	307.00	302.14	0.189
SAP33015	301.45	306.71	301.88	0.189
SAP33014	301.23	306.42	301.67	0.203
SAP33013	300.98	306.14	301.34	0.210
SAP33012	300.65	306.39	301.24	0.212
SAP33011	300.34	306.40	301.13	0.233
SAP33010	300.02	306.71	300.98	0.235
SAP33009	299.69	306.85	300.82	0.235
SAP33008	299.37	306.97	300.67	0.234
SAP32011	299.02	307.23	300.52	0.417
MAPLEVIEW2	298.67	308.60	300.05	0.419
SAP32009	298.32	309.50	299.54	0.419
SAP32008	297.98	308.80	299.06	0.419
SAP32007	297.63	308.30	298.56	0.419
SAP32006	297.29	307.80	298.08	0.425
SAP32005	296.94	306.10	297.57	0.425
SAP32004	296.07	304.30	296.77	0.431
SAP32003	295.66	303.10	296.32	0.431
SAP32002	289.92	302.33	291.20	0.525

Maintenance Hole Summary - Existing with Holly SPS 232 L/s

Name	Invert Elev. (m)	Rim Elev. (m)	Max. HGL (m)	Max. Total Inflow (m^3/s)
SAP33022	303.11	305.57	305.23	0.234
SAP33021	302.85	306.10	305.05	0.235
SAP33020	302.73	307.10	304.91	0.235
SAP33019	302.51	307.86	304.58	0.235
SAP33018	302.19	307.56	304.22	0.235
SAP33017	301.96	307.27	303.93	0.235
SAP33016	301.71	307.00	303.66	0.242
SAP33015	301.45	306.71	303.36	0.241
SAP33014	301.23	306.42	303.05	0.255
SAP33013	300.98	306.14	302.72	0.263
SAP33012	300.65	306.39	302.53	0.263
SAP33011	300.34	306.40	302.34	0.285
SAP33010	300.02	306.71	302.12	0.286
SAP33009	299.69	306.85	301.89	0.286
SAP33008	299.37	306.97	301.67	0.286
SAP32011	299.02	307.23	301.44	0.469
MAPLEVIEW2	298.67	308.60	300.84	0.471
SAP32009	298.32	309.50	300.19	0.471
SAP32008	297.98	308.80	299.59	0.471
SAP32007	297.63	308.30	298.96	0.471
SAP32006	297.29	307.80	298.35	0.477
SAP32005	296.94	306.10	297.70	0.477
SAP32004	296.07	304.30	297.09	0.483
SAP32003	295.66	303.10	296.45	0.483
SAP32002	289.92	302.33	291.48	0.577

Maintenance Hole Summary - North Block with Holly SPS 112 L/s

Name	Invert Elev. (m)	Rim Elev. (m)	Max. HGL (m)	Max. Total Inflow (m^3/s)
SAP33022	303.11	305.57	303.39	0.114
SAP33021	302.85	306.10	303.14	0.114
SAP33020	302.73	307.10	303.04	0.114
SAP33019	302.51	307.86	302.81	0.114
SAP33018	302.19	307.56	302.49	0.114
SAP33017	301.96	307.27	302.25	0.114
SAP33016	301.71	307.00	302.02	0.116
SAP33015	301.45	306.71	301.78	0.131
SAP33014	301.23	306.42	301.57	0.143
SAP33013	300.98	306.14	301.26	0.150
SAP33012	300.65	306.39	300.93	0.151
SAP33011	300.34	306.40	300.64	0.172
SAP33010	300.02	306.71	300.32	0.173
SAP33009	299.69	306.85	299.99	0.173
SAP33008	299.37	306.97	299.67	0.173
SAP32011	299.02	307.23	299.53	0.356
MAPLEVIEW2	298.67	308.60	299.20	0.358
SAP32009	298.32	309.50	298.84	0.358
SAP32008	297.98	308.80	298.51	0.358
SAP32007	297.63	308.30	298.15	0.358
SAP32006	297.29	307.80	297.82	0.364
SAP32005	296.94	306.10	297.45	0.364
SAP32004	296.07	304.30	296.61	0.370
SAP32003	295.66	303.10	296.18	0.370
SAP32002	289.92	302.33	290.91	0.464

Maintenance Hole Summary - North Block with Holly SPS 180 L/s

Name	Invert Elev. (m)	Rim Elev. (m)	Max. HGL (m)	Max. Total Inflow (m^3/s)
SAP33022	303.11	305.57	303.47	0.182
SAP33021	302.85	306.10	303.26	0.182
SAP33020	302.73	307.10	303.16	0.182
SAP33019	302.51	307.86	302.91	0.182
SAP33018	302.19	307.56	302.60	0.182
SAP33017	301.96	307.27	302.35	0.182
SAP33016	301.71	307.00	302.13	0.184
SAP33015	301.45	306.71	301.92	0.199
SAP33014	301.23	306.42	301.73	0.211
SAP33013	300.98	306.14	301.53	0.218
SAP33012	300.65	306.39	301.42	0.220
SAP33011	300.34	306.40	301.29	0.240
SAP33010	300.02	306.71	301.13	0.242
SAP33009	299.69	306.85	300.97	0.241
SAP33008	299.37	306.97	300.81	0.241
SAP32011	299.02	307.23	300.64	0.424
MAPLEVIEW2	298.67	308.60	300.16	0.426
SAP32009	298.32	309.50	299.63	0.426
SAP32008	297.98	308.80	299.14	0.426
SAP32007	297.63	308.30	298.62	0.426
SAP32006	297.29	307.80	298.12	0.432
SAP32005	296.94	306.10	297.59	0.432
SAP32004	296.07	304.30	296.80	0.438
SAP32003	295.66	303.10	296.34	0.438
SAP32002	289.92	302.33	291.24	0.532

Maintenance Hole Summary - North Block with Holly SPS 232 L/s

Name	Invert Elev. (m)	Rim Elev. (m)	Max. HGL (m)	Max. Total Inflow (m^3/s)
SAP33022	303.11	305.57	305.47	0.234
SAP33021	302.85	306.10	305.28	0.235
SAP33020	302.73	307.10	305.14	0.235
SAP33019	302.51	307.86	304.81	0.235
SAP33018	302.19	307.56	304.45	0.235
SAP33017	301.96	307.27	304.17	0.235
SAP33016	301.71	307.00	303.89	0.237
SAP33015	301.45	306.71	303.61	0.251
SAP33014	301.23	306.42	303.28	0.264
SAP33013	300.98	306.14	302.92	0.273
SAP33012	300.65	306.39	302.72	0.271
SAP33011	300.34	306.40	302.52	0.292
SAP33010	300.02	306.71	302.29	0.293
SAP33009	299.69	306.85	302.04	0.293
SAP33008	299.37	306.97	301.81	0.293
SAP32011	299.02	307.23	301.57	0.476
MAPLEVIEW2	298.67	308.60	300.95	0.478
SAP32009	298.32	309.50	300.29	0.478
SAP32008	297.98	308.80	299.67	0.478
SAP32007	297.63	308.30	299.02	0.478
SAP32006	297.29	307.80	298.39	0.484
SAP32005	296.94	306.10	297.72	0.484
SAP32004	296.07	304.30	297.12	0.490
SAP32003	295.66	303.10	296.47	0.490
SAP32002	289.92	302.33	291.52	0.584

Maintenance Hole Summary - North and South Blocks with Holly SPS 112 L/s

Name	Invert Elev. (m)	Rim Elev. (m)	Max. HGL (m)	Max. Total Inflow (m^3/s)
SAP33022	303.11	305.57	303.39	0.114
SAP33021	302.85	306.10	303.14	0.114
SAP33020	302.73	307.10	303.04	0.114
SAP33019	302.51	307.86	302.81	0.114
SAP33018	302.19	307.56	302.49	0.114
SAP33017	301.96	307.27	302.25	0.114
SAP33016	301.71	307.00	302.02	0.116
SAP33015	301.45	306.71	301.83	0.158
SAP33014	301.23	306.42	301.61	0.169
SAP33013	300.98	306.14	301.29	0.175
SAP33012	300.65	306.39	300.96	0.176
SAP33011	300.34	306.40	300.67	0.195
SAP33010	300.02	306.71	300.35	0.196
SAP33009	299.69	306.85	300.02	0.196
SAP33008	299.37	306.97	299.87	0.197
SAP32011	299.02	307.23	299.78	0.379
MAPLEVIEW2	298.67	308.60	299.39	0.381
SAP32009	298.32	309.50	298.97	0.381
SAP32008	297.98	308.80	298.60	0.381
SAP32007	297.63	308.30	298.22	0.381
SAP32006	297.29	307.80	297.87	0.387
SAP32005	296.94	306.10	297.48	0.387
SAP32004	296.07	304.30	296.65	0.393
SAP32003	295.66	303.10	296.22	0.393
SAP32002	289.92	302.33	291.01	0.487

Maintenance Hole Summary - North and South Blocks with Holly SPS 180 L/s

Name	Invert Elev. (m)	Rim Elev. (m)	Max. HGL (m)	Max. Total Inflow (m^3/s)
SAP33022	303.11	305.57	303.87	0.182
SAP33021	302.85	306.10	303.75	0.182
SAP33020	302.73	307.10	303.67	0.183
SAP33019	302.51	307.86	303.47	0.183
SAP33018	302.19	307.56	303.25	0.183
SAP33017	301.96	307.27	303.08	0.183
SAP33016	301.71	307.00	302.91	0.185
SAP33015	301.45	306.71	302.74	0.227
SAP33014	301.23	306.42	302.47	0.238
SAP33013	300.98	306.14	302.18	0.244
SAP33012	300.65	306.39	302.02	0.245
SAP33011	300.34	306.40	301.86	0.264
SAP33010	300.02	306.71	301.66	0.265
SAP33009	299.69	306.85	301.47	0.265
SAP33008	299.37	306.97	301.27	0.266
SAP32011	299.02	307.23	301.07	0.449
MAPLEVIEW2	298.67	308.60	300.52	0.451
SAP32009	298.32	309.50	299.93	0.451
SAP32008	297.98	308.80	299.38	0.451
SAP32007	297.63	308.30	298.81	0.451
SAP32006	297.29	307.80	298.24	0.457
SAP32005	296.94	306.10	297.65	0.457
SAP32004	296.07	304.30	296.98	0.463
SAP32003	295.66	303.10	296.40	0.462
SAP32002	289.92	302.33	291.36	0.556

Maintenance Hole Summary - North and South Blocks with Holly SPS 232 L/s

Name	Invert Elev. (m)	Rim Elev. (m)	Max. HGL (m)	Max. Total Inflow (m^3/s)
SAP33022	303.11	305.57	306.45	0.234
SAP33021	302.85	306.10	306.27	0.237
SAP33020	302.73	307.10	306.13	0.240
SAP33019	302.51	307.86	305.80	0.241
SAP33018	302.19	307.56	305.44	0.242
SAP33017	301.96	307.27	305.16	0.241
SAP33016	301.71	307.00	304.88	0.244
SAP33015	301.45	306.71	304.59	0.287
SAP33014	301.23	306.42	304.19	0.298
SAP33013	300.98	306.14	303.76	0.305
SAP33012	300.65	306.39	303.52	0.300
SAP33011	300.34	306.40	303.28	0.316
SAP33010	300.02	306.71	303.01	0.316
SAP33009	299.69	306.85	302.73	0.316
SAP33008	299.37	306.97	302.45	0.317
SAP32011	299.02	307.23	302.17	0.500
MAPLEVIEW2	298.67	308.60	301.49	0.502
SAP32009	298.32	309.50	300.76	0.502
SAP32008	297.98	308.80	300.08	0.502
SAP32007	297.63	308.30	299.37	0.502
SAP32006	297.29	307.80	298.67	0.508
SAP32005	296.94	306.10	297.94	0.508
SAP32004	296.07	304.30	297.25	0.514
SAP32003	295.66	303.10	296.53	0.514
SAP32002	289.92	302.33	291.65	0.608

Maintenance Hole and Pipe Summary - Proposed Sewer Improvements - North and South Blocks with Holly SPS 232 L/s

Junction Output

Name	Invert Elev.	Rim Elev. (r	Max. HGL (m)	Max. Total Inflow (m^3/s)
SAP33022	303.11	305.57	303.48	0.234
SAP33021	302.85	306.10	303.28	0.234
SAP33020	302.73	307.10	303.18	0.234
SAP33019	302.51	307.86	302.93	0.234
SAP33018	302.19	307.56	302.58	0.234
SAP33017	301.96	307.27	302.34	0.234
SAP33016	301.71	307.00	302.11	0.236
SAP33015	301.45	306.71	301.89	0.278
SAP33014	301.23	306.42	301.67	0.289
SAP33013	300.98	306.14	301.37	0.295
SAP33012	300.65	306.39	301.05	0.296
SAP33011	300.34	306.40	300.75	0.315
SAP33010	300.02	306.71	300.43	0.316
SAP33009	299.69	306.85	300.10	0.316
SAP33008	299.37	306.97	299.78	0.317
SAP32011	299.02	307.23	299.62	0.500
MAPLEVIE\	298.67	308.60	299.29	0.502
SAP32009	298.32	309.50	298.92	0.502
SAP32008	297.98	308.80	298.59	0.502
SAP32007	297.63	308.30	298.24	0.502
SAP32006	297.29	307.80	297.90	0.508
SAP32005	296.94	306.10	297.51	0.508
SAP32004	296.07	304.30	296.67	0.514
SAP32003	295.66	303.10	296.25	0.514
SAP32002	289.92	302.33	290.88	0.608

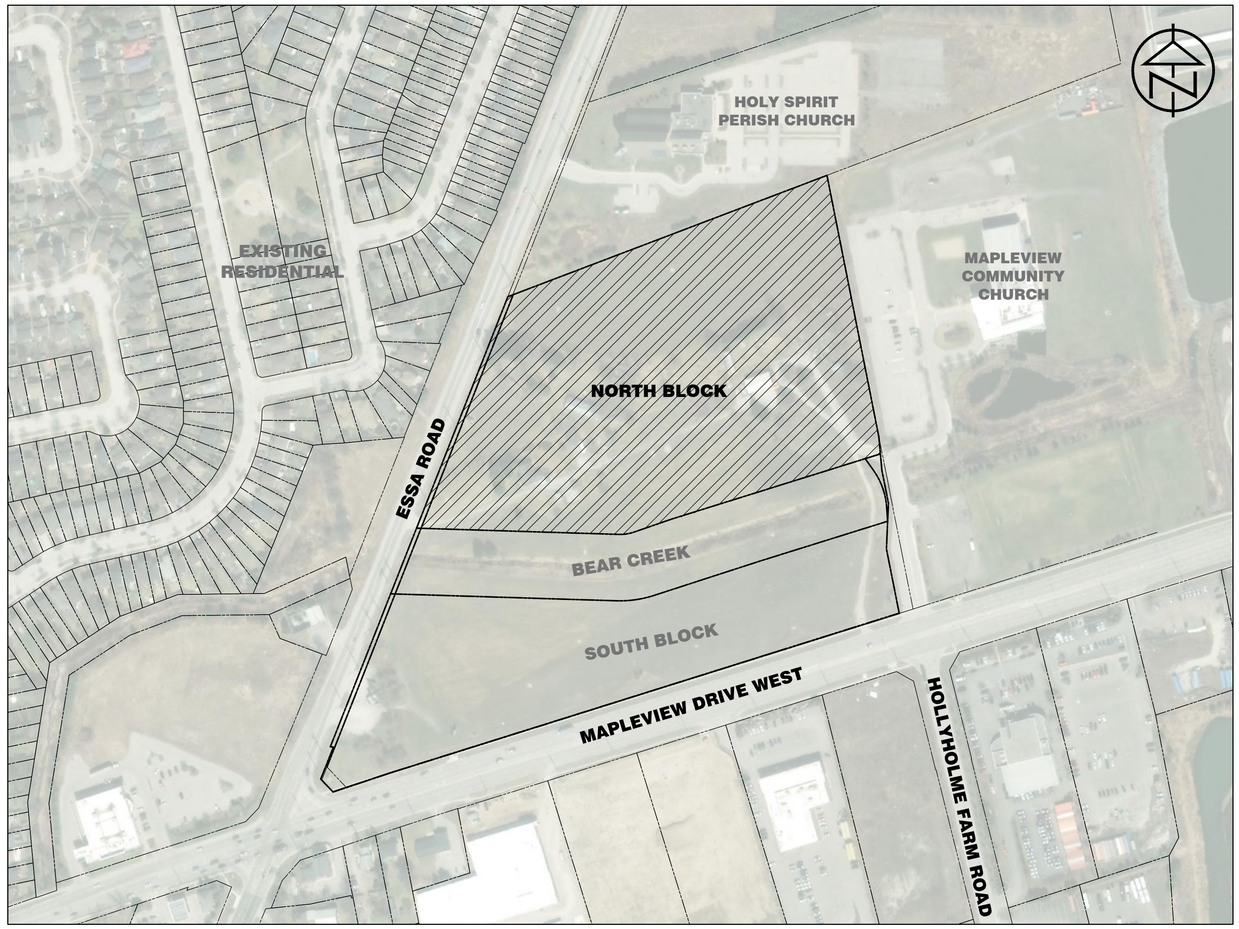
Conduit Output

Name	Inlet Node	Outlet Node	Pipe Diameter (m)
3742	SAP33022	SAP33021	0.525
649	SAP33021	SAP33020	0.600
4900	SAP33020	SAP33019	0.600
6582	SAP33019	SAP33018	0.600
693	SAP33018	SAP33017	0.675
2037	SAP33017	SAP33016	0.675
6440	SAP33016	SAP33015	0.675
3905	SAP33015	SAP33014	0.675
2902	SAP33014	SAP33013	0.675
7488	SAP33013	SAP33012	0.675
7480	SAP33012	SAP33011	0.675
7614	SAP33011	SAP33010	0.675
6146	SAP33010	SAP33009	0.675
5608	SAP33009	SAP33008	0.675
104	SAP33008	SAP32011	0.675
4745	SAP32011	MAPLEVIEW2	0.675
2276	MAPLEVIEW2	SAP32009	0.675
3144	SAP32009	SAP32008	0.675
3713	SAP32008	SAP32007	0.675
3528	SAP32007	SAP32006	0.675
1059	SAP32006	SAP32005	0.675
3904	SAP32005	SAP32004	0.675
259	SAP32004	SAP32003	0.675
5953	SAP32003	SAP32002	0.675
4768	SAP32002	SAP32001	0.675

Appendix C:
Digital PCSWMM Models

Appendix E: Drawings

MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS



TATHAM ENGINEERING

SPA - FIRST SUBMISSION
OCTOBER 8, 2024
PROJECT 422433-2

Pearl Builders

SPA - FIRST SUBMISSION
OCTOBER 8, 2024
PROJECT 422433-2

TATHAM ENGINEERING

INDEX

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ESC–2	EROSION & SEDIMENT CONTROL DETAILS & NOTES
CM–1	CONSTRUCTION MANAGEMENT & PARKING PLAN
SS–1	SITE SERVICING PLAN
STM–1	STORM SEWER CATCHMENT PLAN
STM–2	STORM SEWER DESIGN SHEET – EAST SYSTEM
STM–3	STORM SEWER DESIGN SHEET – WEST SYSTEM
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LEGEND

ITEM	EXISTING	PROPOSED
PROPERTY LINE		
LOT LINE		
CENTERLINE		
EDGE OF ASPHALT		
CONCRETE CURB		
EDGE OF GRAVEL SHOULDER		
DITCH/DIRECTION OF FLOW		
DRAINAGE SWALE/DIRECTION OF FLOW		
WATERMAIN/SIZE	150ø W/M	150ø W/M
WATER SERVICE		
FIRE HYDRANT	HYD	HYD
EXISTING WATER VALVE	WV	WV
CURB STOP VALVE	CSV	CSV
WATERMAIN PLUG AND THRUST BLOCK		
WATERMAIN BLOWOFF	BLOWOFF	BLOWOFF
WATERMAIN REDUCER		
SANITARY SEWER/SIZE/DIRECTION OF FLOW	200ø SAN	200ø SAN
SANITARY MAINTENANCE HOLE	SAN MH	SAN MH4
SANITARY SERVICE		
SANITARY FORCEMAIN		
STORM SEWER/SIZE/DIRECTION OF FLOW	375ø STM	375ø STM
STORM MAINTENANCE HOLE	STM MH	STM MH4
CATCH BASIN	CB	CB4
DOUBLE CATCH BASIN	DCB	DCB4
CATCH BASIN MAINTENANCE HOLE	CBMH	CBMH4
DOUBLE CATCH BASIN MAINTENANCE HOLE	DCBMH	DCBMH4
DITCH INLET CATCH BASIN	DICB	DICB4
CULVERT		
BELL UNDERGROUND	BU	BU
BELL AERIAL	BA	BA
CABLE UNDERGROUND	CU	CU
CABLE AERIAL	CA	CA
HYDRO UNDERGROUND	HU	HU
HYDRO AERIAL	HA	HA
GAS MAIN/SERVICE	GAS	GAS
FENCE	X X	X X
GUIDERAIL		
BUSHLINE/TREELINE		
CONTOUR	179.00	179.00
SPOT ELEVATION	× 179.00	×179.00
GRADING DIRECTION/GRADE PERCENTAGE	1.9%	1.9%
DRAINAGE FLOW		
TRAFFIC SIGN	SIGN	SIGN
TRAFFIC POLE/TRAFFIC SIGNAL	TLS	P1
LIGHT STANDARD	LS	LS
HYDRO POLE	HP	HP
GUY WIRE		
BELL POLE	BP	
BELL MAINTENANCE HOLE	BELL MH	
BELL PEDESTAL/VAULT		
CABLE PEDESTAL/VAULT		
HYDRO TRANSFORMER/VAULT		
GAS VALVE	GAS VALVE	
GAS MARKER	GAS	
MAILBOX		
STANDARD IRON BAR	SIB	
IRON BAR	IB	
TEMPORARY BENCHMARK	TBM#1	
BOREHOLE/TEST HOLE	BH9	
DECIDUOUS/CONIFEROUS TREE, SHRUB/BUSH		

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ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

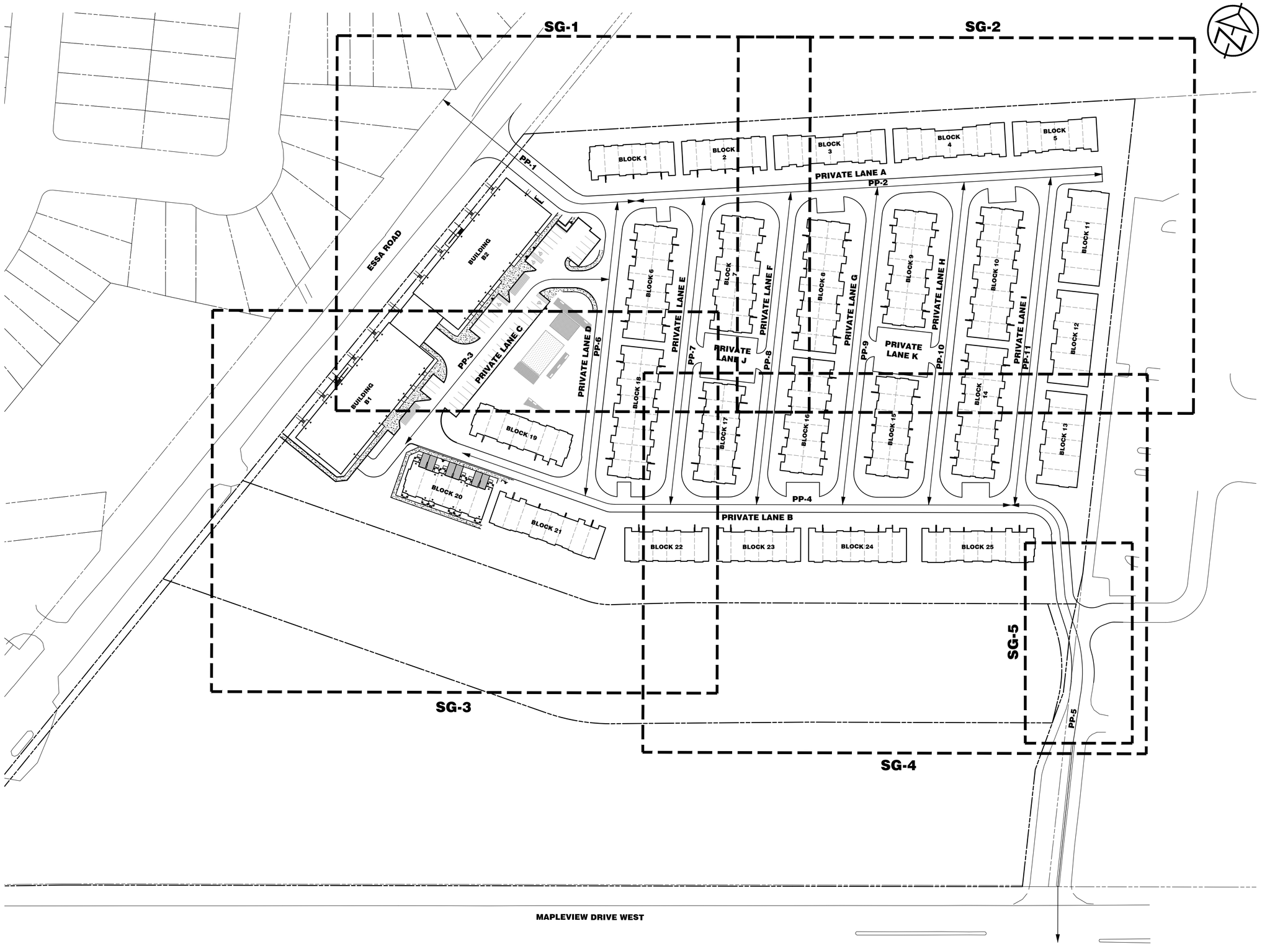
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

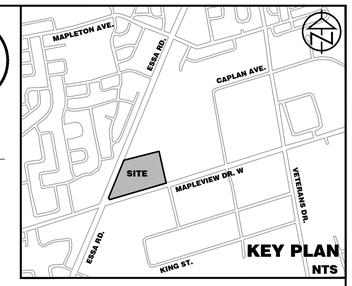
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TATHAM ENGINEERING

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Drawing Name: 422433–TP01.dwg, Plotted: Oct 10, 2024





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ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

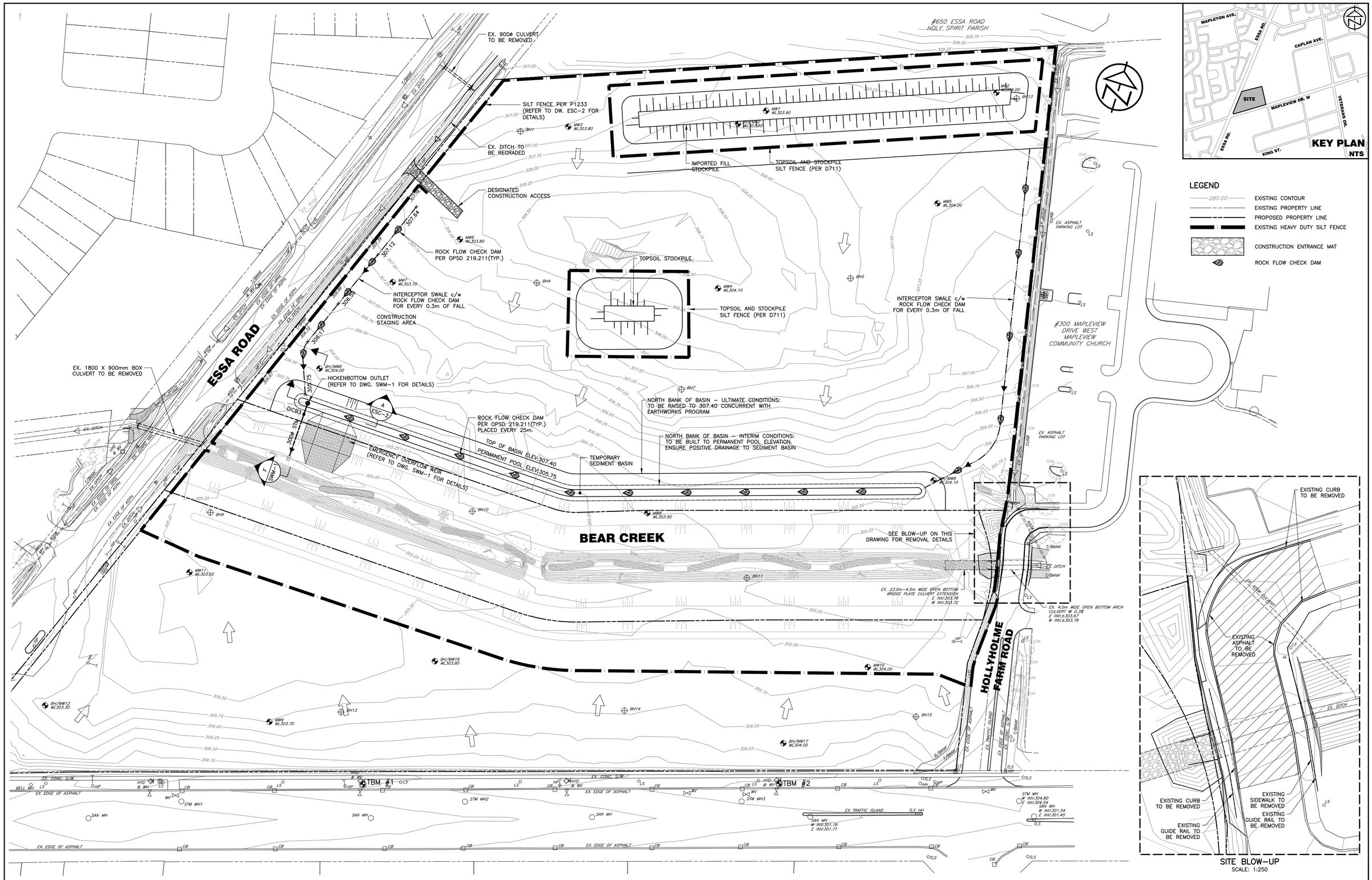
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

ORIENTATION PLAN

TATHAM ENGINEERING

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TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
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ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
M. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

EROSION & SEDIMENT CONTROL & REMOVALS PLAN

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: **ESC-1**
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:750	

Drawing Name: 422433-ESC01.dwg, Plotted: Oct 08, 2024

EROSION & SEDIMENT CONTROL

A. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED. EROSION AND SEDIMENT CONTROL MEASURES THAT ARE DESIGNED TO CONTROL RUNOFF FROM SPECIFIC AREAS MUST BE INSTALLED PRIOR TO ANY DISTURBANCE OF THAT PART OF THE SITE. THE LOCATION OF ALL EROSION AND SEDIMENT CONTROL WORKS TO BE REVIEWED ON SITE AND MAY BE REVISED AS DIRECTED BY THE ENGINEER.

B. THE CONTRACTOR MAY CONSIDER ALTERNATIVE EROSION AND SEDIMENT CONTROL MEASURES. SUCH MEASURES MUST BE PRESENTED IN WRITING TO THE CONTRACT ADMINISTRATOR FOR APPROVAL BY THE CITY OF BARRIE.

C. THE CONTRACTOR SHALL HAVE MATERIALS AVAILABLE ON-SITE TO REPAIR SEDIMENT AND EROSION CONTROL MEASURES IN THE EVENT OF UNFORESEEN CONDITIONS: HIGH WATER, EXTREME RAINFALL EVENTS, ETC.

D. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSPECTED, CLEANED AND REPAIRED BY THE CONTRACTOR AFTER EACH STORM EVENT AS NECESSARY TO PREVENT ANY OFF-SITE ENVIRONMENTAL IMPACTS (CITY OF BARRIE SITE ALTERATION BY-LAW 2014-100). ALL WORKS WILL BE INSPECTED BY THE ENGINEER WEEKLY AND AFTER EACH MAJOR STORM EVENT.9

E. CONSTRUCTION OF ALL EROSION AND SEDIMENT CONTROL WORKS ARE TO BE IN ACCORDANCE WITH THE FOLLOWING STEPS:

1. INSTALL CONSTRUCTION ENTRANCE MAT IN ACCORDANCE WITH D710.
2. INSTALL SILT FENCE IN ACCORDANCE WITH P1233.
3. INSTALL OUTLET STRUCTURES IN ACCORDANCE WITH D779.

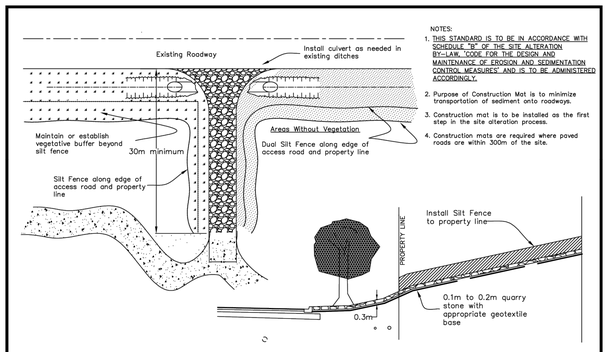
F. ALL CONSTRUCTION VEHICLES TO ACCESS SITE USING THE DESIGNATED CONSTRUCTION ENTRANCE.

G. EROSION AND SEDIMENT CONTROL MEASURES TO BE REMOVED BY THE CONTRACTOR ONCE GROUND COVER IS ESTABLISHED AND LANDSCAPING IS COMPLETE AND AS APPROVED BY THE CONTRACT ADMINISTRATOR.

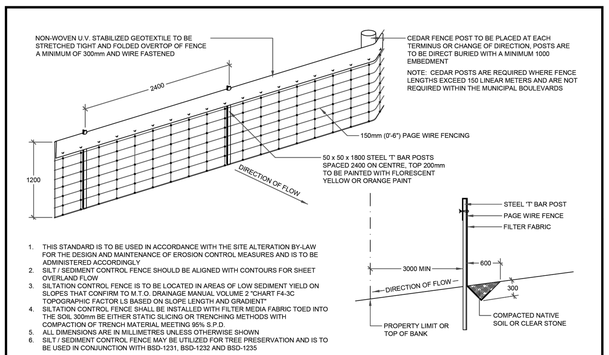
H. ALL STOCKPILE LOCATIONS ARE TO BE APPROVED BY THE CONTRACT ADMINISTRATOR.

I. PROVIDE SNOW FENCE OR APPROVED EQUAL ACROSS ALL CONSTRUCTION ENTRANCES DURING PERIODS OF INACTIVITY.

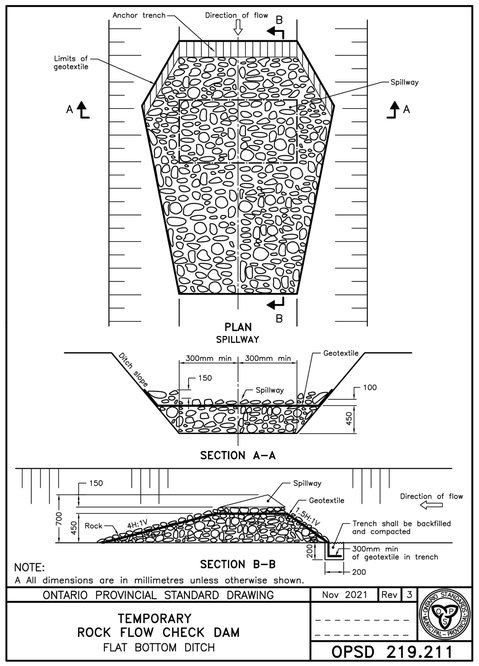
J. CONSTRUCTION AREAS THAT EXCEED 30 DAYS OF INACTIVITY SHALL BE STABILIZED BY SEEDING. THIS SHALL INCLUDE STOCKPILES OF FILL AND TOPSOIL.



Barrie	Construction Entrance	REV No. 2	DATE: APR 2023
			SCALE: N.T.S
			D710

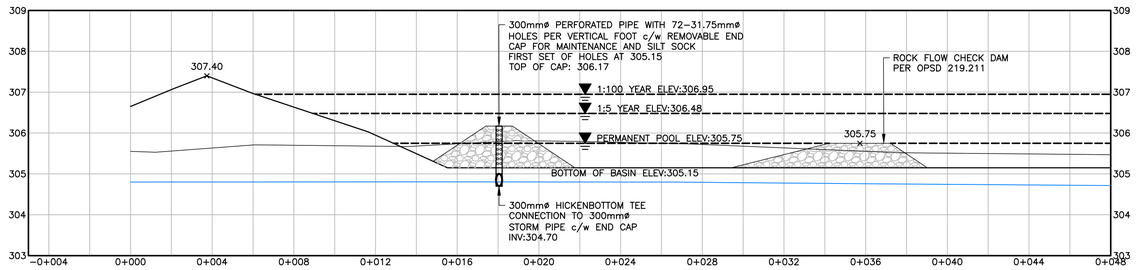


Barrie STANDARD DETAIL	SILTATION CONTROL FENCING	REV No. 2	DATE: OCT 2017
			SCALE: N.T.S.
		BSD-1233 FORMERLY BSD-23A	APPROVED Oct 10/17 DATE Original Signed By DIRECTOR OF ENGINEERING



NOTE:
A All dimensions are in millimetres unless otherwise shown.

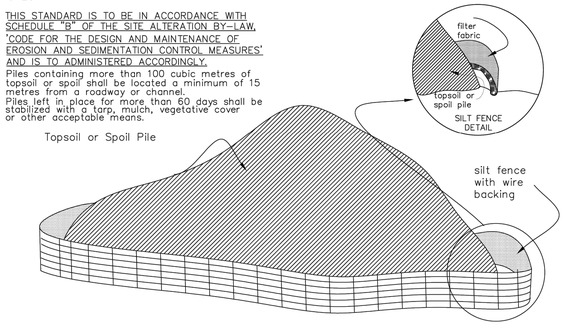
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev 3
TEMPORARY ROCK FLOW CHECK DAM FLAT BOTTOM DITCH		OPSD 219.211



A ESC-1 TEMPORARY SEDIMENT BASIN
NOT TO SCALE

NOTES:
1. THIS STANDARD IS TO BE IN ACCORDANCE WITH SCHEDULE "B" OF THE SITE ALTERATION BY-LAW, 'CODE FOR THE DESIGN AND MAINTENANCE OF EROSION AND SEDIMENTATION CONTROL MEASURES' AND IS TO ADMINISTERED ACCORDINGLY.
2. Piles containing more than 100 cubic metres of topsoil or spoil shall be located a minimum of 15 metres from a roadway or channel.
3. Piles left in place for more than 60 days shall be stabilized with a tarp, mulch, vegetative cover or other acceptable means.

Topsoil or Spoil Pile



Barrie	Siltation Control	REV No. 1	DATE: APR 2023
			SCALE: N.T.S
			D711

DISCLAIMER AND COPYRIGHT

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DRAWING REFERENCES

LEGAL BOUNDARIES AND ROAD WIDENING SHOWN ON THIS PLAN BASED ON PLAN COMPLETED BY RUDY MAK SURVEYING LTD., DATED FEBRUARY 15, 2024.

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ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA - 1ST SUBMISSION	OCT 8/24

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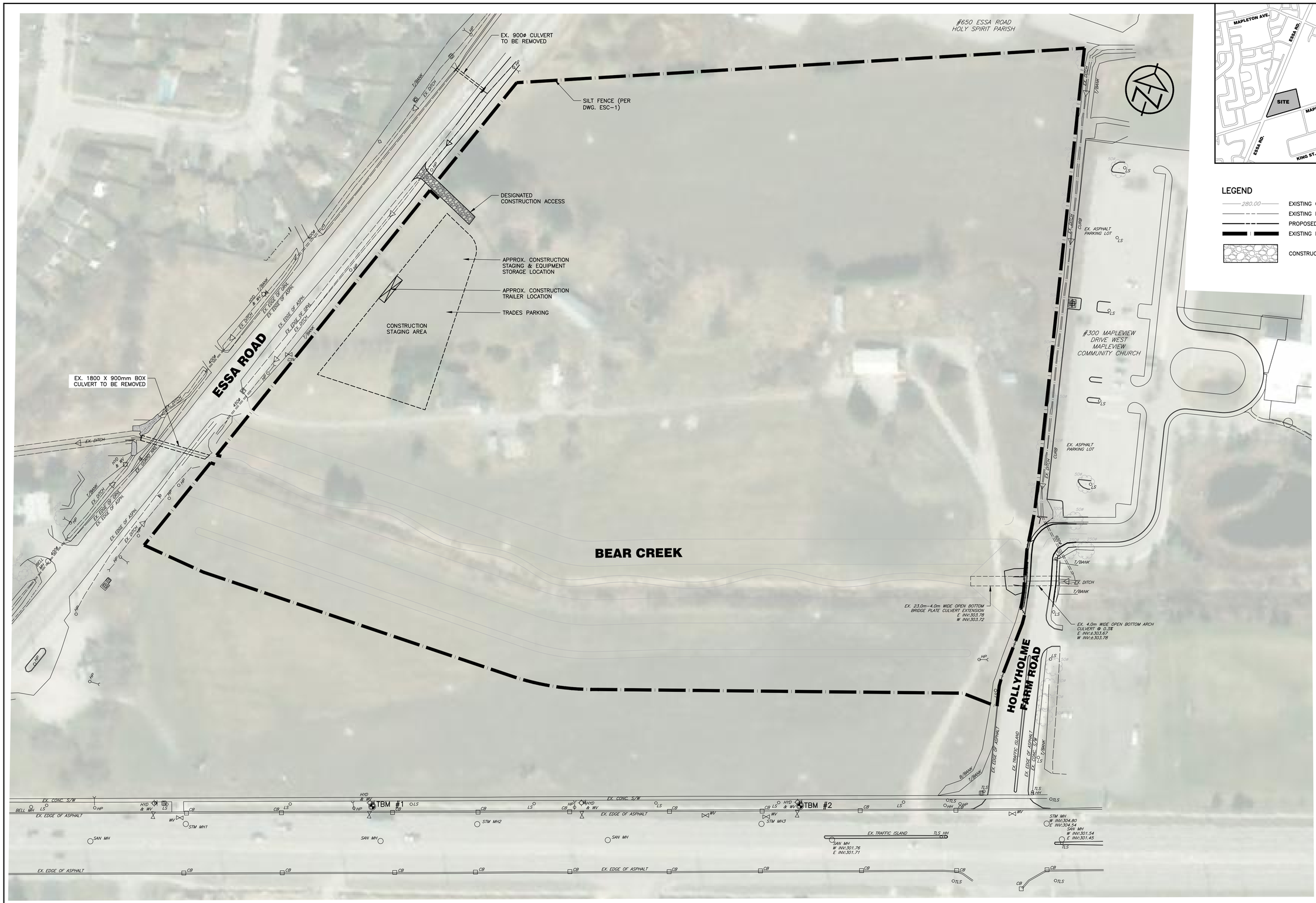
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

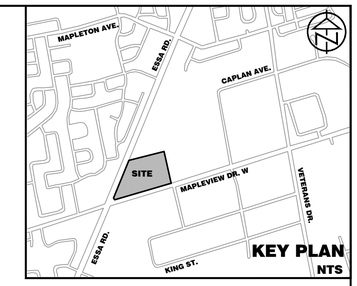
EROSION & SEDIMENT CONTROL DETAILS

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: ESC-2
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: AS NOTED	

Drawing Name: 422433-ESC02.dwg, Plotted: Oct 08, 2024





LEGEND

- 280.00 — EXISTING CONTOUR
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- EXISTING HEAVY DUTY SILT FENCE
- CONSTRUCTION ENTRANCE MAT

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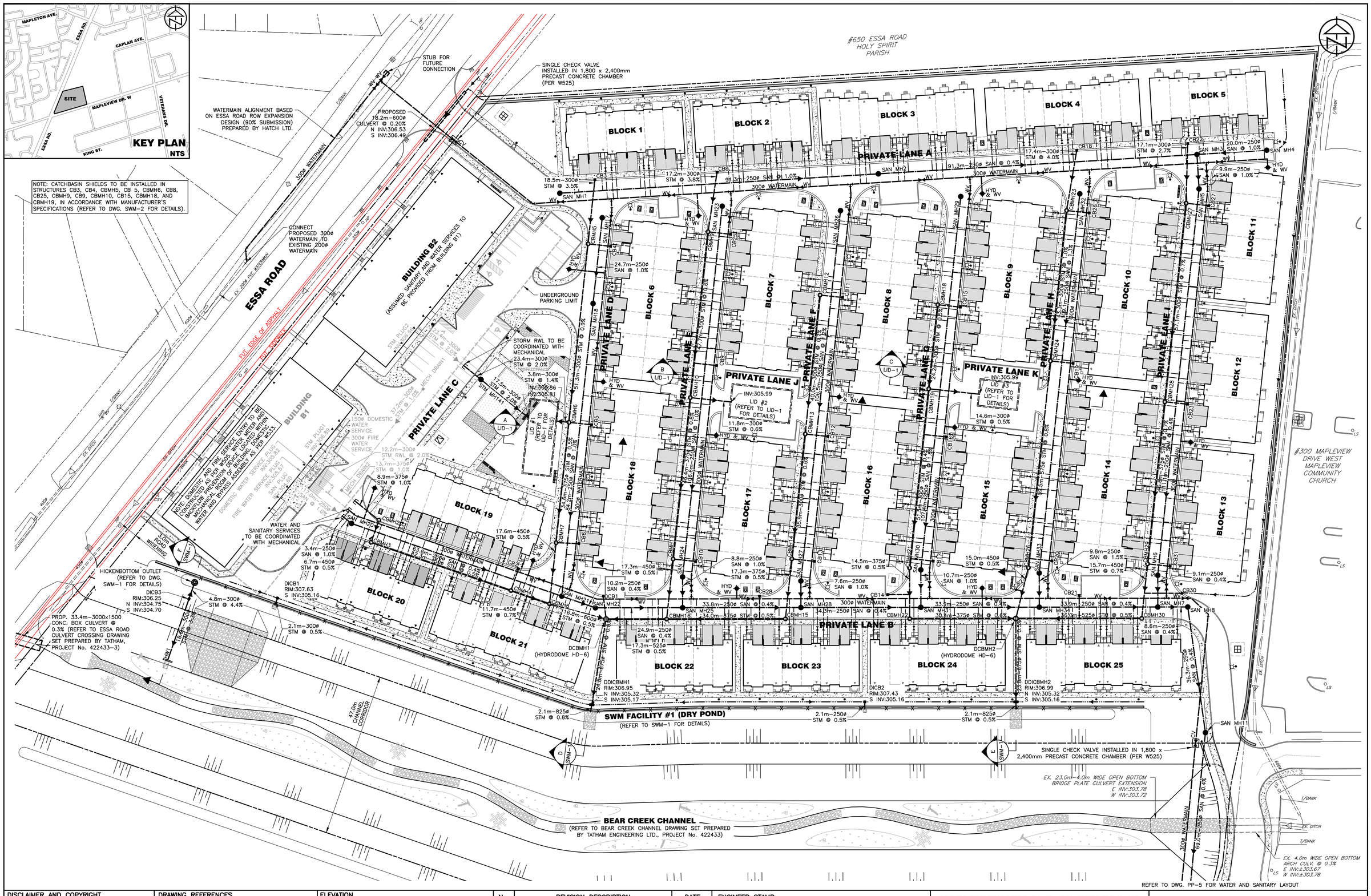
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

CONSTRUCTION MANAGEMENT & PARKING PLAN

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: CM-1
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:750	

Drawing Name: 422433-CM01.dwg, Plotted: Oct 08, 2024



NOTE: CATCHBASIN SHIELDS TO BE INSTALLED IN STRUCTURES CB3, CB4, CBMH5, CB 5, CBMH6, CB8, CB25, CBMH9, CB9, CBMH10, CB15, CBMH18, AND CBMH19, IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS (REFER TO DWG. SWM-2 FOR DETAILS).

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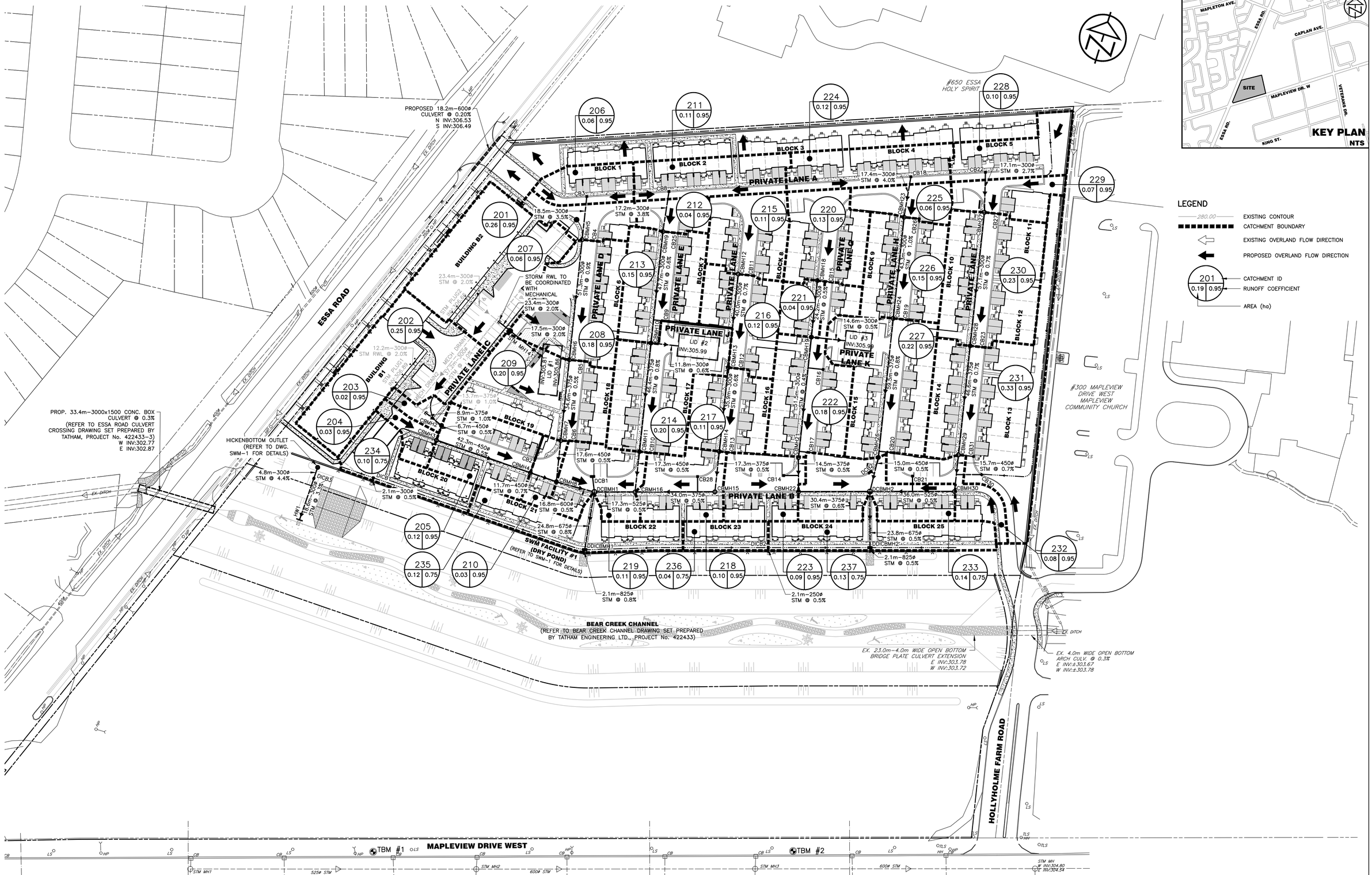
MAPLEVIEW VILLAGE - NORTH BLOCK
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PEARL BUILDERS

TATHAM ENGINEERING

SITE SERVICING PLAN

DESIGN: LG	FILE: 422433-2	DWG:	SS-1
DRAWN: LG	DATE: NOV. 2022		
CHECK: NM	SCALE: 1:500		

Drawing Name: 422433-SS01.dwg, Plotted: Oct 09, 2024



LEGEND

- 280.00 — EXISTING CONTOUR
- CATCHMENT BOUNDARY
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED OVERLAND FLOW DIRECTION
- 201 / 0.19 / 0.95 — CATCHMENT ID / RUNOFF COEFFICIENT / AREA (ha)

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MAPLEVIEW VILLAGE - NORTH BLOCK
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PEARL BUILDERS

STORM SEWER CATCHMENT PLAN

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: STM-1
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:750	

TATHAM ENGINEERING

Storm Sewer Design Sheet - East Sewers

Project Information

Mapleview Village - North Block	422433

Drawing Reference

Storm Sewer Catchment Plan (Drawing STM-1)	10/4/2024

Prepared By

LJC/LG	10/4/2024

Reviewed By

NM	10/4/2024

Municipality

City of Barrie

Runoff Coefficient Adjustment

Equation	1	
Year	**A**	**B**
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	675.59	4.68	0.78
5	843.02	4.58	0.76
10	976.90	4.75	0.76
25	1133.12	4.73	0.76
50	1251.47	4.85	0.75
100	1383.63	4.91	0.75

Manning's Coefficient

Material	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Notes

Version Date: 10/4/2024

Version Number: 1

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
LANE G	220	CBMH18	CBMH19	0.13	0.95	5	0.95	0.12	0.13	0.12	10.00	109.11	0.037	0.013	24.2	0.5%	300	0.97	0.068	0.92	0.44	239	54.7%	10.44
LANE G	221	CBMH19	CBMH21	0.04	0.95	5	0.95	0.04	0.17	0.16	10.44	106.68	0.048	0.013	51.5	0.4%	300	0.87	0.061	0.87	0.99	274	78.2%	11.43
LANE G	222	CBMH21	CBMH22	0.18	0.95	5	0.95	0.17	0.35	0.33	11.43	101.60	0.094	0.013	14.5	0.5%	375	1.12	0.124	1.12	0.22	338	75.7%	11.64
LANE B	223	CBMH22	DCBMH2	0.09	0.95	5	0.95	0.09	0.44	0.42	11.64	100.56	0.117	0.013	30.4	0.6%	375	1.23	0.136	1.23	0.41	354	86.0%	12.06
LANE A	224	CB18	CBMH23	0.12	0.95	5	0.95	0.11	0.12	0.11	10.00	109.11	0.035	0.013	17.4	4.0%	300	2.74	0.193	1.95	0.15	157	17.9%	10.15
LANE H	225	CBMH23	CBMH24	0.06	0.95	5	0.95	0.06	0.18	0.17	10.15	108.26	0.051	0.013	43.3	1.0%	300	1.37	0.097	1.30	0.55	237	53.2%	10.70
LANE H	226	CBMH24	CBMH26	0.15	0.95	5	0.95	0.14	0.33	0.31	10.70	105.25	0.092	0.013	59.5	0.8%	**375**	1.42	0.157	1.38	0.72	306	58.4%	11.42
LANE H	227	CBMH26	DCBMH2	0.22	0.95	5	0.95	0.21	0.55	0.52	11.42	101.64	0.148	0.013	15.0	0.5%	**450**	1.27	0.202	1.27	0.20	400	73.2%	11.62
LANE A	228	CB22	CBMH27	0.10	0.95	5	0.95	0.10	0.10	0.10	10.00	109.11	0.029	0.013	17.1	2.7%	300	2.25	0.159	1.61	0.18	158	18.1%	10.18
LANE I	229	CBMH27	CBMH28	0.07	0.95	5	0.95	0.07	0.17	0.16	10.18	108.11	0.048	0.013	57.1	0.7%	300	1.14	0.081	1.12	0.85	248	59.9%	11.02
LANE I	230	CBMH28	CBMH29	0.23	0.95	5	0.95	0.22	0.40	0.38	11.02	103.60	0.109	0.013	46.6	0.7%	375	1.33	0.147	1.33	0.58	336	74.5%	11.61
LANE I	231	CBMH29	CBMH30	0.33	0.95	5	0.95	0.31	0.73	0.69	11.61	100.73	0.194	0.013	15.7	0.7%	450	1.50	0.239	1.50	0.17	416	81.3%	11.78
LANE B	232	CBMH30	DCBMH2	0.08	0.95	5	0.95	0.08	0.81	0.77	11.78	99.91	0.214	0.013	36.0	0.5%	525	1.40	0.304	1.40	0.43	460	70.2%	12.21
LANE B	233	DCBMH2	DDICBMH2	0.14	0.95	5	0.95	0.13	1.94	1.84	12.21	97.96	0.502	0.013	23.8	0.5%	**675**	1.66	0.594	1.66	0.24	633	84.4%	12.45
Overland Flow Route #2 (East)	237	DDICBMH2	SWMF#1	0.13	0.75	5	0.75	0.10	2.07	1.94	12.45	96.91	0.522	0.013	2.1	0.5%	**825**	1.90	1.015	1.79	0.02	643	51.5%	12.47
SWMF Inlet	236	DICB2	SWMF#1	0.04	0.75	5	0.75	0.03	0.04	0.03	10.00	109.11	0.009	0.013	2.1	0.5%	**250**	0.86	0.042	0.64	0.05	141	21.6%	10.05

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MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

STORM SEWER DESIGN SHEET
EAST SEWER SYSTEM

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG:	**STM-2**
DRAWN: LG	DATE: NOV. 2022		
CHECK: NM	SCALE: NTS		

TATHAM ENGINEERING

Storm Sewer Design Sheet - West Sewers

Project Information

Mapleview Village - North Block	422433

Drawing Reference

Storm Sewer Catchment Plan (Drawing STM-1)	10/4/2024

Prepared By

LJC/LG	10/4/2024

Reviewed By

NM	10/4/2024

Municipality

City of Barrie

Runoff Coefficient Adjustment

Equation	1	
Year	**A**	**B**
10	1.00	0.00
25	1.10	0.00
50	1.20	0.00
100	1.25	0.00

Time of Concentration

10 mins

IDF Curve Coefficients

Year	A	B	C
2	675.59	4.68	0.78
5	843.02	4.58	0.76
10	976.90	4.75	0.76
25	1133.12	4.73	0.76
50	1251.47	4.85	0.75
100	1383.63	4.91	0.75

Manning's Coefficient

Material	Value
CSP	0.024
Concrete	0.013
PVC	0.013

Notes

Version Date: 10/4/2024

Version Number: 1

Engineer Stamp

Street Name	Area ID / Label	Upstream Maintenance Hole	Downstream Maintenance Hole	Area (ha)	5 Year Runoff Coefficient (C)	Design Storm (Year)	Adjusted Runoff Coefficient (C)	Area x Runoff Coefficient	Cumulative Area (ha)	Cumulative Area x Adjusted Runoff Coefficient	Time of Concentration (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Manning's Roughness Coefficient	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (m^3/s)	Actual Velocity (m/s)	Travel Time (min)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)	Total Time of Travel (min)
LANE C	201	MECH DRAIN1	MECH DRAIN2	0.26	0.95	5	0.95	0.25	0.26	0.25	10.00	109.11	0.075	0.013	37.2	1.0%	300	1.37	0.097	1.37	0.45	272	77.4%	10.45
LANE B	202	MECH DRAIN2	CBMH2	0.25	0.95	5	0.95	0.24	0.51	0.48	10.45	106.59	0.143	0.013	13.7	1.0%	375	1.59	0.175	1.59	0.14	348	81.8%	10.60
LANE B	203	CBMH2	CBMH3	0.02	0.95	5	0.95	0.02	0.53	0.50	10.60	105.82	0.148	0.013	6.7	0.5%	450	1.27	0.202	1.27	0.09	401	73.4%	10.68
LANE B	204	CBMH3	CBMH4	0.03	0.95	5	0.95	0.03	0.56	0.53	10.68	105.35	0.156	0.013	42.3	0.5%	450	1.27	0.202	1.27	0.56	408	77.2%	11.24
LANE B	205	CBMH4	CBMH8	0.12	0.95	5	0.95	0.11	0.68	0.65	11.24	102.52	0.184	0.013	11.7	0.7%	450	1.50	0.239	1.50	0.13	408	77.1%	11.37
LANE A	206	CB3	CBMH5	0.06	0.95	5	0.95	0.06	0.06	0.06	10.00	109.11	0.017	0.013	18.5	3.5%	300	2.56	0.181	1.54	0.20	124	9.5%	10.20
LANE D	207	CBMH5	CBMH6	0.06	0.95	5	0.95	0.06	0.12	0.11	10.20	107.98	0.034	0.013	51.3	0.9%	300	1.30	0.092	1.12	0.76	207	37.3%	10.96
LANE D	208	CBMH6	CBMH7	0.18	0.95	5	0.95	0.17	0.30	0.29	10.96	103.91	0.082	0.013	34.6	0.5%	**375**	1.12	0.124	1.12	0.51	321	66.4%	11.48
LANE D	209	CBMH7	CBMH8	0.20	0.95	5	0.95	0.19	0.50	0.48	11.48	101.36	0.134	0.013	17.6	0.5%	450	1.27	0.202	1.27	0.23	386	66.3%	11.71
LANE B	210	CBMH8	DCBMH1	0.03	0.95	5	0.95	0.03	1.21	1.15	11.37	101.88	0.325	0.013	16.8	0.5%	600	1.54	0.434	1.54	0.18	538	74.9%	11.55
LANE A	211	CB8	CBMH9	0.11	0.95	5	0.95	0.10	0.11	0.10	10.00	109.11	0.032	0.013	17.2	3.8%	300	2.67	0.189	1.87	0.15	154	16.8%	10.15
LANE E	212	CBMH9	CBMH10	0.04	0.95	5	0.95	0.04	0.15	0.14	10.15	108.24	0.043	0.013	47.7	0.6%	300	1.06	0.075	1.03	0.78	243	57.2%	10.93
LANE E	213	CBMH10	CBMH11	0.15	0.95	5	0.95	0.14	0.30	0.29	10.93	104.08	0.082	0.013	46.4	0.8%	**375**	1.42	0.157	1.35	0.57	294	52.5%	11.50
LANE E	214	CBMH11	CBMH16	0.20	0.95	5	0.95	0.19	0.50	0.48	11.50	101.23	0.134	0.013	17.3	0.5%	450	1.27	0.202	1.27	0.23	385	66.3%	11.73
LANE A	215	CBMH12	CBMH13	0.11	0.95	5	0.95	0.10	0.11	0.10	10.00	109.11	0.032	0.013	40.0	0.7%	300	1.14	0.081	1.00	0.67	211	39.1%	10.67
LANE F	216	CBMH13	CBMH14	0.12	0.95	5	0.95	0.11	0.23	0.22	10.15	108.24	0.066	0.013	35.9	0.6%	300	1.06	0.075	1.06	0.56	285	87.7%	10.72
LANE F	217	CBMH14	CBMH15	0.11	0.95	5	0.95	0.10	0.34	0.32	10.72	105.17	0.094	0.013	17.3	0.5%	**375**	1.12	0.124	1.12	0.26	338	76.1%	10.97
LANE B	-	CBMH15	CBMH16	-	-	5	-	0.00	0.34	0.32	10.97	103.85	0.093	0.013	34.0	0.5%	375	1.12	0.124	1.12	0.50	337	75.2%	11.48
LANE B	218	CBMH16	DCBMH1	0.10	0.95	5	0.95	0.10	0.94	0.89	11.73	100.15	0.248	0.013	17.3	0.5%	525	1.40	0.304	1.40	0.21	486	81.7%	11.94

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SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

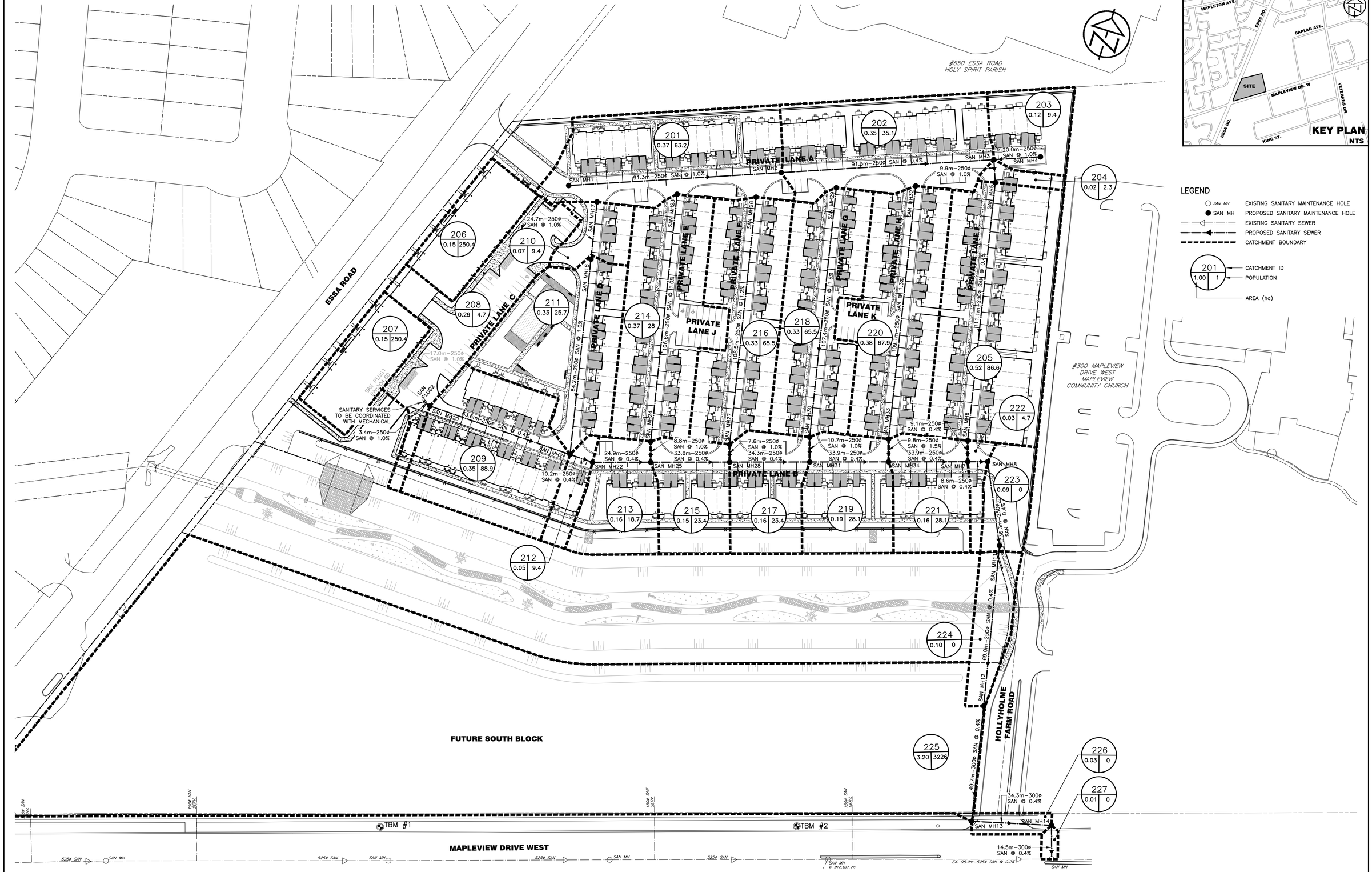
LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

STORM SEWER DESIGN SHEET
WEST SEWER SYSTEM

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG:	
DRAWN: LG	DATE: NOV. 2022	**STM-3**	
CHECK: NM	SCALE: NTS		



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SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

TATHAM ENGINEERING

SANITARY SEWER CATCHMENT PLAN

DESIGN: LG	FILE: 422433-2	DWG: SAN-1
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:750	

Drawing Name: 422433-SAN01.dwg, Plotted: Oct 08, 2024

TATHAM ENGINEERING

Sanitary Sewer Design Sheet

Project Information

Mapleview Village - North Block	422433-2

Drawing Reference

SAN-01	October 01-24

Prepared By

LG	October 01-24

Reviewed By

NM	October 02-24

Municipality

City of Barrie

Population Density

Capita per Unit	Low	Med.	High
	3.13	2.34	1.67

Infiltration

Infiltration (L/s/ha)	0.1

Manning's Coefficient

Pipe Material	Value
Concrete	0.013
PVC	0.013
Applied	0.013

Flow

Development Type	Average (L/cap/day)	Peaking Factor
Residential	225	Harmon
Development Type	**Average (L/ha/day)**	**Peaking Factor**
Institution	28,000	2
Commercial	28,000	2
Industrial (High)	55,000	-
Industrial (Low)	50,000	-

Notes

Engineer Stamp

Version Date: October 1, 2024

Version Number: 1

Street Name	Area Label/ID	Upstream Maintenance Hole	Downstream Maintenance Hole	Development Type	Population Density	Number of Units	Population (cap)	Accumulated Population (cap)	Peaking Factor	Area (ha)	Cumulative Area (ha)	Average Flow (L/s)			Peak Flow (L/s)			Proposed Sanitary Sewer							
												Development	Infiltration	Total	Development	Infiltration	Total	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
LANE A	201	SAN MH1	SAN MH2	Residential	Med.	27	63.2	63.2	4.29	0.37	0.37	0.16	0.04	0.20	0.71	0.04	0.74	91.3	1.0%	250	1.21	59.47	0.43	48	1.2%
LANE A	202	SAN MH2	SAN MH3	Residential	Med.	15	35.1	98.3	4.25	0.35	0.72	0.26	0.07	0.33	1.09	0.07	1.16	91.3	0.4%	250	0.77	37.61	0.34	68	3.1%
LANE A	203	SAN MH 4	SAN MH3	Residential	Med.	4	9.4	9.4	4.42	0.12	0.12	0.02	0.01	0.04	0.11	0.01	0.12	20.0	1.0%	250	1.21	59.47	0.26	24	0.2%
LANE I	204	SAN MH3	SAN MH5	Residential	Med.	1	2.3	110.0	4.23	0.02	0.86	0.29	0.09	0.37	1.21	0.09	1.30	9.9	1.0%	250	1.21	59.47	0.50	60	2.2%
LANE I	205	SAN MH5	SAN MH6	Residential	Med.	37	86.6	196.6	4.15	0.52	1.38	0.51	0.14	0.65	2.12	0.14	2.26	111.1	0.4%	250	0.77	37.61	0.41	87	6.0%
LANE I	-	SAN MH6	SAN MH7	Residential	Med.	0	0.0	196.6	4.15	0.00	1.38	0.51	0.14	0.65	2.12	0.14	2.26	9.1	0.4%	250	0.77	37.61	0.41	87	6.0%
Building B1/B2 Sewers TBD by Mec	206,207	SAN PLUG1	SAN PLUG2	Residential	Med.	214	500.8	500.8	3.97	0.30	0.30	1.30	0.03	1.33	5.18	0.03	5.21	17.0	1.0%	250	1.21	59.47	0.72	100	8.8%
LANE B	208	SAN PLUG2	SAN MH20	Residential	Med.	2	4.7	505.4	3.97	0.29	0.59	1.32	0.06	1.38	5.23	0.06	5.29	3.4	1.0%	250	1.21	59.47	0.72	101	8.9%
LANE B	209	SAN MH20	SAN MH21	Residential	Med.	38	88.9	594.4	3.93	0.35	0.94	1.55	0.09	1.64	6.09	0.09	6.18	63.6	0.4%	250	0.77	37.61	0.54	127	16.4%
LANE D	210	SAN MH17	SAN MH18	Residential	Med.	4	9.4	9.4	4.42	0.07	0.07	0.02	0.01	0.03	0.11	0.01	0.11	24.7	1.0%	250	1.21	59.47	0.26	24	0.2%
LANE D	211	SAN MH18	SAN MH21	Residential	Med.	11	25.7	35.1	4.34	0.33	0.40	0.09	0.04	0.13	0.40	0.04	0.44	84.2	1.0%	250	1.21	59.47	0.37	40	0.7%
LANE B	212	SAN MH21	SAN MH22	Residential	Med.	4	9.4	638.8	3.92	0.05	1.39	1.66	0.14	1.80	6.52	0.14	6.66	10.2	0.4%	250	0.77	37.61	0.55	131	17.7%
LANE B	213	SAN MH22	SAN MH25	Residential	Med.	8	18.7	657.5	3.91	0.16	1.55	1.71	0.16	1.87	6.70	0.16	6.85	24.9	0.4%	250	0.77	37.61	0.56	132	18.2%
LANE E	214	SAN MH23	SAN MH24	Residential	Med.	28	65.5	65.5	4.29	0.37	0.37	0.17	0.04	0.21	0.73	0.04	0.77	106.6	1.0%	250	1.21	59.47	0.43	49	1.3%
LANE E	-	SAN MH24	SAN MH25	Residential	Med.	0	0.0	65.5	4.29	0.00	0.37	0.17	0.04	0.21	0.73	0.04	0.77	8.8	1.0%	250	1.21	59.47	0.43	49	1.3%
LANE B	215	SAN MH25	SAN MH28	Residential	Med.	10	23.4	746.5	3.88	0.15	2.07	1.94	0.21	2.15	7.54	0.21	7.75	33.8	0.4%	250	0.77	37.61	0.58	138	20.6%
LANE F	216	SAN MH26	SAN MH27	Residential	Med.	28	65.5	65.5	4.29	0.33	0.33	0.17	0.03	0.20	0.73	0.03	0.76	106.5	1.2%	250	1.33	65.14	0.46	47	1.2%
LANE F	-	SAN MH27	SAN MH28	Residential	Med.	0	0.0	65.5	4.29	0.00	0.33	0.17	0.03	0.20	0.73	0.03	0.76	7.6	1.0%	250	1.21	59.47	0.43	49	1.3%
LANE B	217	SAN MH28	SAN MH31	Residential	Med.	10	23.4	835.4	3.85	0.16	2.56	2.18	0.26	2.43	8.37	0.26	8.63	34.3	0.4%	250	0.77	37.61	0.59	144	22.9%
LANE G	218	SAN MH29	SAN MH30	Residential	Med.	28	65.5	65.5	4.29	0.33	0.33	0.17	0.03	0.20	0.73	0.03	0.76	107.4	1.6%	250	1.53	75.22	0.51	45	1.0%
LANE G	-	SAN MH30	SAN MH31	Residential	Med.	0	0.0	65.5	4.29	0.00	0.33	0.17	0.03	0.20	0.73	0.03	0.76	10.7	1.0%	250	1.21	59.47	0.43	49	1.3%
LANE B	219	SAN MH31	SAN MH34	Residential	Med.	12	28.1	929.0	3.82	0.19	3.08	2.42	0.31	2.73	9.24	0.31	9.55	33.9	0.4%	250	0.77	37.61	0.61	149	25.4%
LANE H	220	SAN MH32	SAN MH33	Residential	Med.	29	67.9	67.9	4.29	0.38	0.38	0.18	0.04	0.21	0.76	0.04	0.80	109.1	1.3%	250	1.38	67.80	0.48	47	1.2%
LANE H	-	SAN MH33	SAN MH34	Residential	Med.	0	0.0	67.9	4.29	0.00	0.38	0.18	0.04	0.21	0.76	0.04	0.80	9.8	1.5%	250	1.48	72.83	0.50	46	1.1%
LANE B	221	SAN MH34	SAN MH7	Residential	Med.	12	28.1	1024.9	3.79	0.16	3.62	2.67	0.36	3.03	10.12	0.36	10.49	33.9	0.4%	250	0.77	37.61	0.62	155	27.9%
LANE B	222	SAN MH7	SAN MH8	Residential	Med.	2	4.7	1226.2	3.74	0.03	5.03	3.19	0.50	3.70	11.95	0.50	12.45	8.6	0.4%	250	0.77	37.61	0.65	165	33.1%
LANE B	223	SAN MH8	SAN MH11	Residential	Med.	0	0.0	1226.2	3.74	0.09	5.12	3.19	0.51	3.71	11.95	0.51	12.46	36.3	0.4%	250	0.77	37.61	0.65	165	33.1%
LANE B	224	SAN MH11	SAN MH12	Residential	Med.	0	0.0	1226.2	3.74	0.10	5.22	3.19	0.52	3.72	11.95	0.52	12.47	69.0	0.4%	250	0.77	37.61	0.65	165	33.2%
FUTURE SOUTH BLOCK (Including 1,400sq.m Commercial Retail Space)	225	SAN MH12	SAN MH13	Residential	High	1921	3226	4452.2	3.29	3.20	8.42	11.59	0.84	12.44	38.16	0.84	39.00	49.7	0.4%	300	0.87	61.16	0.87	253	63.8%
HOLLYHOLME FARM ROAD	226	SAN MH13	SAN MH14	Residential	Med.	0	0.0	4452.2	3.29	0.03	8.45	11.59	0.85	12.44	38.16	0.85	39.01	34.3	0.4%	300	0.87	61.16	0.87	253	63.8%
MAPLEVIEW DRIVE WEST	227	SAN MH14	EX SAN MH	Residential	Med.	0	0.0	4452.2	3.29	0.01	8.46	11.59	0.85	12.44	38.16	0.85	39.01	14.5	0.4%	300	0.87	61.16	0.87	253	63.8%

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SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

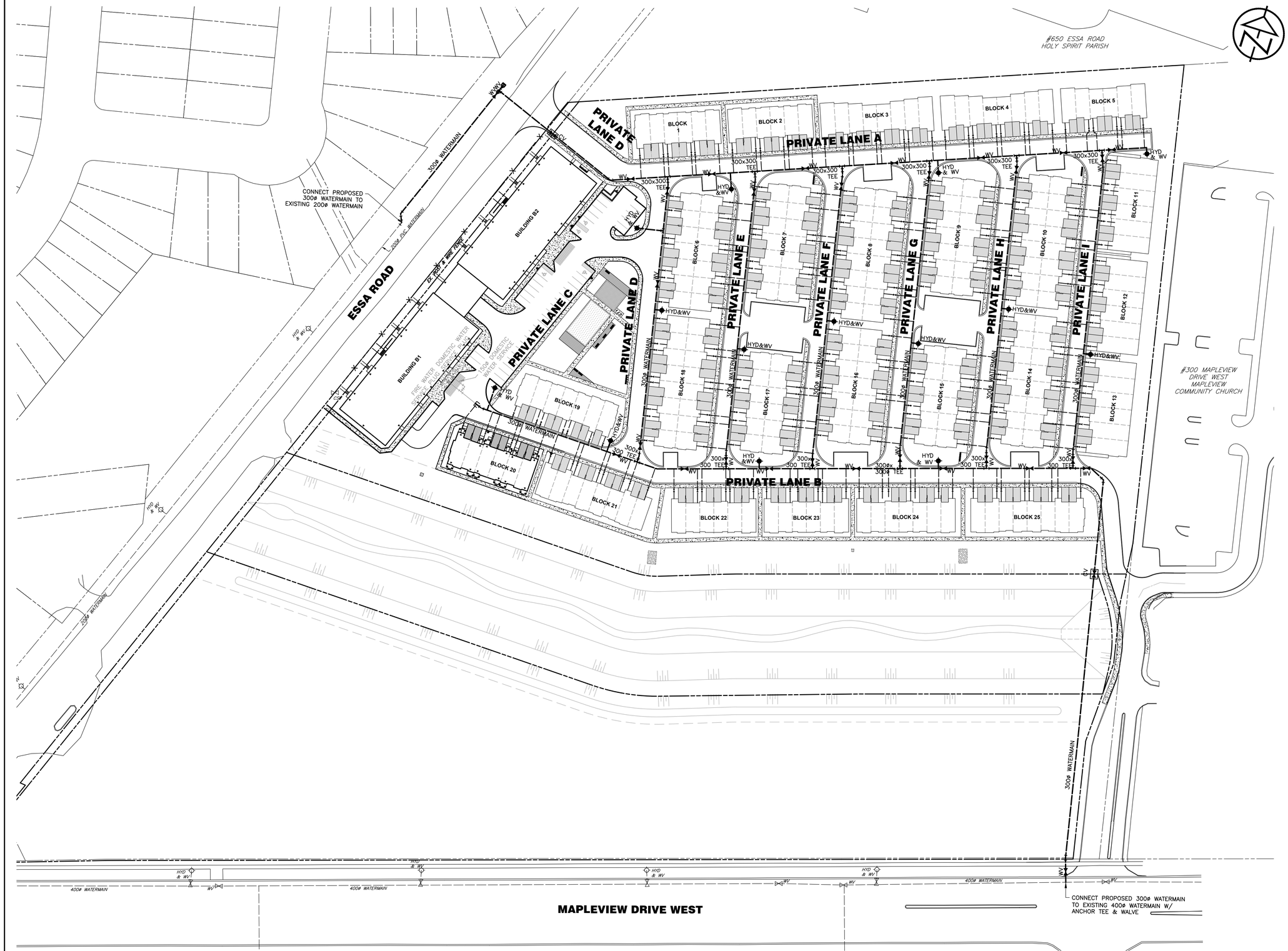
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

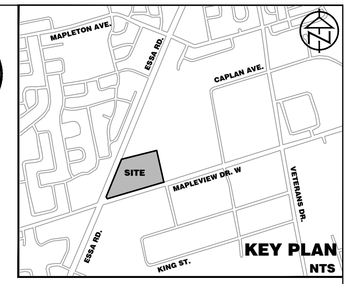
SANITARY SEWER DESIGN SHEET

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: SAN-2
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: NTS	

Drawing Name: 422433-SAN01.dwg, Plotted: Oct 08, 2024





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SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

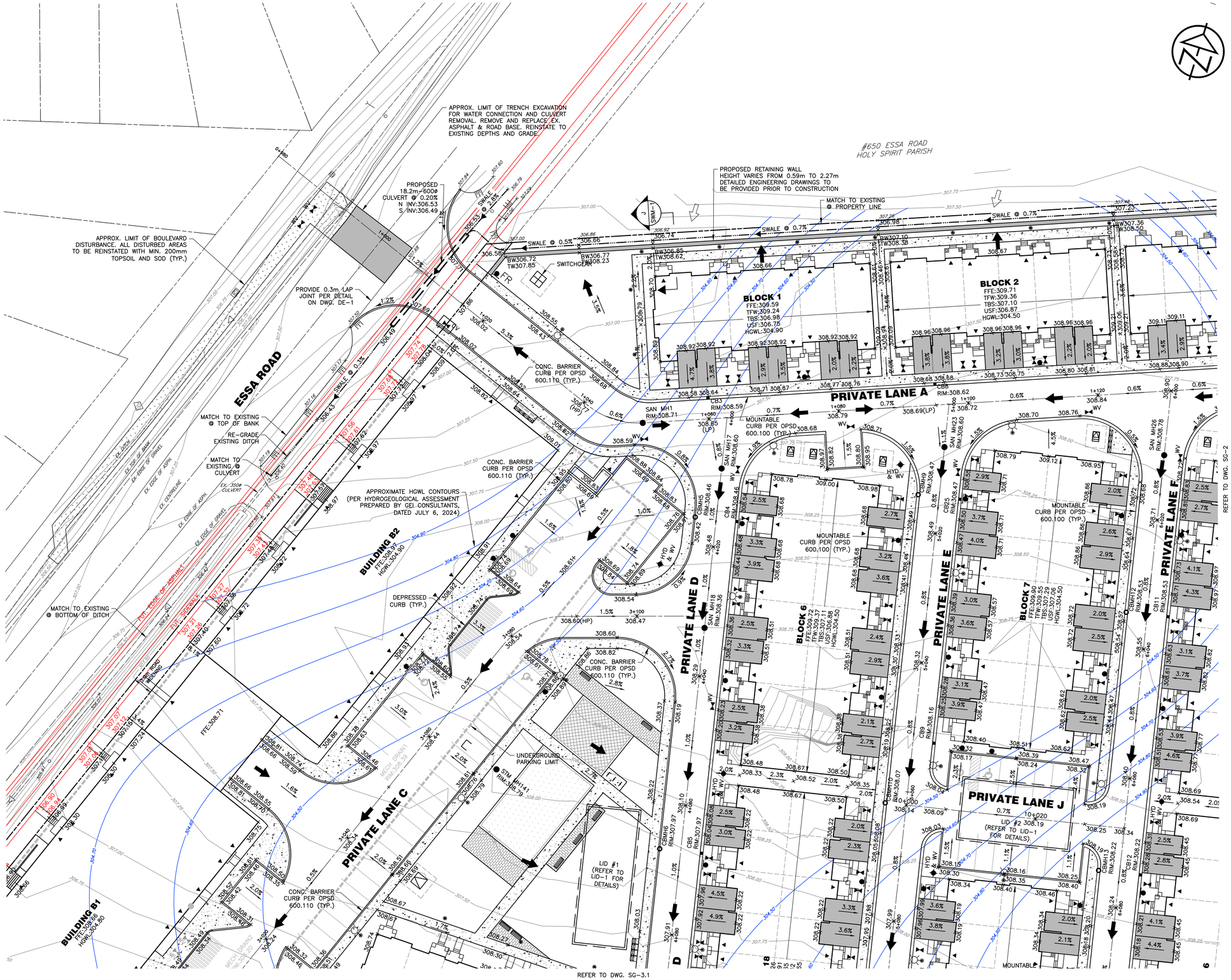
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

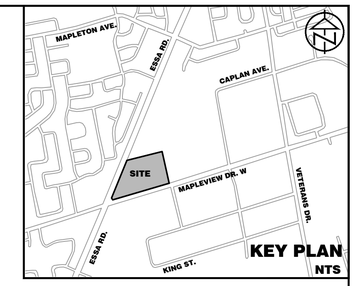
WATER DISTRIBUTION PLAN

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG:
DRAWN: LG	DATE: NOV. 2022	**WAT-1**
CHECK: NM	SCALE: 1:750	

Drawing Name: 422433-WAT01.dwg, Plotted: Oct 08, 2024





FRONT HALF OF ROOF FOR BLOCKS 1 TO 5 TO DRAIN TO THE INTERNAL LANEWAYS

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100190121
Oct. 8/24
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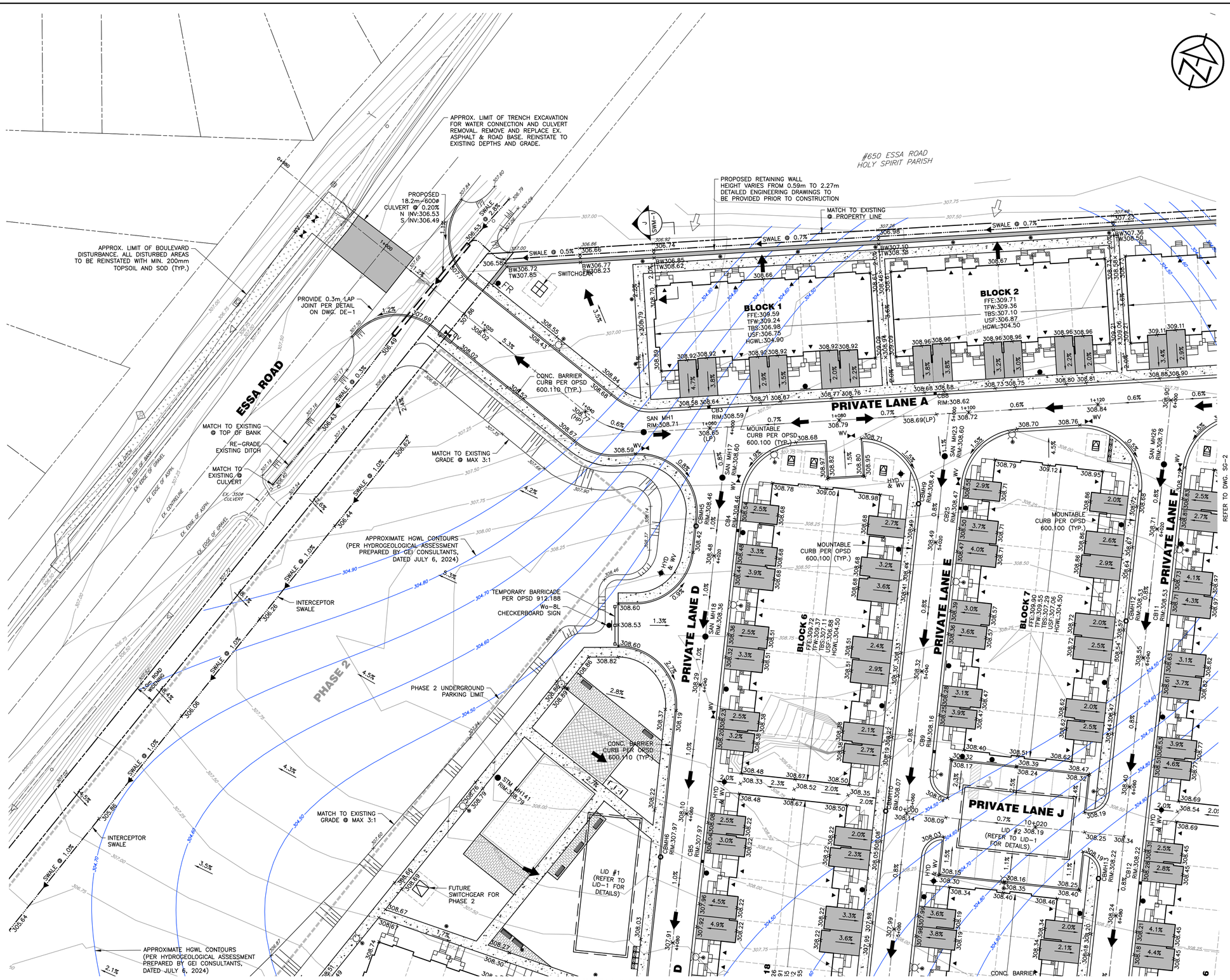
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

SITE GRADING PLAN – ULTIMATE
SHEET 1.1 OF 5

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: SG-1.1
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:300	

Drawing Name: 422433-SG01.1.dwg, Plotted: Oct 15, 2024


ESSA ROAD
PROPOSED 18.2m–600ø CULVERT @ 0.20% N INV:306.53 S INV:306.49
APPROX. LIMIT OF TRENCH EXCAVATION FOR WATER CONNECTION AND CULVERT REMOVAL. REMOVE AND REPLACE EX. ASPHALT & ROAD BASE. REINSTATE TO EXISTING DEPTHS AND GRADE.
APPROX. LIMIT OF BOULEVARD DISTURBANCE. ALL DISTURBED AREAS TO BE REINSTATED WITH MIN. 200mm TOPSOIL AND SOD (TYP.)
PROVIDE 0.3m LAP JOINT PER DETAIL ON DWG. DE-1
MATCH TO EXISTING @ TOP OF BANK
RE-GRADE EXISTING DITCH
MATCH TO EXISTING @ CULVERT
MATCH TO EXISTING GRADE @ MAX 3:1
CONC. BARRIER CURB PER OPSD 600.110 (TYP.)
APPROXIMATE HGWL CONTOURS (PER HYDROGEOLOGICAL ASSESSMENT PREPARED BY GEI CONSULTANTS, DATED JULY 6, 2024)
TEMPORARY BARRICADE PER OPSD 912.188 Wa-8L CHECKERBOARD SIGN
INTERCEPTOR SWALE
PHASE 2
PHASE 2 UNDERGROUND PARKING LIMIT
FUTURE SWITCHGEAR FOR PHASE 2
LID #1 (REFER TO LID-1 FOR DETAILS)
#650 ESSA ROAD HOLY SPIRIT PARISH
PROPOSED RETAINING WALL HEIGHT VARIES FROM 0.59m TO 2.27m DETAILED ENGINEERING DRAWINGS TO BE PROVIDED PRIOR TO CONSTRUCTION
MATCH TO EXISTING @ PROPERTY LINE
BLOCK 1
FFE:309.59
TFW:309.24
TBS:306.98
USF:306.75
HGWL:304.90
BLOCK 2
FFE:309.71
TFW:309.36
TBS:307.10
USF:306.87
HGWL:304.50
PRIVATE LANE A
PRIVATE LANE D
PRIVATE LANE E
PRIVATE LANE F
PRIVATE LANE J
BLOCK 6
FFE:309.72
TFW:309.37
TBS:307.11
USF:306.88
HGWL:304.50
BLOCK 7
FFE:309.90
TFW:309.55
TBS:307.29
USF:307.06
HGWL:304.50
MOUNTABLE CURB PER OPSD 600.100 (TYP.)
LID #2 308.19 (REFER TO LID-1 FOR DETAILS)
REFER TO DWG. SG-2
REFER TO DWG. SG-3.2
CONC. BARRIER
SWITCHGEAR
SWM-1
SAN MH1 RIM:308.71
SAN MH17 RIM:308.60
SAN MH18 RIM:308.36
SAN MH23 RIM:308.60
SAN MH26 RIM:308.78
STM MH141 RIM:308.79
CB1 RIM:308.59
CB4 RIM:308.46
CB5 RIM:307.97
CB6 RIM:308.62
CB8 RIM:308.07
CB9 RIM:308.16
CB10 RIM:308.47
CB11 RIM:308.53
CB12 RIM:308.22
CB25 RIM:308.47
CBMH5 RIM:308.46
CBMH6 RIM:307.97
CBMH12 RIM:308.53
CBMH13 RIM:308.22
CBMH19 RIM:308.47
0.4ø80
1.2ø80
2.4ø80
0.3ø80
0.6ø80
0.9ø80
1.2ø80
1.5ø80
1.8ø80
2.1ø80
2.4ø80
2.7ø80
3.0ø80
3.3ø80
3.6ø80
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4.8ø80
5.1ø80
5.4ø80
5.7ø80
6.0ø80
6.3ø80
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10.5ø80
10.8ø80
11.1ø80
11.4ø80
11.7ø80
12.0ø80



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TBM#2 ELEV. 308.080 m
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No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N.A. MILLINGTON
100190121
Oct. 8/24
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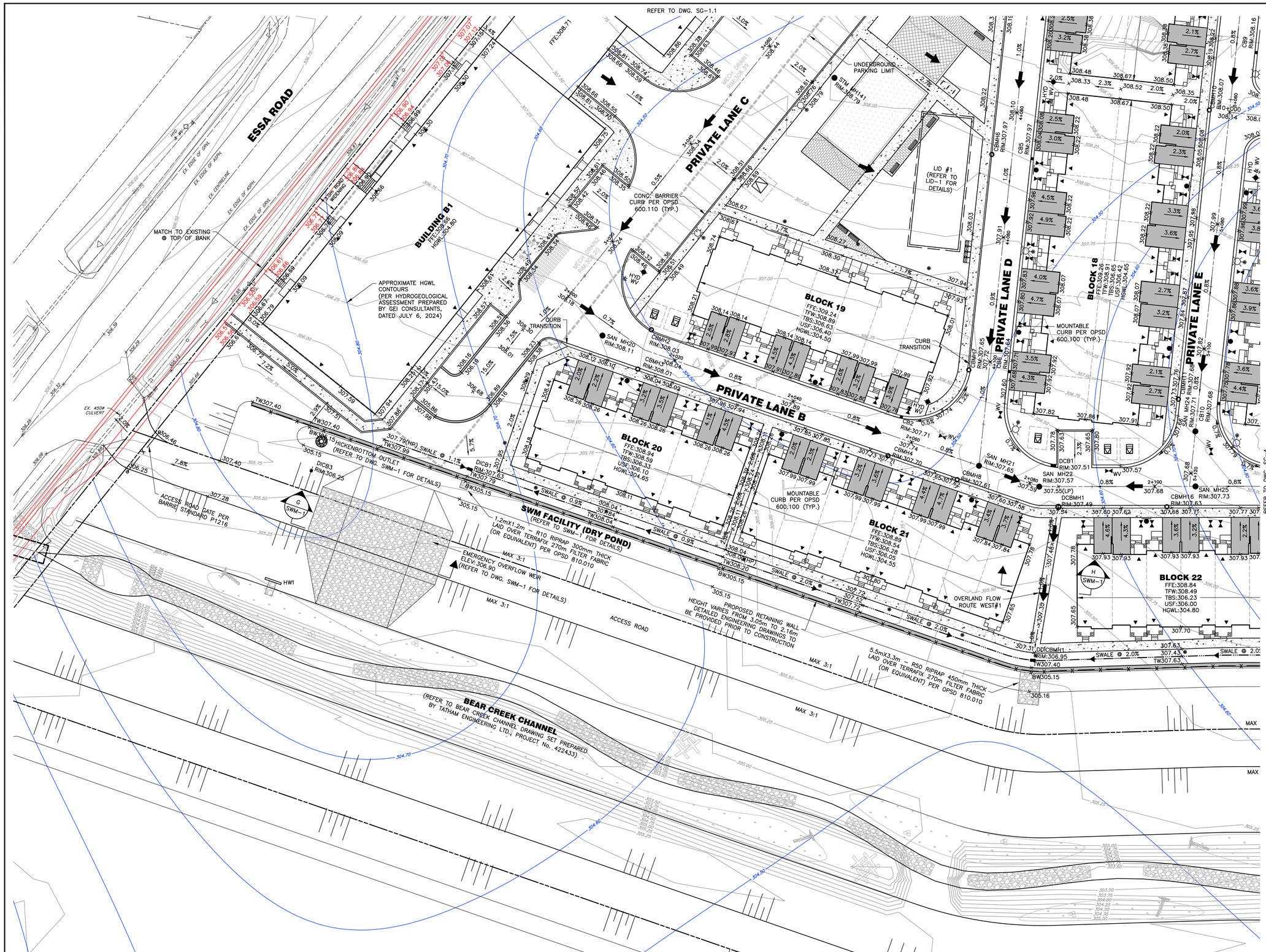
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

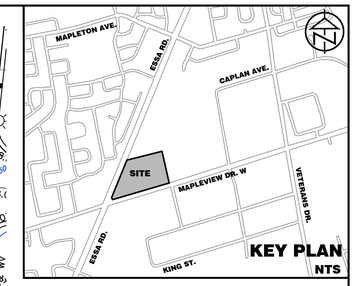
SITE GRADING PLAN
SHEET 2 OF 5

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: SG-2
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:300	

Drawing Name: 422433-SG01.1.dwg, Plotted: Oct 08, 2024





FRONT HALF OF ROOF FOR BLOCKS 20 TO 25 TO DRAIN TO THE INTERNAL LANEWAYS

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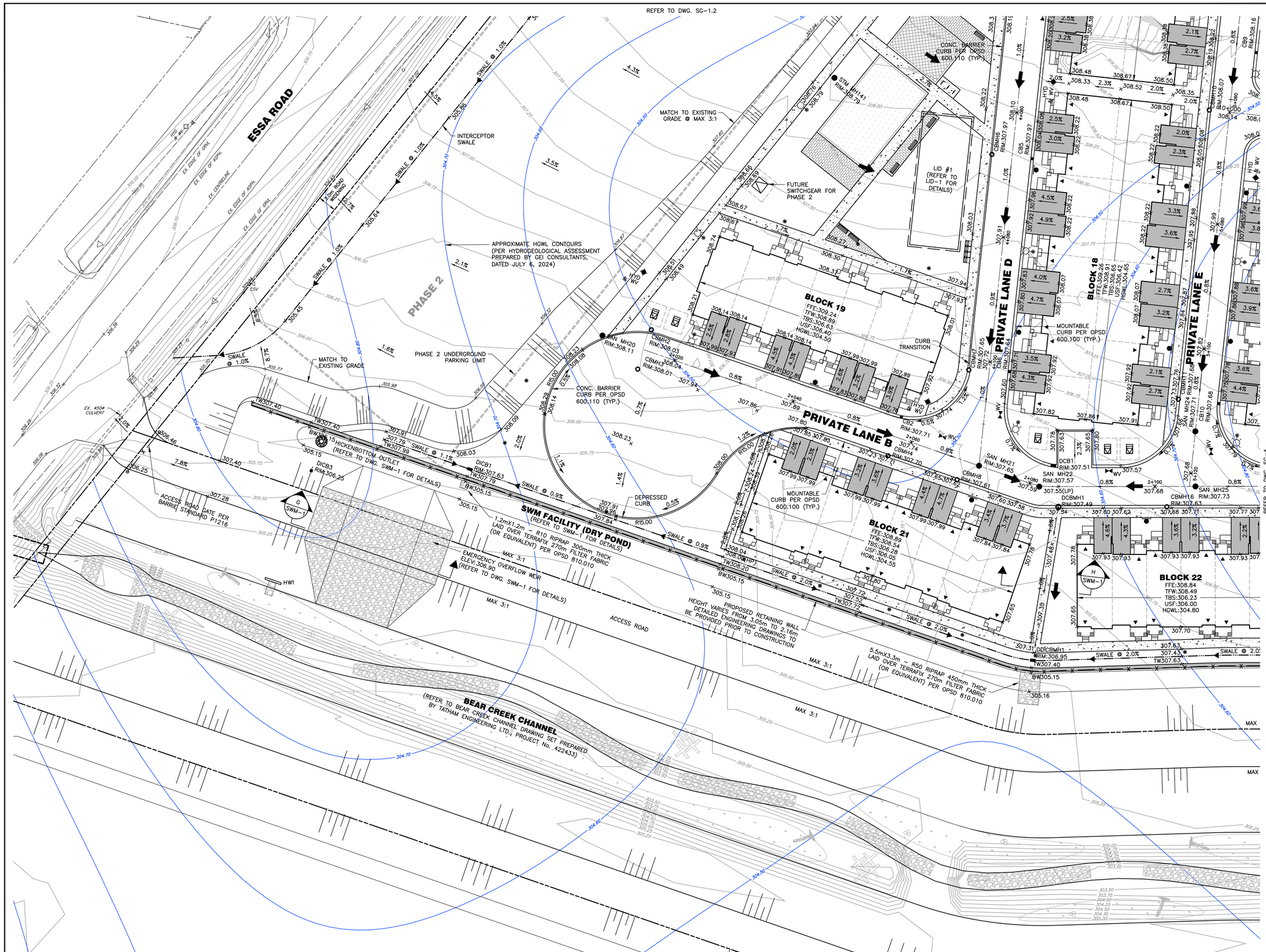
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

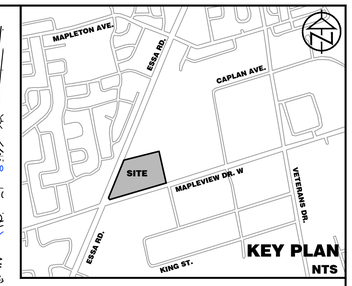
SITE GRADING PLAN – ULTIMATE
SHEET 3.1 OF 5

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: SG-3.1
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:300	

Drawing Name: 422433-SG01.1.dwg, Plotted: Oct 09, 2024





FRONT HALF OF ROOF FOR BLOCKS 20 TO 25 TO DRAIN TO THE INTERNAL LANEWAYS

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100190121
Oct. 8/24
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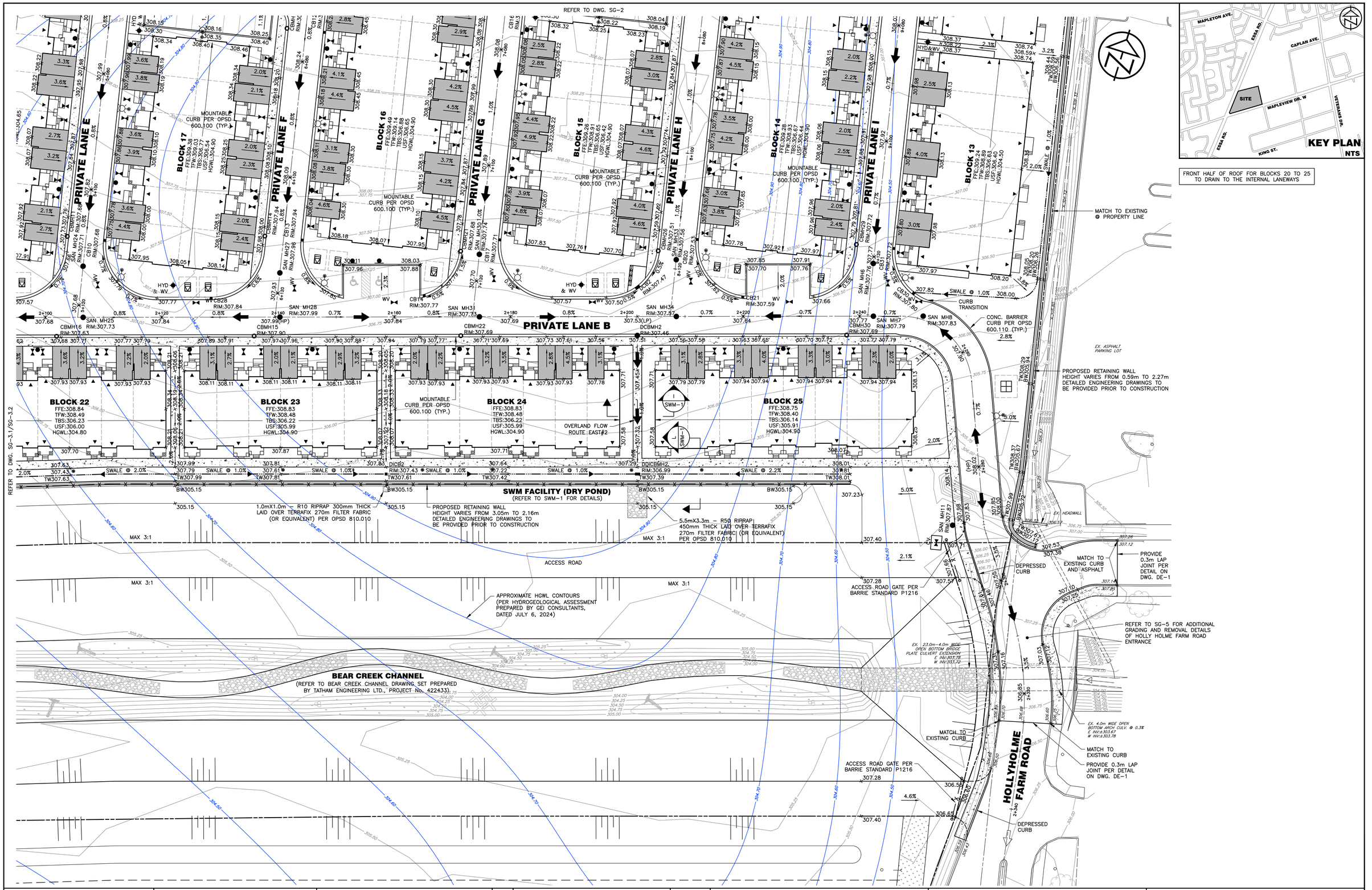
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

SITE GRADING PLAN – INTERIM
SHEET 3.2 OF 5

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: SG-3.2
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:300	

Drawing Name: 422433-SG01.2.dwg, Plotted: Oct 09, 2024



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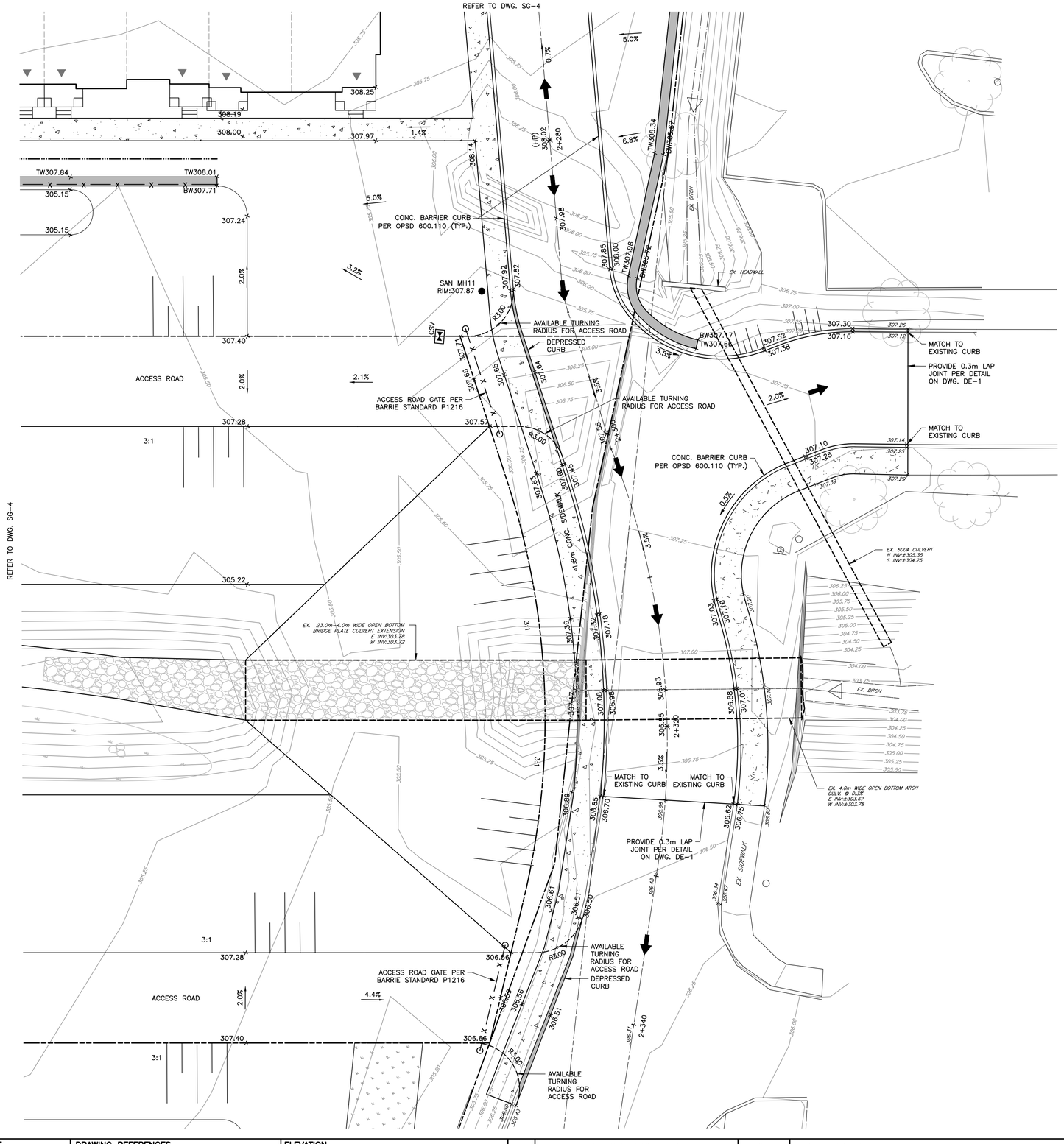
MAPLEVIEW VILLAGE - NORTH BLOCK
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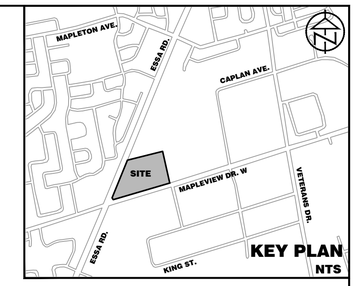
SITE GRADING PLAN
SHEET 4 OF 5

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: SG-4
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:300	

Drawing Name: 422433-SG01.1.dwg, Plotted: Oct 09, 2024





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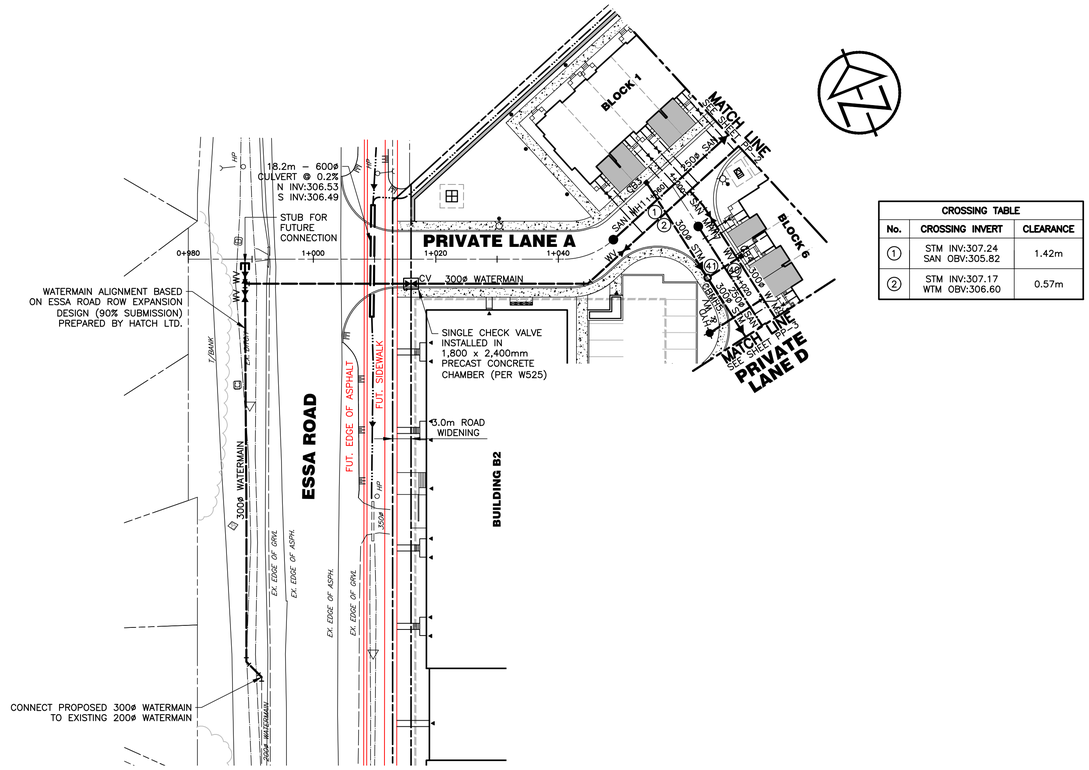
MAPLEVIEW VILLAGE - NORTH BLOCK
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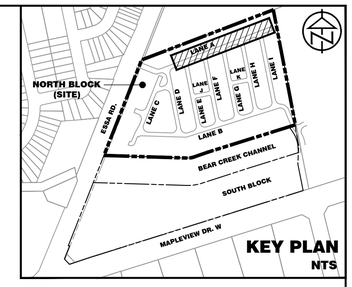
SITE GRADING PLAN
SHEET 5 OF 5

TATHAM ENGINEERING

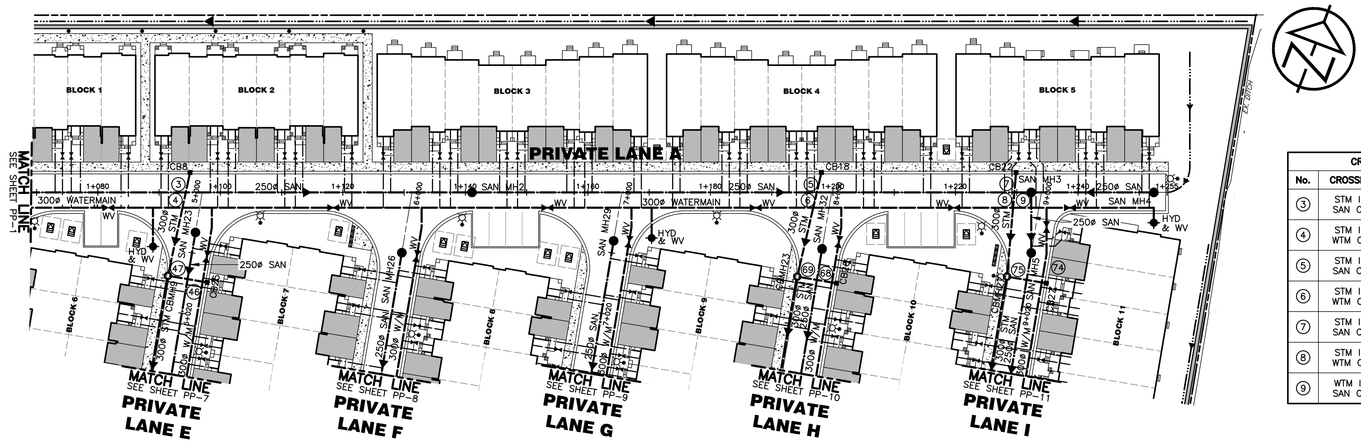
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Drawing Name: 422433-SG05.dwg, Plotted: Oct 08, 2024

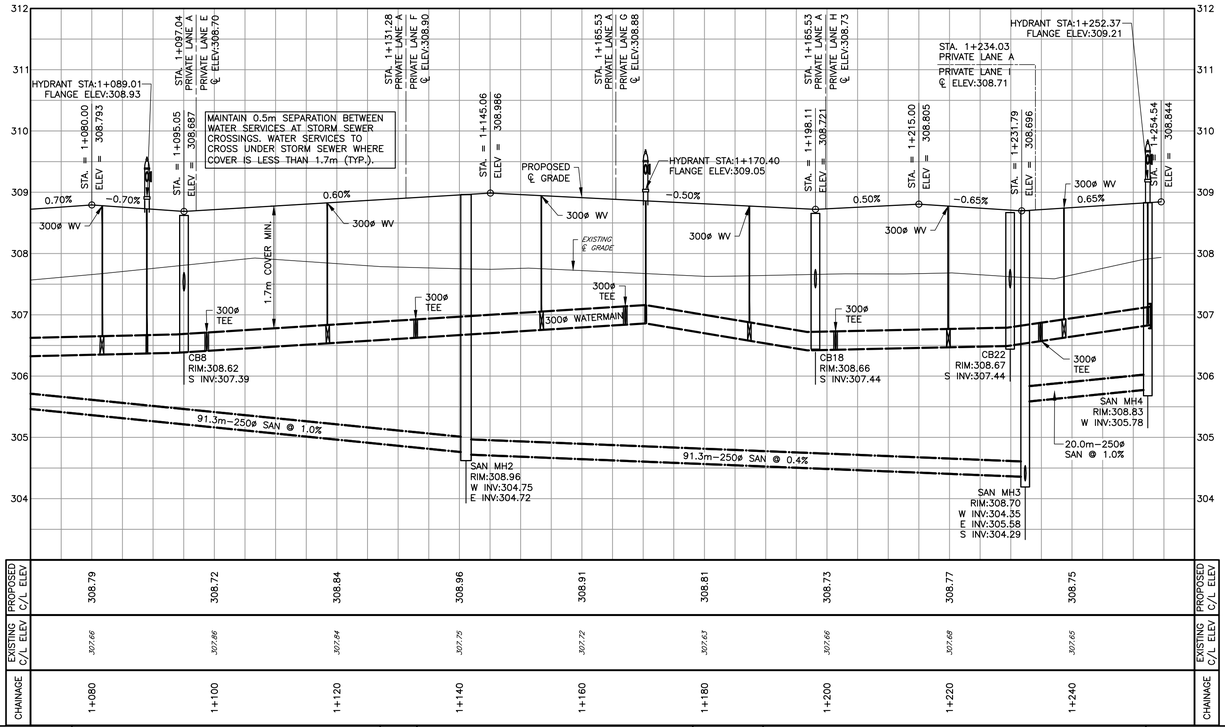

PRIVATE LANE A
ESSA ROAD
BLOCK 1
BLOCK 6
BUILDING B2
PRIVATE LANE D
MATCH LINE
MATCH LINE
18.2m - 600ø CULVERT @ 0.2%
N INV:306.53
S INV:306.49
STUB FOR FUTURE CONNECTION
WATERMAIN ALIGNMENT BASED ON ESSA ROAD ROW EXPANSION DESIGN (90% SUBMISSION) PREPARED BY HATCH LTD.
CONNECT PROPOSED 300ø WATERMAIN TO EXISTING 200ø WATERMAIN
CV 300ø WATERMAIN
SINGLE CHECK VALVE INSTALLED IN 1,800 x 2,400mm PRECAST CONCRETE CHAMBER (PER W525)
3.0m ROAD WIDENING
FUT. EDGE OF ASPHALT
FUT. SIDEWALK
300ø WATERMAIN
SAN MH1
SAN MH2
SAN MH3
SAN MH4
SAN MH5
SAN MH6
SAN MH7
SAN MH8
SAN MH9
SAN MH10
SAN MH11
SAN MH12
SAN MH13
SAN MH14
SAN MH15
SAN MH16
SAN MH17
SAN MH18
SAN MH19
SAN MH20
SAN



KEY PLAN
NTS



CROSSING TABLE		
No.	CROSSING INVERT	CLEARANCE
③	STM INV:307.28 SAN OBV:305.47	1.81m
④	STM INV:307.18 WTM OBV:306.68	0.50m
⑤	STM INV:307.28 SAN OBV:305.47	2.57m
⑥	STM INV:307.22 WTM OBV:306.72	0.50m
⑦	STM INV:307.36 SAN OBV:304.62	2.74m
⑧	STM INV:307.29 WTM OBV:306.79	0.50m
⑨	WTM INV:306.53 SAN OBV:304.52	2.56m



DISCLAIMER AND COPYRIGHT

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DRAWING REFERENCES

LEGAL BOUNDARIES AND ROAD WIDENING SHOWN ON THIS PLAN BASED ON PLAN COMPLETED BY RUDY MAK SURVEYING LTD., DATED FEBRUARY 15, 2024.

TOPOGRAPHIC FEATURES AND CONTOURS SHOWN ON THIS PLAN BASED ON SURVEY COMPLETED BY TATHAM ENGINEERING LIMITED. UNDERGROUND SERVICES ARE APPROXIMATE ONLY BASED ON CITY OF BARRIE GIS DATA AND AVAILABLE AS-BUILT INFORMATION.

SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

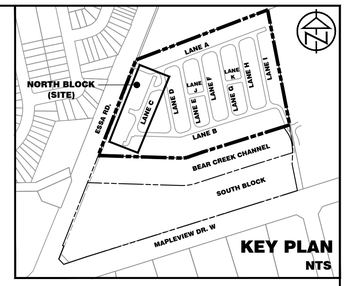
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

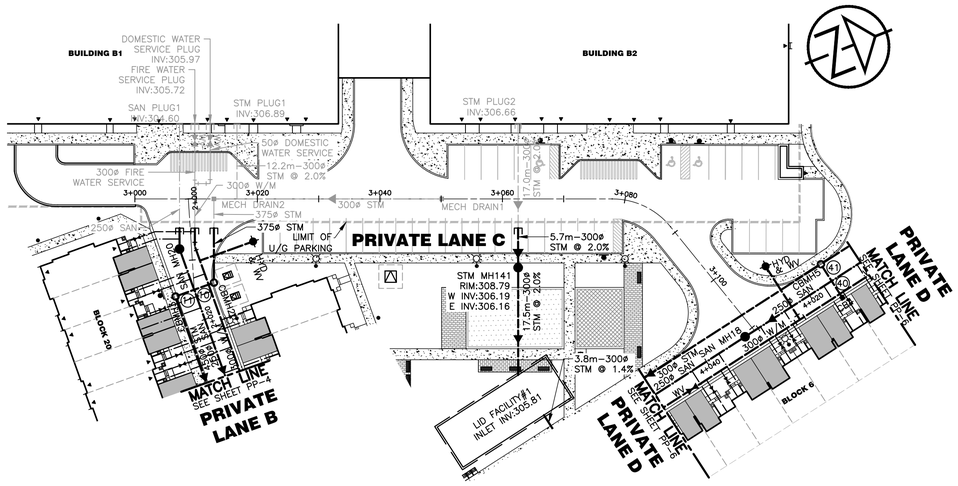
PLAN & PROFILE
PRIVATE LANE A
STA. 1+070 TO 1+253

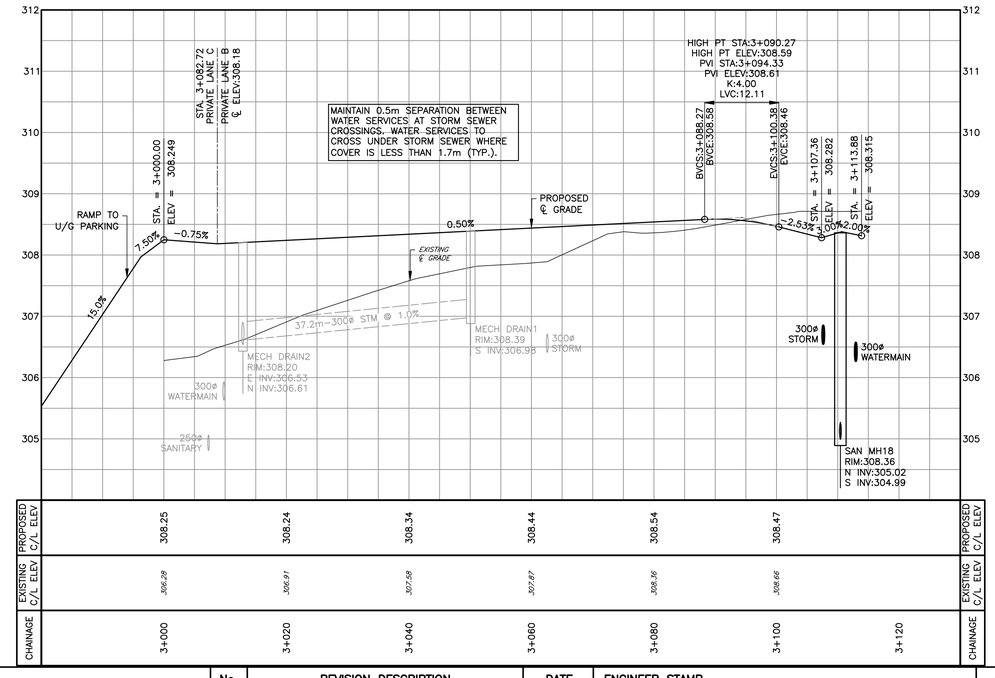
TATHAM ENGINEERING

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DRAWN: LG	DATE: NOV. 2022	**PP-2**
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Drawing Name: 422433-PP02.dwg, Plotted: Oct 08, 2024







DISCLAIMER AND COPYRIGHT

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SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

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TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

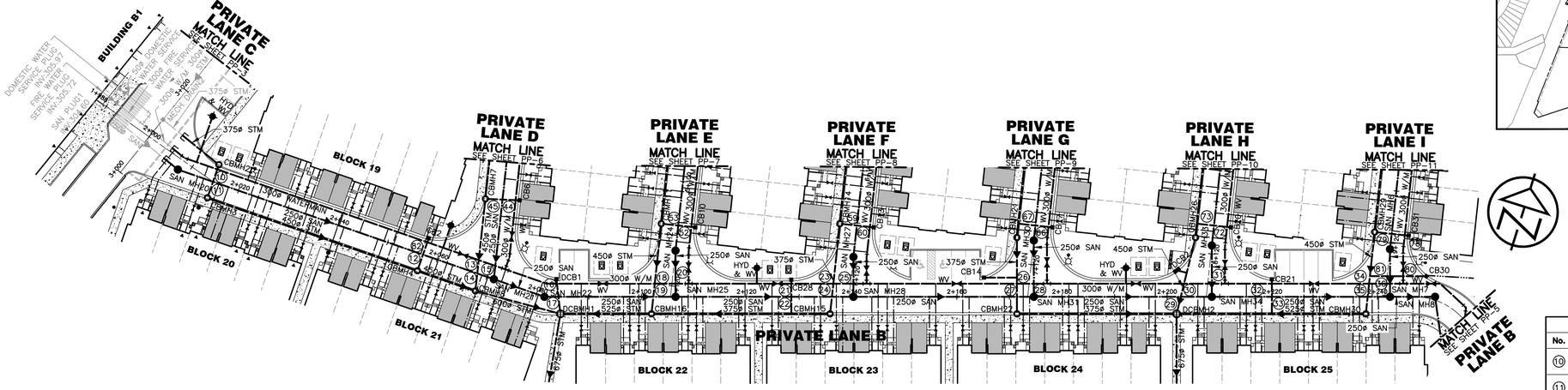
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

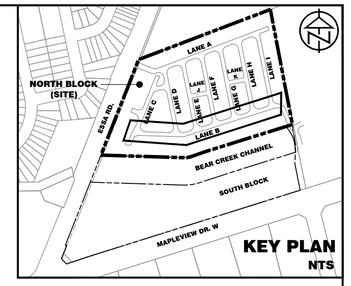
TATHAM ENGINEERING

PLAN & PROFILE
PRIVATE LANE C
STA. 3+000 TO 3+111

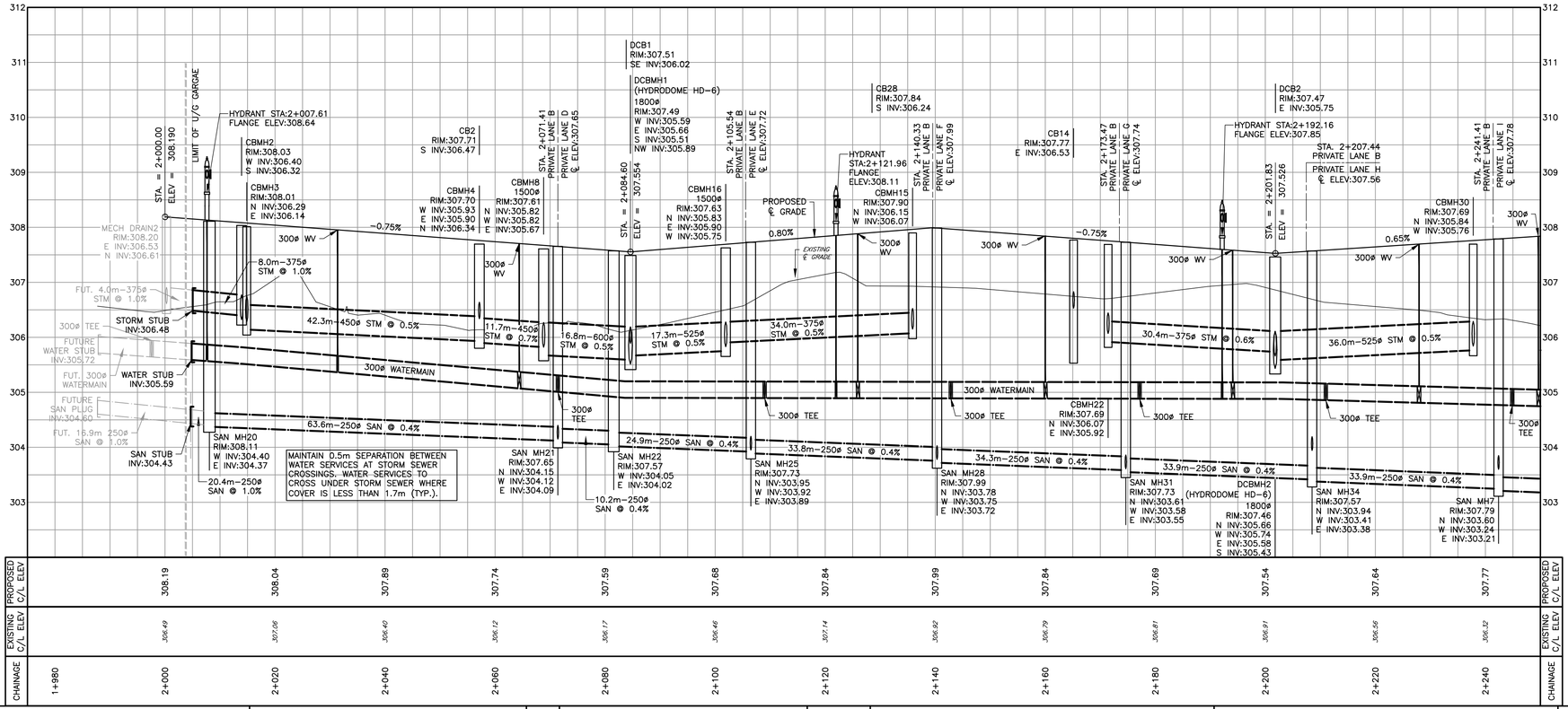
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CHECK: NM	SCALE: 1:500	

Drawing Name: 422433–PP03.dwg, Plotted: Oct 08, 2024





CROSSING TABLE		
No.	CROSSING INVERT	CLEARANCE
⑩	STM INV:306.32 WTM OBV:305.82	0.50m
⑪	STM INV:306.31 SAN OBV:304.59	1.71m
⑫	STM INV:306.31 SAN OBV:304.59	1.71m
⑬	STM INV:305.85 WTM OBV:305.34	0.51m
⑭	STM INV:305.84 SAN OBV:304.38	1.46m
⑮	WTM INV:305.01 SAN OBV:304.42	0.59m
⑯	STM INV:306.01 WTM OBV:305.20	0.81m
⑰	STM INV:305.96 SAN OBV:305.16	0.80m
⑱	STM INV:305.87 WTM OBV:305.20	0.67m
⑲	STM INV:305.85 SAN OBV:304.19	1.66m
⑳	WTM INV:304.90 SAN OBV:304.23	0.67m
㉑	STM INV:306.23 WTM OBV:305.20	1.03m
㉒	STM INV:306.18 SAN OBV:304.05	2.13m
㉓	STM INV:306.19 WTM OBV:305.20	0.99m
㉔	STM INV:306.17 SAN OBV:304.02	2.15m
㉕	WTM INV:304.90 SAN OBV:304.07	0.83m
㉖	STM INV:306.10 WTM OBV:305.19	0.91m
㉗	STM INV:306.09 SAN OBV:303.85	2.24m
㉘	WTM INV:304.88 SAN OBV:303.89	0.99m
㉙	STM INV:305.67 SAN OBV:303.69	1.98m
㉚	STM INV:305.69 WTM OBV:305.18	0.51m
㉛	WTM INV:304.86 SAN OBV:305.16	0.62m
㉜	STM INV:306.35 WTM OBV:305.13	1.22m
㉝	STM INV:305.76 SAN OBV:303.59	2.17m
㉞	STM INV:305.88 WTM OBV:305.08	0.80m
㉟	STM INV:305.87 SAN OBV:303.51	2.35m
㊱	WTM INV:304.77 SAN OBV:303.87	0.90m
㊷	STM INV:306.45 WTM OBV:305.44	1.01m



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ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

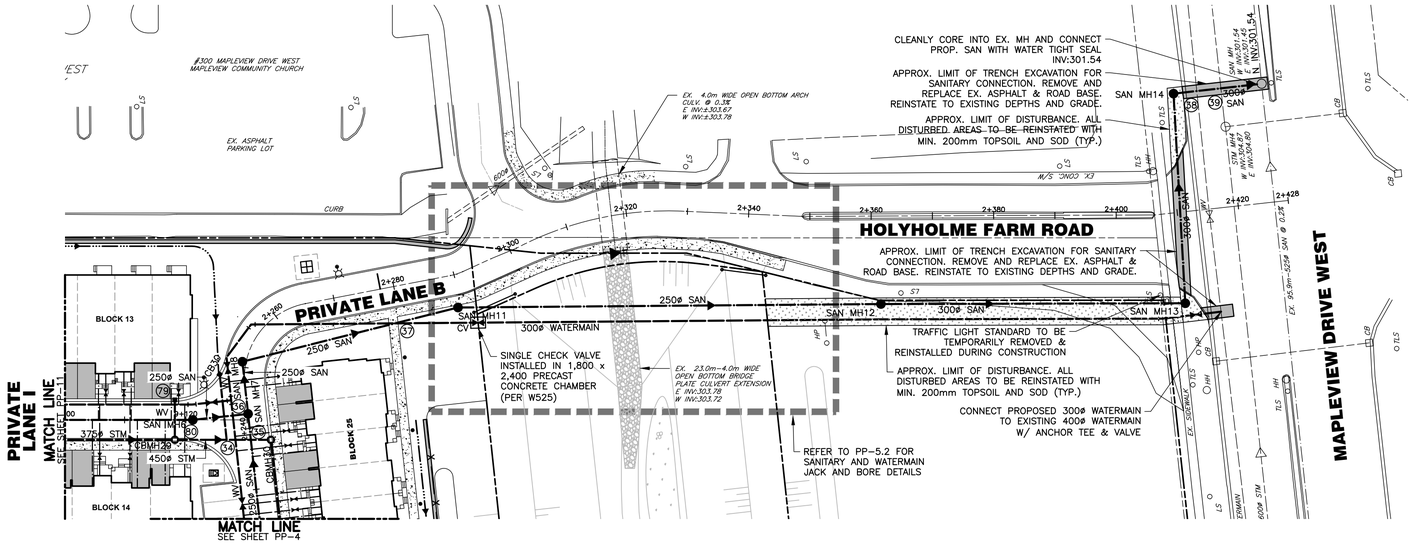
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

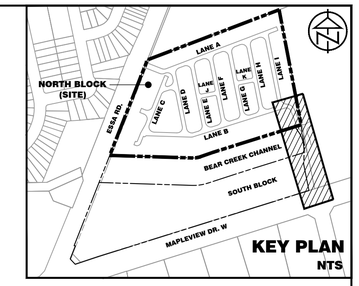
PLAN & PROFILE
PRIVATE LANE B
STA. 2+000 TO 2+240

TATHAM ENGINEERING

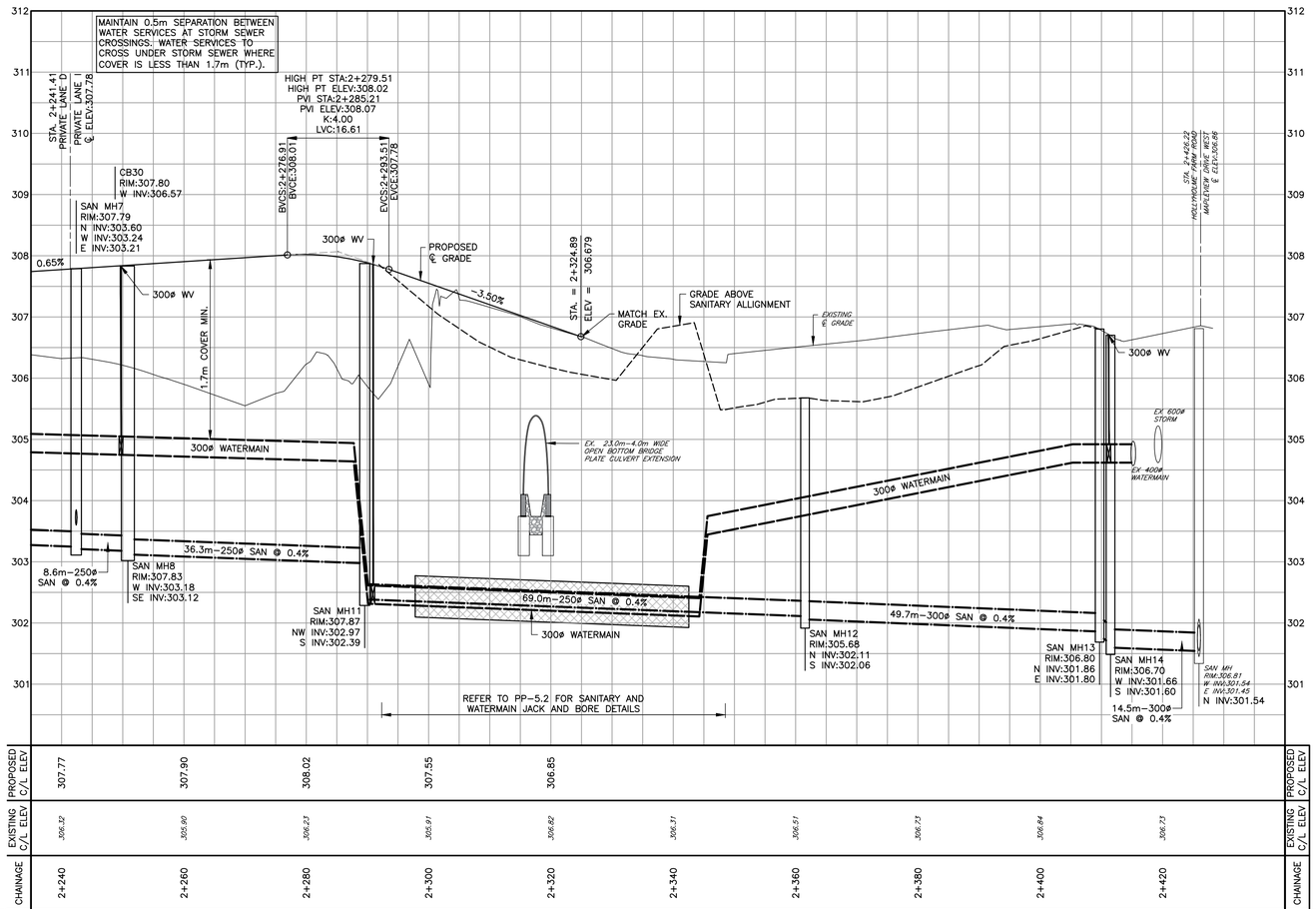
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DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:500	

Drawing Name: 422433–PP04.dwg, Plotted: Oct 08, 2024





CROSSING TABLE		
No.	CROSSING INVERT	CLEARANCE
57	WTM INV:304.77 SAN OBV:303.27	1.50m
58	WTM INV:304.96 SAN OBV:301.88	3.08m
59	STM INV:304.62 SAN OBV:301.87	2.75m



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No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

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LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

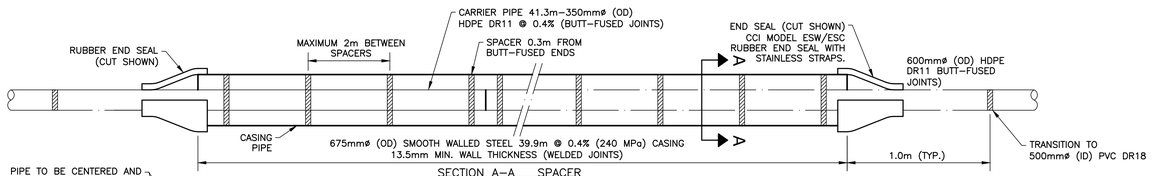
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

PLAN & PROFILE
HOLLYHOLME FARM ROAD
STA. 2+240 TO 2+428

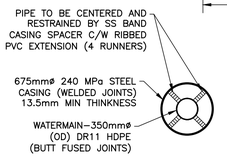
TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: PP-5.1
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:500	

Drawing Name: 422433-PP05.1.dwg, Plotted: Oct 08, 2024



SECTION A–A SPACER CONFIGURATION
SCALE: NTS



SECTION A–A
CASING SECTION
SCALE: NTS

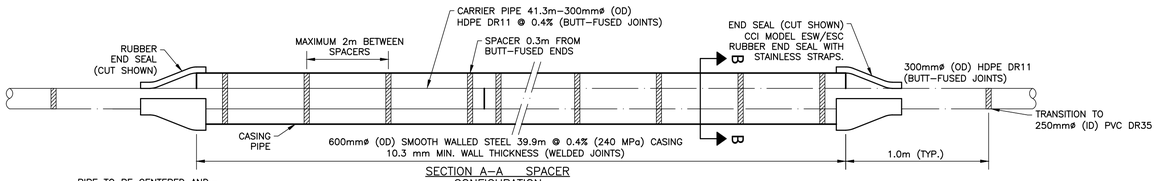
NOTE:
USE PRODUCTS AS SPECIFIED
BY CCI PIPELINE SYSTEMS

NOTE:
1. WATERMAIN–350mmø (OD) DR11 HDPE (BUTT FUSED JOINTS).
2. WATERMAIN CASING PIPE–675mmø (OD)–240MPA STEEL 13.5mm MIN. WALL THICKNESS (WELDED JOINTS).
3. USE END SEAL AND SPACERS AS SPECIFIED BY CCI PIPELINE SYSTEMS (MODEL CSS8) OR APPROVED EQUIVALENT.
4. SPACERS AT 2m CENTERS.
5. GROUTING ANNULAR SPACE BETWEEN CARRIER PIPE AND CROSSING PIPE IS NOT PERMITTED, INCLUDING ANNULAR SPACE ENDS. CARRIER PIPE SHALL BE ABLE TO BE REMOVED WITHOUT DISTURBING THE CASING PIPE.
6. THE CASING PIPE SHALL BE CONSTRUCTED TO PREVENT LEAKAGE THROUGHOUT ITS LENGTH; THE SPACE BETWEEN THE CARRIER PIPE AND THE CASING PIPE SHALL BE SEALED AT THE CASING ENDS TO PREVENT THE ENTRY OF WATER AND PREVENT THE FORMATION OF A WATERWAY UNDER THE TRACK. THE ENDS OF THE STEEL CASING ARE TO BE SEALED WITH RUBBER GASKETS.
7. PLEASE BE ADVISED THAT THE CONTRACTOR IS REQUIRED TO SUBMIT THE FOLLOWING OF REVIEW AND APPROVAL PRIOR TO CONSTRUCTION:
   - DETAILED WORK PLAN METHODOLOGY FOR THE INSTALLATION (WITH PRE–PLANNED SETTLEMENT MITIGATION MEASURES), WITH ENGINEERED STAMP.
   - METHODOLOGY FOR ANY TEMPORARY EXCAVATION PROTECTION, IF REQUIRED.
   - ANY DEWATERING SCHEMES ON OR ADJACENT TO GO TRANSIT/METROLINX RIGHT–OF–WAY, IF REQUIRED.

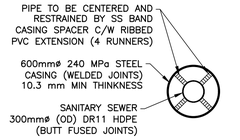
THE CONTINGENCY PLAN FOR DEALING WITH BOULDERS

1. THE LOCATION OF ANY BOULDER REMOVALS MUST BE LOGGED BY A QUALIFIED GEOTECHNICAL ENGINEER ON SITE AND ANY LARGE VOIDS CREATED DURING REMOVAL OF BOULDERS ARE TO BE PACKED WITH CONCRETE "DRY–PACK" GROUT. TO INFILL ANY VOIDS THAT MAY RE–APPEAR AS A RESULT OF THE GROUT BEING MOVED DURING SUBSEQUENT PIPE JACKING. THE CONTRACTOR IS REQUIRED TO INJECT BENTONITE GROUT EACH TIME A GROUT PORT PASSES A LOGGED BOULDER REMOVAL LOCATION. A REPORT OF BOULDER REMOVAL LOG IS TO BE PROVIDED TO BE METROLINX.
2. METROLINX IS TO BE NOTIFIED AND THE CONTRACTOR MUST AWAIT INSTRUCTIONS REGARDING THE STATUS OF THE CASING PIPE IN THE EVENT THAT AN ABANDONMENT OF CASING PIPE IS IMMINENT DUE TO IMPASSABLE OBSTRUCTIONS. IT IS NOTED THAT GROUTING OR INFILLING THE CASING WITH CLEAN SAND IS RECOMMENDED. HOWEVER, METROLINX MAY REQUIRE THE COMPLETE REMOVAL OF THE CASING OFF SITE, IN WHICH CASE THE GROUND IS TO BE RESTORED TO ITS ORIGINAL OR BETTER CONDITION. AN ALTERNATE NEW ALIGNMENT IS SUBJECT TO REVIEW AND APPROVAL BY METROLINX.

WATERMAIN SPACER CONFIGURATION
SCALE: NTS



SECTION A–A SPACER CONFIGURATION
SCALE: NTS



SECTION B–B
CASING SECTION
SCALE: NTS

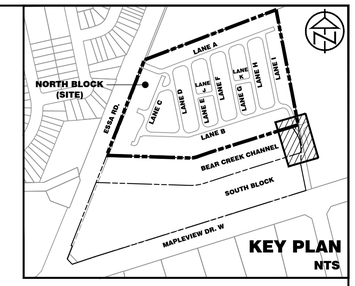
NOTE:
USE PRODUCTS AS SPECIFIED
BY CCI PIPELINE SYSTEMS

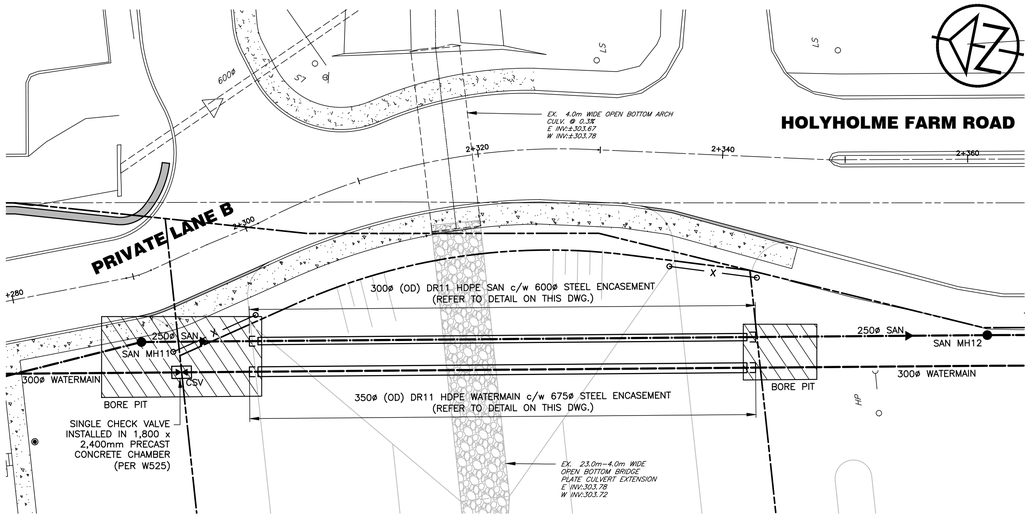
NOTE:
1. SANITARY SEWER–300 mmø (OD) DR11 HDPE (BUTT FUSED JOINTS).
2. SANITARY SEWER CASING PIPE–600mmø (OD)–240 mPa STEEL 10.3 mm MIN. WALL THICKNESS (WELDED JOINTS).
3. USE END SEAL AND SPACERS AS SPECIFIED BY CCI PIPELINE SYSTEMS (MODEL CSS8) OR APPROVED EQUIVALENT.
4. SPACERS AT 2m CENTERS.
5. GROUTING ANNULAR SPACE BETWEEN CARRIER PIPE AND CROSSING PIPE IS NOT PERMITTED, INCLUDING ANNULAR SPACE ENDS. CARRIER PIPE SHALL BE ABLE TO BE REMOVED WITHOUT DISTURBING THE CASING PIPE.
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7. PLEASE BE ADVISED THAT THE CONTRACTOR IS REQUIRED TO SUBMIT THE FOLLOWING OF REVIEW AND APPROVAL PRIOR TO CONSTRUCTION:
   - DETAILED WORK PLAN METHODOLOGY FOR THE INSTALLATION (WITH PRE–PLANNED SETTLEMENT MITIGATION MEASURES), WITH ENGINEERED STAMP.
   - METHODOLOGY FOR ANY TEMPORARY EXCAVATION PROTECTION, IF REQUIRED.
   - ANY DEWATERING SCHEMES ON OR ADJACENT TO GO TRANSIT/METROLINX RIGHT–OF–WAY, IF REQUIRED.

THE CONTINGENCY PLAN FOR DEALING WITH BOULDERS

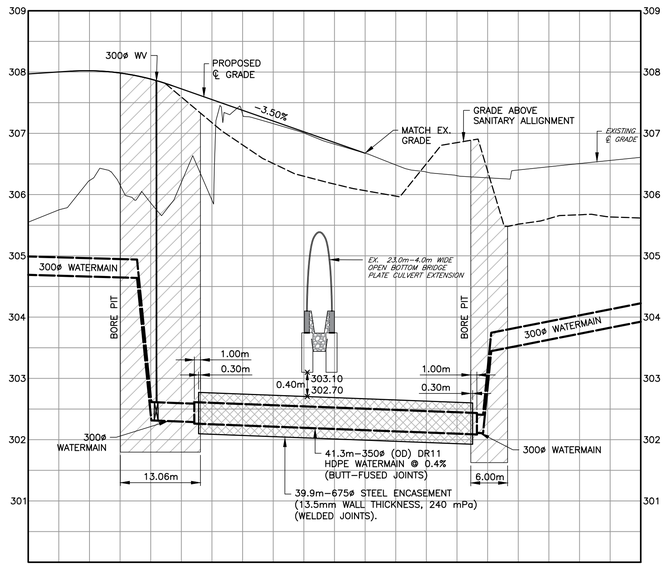
1. THE LOCATION OF ANY BOULDER REMOVALS MUST BE LOGGED BY A QUALIFIED GEOTECHNICAL ENGINEER ON SITE AND ANY LARGE VOIDS CREATED DURING REMOVAL OF BOULDERS ARE TO BE PACKED WITH CONCRETE "DRY–PACK" GROUT. TO INFILL ANY VOIDS THAT MAY RE–APPEAR AS A RESULT OF THE GROUT BEING MOVED DURING SUBSEQUENT PIPE JACKING. THE CONTRACTOR IS REQUIRED TO INJECT BENTONITE GROUT EACH TIME A GROUT PORT PASSES A LOGGED BOULDER REMOVAL LOCATION. A REPORT OF BOULDER REMOVAL LOG IS TO BE PROVIDED TO BE METROLINX.
2. METROLINX IS TO BE NOTIFIED AND THE CONTRACTOR MUST AWAIT INSTRUCTIONS REGARDING THE STATUS OF THE CASING PIPE IN THE EVENT THAT AN ABANDONMENT OF CASING PIPE IS IMMINENT DUE TO IMPASSABLE OBSTRUCTIONS. IT IS NOTED THAT GROUTING OR INFILLING THE CASING WITH CLEAN SAND IS RECOMMENDED. HOWEVER, METROLINX MAY REQUIRE THE COMPLETE REMOVAL OF THE CASING OFF SITE, IN WHICH CASE THE GROUND IS TO BE RESTORED TO ITS ORIGINAL OR BETTER CONDITION. AN ALTERNATE NEW ALIGNMENT IS SUBJECT TO REVIEW AND APPROVAL BY METROLINX.

SANITARY SPACER CONFIGURATION
SCALE: NTS

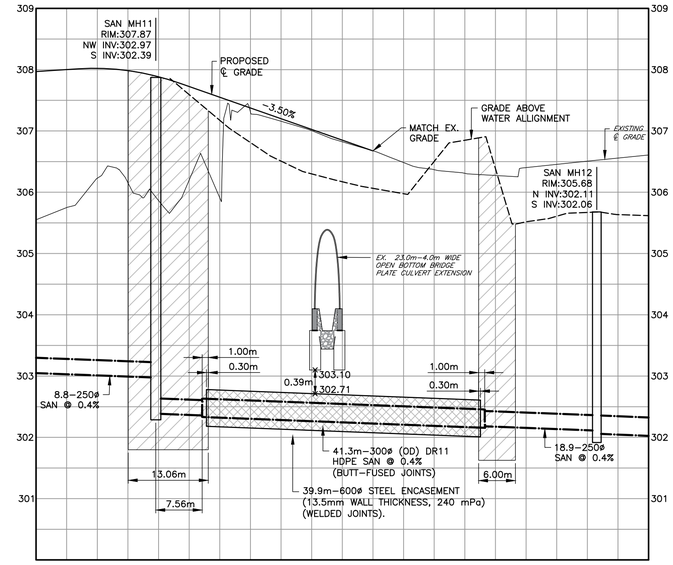




SANITARY AND WATERMAIN CULVERT CROSSING PLAN VIEW
SCALE: 1:250



WATERMAIN CROSSING SECTION VIEW
SCALE: H1:500, V1:50



SANITARY CROSSING SECTION VIEW
SCALE: H1:500, V1:50

DISCLAIMER AND COPYRIGHT

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SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MELLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

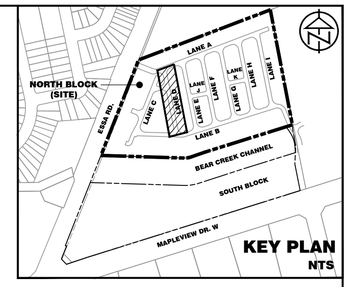
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

HOLLYHOLME FARM ROAD
WATERMAN & SANITARY
CROSSING DETAILS

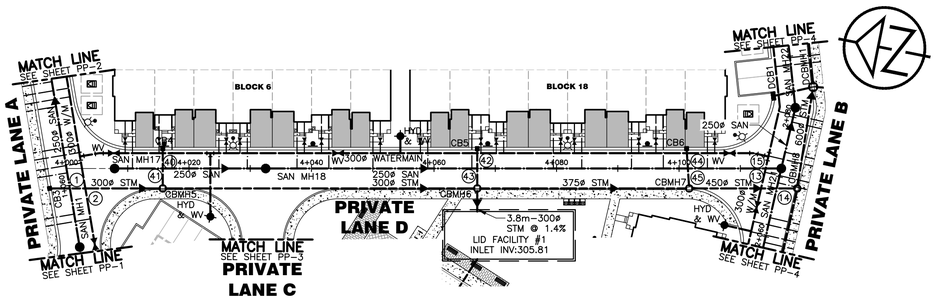
TATHAM ENGINEERING

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DRAWN: LG	DATE: NOV. 2022	**PP-5.2**
CHECK: NM	SCALE: AS NOTED	

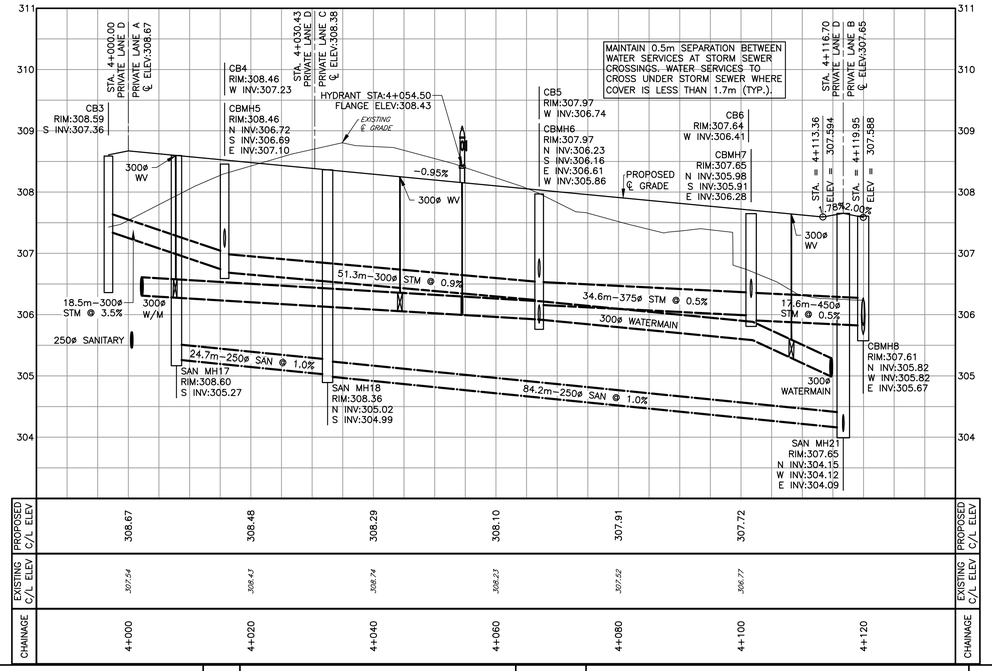
Drawing Name: 422433–PP05.2.dwg, Plotted: Oct 08, 2024



KEY PLAN
NTS



CROSSING TABLE		
No.	CROSSING INVERT	CLEARANCE
40	STM INV:307.22 WTM OBV:306.53	0.69m
41	STM INV:307.17 SAN OBV:305.71	1.46m
42	STM INV:306.73 WTM OBV:306.22	0.51m
43	STM INV:306.68 SAN OBV:305.16	1.52m
44	STM INV:306.40 WTM OBV:305.89	0.51m
45	STM INV:306.35 SAN OBV:305.50	0.85m



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TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

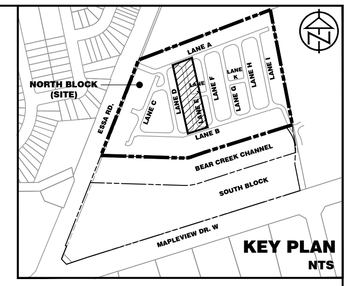
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

TATHAM ENGINEERING

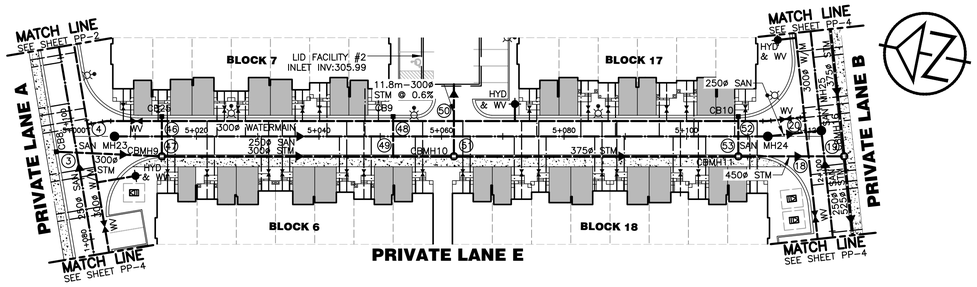
PLAN & PROFILE
PRIVATE LANE D
STA. 4+000 TO 4+120

DESIGN: LG	FILE: 422433-2	DWG: **PP-6**
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:500	

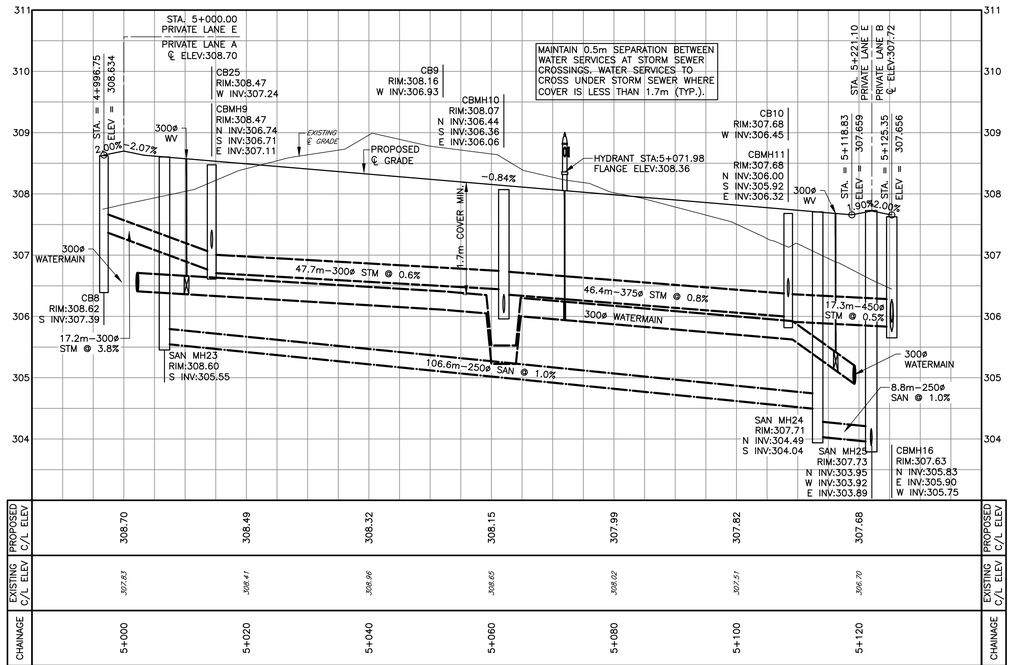
Drawing Name: 422433-PP06.dwg, Plotted: Oct 08, 2024



KEY PLAN
NTS



CROSSING TABLE		
No.	CROSSING INVERT	CLEARANCE
46	STM INV:307.23 WTM OBV:306.62	0.61m
47	STM INV:307.18 SAN OBV:305.73	1.45m
48	STM INV:306.92 WTM OBV:306.36	0.56m
49	STM INV:306.87 SAN OBV:305.35	1.52m
50	STM INV:306.03 WTM OBV:305.53	0.50m
51	STM INV:306.04 SAN OBV:305.35	0.79m
52	STM INV:306.45 WTM OBV:305.79	0.66m
53	STM INV:306.39 SAN OBV:304.75	1.64m



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TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

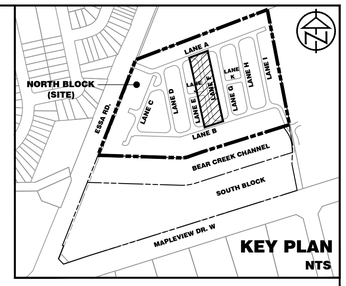
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

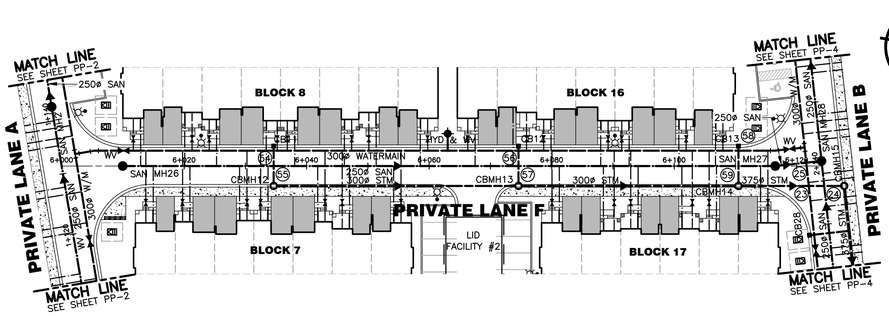
TATHAM ENGINEERING

PLAN & PROFILE
PRIVATE LANE E
STA. 5+000 TO 5+122

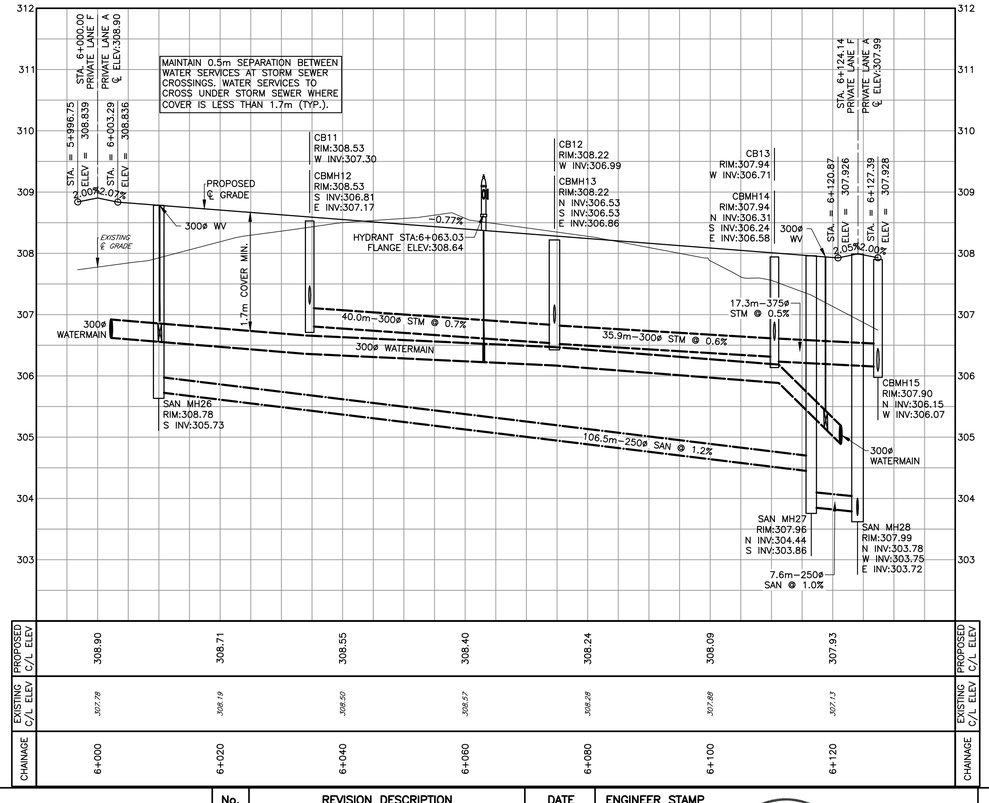
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DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:500	

Drawing Name: 422433-PP07.dwg, Plotted: Oct 08, 2024





CROSSING TABLE		
No.	CROSSING INVERT	CLEARANCE
54	STM INV:307.16 WTM OBV:306.66	0.50m
55	STM INV:307.24 SAN OBV:305.69	1.55m
56	STM INV:306.98 WTM OBV:306.47	0.51m
57	STM INV:306.93 SAN OBV:305.21	1.72m
58	STM INV:306.98 WTM OBV:306.19	0.79m
59	STM INV:306.65 SAN OBV:304.77	1.88m



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TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

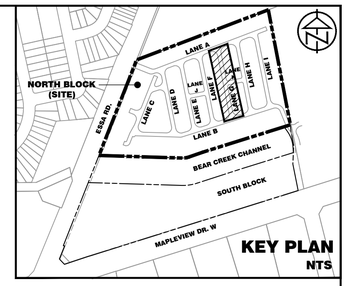
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

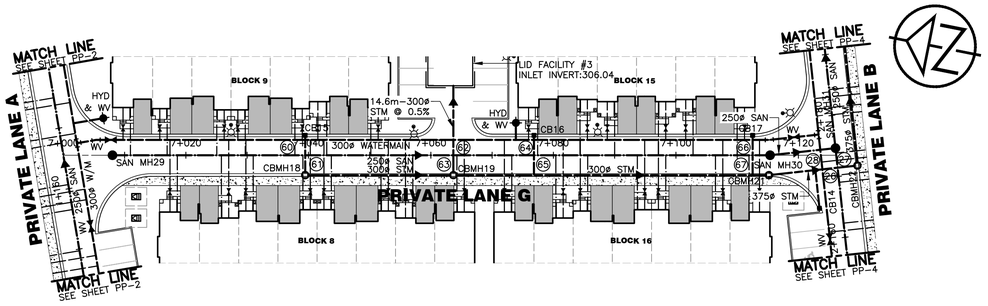
TATHAM ENGINEERING

PLAN & PROFILE
PRIVATE LANE F
STA. 6+000 TO 6+124

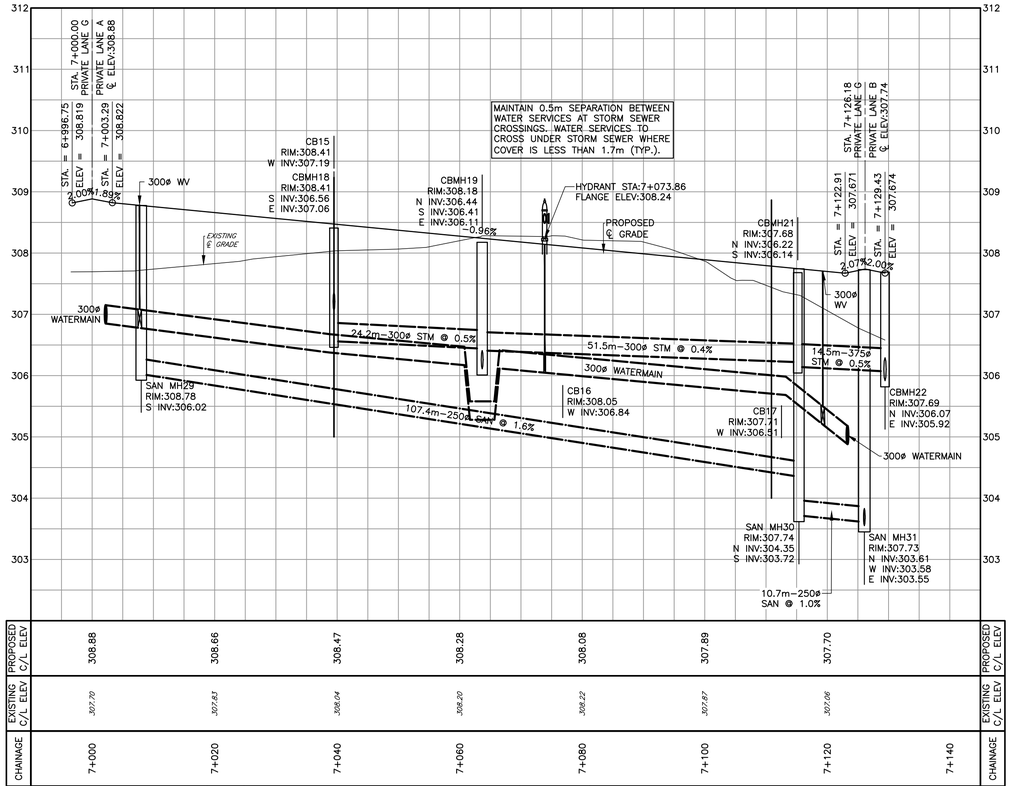
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DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: 1:500	

Drawing Name: 422433-PP08.dwg, Plotted: Oct 08, 2024





CROSSING TABLE		
No.	CROSSING INVERT	CLEARANCE
60	STM INV:307.18 WTM OBV:306.67	0.51m
61	STM INV:305.25 SAN OBV:307.43	1.63m
62	STM INV:306.08 WTM OBV:305.58	0.50m
63	STM INV:307.18 SAN OBV:305.41	1.76m
64	STM INV:306.83 WTM OBV:306.32	0.51m
65	STM INV:306.78 SAN OBV:305.21	1.57m
66	STM INV:306.50 WTM OBV:305.99	0.51m
67	STM INV:306.45 SAN OBV:304.65	1.80m



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ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
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100190121
Oct. 8/24
PROVINCE OF ONTARIO

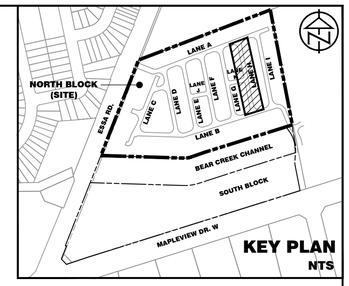
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

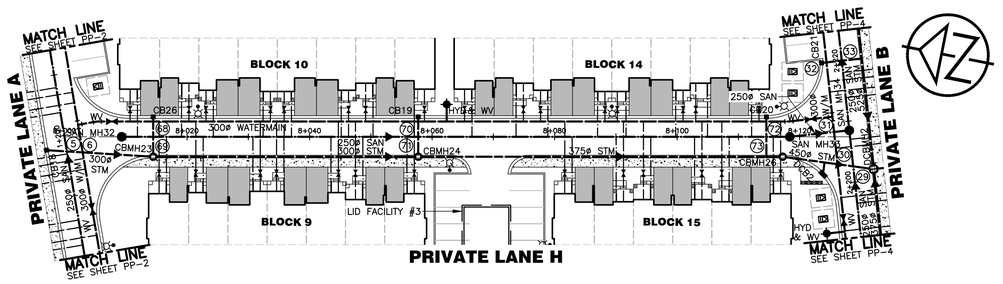
PLAN & PROFILE
PRIVATE LANE G
STA. 7+000 TO 7+126

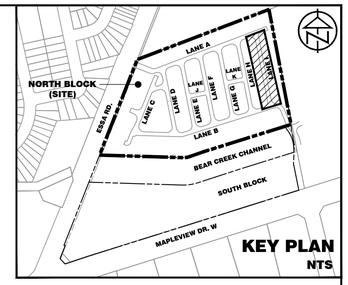
TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: PP-9
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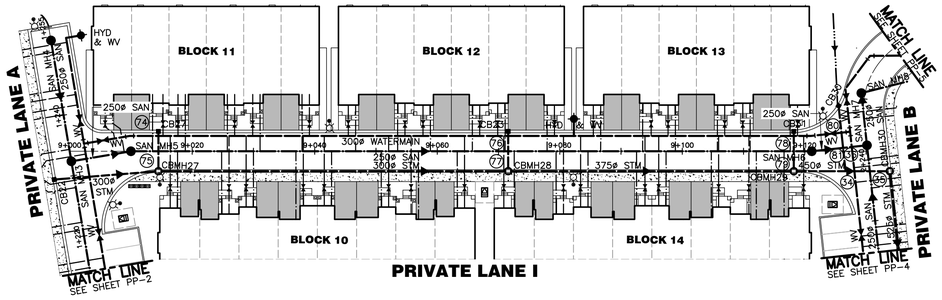
Drawing Name: 422433-PP09.dwg, Plotted: Oct 08, 2024


LANE A
LANE 1
NORTH BLOCK (SITE)
LANE 2
LANE 3
LANE 4
LANE 5
LANE 6
LANE 7
LANE 8
LANE C
LANE B
BEAR CREEK CHANNEL
SOUTH BLOCK
MAPLEVIEW DR. W
KEY PLAN
NTS

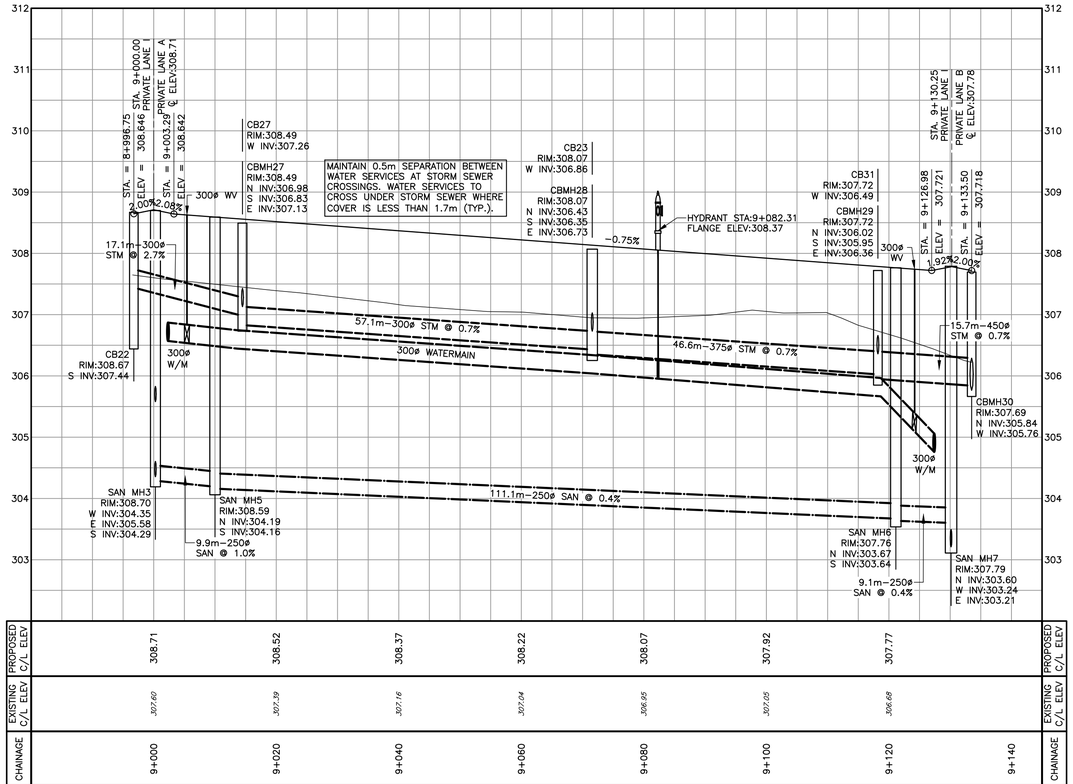

MATCH LINE
SEE SHEET PP-2
MATCH LINE
SEE SHEET PP-4
PRIVATE LANE A
PRIVATE LANE B
PRIVATE LANE H
BLOCK 10
BLOCK 14
BLOCK 9
BLOCK 15
LID FACILITY #3
CB26
CB19
CB20
HYD & WV
250ø SAN
SAN MH32
CBMH23
300ø STM
8+020
300ø WATERMAIN
8+040
250ø SAN
500ø STM
CBMH24
8+060
8+080
375ø STM
8+100
8+120
SAN MH33
450ø STM
CBMH26
SAN MH34
8+140
CB18
CB21
CB22
CB23
CB24
CB25
CB27
CB28
CB29
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CB58
CB59
CB60
CB61
CB62
CB63
CB64
CB65
CB66



KEY PLAN
NTS



CROSSING TABLE		
No.	CROSSING INVERT	CLEARANCE
74	STM INV:307.25 WTM OBV:306.74	0.51m
75	STM INV:307.20 SAN OBV:304.39	2.81m
76	STM INV:306.85 WTM OBV:306.34	0.51m
77	STM INV:306.80 SAN OBV:304.39	2.66m
78	STM INV:306.48 WTM OBV:305.97	0.51m
79	STM INV:306.43 SAN OBV:303.94	2.49m
80	STM INV:306.50 WTM OBV:306.00	0.50m
81	STM INV:306.43 SAN OBV:303.87	2.56m



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SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

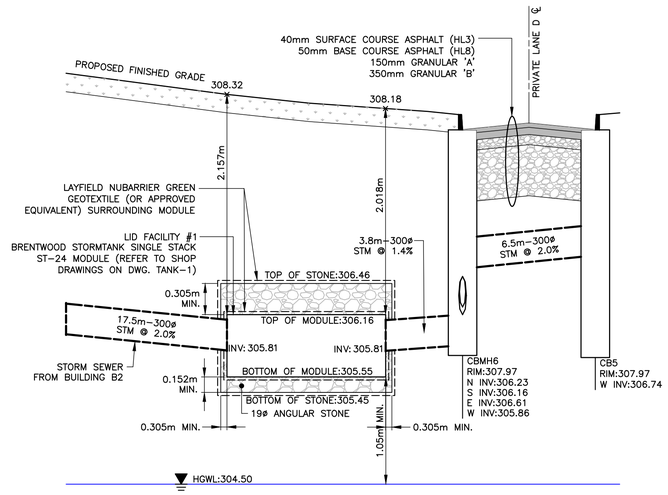
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

PLAN & PROFILE
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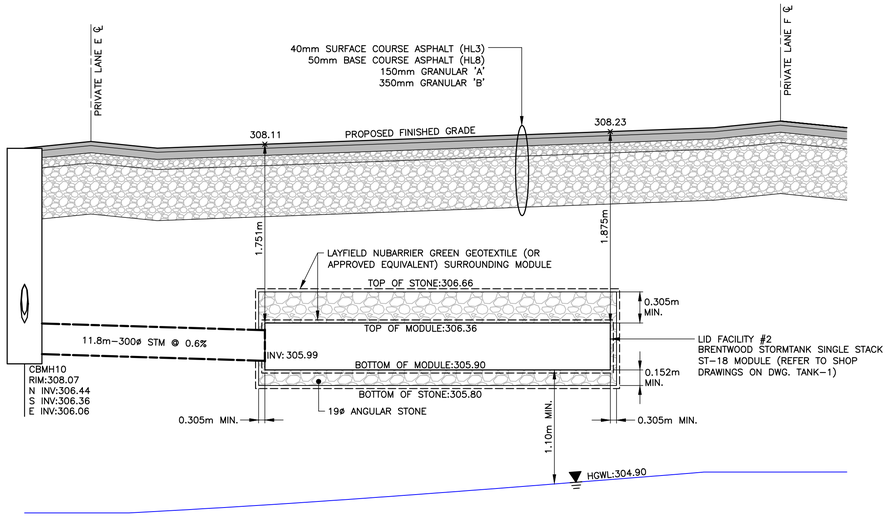
TATHAM ENGINEERING

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CHECK: NM	SCALE: 1:500	

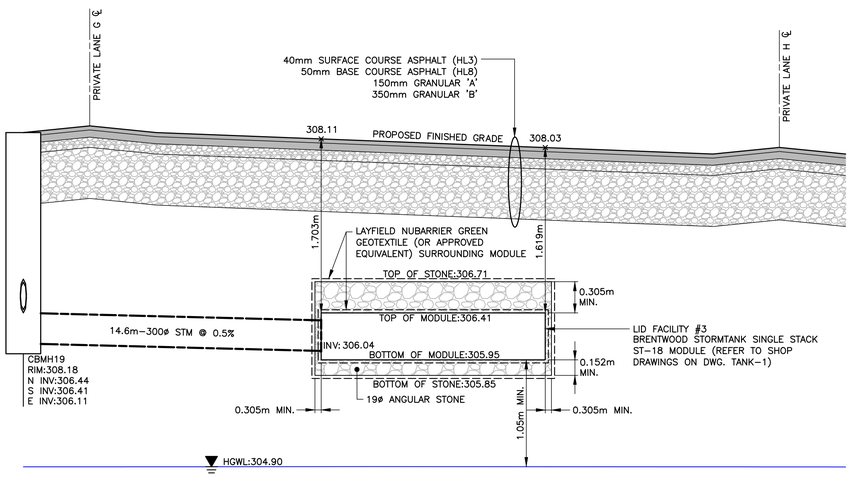
Drawing Name: 422433–PP11.dwg, Plotted: Oct 08, 2024



A GP-3 LOW IMPACT DEVELOPMENT FACILITY #1
NOT TO SCALE



B GP-2 LOW IMPACT DEVELOPMENT FACILITY #2
NOT TO SCALE



C GP-4 LOW IMPACT DEVELOPMENT FACILITY #3
NOT TO SCALE

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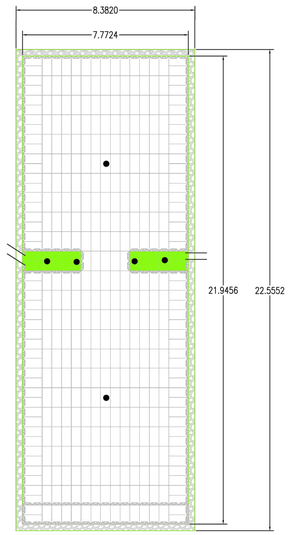
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

LOW IMPACT DEVELOPMENT FACILITY SECTIONS

TATHAM ENGINEERING

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DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: AS NOTED	

Drawing Name: 422433-LID01.dwg, Plotted: Oct 08, 2024



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BRENTWOOD STORMTANK COMPONENTS

	STORMTANK SIDE PANEL (SEE DETAIL 3/S-02)
	STORMTANK MODULE (SEE DETAIL 2/S-02)
	STORMTANK OBSERVATION PORT (SEE DETAIL 2/S-03)
	STORMTANK DEBRIS ROW (SEE DETAIL 1/S-03)
	INLET/OUTLET CONNECTION (SEE DETAIL S-04)
	19 MM CLEAR STONE

TitanEnviro.com
866-327-1957

No.	Description	By	dd.mm.yyyy
5			
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3			
2			
1	REVISED STORAGE LID 1 & 3	AW	09/26/2024
0	PRELIMINARY LAYOUT	AW	09/17/2024

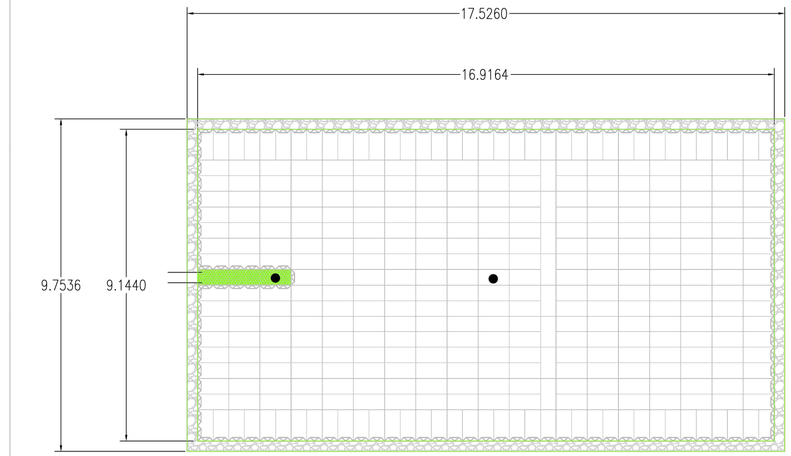
NOTES:
1) ALL DIMENSIONS ARE MEASURED IN METERS UNLESS NOTED OTHERWISE.
2) REFERENCE BRENTWOOD STORMTANK DESIGN GUIDE AND INSTALLATION GUIDE FOR DETAILED AND CURRENT INFORMATION (www.stormtank.com)
3) ENGINEER OF RECORD TO CONFIRM REGULATORY CONFORMANCE FOR ALLOWABLE PROXIMITY TO STRUCTURES, PIPES AND FOUNDATIONS.
4) ALL INLET AND PIPE LOCATIONS AND DESIGNS BY OTHERS.
5) DURING AND AFTER INSTALLATION, THE STORMTANK MODULE AREA SHOULD BE CLEARLY MARKED TO PREVENT UNAUTHORIZED CONSTRUCTION AND EQUIPMENT TRAFFICKING OVER THE MODULES.
6) TOP OF GROUND WATER IS TO BE MAINTAINED 610mm (2ft) BELOW THE MODULE TO PREVENT BUOYANCY, UNLESS OTHERWISE NOTED BY ENGINEER.
7) MATERIALS MUST BE STORED IN A MANNER TO PREVENT PROLONGED EXPOSURE TO UV LIGHT.

INSTALLATION GUIDE
MODULE ASSEMBLY

ELEVATIONS		QUANTITIES			GROUNDWATER LEVEL REVIEW	
MAXIMUM FINISHED GRADE	308.9000	TOTAL STORAGE VOLUME	100.12	m^3	GROUNDWATER ELEVATION (AS PROVIDED BY XXXX)	N/A
MINIMUM FINISHED GRADE	306.7692	MODULE STORAGE VOLUME	100.12	m^3		
TOP OF STONE BACKFILL	306.4644	STONE STORAGE VOLUME	0.00	m^3	HAS THE TANK DESIGN INCLUDED A REVIEW FOR UPLIFT PRESSURE DUE TO THE GROUNDWATER LEVEL?	N/A
TOP OF MODULE	306.1596	ACTIVE STORAGE VOLUME	N/A	m^3		
MODULE INVERT	305.5500	ACTIVE STORAGE ELEVATION	N/A	m	ALLOWABLE LOADING	HS25
LEVELING STONE BOTTOM	305.4484					
TOP MODULE	ST24					
BOTTOM MODULE	N/A					

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Project Number: OPP23348
Project Name/Location: MAPLEVIEW/ESSA SUBDIVISION - LID 1
Barrie, ON
Sheet Title: LAYOUT
Scale: NTS
SHEET: **1a of 4**



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BRENTWOOD STORMTANK COMPONENTS

	STORMTANK SIDE PANEL (SEE DETAIL 3/S-02)
	STORMTANK MODULE (SEE DETAIL 2/S-02)
	STORMTANK OBSERVATION PORT (SEE DETAIL 2/S-03)
	STORMTANK DEBRIS ROW (SEE DETAIL 1/S-03)
	INLET/OUTLET CONNECTION (SEE DETAIL S-04)
	19 MM CLEAR STONE

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No.	Description	By	dd.mm.yyyy
5			
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1	REVISED STORAGE LID 1 & 3	AW	09/26/2024
0	PRELIMINARY LAYOUT	AW	09/17/2024

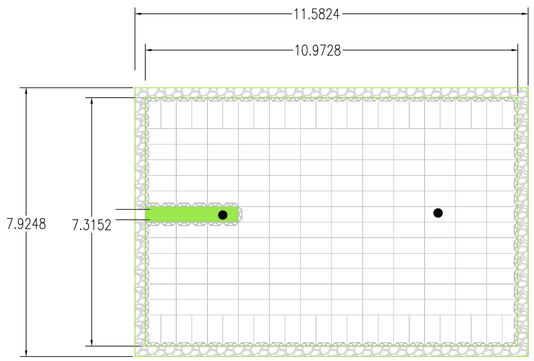
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INSTALLATION GUIDE
MODULE ASSEMBLY

ELEVATIONS		QUANTITIES			GROUNDWATER LEVEL REVIEW	
MAXIMUM FINISHED GRADE	309.2500	TOTAL STORAGE VOLUME	67.49	m^3	GROUNDWATER ELEVATION (AS PROVIDED BY XXXX)	N/A
MINIMUM FINISHED GRADE	306.9668	MODULE STORAGE VOLUME	67.49	m^3		
TOP OF STONE BACKFILL	306.6620	STONE STORAGE VOLUME	0.00	m^3	HAS THE TANK DESIGN INCLUDED A REVIEW FOR UPLIFT PRESSURE DUE TO THE GROUNDWATER LEVEL?	N/A
TOP OF MODULE	306.3572	ACTIVE STORAGE VOLUME	N/A	m^3		
MODULE INVERT	305.9000	ACTIVE STORAGE ELEVATION	N/A	m	ALLOWABLE LOADING	HS25
LEVELING STONE BOTTOM	305.7984					
TOP MODULE	ST18					
BOTTOM MODULE	N/A					

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Project Number: OPP23348
Project Name/Location: MAPLEVIEW/ESSA SUBDIVISION - LID 2
Barrie, ON
Sheet Title: LAYOUT
Scale: NTS
SHEET: **1b of 4**



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BRENTWOOD STORMTANK COMPONENTS

	STORMTANK SIDE PANEL (SEE DETAIL 3/S-02)
	STORMTANK MODULE (SEE DETAIL 2/S-02)
	STORMTANK OBSERVATION PORT (SEE DETAIL 2/S-03)
	STORMTANK DEBRIS ROW (SEE DETAIL 1/S-03)
	INLET/OUTLET CONNECTION (SEE DETAIL S-04)
	19 MM CLEAR STONE

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No.	Description	By	dd.mm.yyyy
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1	REVISED STORAGE LID 1 & 3	AW	09/26/2024
0	PRELIMINARY LAYOUT	AW	09/17/2024

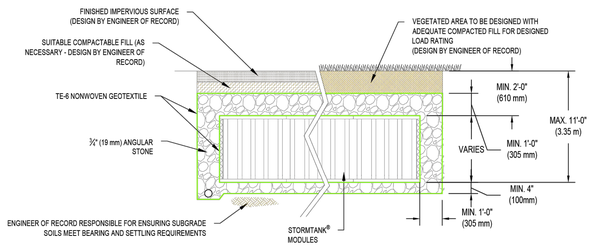
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INSTALLATION GUIDE
MODULE ASSEMBLY

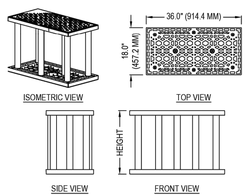
ELEVATIONS		QUANTITIES			GROUNDWATER LEVEL REVIEW	
MAXIMUM FINISHED GRADE	309.3000	TOTAL STORAGE VOLUME	35.02	m^3	GROUNDWATER ELEVATION (AS PROVIDED BY XXXX)	N/A
MINIMUM FINISHED GRADE	307.0168	MODULE STORAGE VOLUME	35.02	m^3		
TOP OF STONE BACKFILL	306.7120	STONE STORAGE VOLUME	0.00	m^3	HAS THE TANK DESIGN INCLUDED A REVIEW FOR UPLIFT PRESSURE DUE TO THE GROUNDWATER LEVEL?	N/A
TOP OF MODULE	306.4072	ACTIVE STORAGE VOLUME	N/A	m^3		
MODULE INVERT	305.9500	ACTIVE STORAGE ELEVATION	N/A	m	ALLOWABLE LOADING	HS25
LEVELING STONE BOTTOM	305.8484					
TOP MODULE	ST18					
BOTTOM MODULE	N/A					

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Project Number: OPP23348
Project Name/Location: MAPLEVIEW/ESSA SUBDIVISION - LID 3
Barrie, ON
Sheet Title: LAYOUT
Scale: NTS
SHEET: **1c of 4**

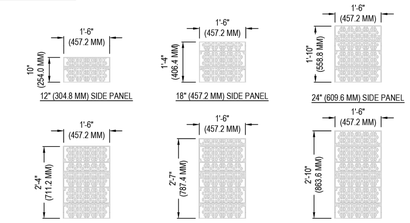


1 S-02 CROSS SECTION



25 SERIES MODULE				
MODEL	HEIGHT (MM)	CAPACITY (MP)	NOMINAL VOID	NOMINAL WEIGHT (KG)
2512	12" (304.8)	4.216 CF (0.1194)	93.70%	17.56 LBS. (7.965)
2518	18" (457.2)	6.436 CF (0.1824)	95.50%	22.70 LBS. (10.29)
2524	24" (609.6)	8.656 CF (0.2454)	96.00%	26.30 LBS. (11.92)
2530	30" (762.0)	10.876 CF (0.3084)	96.50%	29.50 LBS. (13.38)
2533	33" (838.2)	11.986 CF (0.3399)	96.90%	29.82 LBS. (13.53)
2536	36" (914.4)	13.096 CF (0.3714)	97.00%	33.10 LBS. (15.01)

2 S-02 MODULE DETAIL



- SIDE PANELS TO BE INSTALLED ALONG SYSTEM PERIMETER, UNLESS OTHERWISE SPECIFIED.
- ALL HEIGHTS TO BE CUT FROM A 36" (914.4 MM) SIDE PANEL AT PRE-SCRIBED LOCATIONS, EXCEPT 33" (838.2 MM) & 12" (304.8 MM) SIDE PANEL.

3 S-02 SIDE PANEL DETAIL

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1	REVISED STORAGE LID 1 & 3	AW	09/26/2024
0	PRELIMINARY LAYOUT	AW	09/17/2024

Project Number: OPP23348
Project Name/Location: MAPLEVIEW/ESSA SUBDIVISION - LID 1
Barrie, ON

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Sheet Title: CROSS SECTION
Scale: NTS
SHEET: **2of 4**

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No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP



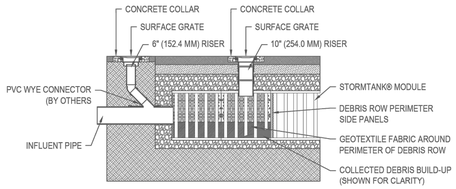
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

LOW IMPACT DEVELOPMENT
FACILITY DETAILS
SHEET 1 OF 2

TATHAM ENGINEERING

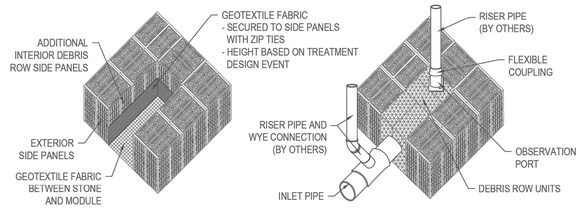
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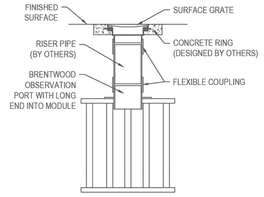
CROSS SECTION

NOTE: GEOTEXTILE HEIGHT BASED ON HYDROGRAPH ELEVATION OF SELECTED STORM OR MINIMUM 12" (304.8 MM), WHICHEVER IS GREATER, AND CONNECTED TO PANEL WITH ZIP-TIES.



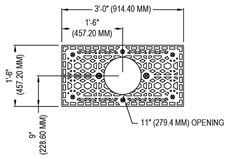
ISOMETRIC

1 S-03 DEBRIS ROW DETAIL



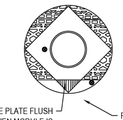
STEP 1

PORT IS TO BE MARKED ONTO THE PLATEN AND THEN THE OPENING CUT INTO THE PLATEN USING A JIGSAW OR SAWZALL, BEING SURE TO STAY AS CLOSE TO THE PORT DIAMETER AS POSSIBLE.



STEP 2

PLACE PORT INTO OPENING, ALIGNING PORT WITH STACKING PINS PLACED IN CUPS WITHIN THE PLATEN.



2 S-03 OBSERVATION PORT DETAIL

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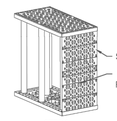
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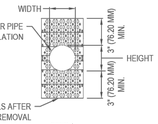
Project Name/Location MAPLEVIEW/ESSA SUBDIVISION - LID 1
Barrie, ON

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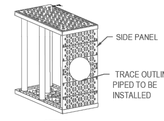
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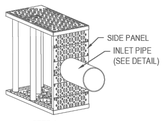
STEP 1
LOCATE AND MARK OPENING



STEP 2
REMOVE SIDE PANELS FROM MODULES AND CUT OPENING

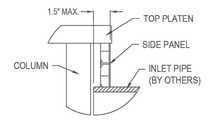


STEP 3
REINSTALL SIDE PANEL



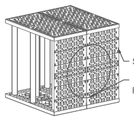
STEP 4
INSERT PIPE (SLIP FIT) AND SECURE GEOTEXTILE FABRIC

1 S-04 SMALL DIAMETER PIPE DETAIL

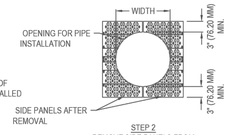


PIPE DETAIL

DIMENSION TABLE			
MODULE 25 SERIES	MAX. OPENING HEIGHT (MM)	SINGLE PANEL MAX. OPENING WIDTH (MM)	DOUBLE PANEL MAX. OPENING WIDTH (MM)
2512	6" (152.4)	15" (381.0)	30" (762.0)
2518	12" (304.8)	15" (381.0)	30" (762.0)
2524	18" (457.2)	15" (381.0)	30" (762.0)
2530	24" (609.6)	15" (381.0)	30" (762.0)
2533	27" (685.8)	15" (381.0)	30" (762.0)
2536	30" (762.0)	15" (381.0)	30" (762.0)



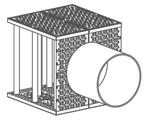
STEP 1
LOCATE AND MARK OPENING



STEP 2
REMOVE SIDE PANELS FROM MODULES AND CUT OPENING



STEP 3
REINSTALL SIDE PANEL

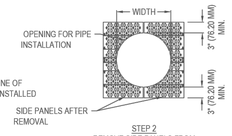


STEP 4
INSERT PIPE (SLIP FIT) AND SECURE GEOTEXTILE FABRIC

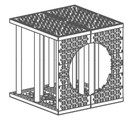
2 S-04 LARGE DIAMETER PIPE DETAIL



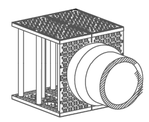
STEP 1
LOCATE AND MARK I.D. OPENING



STEP 2
REMOVE SIDE PANELS FROM MODULES AND CUT OPENING



STEP 3
REINSTALL SIDE PANEL



STEP 2
ABUT THE PIPE AND SECURE GEOTEXTILE FABRIC

3 S-04 LARGE DIAMETER PIPE DETAIL

TITAN
BUILD YOUR LEGEND
TitanEnviro.com
866-327-1957

No.	Description	By	dd.mm.yyyy
5			
4			
3			
2			
1	REVISED STORAGE LID 1 & 3	AW	09/26/2024
0	PRELIMINARY LAYOUT	AW	09/17/2024

Project Number: OPP23348

Project Name/Location MAPLEVIEW/ESSA SUBDIVISION - LID 1
Barrie, ON

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Sheet Title: PIPE CONNECTIONS | Scale: NTS | SHEET 4 of 4

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DRAWING REFERENCES

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TOPOGRAPHIC FEATURES AND CONTOURS SHOWN ON THIS PLAN BASED ON SURVEY COMPLETED BY TATHAM ENGINEERING LIMITED. UNDERGROUND SERVICES ARE APPROXIMATE ONLY BASED ON CITY OF BARRIE GIS DATA AND AVAILABLE AS-BUILT INFORMATION.

SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

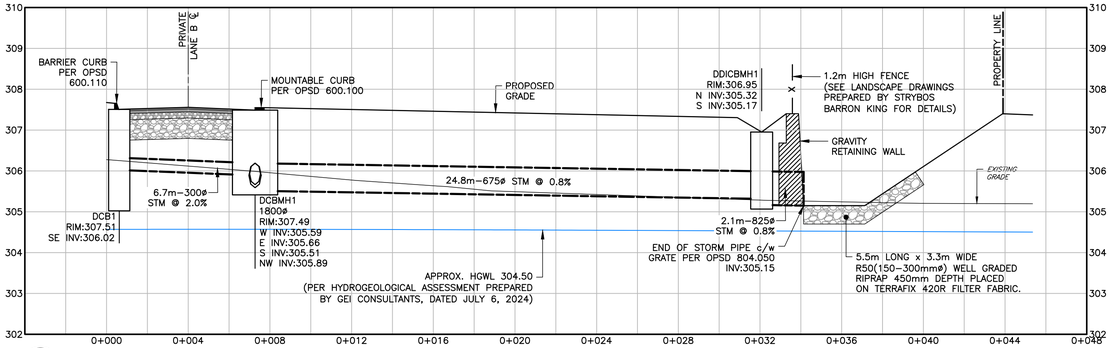
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

LOW IMPACT DEVELOPMENT FACILITY DETAILS SHEET 2 OF 2

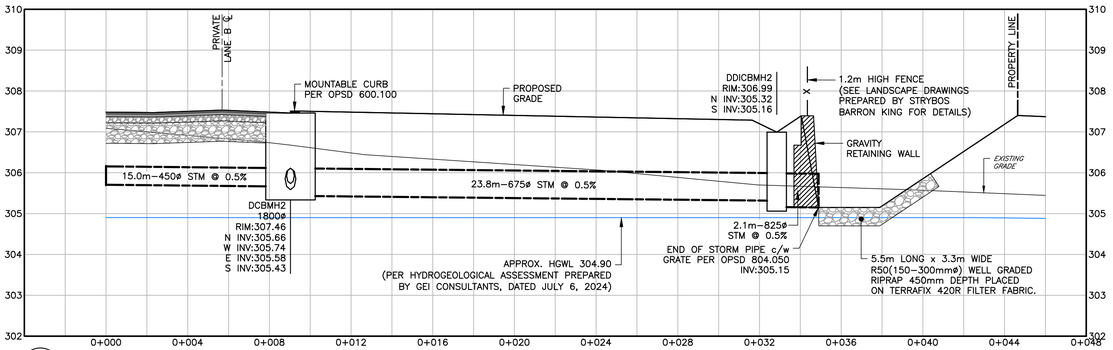
TATHAM ENGINEERING

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DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: AS NOTED	

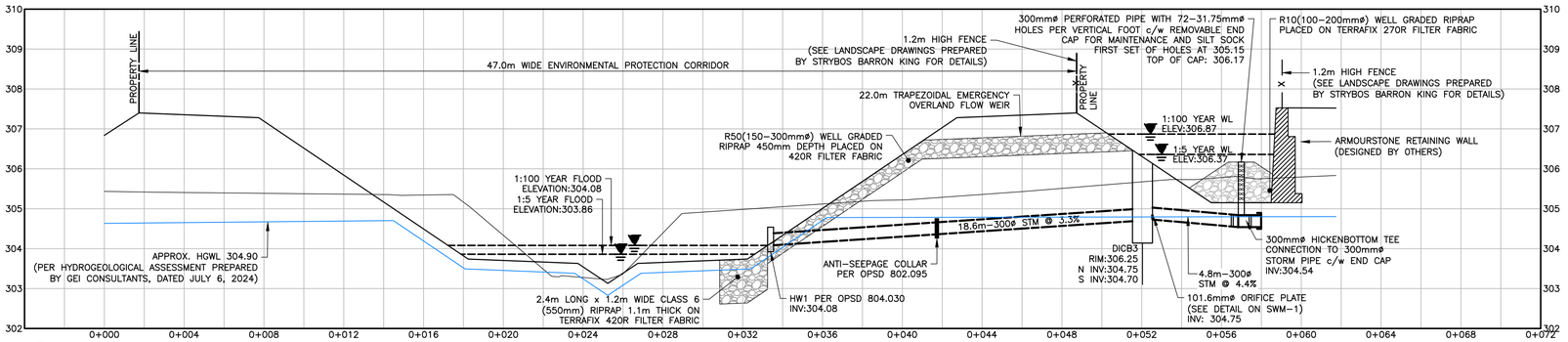
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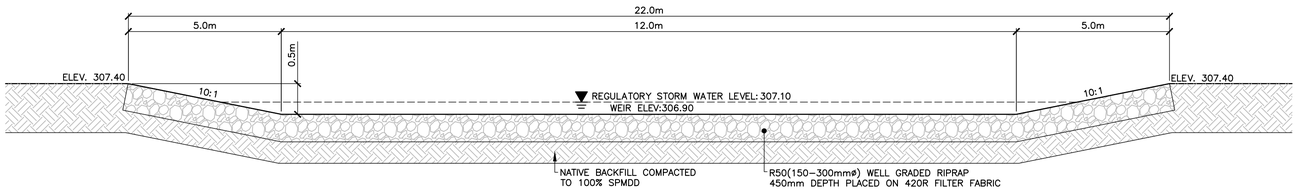
D / SS–1 WEST POND INLET
SCALE 1:150H 1:75V



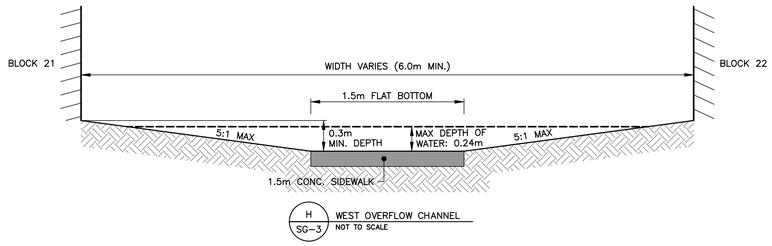
E / SS–1 EAST POND INLET
SCALE 1:150H 1:75V



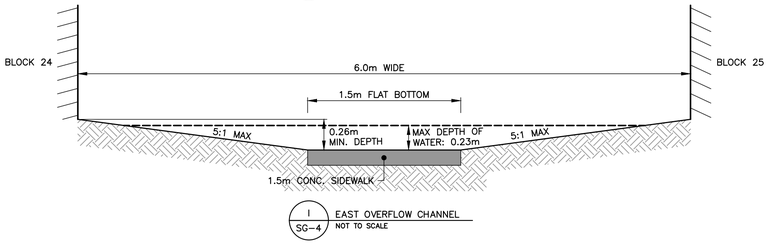
F / SS–1 POND OUTLET
SCALE 1:150H 1:75V



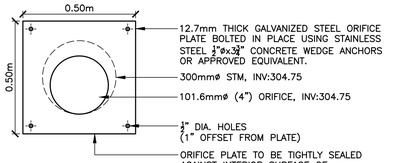
G / SG–3 EMERGENCY OVERFLOW WEIR
NOT TO SCALE



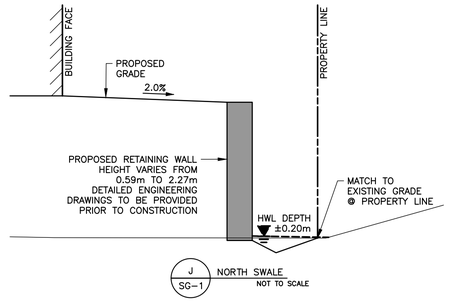
H / SG–3 WEST OVERFLOW CHANNEL
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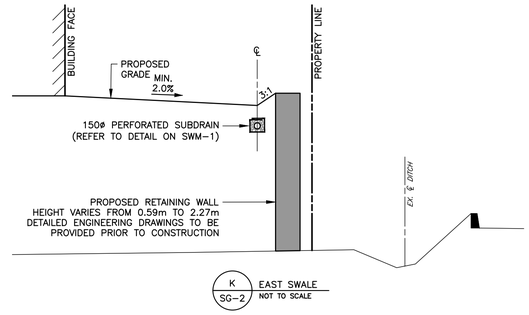
I / SG–4 EAST OVERFLOW CHANNEL
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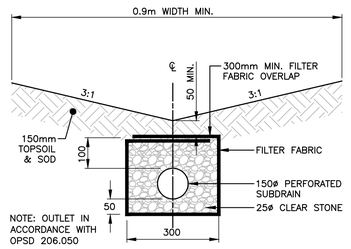
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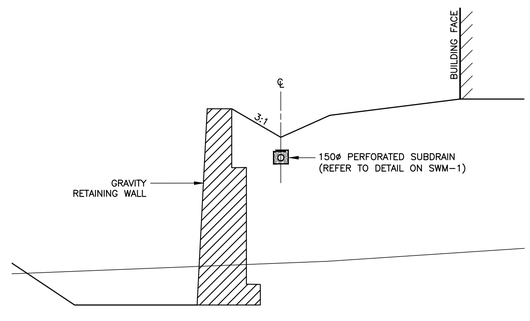
J / SG–1 NORTH SWALE
NOT TO SCALE



K / SG–2 EAST SWALE
NOT TO SCALE



150ø PERFORATED SUBDRAIN IN SWALE
NOT TO SCALE



L / SG–4 SOUTH SWALE
NOT TO SCALE

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No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

TATHAM ENGINEERING

STORMWATER MANAGEMENT DETAILS
SHEET 1 OF 2

DESIGN: LG	FILE: 422433–2	DWG:
DRAWN: LG	DATE: NOV. 2022	**SWM-1**
CHECK: NM	SCALE: AS NOTED	

Drawing Name: 422433–SWM01.dwg, Plotted: Oct 08, 2024

Specifications

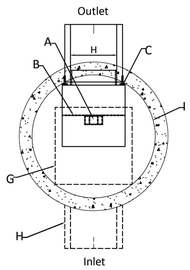
1. The separator must be designed based on the following criteria:

Flow Criteria	
Water Quality FLow cfs (L/s)	
Peak Design Flow cfs (L/s)	

TSS Removal Criteria	
Annual TSS Removal (%)	
NJDEP/ETV Canada TSS	
OK110 Sand	
F95 Sand	
Other	

2. The separator must be independently tested and verified to the 2013 NJDEP separator protocol and 2014 ETV Canada Separator protocol

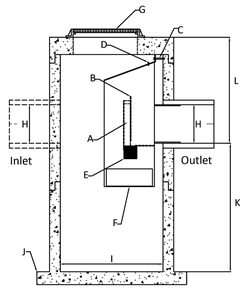
3. Vendor testing and/or field testing is not acceptable to determine an alternate equal due to the lack of repeatability.



Plan

HydroDome Components

A. Siphon
B. Overflow Weir
C. Wall Anchor
D. Air Check Valve
E. Coarse Foam Debris Screen
F. Perforated Bottom
G. Grate or Cover
H. Inlet and Outlet Pipes
I. Structure Diameter
J. Base Extension
K. Sump Depth
L. Invert to Top of Structure



Profile

HydroDome Dimensions / Capacities *

Model	Diameter ft (m) I	Sump Depth ft (m) K	Max. Pipe in (mm) H	Total Volume gal (L)	Oil Spill Volume gal (L)	Sediment Volume ft3 (m3)
HD 3	3 (0.9)	4 (1.2)	18 (450)	210 (800)	30 (120)	15 (0.5)
HD 4	4 (1.2)	4.5 (1.4)	21 (525)	420 (1600)	70 (265)	30 (0.9)
HD 5	5 (1.5)	5.5 (1.7)	27 (675)	805 (3055)	125 (480)	60 (1.7)
HD 6	6 (1.8)	6.5 (2.0)	33 (825)	1375 (5200)	210 (800)	100 (2.9)
HD 7	7 (2.1)	7.5 (2.3)	39 (975)	2155 (8170)	320 (1225)	160 (4.6)
HD 8	8 (2.4)	8.5 (2.6)	42 (1050)	3195 (12095)	490 (1860)	235 (6.8)
HD 10	10 (3.0)	10.5 (3.2)	54 (1350)	6165 (23350)	955 (3615)	455 (13.0)
HD 12	12 (3.6)	12.5 (3.8)	66 (1650)	10575 (40030)	1640 (6220)	780 (22.2)

* HD dimensions can be customized to provide custom oil or sediment volumes

Notes:

1. Sump depths shown are typical. Additional depth can be added as required.
2. Single or multiple inlet pipes allowed.
3. Drops allowed.
4. Inlet Grate Shown. HydroDome can be desiged with a closed cover if required.
5. Oil capacities given are spill capacities.
6. Sediment depths are maximum holding capacities and not recommended capacities for regular maintenance.
7. Capacities are rounded down to nearest 5 gal or ft3 (5L or 0.1 m3 for metric units)
8. Minimum rim to top of structure [L] required may vary for HydroDome. Please call Hydroworks for site-specific design questions.
9. Hydraulics vary with pipe size and model number. Please call Hydroworks for site-specific headloss calculations.

HydroDome by Hydroworks, LLC
U.S. Patent # 10,801,196
www.hydroworks.com
888-290-7900

Hydroworks HydroDome

PROJECT:

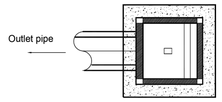
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REVISION DATE: 01/24/2022

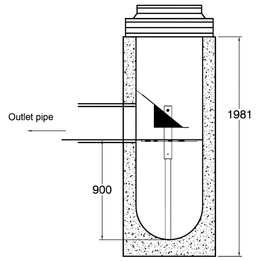
Hydroworks

Notes

1 Recommended depth t/g - invert = 1.2m
Maximum depth t/g - invert = 2.4m
1. CB Shield to be installed in non frozen conditions.
2. The frame and cover should be well aligned with the catchbasin.
3. The sump must be clean before installation
4. The grate is at the same elevation as pipe invert.
5. Pipes must be cut flush with inside walls



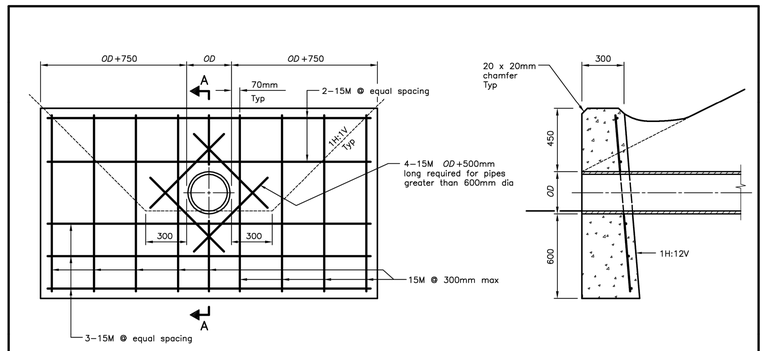
Top view



Profile view

CB SHIELD

600 x 600 CB
CB Shield (900mm Sump)



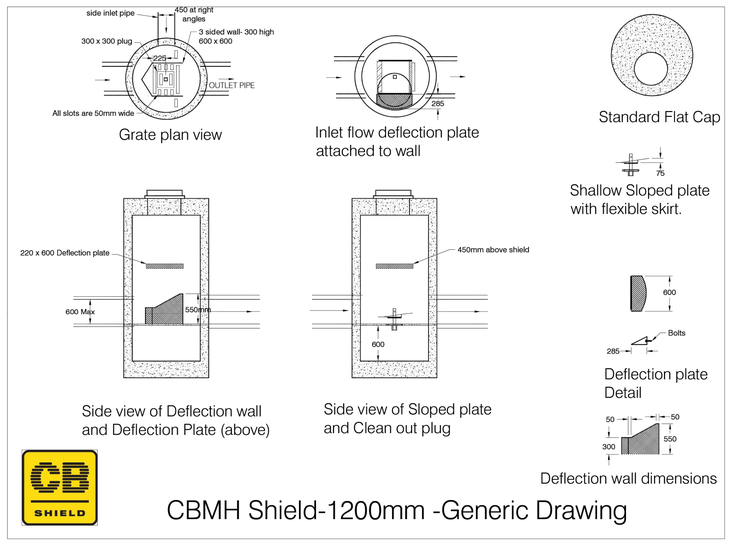
FRONT ELEVATION

SECTION A–A

LEGEND:
OD – Outside diameter of pipe

NOTES:
A This OPSD to be read in conjunction with OPSD 3940.150.
B If a steel grate is required, refer to OPSD 804.05.
C Class of concrete: 30MPa.
D Cover to reinforcing bars 70mm ± 20mm.
E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev 2
CONCRETE HEADWALL FOR PIPE LESS THAN 900mm DIAMETER		OPSD 804.030



CB SHIELD

CBMH Shield-1200mm -Generic Drawing

SPECIFICATION FOR CATCH BASIN INSERT

PART 1-PRODUCT

1.1 GENERAL:

1.1.1 The catch basin insert must be able to fit reasonably tight to the catch basin and shall be square and vertically upright within it once placed. A top sloped plate shall direct flows toward the rear of the catch basin where the majority of flow shall be directed across a grate to allow sediment to drop out, with flows exiting at the outlet pipe of the catch basin.

1.1.2 The insert shall be supported by a "leg" that in turn supports the grate and top slope. The leg will be telescopic, allowing adjustment of the grate to be equal with the invert of the outgoing pipe from the catch basin.

1.1.3 The telescopic leg shall allow for adjustments in sump depths from 150 to 900 mm.

1.1.4 The catch basin insert must be easily removed to allow maintenance of the catch basin.

1.1.5 The insert should be fabricated from either fiberglass or co-polymer polypropylene.

1.1.6 The insert shall not include a flow through membrane to trap sediment.

1.2 FIBERGLASS:

A fiberglass insert should be fabricated in accordance with the following standard: ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks

1.3 CO-POLYMER POLYPROPYLENE:

A co-polymer polypropylene insert shall conform to a tensile strength of 4000 psi (ASTM D-683), an Izod impact value of 2.5 (ASTM D-792), a flexural modulus of 195000 (ASTM D-790) , A heat distortion temperature of 190° F (ASTM 648) and a Rockwell hardness of 74 (ASTM D-785)

1.4 FASTENERS:

The insert parts shall be fastened together with stainless steel hardware Grade 304 or 316.

PART 2 – PERFORMANCE

2.1 GENERAL

The catch basin insert shall facilitate removal of sediment from stormwater by settling in the catch basin sump during frequent rain and snowmelt events. The insert shall prevent re-suspension of captured material during higher flow events, with sediment to remain in place until suitably removed with appropriate catch basin cleaning equipment. The insert shall not impede flows through the catch basin, and shall not be prone to blockage.

2.2 TOTAL SUSPENDED SOLIDS and PARTICLE SIZE DISTRIBUTION:

2.2.1 The catch basin insert shall enhance and not impede the catch basin's ability to capture sediment. Depending on site conditions, the system shall generally be capable of capturing and retaining a long term average of 50% to 60% of incoming total suspended solids (TSS) loading. Sediment/TSS removal calculations shall be based on the particle size distribution associated with the ETV Canada definition of test sediment as outlined in their protocol for testing of Oil Grit Separator type devices.

2.2.2 The catch basin insert performance shall be determined through independent laboratory testing with protocols based on (and in general conformance with) the Canadian ETV program's protocol for TSS removal and scour for Oil Grit Separator type devices (as authored by Toronto Region Conservation Authority, revised June 2014).

2.2.3 Alternative long term removal rates associated with assuming a different PSD for incoming TSS (such as for sediment consistent with the City of Toronto's Wet Weather Flow Management Guidelines) will be provided by CB Shield Inc. if assumed in design calculations.

2.3 SITE SPECIFIC DESIGN AND PERFORMANCE

2.3.1 The catch basin insert shall enhance a catch basin's ability to capture TSS, with actual long term sediment removal performance based on the drainage area required for treatment and the level of imperviousness. ,

2.3.2 **T**he anticipated long term TSS removal performance for site specific installations shall be determined and stamped by a licensed engineer.

2.3.3 For a **double catch basin**. There will be two standard CB Shield inserts and one center spacer installed. The first insert is installed with the high part of the slope facing the outlet hole. The center spacer complete with foot is then installed directly below the double catch basin center beam. The second insert is installed in the section that does not have an outlet pipe. This insert will have the high point of the slope face either 90 or 180 degrees away from the outlet pipe.

DISCLAIMER AND COPYRIGHT

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TATHAM ENGINEERING LIMITED CLAIMS COPYRIGHT TO THIS DRAWING WHICH MAY NOT BE USED FOR ANY PURPOSE OTHER THAN THAT PROVIDED IN THE CONTRACT BETWEEN THE OWNER/CLIENT AND THE ENGINEER WITHOUT THE EXPRESS CONSENT OF TATHAM ENGINEERING LIMITED.

DRAWING REFERENCES

LEGAL BOUNDARIES AND ROAD WIDENING SHOWN ON THIS PLAN BASED ON PLAN COMPLETED BY RUDY MAK SURVEYING LTD., DATED FEBRUARY 15, 2024.

TOPOGRAPHIC FEATURES AND CONTOURS SHOWN ON THIS PLAN BASED ON SURVEY COMPLETED BY TATHAM ENGINEERING LIMITED. UNDERGROUND SERVICES ARE APPROXIMATE ONLY BASED ON CITY OF BARRIE GIS DATA AND AVAILABLE AS-BUILT INFORMATION.

SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

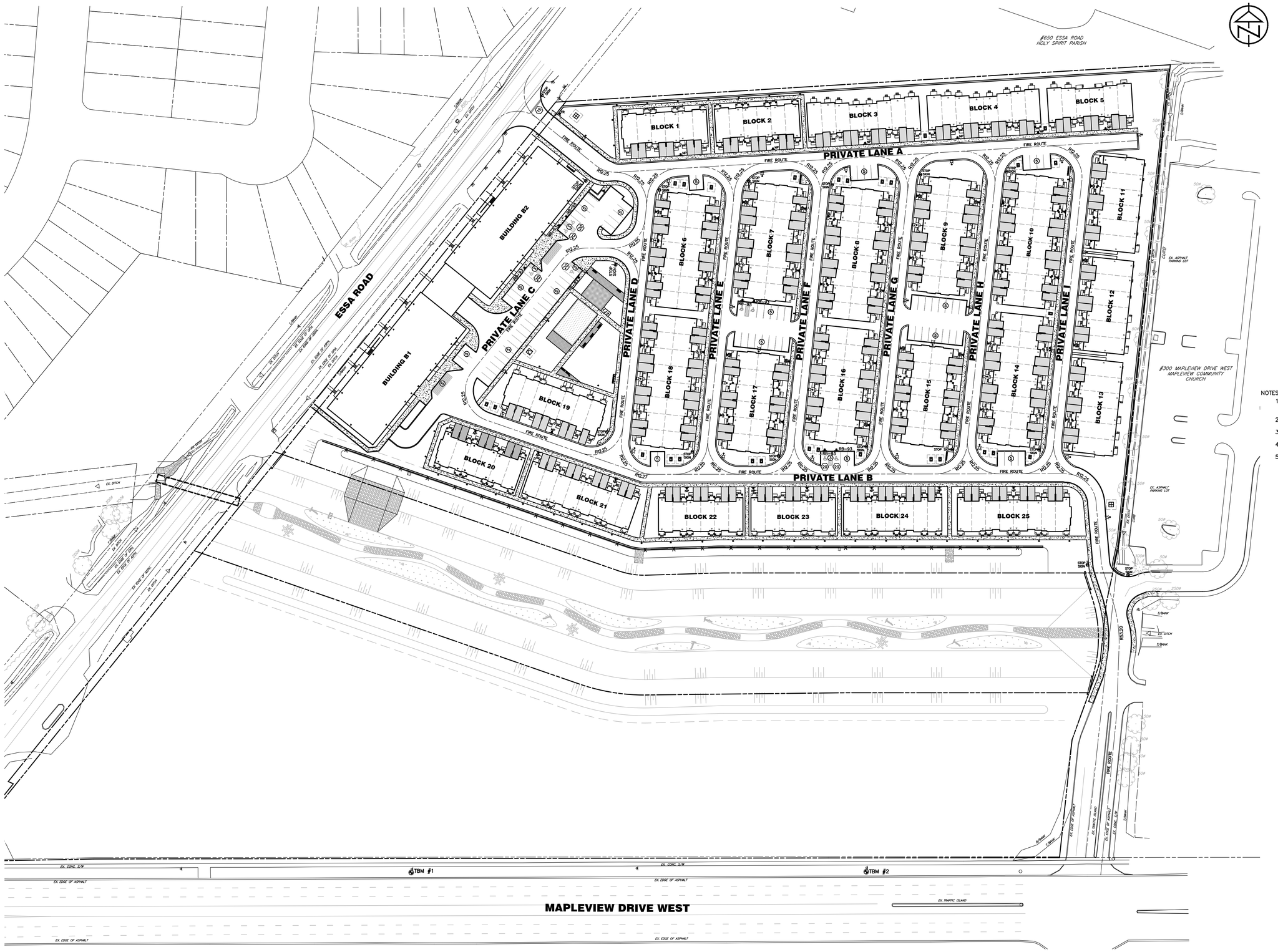
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

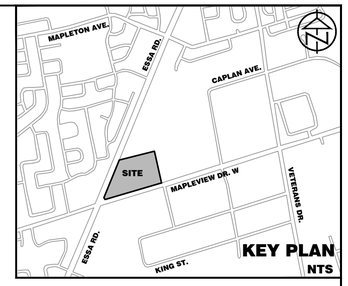
STORMWATER MANAGEMENT DETAILS
SHEET 2 OF 2

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: **SWM-2**
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: AS NOTED	

Drawing Name: 422433-SWM01.dwg, Plotted: Oct 08, 2024

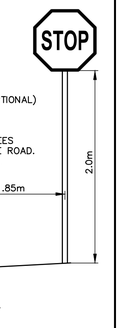




1	SOLID YELLOW,10cm
2	SOLID DOUBLE YELLOW,10cm
3	363 BROKEN YELLOW,10cm
4	SOLID YELLOW,20cm
5	SOLID WHITE,10cm
6	333 BROKEN WHITE,10cm
7	363 BROKEN WHITE,10cm
8	393 BROKEN WHITE,10cm
9	SOLID WHITE,20cm
10	111 BROKEN WHITE,20cm
11	333 BROKEN WHITE,20cm
12	333 BROKEN WHITE,30cm
13	SOLID WHITE,30cm
14	SOLID WHITE,45cm
15	SOLID WHITE,60cm
20	SYMBOLS
] [	LIMITS OF MARKINGS

NOTES:

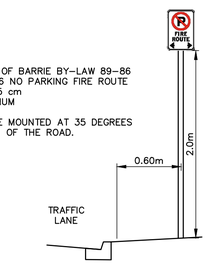
1. 333, 363, 393, Denotes Pavement Marking Spacing (ie., 3 m line, 3 m gap, 3 m line)
2. (1) Denotes PAVEMENT MARKING, PAINT
3. [1] Denotes PAVEMENT MARKING, TEMPORARY
4. ⚠1 Denotes PAVEMENT MARKING, TEMPORARY–REMOVABLE
5. ⟨1⟩ Denotes PAVEMENT MARKING, DURABLE



NOTES:

OTM SIGN: RA–1 STOP SIGN,
RA–1T ALL–WAY TAB SIGN (OPTIONAL)
SIZE: 60 cm x 60 cm
15 cm x 30 cm
MATERIAL: STEEL
NOTE: SIGN TO BE MOUNTED AT 90 DEGREES PERPENDICULAR TO THE DIRECTION OF THE ROAD.
STREET SIGN TO BE MOUNTED OVER RA–1.

STOP SIGN DETAIL
NTS



NOTES:

REFERENCE: CITY OF BARRIE BY–LAW 89–86
OTM SIGN: SFR–16 NO PARKING FIRE ROUTE
SIZE: 30 cm x 45 cm
MATERIAL: ALUMINUM

NOTE: SIGN TO BE MOUNTED AT 35 DEGREES TO THE DIRECTION OF THE ROAD.

NO PARKING SIGN (NP) DETAIL
NTS

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No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
M. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

PAVEMENT MARKING & SIGNAGE PLAN

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433–2	DWG:
DRAWN: LG	DATE: NOV. 2022	**PM-1**
CHECK: NM	SCALE: 1:750	

Drawing Name: 422433–PM01.dwg, Plotted: Oct 08, 2024

GENERAL

A. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT CITY OF BARRIE ENGINEERING STANDARDS AND ONTARIO PROVINCIAL STANDARD SPECIFICATIONS AND DRAWINGS. WHERE CONFLICT OCCURS, CITY OF BARRIE ENGINEERING STANDARDS TO GOVERN.
B. A ROAD OCCUPANCY PERMIT SHALL BE OBTAINED FROM THE ROADS AND PARKS OPERATIONS BRANCH PRIOR TO THE COMMENCEMENT OF WORK WITHIN THE CITY ROAD ALLOWANCE.
C. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN MILLIMETERS AND ALL ELEVATIONS ARE IN METERS.
D. THE OWNER'S ENGINEER SHALL PROVIDE BENCHMARK ELEVATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DETAILED LAYOUT OF THE WORK.
E. ALL PROPERTY BARS TO BE PRESERVED AND REPLACED BY OLS AT CONTRACTOR'S EXPENSE IF REMOVED DURING CONSTRUCTION.
F. THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR THE SUPPLY OF TEMPORARY WATER AND POWER.
G. DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS.MUNI 517 AND OPSS.MUNI 518. MAINTAIN ALL TRENCHES IN A DRY CONDITION. A MOECC PERMIT TO TAKE WATER (PTTW) HAS NOT BEEN OBTAINED FOR THIS PROJECT. THE CONTRACTOR SHALL ENSURE THAT ALL DEWATERING WORKS BETWEEN 50,000 AND 400,000 L/DAY BE REPORTED TO THE GEOTECHNICAL CONSULTANT. THE GEOTECHNICAL CONSULTANT SHALL BE RESPONSIBLE FOR MONITORING DEWATERING ACTIVITIES AND REPORTING WATER TAKING WITH THE ENVIRONMENTAL ACTIVITY SECTOR REGISTRY (EASR).
H. ALL ENGINE DRIVEN PUMPS TO BE ADEQUATELY SILENCED, SUITABLE FOR OPERATION IN A RESIDENTIAL DISTRICT.
I. GENERAL INSTALLATION AND TESTING OF SEWERS, WATERMAIN AND APPURTENANCES TO BE IN ACCORDANCE WITH MUNICIPAL STANDARDS AND WITH OPSS 407, 408, 409 (CCTV), OPSS MUNI.410, OPSS.MUNI 421, AND OPSS.MUNI 441 AND ALL SPECIFICATIONS REFERENCED WITHIN THESE SECTIONS.
J. ALL MAINTENANCE HOLES ARE 1,200 mm DIAMETER, UNLESS OTHERWISE SPECIFIED.
K. PIPE SUPPORT AT ALL STRUCTURES TO OPSD 708.020.
L. MAINTENANCE HOLE AND CATCH BASIN FRAMES AND GRATES TO BE SET TO BASE COURSE ASPHALT ELEVATION IN ACCORDANCE WITH BSD-41. FRAME AND GRATES TO BE RAISED TO FINISHED GRADE PRIOR TO THE PLACEMENT OF SURFACE COURSE ASPHALT USING CONCRETE ADJUSTMENT UNITS. ADJUSTMENT UNITS MUST BE CERTIFIED TO MEET ALL PERTINENT OPS, CSA, ASTM AND MTO-DSM LISTS, OR OTHER INDUSTRY GUIDELINES FOR MATERIALS, PERFORMANCE AND USE AS APPLICABLE. MAXIMUM COMBINED HEIGHT OF ADJUSTMENT UNITS SHALL BE 300 mm.
M. ADJUSTMENT UNITS AND JOINTS SHALL BE SEALED AND PARGED IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATIONS.
N. MORTAR SHALL BE USED FOR LEVELING PRECAST UNITS ONLY. THE THICKNESS OF MORTAR SHALL BE 10 mm TO FILL ALL VOIDS CREATED BY IRREGULARITIES IN THE PRECAST UNITS TO ENSURE AN EVEN SURFACE ONLY.
O. GRADE AND CROSSFALL ADJUSTMENT OF MAINTENANCE HOLE AND CATCH BASIN FRAMES SHALL BE MADE WITH USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSED.
P. TRENCH BACKFILL TO BE SELECT NATIVE MATERIAL AS APPROVED BY ENGINEER, OR IMPORTED SELECT SUBGRADE MATERIAL TO OPSS 1010. BACKFILL TO BE PLACED IN MAXIMUM 200 mm THICK LIFTS (OR AS OTHERWISE DIRECTED BY THE GEOTECHNICAL CONSULTANT) AND COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD).
Q. PIPE EMBEDMENT TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S SPMDD. BACKFILL AND EMBEDMENT TO OPSD 802.010 (FLEXIBLE PIPE), GRANULAR 'A' EMBEDMENT OR OPSD 802.031 (RIGID PIPE) CLASS 'B', GRANULAR 'A' BEDDING, GRANULAR 'B' COVER (MAX. AGGREGATE SIZE 25 mm). MINIMUM BEDDING DEPTH 150 mm, MINIMUM COVER DEPTH 300 mm ON ALL PIPES. WHERE EXCESSIVELY WET OR POOR SUBGRADE IS ENCOUNTERED AT THE INVERT LEVEL, IT MAY BE NECESSARY TO INCREASE THE BEDDING THICKNESS.
R. CLEAR STONE COMPLETELY WRAPPED IN FILTER FABRIC MAY BE SUBSTITUTED FOR EMBEDMENT MATERIAL IF APPROVED BY THE ENGINEER.
S. ALL SILTATION AND EROSION CONTROL DEVICES ARE TO BE IN PLACE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL CONSTRUCTION IS COMPLETE AND THE GRASS HAS ESTABLISHED GROWTH, SUBJECT TO THE APPROVAL OF THE CITY ENGINEERING DEPARTMENT.
T. DISTURBED AREAS TO BE REINSTATED TO PREVIOUS CONDITION OR BETTER.
U. REINSTATEMENT OF ALL DISTURBED BOULEVARDS AND DITCHES TO INCLUDE REGRADING, PLACEMENT OF MINIMUM 150 mm TOPSOIL AND SOD/SEED IN ACCORDANCE WITH OPSS 802, OPSS 803 AND OPSS.MUNI 804. SOD TO BE STAKED WHERE NECESSARY TO AVOID MOVEMENT.
V. DURING CONSTRUCTION TRAFFIC MARKERS AND SIGNS ARE TO BE INSTALLED IN ACCORDANCE WITH WITH THE MTO TRAFFIC CONTROL MANUAL FOR ROADWAY OPERATIONS, FIELD EDITION 1987.
W. LOCATIONS OF EXISTING UTILITIES ARE NOT GUARANTEED. THE CONTRACTOR IS RESPONSIBLE FOR THE PRESERVATION OF ALL EXISTING INFRASTRUCTURE/FACILITIES AS WELL AS NOTIFYING ALL UTILITY COMPANIES AT LEAST 48 HOURS PRIOR TO COMMENCING WORK AND COORDINATE CONSTRUCTION ACCORDINGLY.
X. ALL ON-SITE MATERIAL SHALL BE PROPERLY STORED, SECURED, MONITORED AND COVERED AS REQUIRED. SPECIFICALLY, ALL PVC PIPE SHALL BE COVERED WHILE STORED ON-SITE.

ROADS

A. SUBGRADE AND BOULEVARD MATERIAL TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S SPMDD. SUBGRADE TO BE PROOF ROLLED AND CERTIFIED PRIOR TO PLACING GRANULAR 'B'.
B. GRANULAR 'A' AND 'B' TO BE COMPACTED TO A DRY DENSITY OF 100% OF THE MATERIAL'S RESPECTIVE SPMDD.
C. ASPHALT TO BE ROLLED AND COMPACTED AS PER OPSS.MUNI 310.
D. ALL LANEWAYS WITHIN THE FIRE ROUTE SHALL BE CONSTRUCTED WITH HEAVY DUTY ASPHALT. ALL LANEWAYS AND PARKING AREAS SHALL BE CONSTRUCTED WITH LIGHT DUTY ASPHALT. MINIMUM PAVEMENT STRUCTURE REQUIREMENTS:

PAVEMENT STRUCTURE		
PAVEMENT LAYER	LIGHT DUTY	HEAVY DUTY
SURFACE COURSE – HL3	40 mm	40 mm
BINDER COURSE – HL8	50 mm	70 mm
BASE COURSE –GRANULAR 'A'	150 mm	150 mm
SUBBASE COURSE – GRANULAR 'B'	350 mm	500 mm

E. JOINTS WITH EXISTING ASPHALT TO BE SAW CUT STRAIGHT PRIOR TO PLACING NEW ASPHALT. WHERE EXISTING ASPHALT IS THICKER THAN 75 mm, A 300 mm WIDE BY 40 mm DEEP LAP JOINT SHALL BE GROUND INTO EXISTING ASPHALT PRIOR TO THE PLACEMENT OF SURFACE COURSE ASPHALT. REFER TO INSET DETAIL.
F. ALL GRANULAR AND ASPHALT MATERIAL TO BE PLACED IN ACCORDANCE WITH OPSS.MUNI 310, OPSS.MUNI 501, OPSS.MUNI 1010 AND OPSS.MUNI 1150.
G. TACK COAT TO BE APPLIED AT THE DIRECTION OF THE ENGINEER.
H. CONCRETE MOUNTABLE CURB WITH NARROW GUTTER SHALL BE IN ACCORDANCE WITH OPSD 600.100 AND OPSS.MUNI 353.
I. CONCRETE BARRIER CURB IN ACCORDANCE WITH OPSD 600.110 AND OPSS.MUNI 353 SHALL BE INSTALLED AS INDICATED ON THE DRAWINGS.
J. CURB DEPRESSIONS AT SIDEWALK SHALL BE IN ACCORDANCE WITH OPSD 310.033. CURB DEPRESSIONS AT DRIVEWAYS SHALL BE IN ACCORDANCE WITH OPSD 351.010.
K. CONCRETE SIDEWALK SHALL BE IN ACCORDANCE WITH OPSD 310.010 AND OPSS 351. SUBBASE TO CONSIST OF 150 mm DEPTH GRANULAR 'A'. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH OPSD 310.033 AND TACTILE WALKING SURFACE INDICATORS WHERE SPECIFIED IN ACCORDANCE WITH OPSD 310.039.
L. ASPHALT DRIVEWAYS TO BE CONSTRUCTED WITH A MINIMUM OF 50 mm OF HL3A ASPHALT AND 200 mm GRANULAR 'A'.
M. SUBDRAINS TO BE PERFORATED, COMPLETE WITH FILTER SOCK, OTHER THAN THE 2.0 m SECTION IMMEDIATELY UPSTREAM OF ALL STRUCTURES WHICH SHALL BE NON-PERFORATED.

STORM SEWER

A. STORM MAINTENANCE HOLES AND CATCH BASIN MAINTENANCE HOLES IN ACCORDANCE WITH OPSD 701.010 AND 701.012.
B. MAINTENANCE HOLES TO BE BENCHED IN ACCORDANCE WITH OPSD 701.021. MINIMUM BENCHING WIDTH SHALL BE 230 mm. CATCH BASIN MAINTENANCE HOLES TO HAVE A 900 mm SUMP IN ACCORDANCE WITH OPSD 701.010.
C. MAINTENANCE HOLE AND CATCH BASIN MAINTENANCE HOLE STEPS IN ACCORDANCE WITH OPSD 405.010.
D. MAINTENANCE HOLE FRAME AND GRATES IN ACCORDANCE WITH OPSD 401.010, TYPE 'A' CLOSED COVER.
E. CATCH BASINS AND DOUBLE CATCH BASINS IN ACCORDANCE WITH OPSD 705.010 AND 705.020 C/W 900 mm SUMP.
F. CATCH BASINS AND DOUBLE CATCH BASINS FRAME AND GRATES IN ACCORDANCE WITH OPSD 401.080. CATCH BASINS, DOUBLE CATCH BASINS AND CATCH BASIN MAINTENANCE HOLES INSTALLED IN CURB LINE IN ACCORDANCE WITH OPSD 610.010.
G. CATCHBASIN SHIELD TO BE INSTALLED IN STRUCTURES CB3, CB4, CBMH5, CB5, CBMH6, CB8, CB25, CBMH9, CB9, CBMH10, CB15, CBMH18 AND CBMH19, IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS. REFER TO DETAILS ON DWG. SWM-2.
H. MAINTENANCE HOLES AND CATCH BASIN ADJUSTMENT UNITS SHALL BE IN ACCORDANCE WITH BSD-41.
I. CATCH BASIN LATERALS TO BE INSTALLED WITH MINIMUM 2.0% GRADE. MINIMUM PIPE SIZE 250 mm DIA. SINGLE, 300 mm DIA. DOUBLE.
J. ALL CONNECTIONS TO THE STORM SEWER SHALL BE MADE WITH A STORM MAINTENANCE HOLE OR AN APPROVED FACTORY TEE CONNECTION IN ACCORDANCE WITH OPSD 708.010 OR OPSD 708.030.
K. STORM SEWER TO BE MINIMUM 300 mm DIAMETER WITH JOINTS CONFORMING TO CSA STANDARD A257.3.
L. ALL PIPE BEDDING MUST BE IN ACCORDANCE WITH OPSD, MAXIMUM COVER TABLE. NO FLEXIBLE PIPE SEWERS WILL BE INSTALLED WITH A DEPTH OF COVER GREATER THAN 6 m UNLESS SPECIFICALLY APPROVED BY THE DIRECTOR OF ENGINEERING.
M. ALL PIPE HANDLING INSTALLATIONS MUST BE IN STRICT COMPLIANCE WITH MANUFACTURER'S INSTALLATION GUIDES AND THE ONTARIO CONCRETE PIPE ASSOCIATION OR UNIBELL GUIDELINES.
N. STORM SEWER WITH LESS THAN 1.5 m COVER TO BE INSULATED PER DETAIL ON DWG. DE-1.

SANITARY SEWER

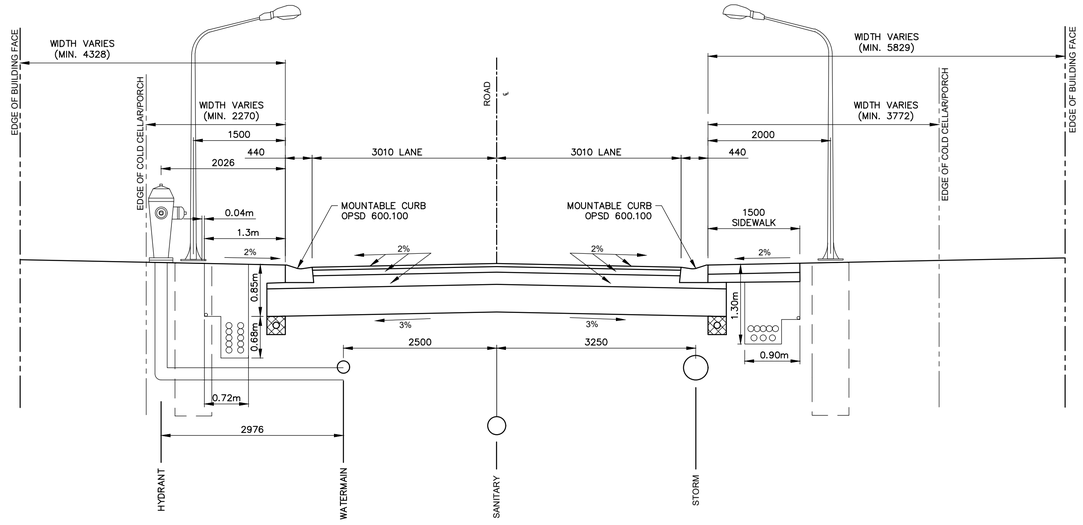
A. SANITARY MAINTENANCE HOLES IN ACCORDANCE WITH OPSD 701.010.
B. SANITARY MAINTENANCE HOLES TO BE BENCHED IN ACCORDANCE WITH OPSD 701.021. ALL CONNECTION TO MAINTENANCE HOLES TO INCLUDE KOR-N-SEAL RUBBER BOOT CONNECTION.
C. FROST STRAPS TO BE INSTALLED ON ALL MAINTENANCE HOLES IN ACCORDANCE WITH OSPD 701.100.
D. MAINTENANCE HOLE STEPS IN ACCORDANCE WITH OPSD 405.010
E. MAINTENANCE HOLE FRAME AND COVER TO OPSD 401.010, TYPE 'A' CLOSED COVER.
F. MAINTENANCE HOLE FRAMES ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND ADJUSTED TO FINAL GRADE WHEN THE TOP LIFT OF ASPHALT IS PLACED. ALL ADJUSTMENTS TO BE IN ACCORDANCE WITH BSD-41.
G. MAINTENANCE HOLE STRUCTURES EXCEEDING 5.0 m IN DEPTH TO INCLUDE SAFETY PLATFORM IN ACCORDANCE WITH OPSD 404.020.
H. MAXIMUM DEFLECTION FROM COMBINED LIVE AND DEAD LOADING SHALL NOT EXCEED ANY CSA, OPSS OR MANUFACTURER'S SPECIFICATIONS.
I. PVC, CONCRETE AND PROFILE WALL PVC SEWERS SHALL HAVE RUBBER GASKET TYPE JOINTS AND SHALL BE CERTIFIED TO CONFORM TO ALL APPLICABLE CURRENT CSA SPECIFICATIONS.
J. ALL CONNECTIONS TO NEW SANITARY MAINS SHALL BE MADE WITH PRE-MANUFACTURED, FABRICATED TEES.
K. SANITARY SERVICES TO BE 100 mm DIA. PVC SDR 28, RUBBER GASKET TYPE JOINTS AND SHALL CONFORM TO CSA. (B-182.2.3.4) (COLOURED GREEN).
L. MINIMUM DEPTH OF LATERAL AT PROPERTY LINE SHALL BE 2.4 m MEASURED FROM THE SEWER OBVERT TO FINISHED GROUND SURFACE ELEVATION UNLESS NOTED OTHERWISE.
M. RADIUS BENDS TO BE USED ON ALL SEWER CONNECTIONS WHERE THE ANGLE OF CONNECTION BETWEEN THE SERVICE AND SEWER EXCEEDS 90°.
N. SANITARY SERVICES TO BE IN ACCORDANCE WITH OPSD 1006.010 WITH A MINIMUM PIPE SLOPE OF 1.0%.

WATERMAIN

A. GENERAL INSTALLATION AND TESTING OF WATERMAIN TO BE IN ACCORDANCE WITH OPSS.MUNI 421, OPSS.MUNI 701 AND CITY OF BARRIE ENGINEERING STANDARDS. ALL WORK ON THE EXISTING WATERMAIN TO BE COORDINATED WITH THE CITY OF BARRIE.
B. CONTRACTORS SHALL INFORM THE CITY OF BARRIE WATER OPERATIONS DEPARTMENT A MINIMUM OF 48 HOURS IN ADVANCE OF THEIR INTENTIONS TO PERFORM WORK ON WATER INFRASTRUCTURE.
C. OPERATION OF HYDRANTS AND VALVES ON THE POTABLE WATER SYSTEM BY OTHER THAN QUALIFIED WATER OPERATIONS STAFF IS PROHIBITED BY CURRENT BY-LAW. CITY SERVICE FEES ARE PER THE CURRENT FEES BY-LAW. THE CITY'S WATER OPERATIONS STAFF WILL SWAB, PRESSURE TEST, CHLORINATE AND FLUSH ALL NEW WATERMAINS.
D. MINIMUM COVER OVER WATERMAIN SHALL BE 1.7 m. THE MINIMUM HORIZONTAL SEPARATION BETWEEN WATERMAIN AND SEWERS SHALL BE 2.5 m WHERE WATERMAIN CONFLICTS WITH SEWER PIPES, DEFLECT WATERMAIN HORIZONTALLY OR VERTICALLY WHILE PROVIDING A MINIMUM OF 0.5 m CLEARANCE BETWEEN WATERMAIN AND SEWERS. INSULATION TO BE PROVIDED WHERE MINIMUM COVER CAN NOT BE ACHIEVED. WATERMAIN SHALL NOT BE INSTALLED WITH COVER LESS THAN 1.2 m.
E. WATER SERVICES SHALL BE EMBEDMENT 100 mm ABOVE AND BELOW TO CONFORM TO OPSS.MUNI 1004.05.07.
F. RESTRAINING WILL BE REQUIRED ON ALL HYDRANTS. THRUST BLOCKS IN ACCORDANCE WITH OPSD 1103.010 AND 1103.020. RESTRAINING DEVICES MAY BE REQUIRED IN ADDITION TO STANDARD CONCRETE THRUST BLOCKING WHERE SOIL CONDITIONS WARRANT AT THE CITY'S DISCRETION. RESTRAINING DEVICES TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
G. CONTRACTOR SHALL PROVIDE CATHODIC PROTECTION ON THE WATER DISTRIBUTION SYSTEM. IN DETERMINING THE MODE OF PROTECTION, AN ELECTRICAL RESISTIVITY OF 4000-4500 OHM-CM SHOULD BE USED. THE CONTRACTOR SHALL PROPOSE METHODS AND MATERIALS TO BE USED FOR APPROVAL BY THE ENGINEER AND CITY OF BARRIE WATER OPERATIONS DEPARTMENT.
H. TRACER WIRE SHALL BE #12 AWG HIGH STRENGTH COPPER CLAD (HS-CSS) AND SHALL BE INSTALLED ON THE TOTAL LENGTH OF ALL WATERMAIN AND BROUGHT UP AT EACH HYDRANT AND CONNECTED TO FLANGE BOLT. ALL SPLICES TO UTILIZE CONNECTORS AS PER THE APPROVED MANUFACTURERS PRODUCTS FOR LINEAR WATER SYSTEMS LIST.
I. ALL WATER SERVICES SHALL BE MINIMUM 25 mm TYPE 'K' COPPER OR CONTINUOUS RUN OF CROSS-LINKED POLYETHYLENE (PEX) TUBING C/W TRACER WIRE AND STAINLESS-STEEL INSERTS AT ALL JOIINTS. WATER SERVICE SADDLES SHALL BE USED WHEN TAPPING INTO PVC WATERMAIN.
J. SERVICE TAPPINGS SHALL BE PLACED AT A MINIMUM SEPARATION OF 1.0 m AND A MINIMUM OF 0.6 m FROM JOINTS (ENDS OF PIPE).
K. RISER PIPES ARE TO BE INSTALLED AS PER BSD-510, AND REMOVED AS DIRECTED. SWABBING SCHEDULE TO BE SUPPLIED BY A WATER OPERATIONS FIELD REPRESENTATIVE. ALL RISERS ARE TO BE RESTRAINED OR THRUST BLOCKED.
L. ALL NEW CURB STOPS AND BOXES TO BE LOCATED 1.0 m OFFSET FROM SIDEWALK/BACK OF CURB AND OUT OF DRIVEWAYS AND SIDEWALKS.

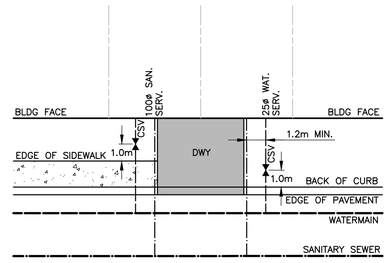
MATERIALS

A. SANITARY SEWER – SDR 35 PVC
B. SANITARY SERVICES – SDR 28 PVC – 100 mm DIA. COLOUR GREEN (CONNECTIONS TO BE MADE USING APPROVED FACTORY MADE TEES).
C. WATERMAIN – PVC DR18 CL150 MINIMUM; DUCTILE IRON CL52 AS PER THE APPROVED MANUFACTURERS PRODUCTS FOR LINEAR WATER SYSTEMS LIST.
D. WATER SERVICES – 25 mm TYPE 'K' (W.H.) 3RD PARTY SOFT COPPER OR CROSS-LINKED POLYETHYLENE (PEX) TUBING.
E. MAIN STOPS – 1" TO 2" 301NL-A4B4 (NO LEAD, LIFETIME GUARANTEED AGAINST LEAD LEACHATE FROM THE CASTING), BALL STYLE c/w STAINLESS STEEL STEM, AWWA THREAD BY COMPRESSION CAMBRIDGE BRASS.
F. CURB STOPS – 1" TO 2" 202NL-B4B4 (NO LEAD, LIFETIME GUARANTEED AGAINST LEAD LEACHATE FROM THE CASTING), BALL STYLE WITH DRAIN c/w STAINLESS STEEL STEM, COMPRESSION JOINT CAMBRIDGE BRASS.
G. SERVICE BOXES – NUMBER 7, D-1 CLOW OR MUELLER, 24" BLACK RODS STRAIGHT.
H. HYDRANTS – CANADA VALVE CENTURY OR CLOW D67M PREMIER. STORZ CONNECTIONS MUST BE SUPPLIED BY MANUFACTURER SPECIFIC TO THE HYDRANT.
I. VALVES – RESILIENT SEATED GATE VALVE, MECHANICAL JOINT, OPEN LEFT CLOW OR MUELLER WITH 5 SL-48 SLIDING VALVE BOX. PROVIDE VALVE STEM EXTENSIONS WHERE WATERMAIN EXCEEDS 1.7m DEPTH.
J. MECHANICAL JOINT DUCTILE FITTINGS – AWWA/ANSI C153/A21.53.
K. RESTRAINING GLANDS – SIGMA ONE-LOK.
L. LIVE TAP SADDLES – EPOXY COATED WITH STAINLESS STEEL BOLTS.
M. LIVE TAP VALVE – RESILIENT SEATED RSGV, LIVE TAP VALVE, OPEN LEFT CLOW OR MUELLER.
N. FILTER FABRIC – TERRAFIX 270R OR APPROVED EQUAL.
O. PERFORATED SUBDRAINS – 100mm BIG 'O' WITH GEOTEXTILE FILTER SOCK OR APPROVED EQUAL.
P. STORM SEWER – REINFORCED CONCRETE WITH A MINIMUM STRENGTH OF 50 N/m/mm CERTIFIED TO CSA STANDARD A247.2-1982, CLASS 100-D OR PVC CERTIFIED TO CSA STANDARDS 182.2 AND 182.4 (MAX. PIPE DIAMETER 450 mm).
Q. OIL GRIT SEPARATOR – HYDRODOME HD-6
R. RIP RAP TO OPSD 1004.05.05, ON TERRAFIX 270R FILTER FABRIC.
S. ALL SPECIFIED AGGREGATES TO OPSD 1010.



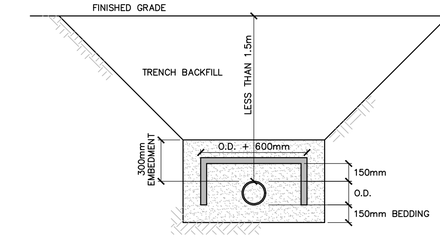
NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN
2. MODIFIED SECTION BASED ON BSD R314

PRIVATE ROAD – 6.5m PLATFORM
TYPICAL CROSS SECTION
NOT TO SCALE



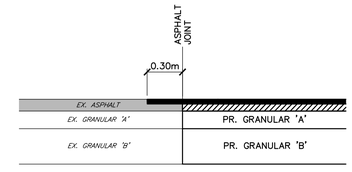
NOTES:
1. SANITARY SERVICES ARE TO BE TEMPORARILY CAPPED. LOCATIONS TO BE PROPERLY MARKED WITH A 50 x 100 mm STAKE (PAINTED GREEN) EXTENDING FROM THE INVERT OF THE SERVICE TO GROUND LEVEL.
2. WATER SERVICES ARE TO BE INSTALLED 5.0m BEYOND BUILDING FACE, TERMINATED WITH A CURB STOP VALVE AND PROPERLY MARKED WITH A 50 x 100 mm STAKE (PAINTED BLUE) EXTENDING FROM THE INVERT OF THE SERVICE TO GROUND LEVEL (REFER TO BSD-48).
3. WATER SERVICE TO BE LOCATED AS SHOWN ON DWG. SS-1 (MIN. 1.2 m OFFSET FROM SANITARY SERVICE). CURB STOP BOXES INSTALLED IN WITHIN DRIVEWAYS SHALL HAVE FROST COLLARS.

TYPICAL SERVICE LOCATIONS
NOT TO SCALE



NOTES:
1. STORM SHALL BE INSULATED TO PROVIDE FROST PROTECTION WHEREVER COVER IS LESS THAN 1.5 m AND AS SPECIFIED ON THE DRAWINGS.
2. INSULATION SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS:
   - DEPTH OF COVER BETWEEN 1.4 m TO 1.7 m REQUIRES MIN. 50 mm INSULATION
   - DEPTH OF COVER BETWEEN 1.2 m TO 1.4 m REQUIRES MIN. 100 mm INSULATION

STORM INSULATION DETAIL
NOT TO SCALE



LAP JOINT DETAIL
NOT TO SCALE

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

TATHAM ENGINEERING LIMITED CLAIMS COPYRIGHT TO THIS DRAWING WHICH MAY NOT BE USED FOR ANY PURPOSE OTHER THAN THAT PROVIDED IN THE CONTRACT BETWEEN THE OWNER/CLIENT AND THE ENGINEER WITHOUT THE EXPRESS CONSENT OF TATHAM ENGINEERING LIMITED.

DRAWING REFERENCES

LEGAL BOUNDARIES AND ROAD WIDENING SHOWN ON THIS PLAN BASED ON PLAN COMPLETED BY RUDY MAK SURVEYING LTD., DATED FEBRUARY 15, 2024.

TOPOGRAPHIC FEATURES AND CONTOURS SHOWN ON THIS PLAN BASED ON SURVEY COMPLETED BY TATHAM ENGINEERING LIMITED. UNDERGROUND SERVICES ARE APPROXIMATE ONLY BASED ON CITY OF BARRIE GIS DATA AND AVAILABLE AS-BUILT INFORMATION.

SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

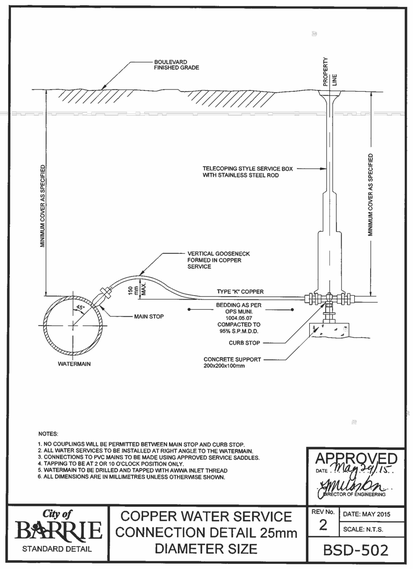
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

TATHAM ENGINEERING

DETAILS & NOTES

DESIGN: LG	FILE: 422433-2	DWG:
DRAWN: LG	DATE: NOV. 2022	**DE-1**
CHECK: NM	SCALE: AS NOTED	

Drawing Name: 422433-DE01.dwg, Plotted: Oct 09, 2024

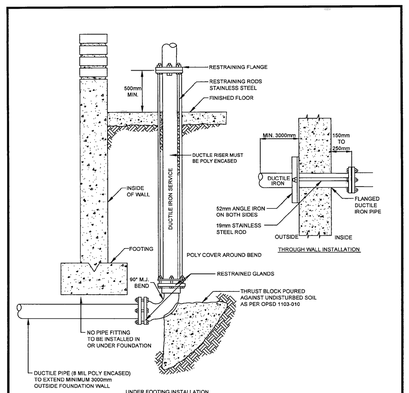


NOTES:
1. NO COUPLINGS WILL BE PERMITTED BETWEEN MAIN STOP AND CURB STOP.
2. ALL WATER SERVICES TO BE INSTALLED AT RIGHT ANGLE TO THE WATERMAIN.
3. CONNECTIONS TO PVC MAINS TO BE MADE USING APPROVED SERVICE SADDLES.
4. TAPPING TO BE AT 2 OR 10 O'CLOCK POSITION ONLY.
5. WATERMAIN TO BE DRILLED AND TAPPED WITH AWWA INLET THREAD
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

APPROVED
DATE: May 15/15
DIRECTOR OF ENGINEERING

City of BARRIE
STANDARD DETAIL

COPPER WATER SERVICE CONNECTION DETAIL 25mm DIAMETER SIZE	REV No. 2	DATE: MAY 2015
		SCALE: N.T.S.
		BSD-502

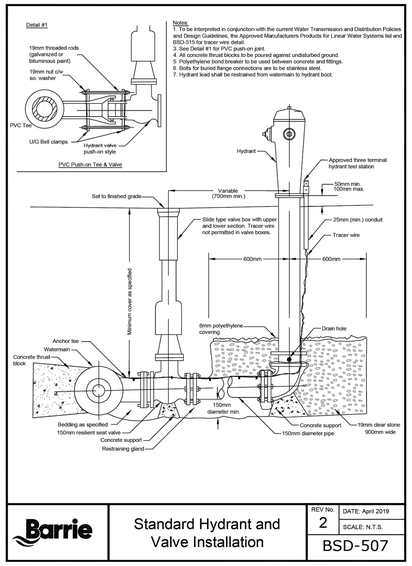


NOTES:
1. INSTALLATION MUST MEET THE CURRENT NATIONAL FIRE PROTECTION ACT.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.

APPROVED
DATE: Feb 2015
DIRECTOR OF ENGINEERING

City of BARRIE
STANDARD DETAIL

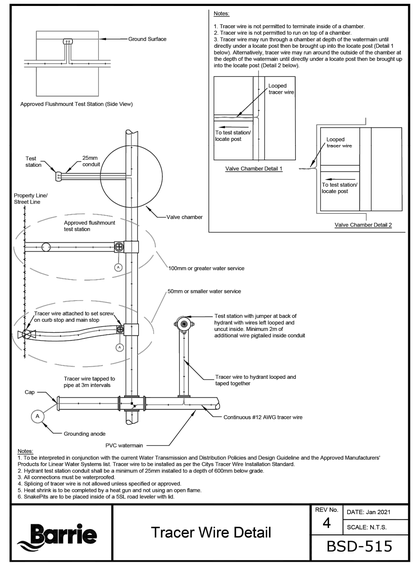
TYPICAL SERVICE ENTRY 100mm TO 300mm DIAMETER PIPE	REV No. 1	DATE: FEB 2015
		SCALE: N.T.S.
		BSD-505 (PREVIOUSLY BSD-61)



Notes:
1. To be interpreted in conjunction with the current Water Transmission and Distribution Policies and Design Guidelines, the Approved Manufacturers Products for Linear Water Systems list and BSD-515 for tracer wire detail.
3. See Detail #1 for PVC push-on joint.
4. All concrete thrust blocks to be poured against undisturbed ground.
5. Polyethylene bond breaker to be used between concrete and fittings.
6. Bolts for buried flange connections are to be stainless steel.
7. Hydrant lead shall be restrained from watermain to hydrant boot.

Barrie

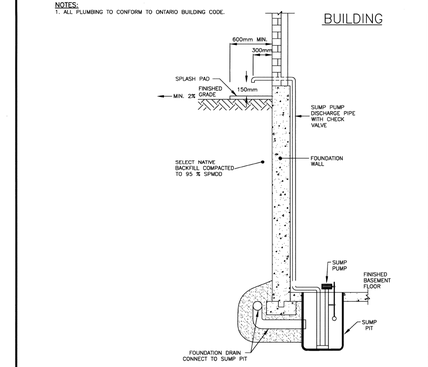
Standard Hydrant and Valve Installation	REV No. 2	DATE: April 2019
		SCALE: N.T.S.
		BSD-507



Notes:
1. Tracer wire is not permitted to terminate inside of a chamber.
2. Tracer wire is not permitted to run on top of a chamber.
3. Tracer wire may run through a chamber at depth of the watermain until directly underneath post then must be brought up into the locate post (Detail 1 below). Tracer wire shall not be seen one may run around the outside of the chamber at the depth of the watermain until directly under a locate post then be brought up into the locate post (Detail 2 below).

Barrie

Tracer Wire Detail	REV No. 4	DATE: Jan 2021
		SCALE: N.T.S.
		BSD-515

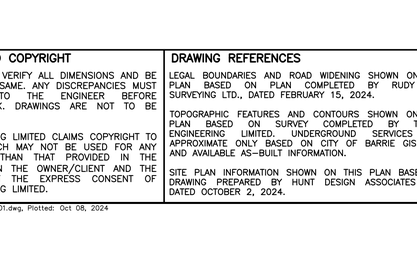


No.	REVISION	APP'D	DATE

CITY OF BARRIE STANDARD

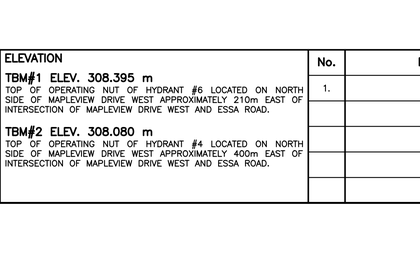
APPROVED
DATE: 09 11 05
DIRECTOR OF ENGINEERING

FOUNDATION DRAIN OUTLET SUMP PUMP TO SURFACE	SCALE: N.T.S
BSD-76	



NOTES:
1 Vents shall be as specified by the manufacturer.
2 Length of plate may be increased to suit the curb depression width.
3 Material of plate shall be as specified in Contract Documents.
A Adjacent cast iron plates shall be permanently connected using a locking mechanism and any hardware shall be hot dipped galvanized.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 1
CONCRETE SIDEWALK RAMPS TACTILE WALKING SURFACE INDICATORS COMPONENT		
		OPSD 310.039

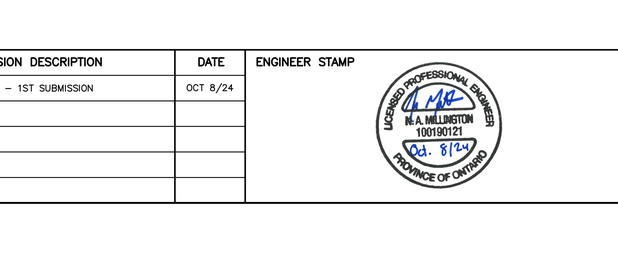


NOTES:
1. MINIMUM CHAMBER SIZE 1800mmx2400mm
2. APPLICATION NON-PRESSURE REDUCING VALVE CHAMBERS ONLY
3. WATERPROOF MEMBRANE TO EXTEND COMPLETELY AROUND RISER SECTION JOINTS WITH A MINIMUM OF 300mm WIDE STRAP.
4. ALL INSULATION TO BE RIGID TYPE EXTRUDED POLYSTRENE FOAM DOW HI-40 OR HI-100. ALL CHAMBER INSULATIONS TO BE INSTALLED WITH CONSTRUCTION ADHESIVE AND TAPCON ANCHORS AT MAX. 600mm SPACING IN ALL DIRECTIONS (MIN. 2 ANCHORS PER SHEET OF INSULATION).
5. SUMP c/w GRATE TO BE LOCATED AT THE BOTTOM OF THE ACCESS LADDER. SUMP SHALL NOT EXTEND THROUGH THE BOTTOM OF BASE.

APPROVED
DATE: Oct 25/17
DIRECTOR OF ENGINEERING

Barrie
STANDARD DETAIL

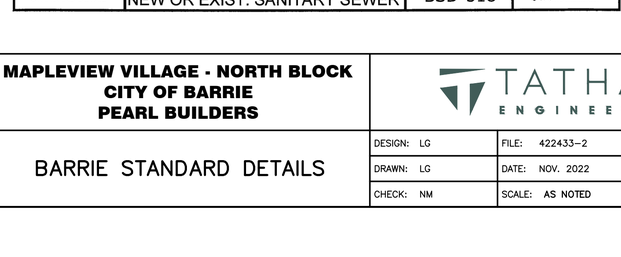
TYPICAL TWO PIECE PRECAST RECTANGULAR CHAMBER DETAILS FOR WATERMAINS	REV No. 2	DATE: OCT 2017
		SCALE: N.T.S.
		BSD-525



NOTES:
1. ADJUSTMENT UNITS SHALL NOT EXTEND BEYOND THE OUTSIDE EDGE OF THE STRUCTURE.
2. MAINTENANCE HOLE TOPS (FRAMES) ARE TO BE SET IN BASE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE WHEN TOP LIFT OF ASPHALT IS PLACED.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
4. IF A STEP IS REQUIRED IN AN ADJUSTMENT UNIT, THEN THE ADJUSTMENT UNIT SHALL BE OF THE TYPE MANUFACTURED WITH A STEP IN PLACE.

Barrie
STANDARD DETAIL

MAINTENANCE HOLE AND CATCH BASIN ADJUSTMENT UNITS	REV No. 3	DATE: Nov 2019
		SCALE: N.T.S.
		BSD-41



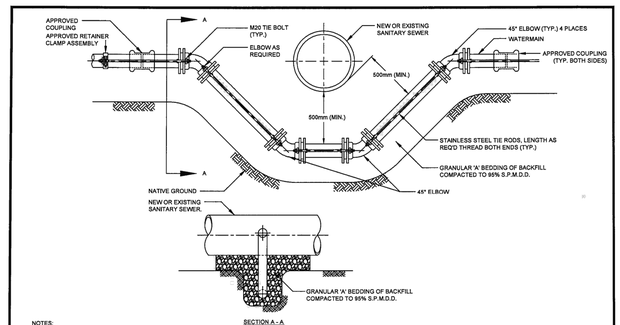
SECTION A - A

NOTES:
1. LOWERED SECTION OF WATERMAIN TO BE SAME MATERIAL AND CLASS AS EXISTING.
2. ALL JOINTS TO BE MECHANICALLY RESTRAINED, INCLUDING JOINTS ON EXISTING WATERMAIN.
3. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.

City of BARRIE
STANDARD DETAIL

LOWERING DETAILOF NEW OR EXIST. WATERMAIN CROSSING NEW OR EXIST. CULVERT, STORM SEWER OR DITCH	REV No. 1	DATE: FEB 2015
		SCALE: N.T.S.
		BSD-519

APPROVED
DATE: 6 Feb 2015
DIRECTOR OF ENGINEERING



SECTION A - A

NOTES:
1. MATERIAL FOR LOWERING SHALL BE DUCTILE IRON IF EXISTING MATERIAL IS METALLIC.
2. UNITS IN MILLIMETERS UNLESS OTHERWISE NOTED.
3. ALL JOINTS TO BE MECHANICALLY RESTRAINED, INCLUDING JOINTS ON EXISTING WATERMAIN.

City of BARRIE
STANDARD DETAIL

LOWERING DETAIL AT NEW OR EXIST. WATERMAIN CROSSING OF NEW OR EXIST. SANITARY SEWER	REV No. 1	DATE: FEB 2015
		SCALE: N.T.S.
		BSD-518

APPROVED
DATE: 6 Feb 2015
DIRECTOR OF ENGINEERING

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DRAWING REFERENCES

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SITE PLAN INFORMATION SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY HUNT DESIGN ASSOCIATES INC., DATED OCTOBER 2, 2024.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	SPA – 1ST SUBMISSION	OCT 8/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
N. A. MILLINGTON
100190121
Oct. 8/24
PROVINCE OF ONTARIO

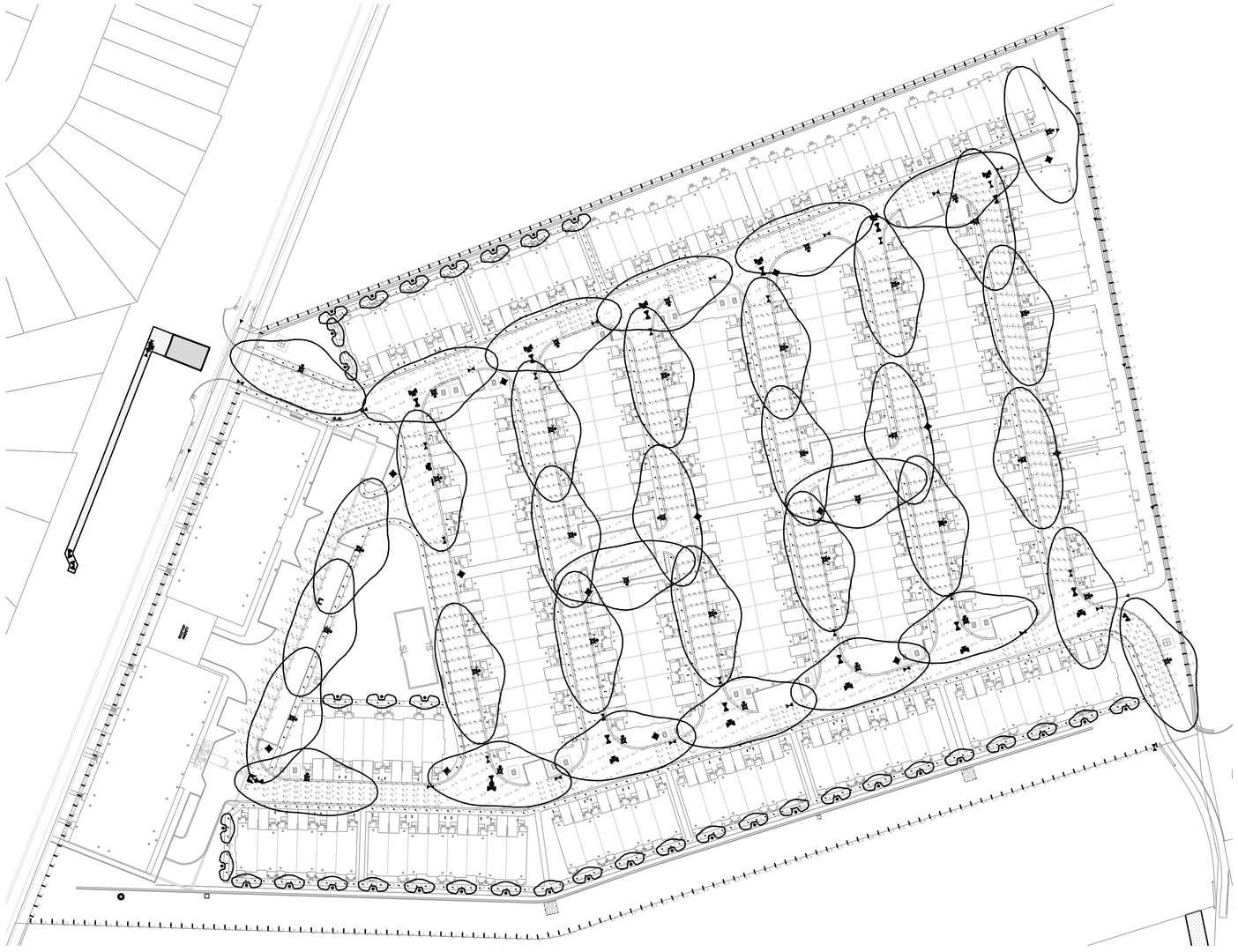
MAPLEVIEW VILLAGE - NORTH BLOCK
CITY OF BARRIE
PEARL BUILDERS

BARRIE STANDARD DETAILS

TATHAM ENGINEERING

DESIGN: LG	FILE: 422433-2	DWG: DE-2
DRAWN: LG	DATE: NOV. 2022	
CHECK: NM	SCALE: AS NOTED	

Drawing Name: 422433-DE01.dwg, Plotted: Oct 08, 2024



1 L1 OVERALL SITE PLAN PHOTOMETRICS

1: 750

ANSI / IES RP-8-22	
Table 11-1: Lighting Design Criteria for Streets	
Street Classification:	Local
Pedestrian Classification:	Low
Avg. illuminance:	0.3 x 15 = 4.5 Lux
Uniformity Ratio Avg (Avg/Min):	6.0
Uniformity Ratio Max (Max/Min):	10.0
Table 11-2: Lighting Design Criteria for Walkways within R.o.W	
Pedestrian Classification:	Low
Avg. illuminance (Horizontal):	2 Lux
Avg. illuminance (Vertical):	1 Lux
Uniformity Ratio Avg (Avg/Min):	10.0
Table 12-1: Lighting Design Criteria for Intersections	
Functional Classification:	Local/Local
Pedestrian Classification:	Low
Avg. illuminance:	8 Lux
Uniformity Ratio Avg (Avg/Min):	6.0
Obtrusive Light	
Functional Classification:	lighting zone 2 (Table 4.1)
Max. Vertical Illuminance:	3.0 (Table 4.2)

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
01 - RW- DW0	Illuminance	Lux	8.21	N.A.	N.A.	1.78	N.A.
01 - RW- DW0-1	Illuminance	Lux	6.30	N.A.	N.A.	4.50	N.A.
01 - RW- DW1-0	Illuminance	Lux	12.69	N.A.	N.A.	2.59	N.A.
01 - RW- DW1-1	Illuminance	Lux	10.31	N.A.	N.A.	4.30	N.A.
01 - RW- DW2-0	Illuminance	Lux	10.57	N.A.	N.A.	2.86	N.A.
01 - RW- DW2-1	Illuminance	Lux	11.19	N.A.	N.A.	4.00	N.A.
01 - RW- DW3 0	Illuminance	Lux	11.98	N.A.	N.A.	2.85	N.A.
01 - RW- DW3 1	Illuminance	Lux	9.62	N.A.	N.A.	5.34	N.A.
01 - RW- DW4 0	Illuminance	Lux	10.00	N.A.	N.A.	3.13	N.A.
01 - RW- DW4 1	Illuminance	Lux	10.64	N.A.	N.A.	3.94	N.A.
01 - RW- ENTRANCE	Illuminance	Lux	8.08	N.A.	N.A.	4.25	N.A.
01 - RW- MAIN 1	Illuminance	Lux	10.34	N.A.	N.A.	2.46	N.A.
01 - RW- MAIN 10	Illuminance	Lux	5.72	N.A.	N.A.	2.04	N.A.
01 - RW- MAIN 11	Illuminance	Lux	4.59	N.A.	N.A.	1.84	N.A.
01 - RW- MAIN 12	Illuminance	Lux	5.80	N.A.	N.A.	5.80	N.A.
01 - RW- MAIN 2	Illuminance	Lux	12.11	N.A.	N.A.	2.20	N.A.
01 - RW- MAIN 3	Illuminance	Lux	12.21	N.A.	N.A.	2.35	N.A.
01 - RW- MAIN 4	Illuminance	Lux	15.74	N.A.	N.A.	1.77	N.A.
01 - RW- MAIN 5	Illuminance	Lux	10.43	N.A.	N.A.	3.86	N.A.
01 - RW- MAIN 6	Illuminance	Lux	9.68	N.A.	N.A.	3.34	N.A.
01 - RW- MAIN 7	Illuminance	Lux	2.17	N.A.	N.A.	2.17	N.A.
01 - RW- MAIN 8	Illuminance	Lux	5.41	N.A.	N.A.	3.01	N.A.
01 - RW- MAIN 9	Illuminance	Lux	6.92	N.A.	N.A.	2.39	N.A.
02 - INT - DW0	Illuminance	Lux	8.72	N.A.	N.A.	4.84	N.A.
02 - INT - DW1	Illuminance	Lux	14.69	N.A.	N.A.	1.53	N.A.
02 - INT - DW2	Illuminance	Lux	13.60	N.A.	N.A.	1.55	N.A.
02 - INT - DW3	Illuminance	Lux	14.75	N.A.	N.A.	1.49	N.A.
02 - INT - DW4	Illuminance	Lux	14.38	N.A.	N.A.	1.44	N.A.
02 - INT - ENTRANCE	Illuminance	Lux	9.00	N.A.	N.A.	2.31	N.A.
02 - INT - MAIN DW0 S	Illuminance	Lux	7.83	N.A.	N.A.	5.59	N.A.
02 - INT - MAIN DW1 N	Illuminance	Lux	8.78	N.A.	N.A.	2.14	N.A.
02 - INT - MAIN DW1 S	Illuminance	Lux	8.54	N.A.	N.A.	3.28	N.A.
02 - INT - MAIN DW2 N	Illuminance	Lux	9.79	N.A.	N.A.	1.92	N.A.
02 - INT - MAIN DW2 S	Illuminance	Lux	9.32	N.A.	N.A.	2.82	N.A.
02 - INT - MAIN DW3 N	Illuminance	Lux	5.28	N.A.	N.A.	1.65	N.A.
02 - INT - MAIN DW3 S	Illuminance	Lux	8.92	N.A.	N.A.	3.43	N.A.
02 - INT - MAIN DW4 N	Illuminance	Lux	6.46	N.A.	N.A.	2.48	N.A.
02 - INT - MAIN DW4 S	Illuminance	Lux	7.43	N.A.	N.A.	5.31	N.A.
02-INT-EXIT	Illuminance	Lux	9.47	N.A.	N.A.	7.28	N.A.
03 - SW - Trail	Illuminance	Lux	4.62	10.6	0.4	11.55	26.50
03 - SW - Trail 2	Illuminance	Lux	4.60	11.8	0.1	46.00	118.00
03-PK-1	Illuminance	Lux	N.A.	23.2	1.0	9.07	N.A.
03-PK-2	Illuminance	Lux	N.A.	22.9	0.7	12.93	N.A.
04-SW-1	Illuminance	Lux	5.47	N.A.	N.A.	2.49	N.A.
04-SW-10	Illuminance	Lux	6.31	N.A.	N.A.	2.74	N.A.
04-SW-11	Illuminance	Lux	7.36	N.A.	N.A.	2.54	N.A.
04-SW-12	Illuminance	Lux	8.14	N.A.	N.A.	3.54	N.A.
04-SW-13	Illuminance	Lux	2.59	N.A.	N.A.	4.32	N.A.
04-SW-2	Illuminance	Lux	2.78	N.A.	N.A.	2.32	N.A.
04-SW-3	Illuminance	Lux	3.40	N.A.	N.A.	2.62	N.A.
04-SW-4	Illuminance	Lux	13.61	N.A.	N.A.	2.09	N.A.
04-SW-5	Illuminance	Lux	5.25	N.A.	N.A.	4.38	N.A.
04-SW-6	Illuminance	Lux	6.28	N.A.	N.A.	2.85	N.A.
04-SW-7	Illuminance	Lux	6.35	N.A.	N.A.	2.89	N.A.
04-SW-8	Illuminance	Lux	8.28	N.A.	N.A.	2.30	N.A.
04-SW-9	Illuminance	Lux	5.71	N.A.	N.A.	3.81	N.A.
09-PL-Tresspass	Illuminance	Lux	N.A.	3.0	0.0	N.A.	N.A.

Luminaire Schedule

Qty	Label	Description	Tag	LLF	Luminaire Lumens	Luminaire Watts	Total Watts	Mounting Height (m)
36	SB40-2W-4100-ASYM_00	SB40 Bollard	B1	0.840	174	2	72	1.5
37	ST37-100-5070-R21603_IES2002	Light Pole	L1	0.820	6000	101.994	3773.778	8.5

DISCLAIMER AND COPYRIGHT

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ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR COORDINATION	FEB/24
2.	SPA – FIRST SUBMISSION	SEP/24
3.	ISSUED FOR 1ST SPA SUBMISSION	OCT/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
A.DIXON
100223176
04OCT'24
PROVINCE OF ONTARIO

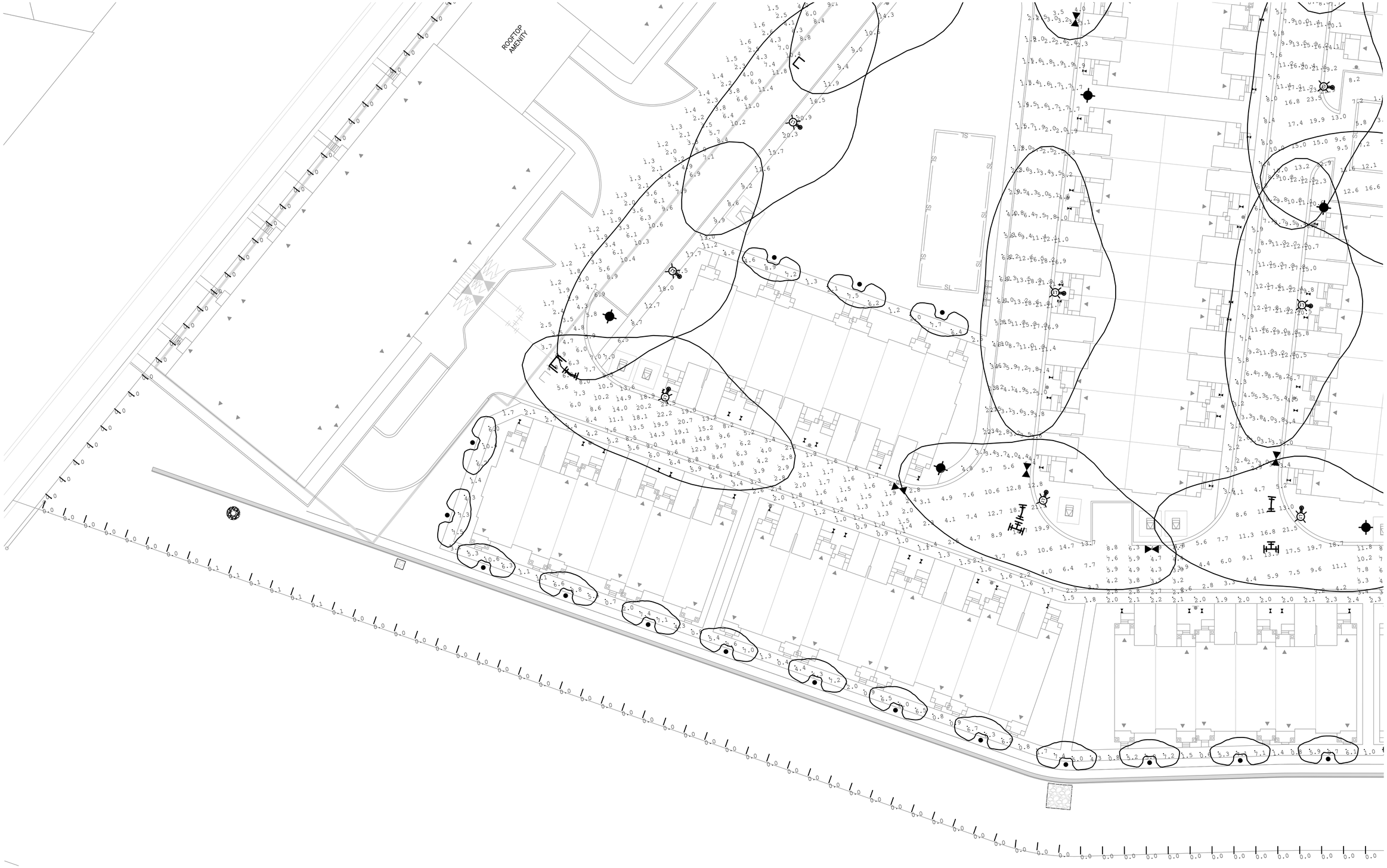
MAPLEVIEW DRIVE WEST & ESSA ROAD
BEAR CREEK CHANNEL IMPROVEMENTS
CITY OF BARRIE

PHOTOMETRICS

TATHAM ENGINEERING

DESIGN: AD	FILE: 422433	DWG: **L1**
DRAWN: RB	DATE: FEB. 2024	
CHECK: AD	SCALE: AS SHOWN	

FOR CONTINUATION SEE DRAWING L4



FOR CONTINUATION SEE DRAWING L3

1 L2 SITE PLAN PHOTOMETRICS

1: 750

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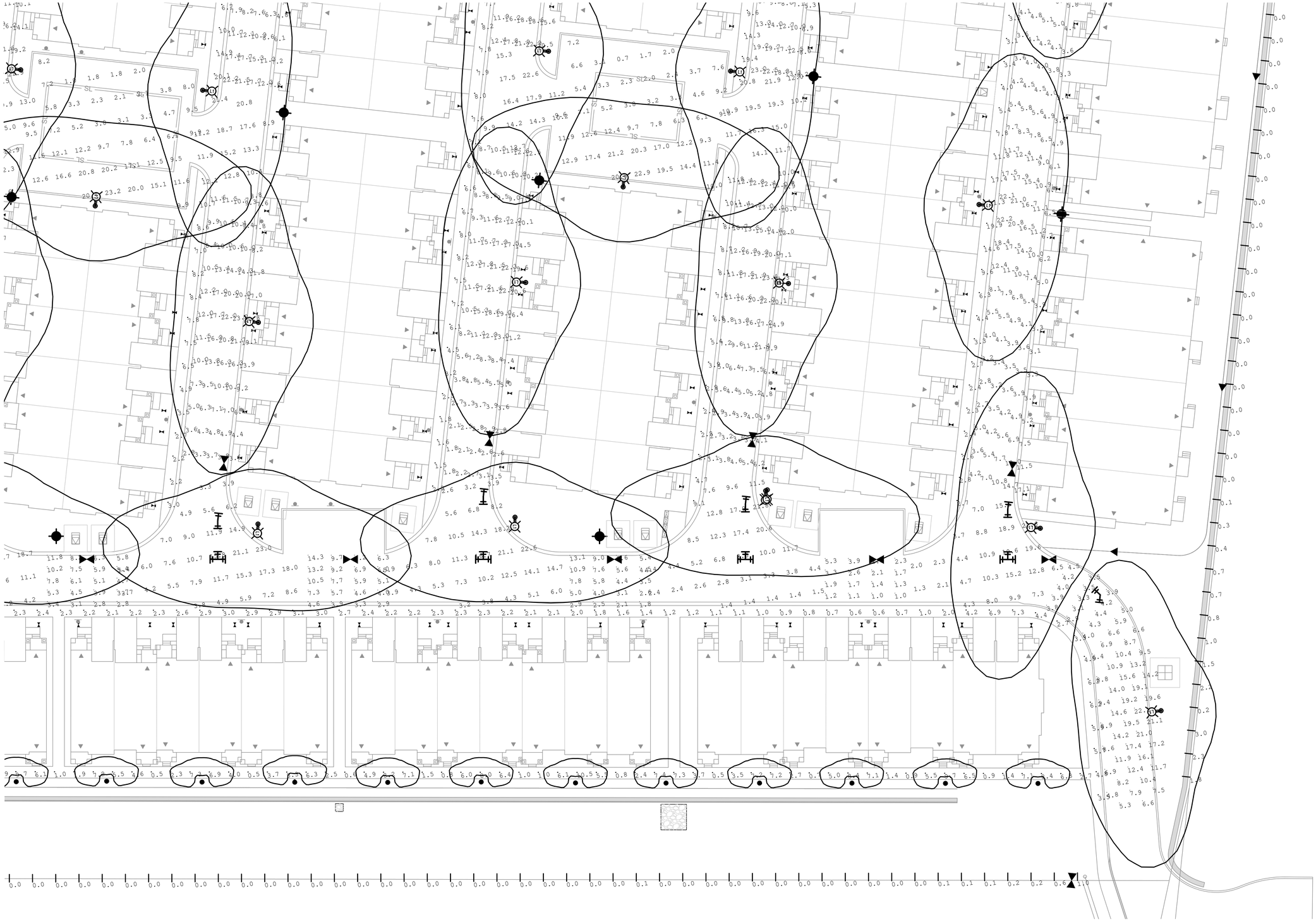
TATHAM ENGINEERING

PHOTOMETRICS

DESIGN: AD	FILE: 422433	DWG: L2
DRAWN: RB	DATE: FEB. 2024	
CHECK: AD	SCALE: AS SHOWN	

FOR CONTINUATION SEE DRAWING L5

FOR CONTINUATION SEE DRAWING L2



1 L3 SITE PLAN PHOTOMETRICS

1:750

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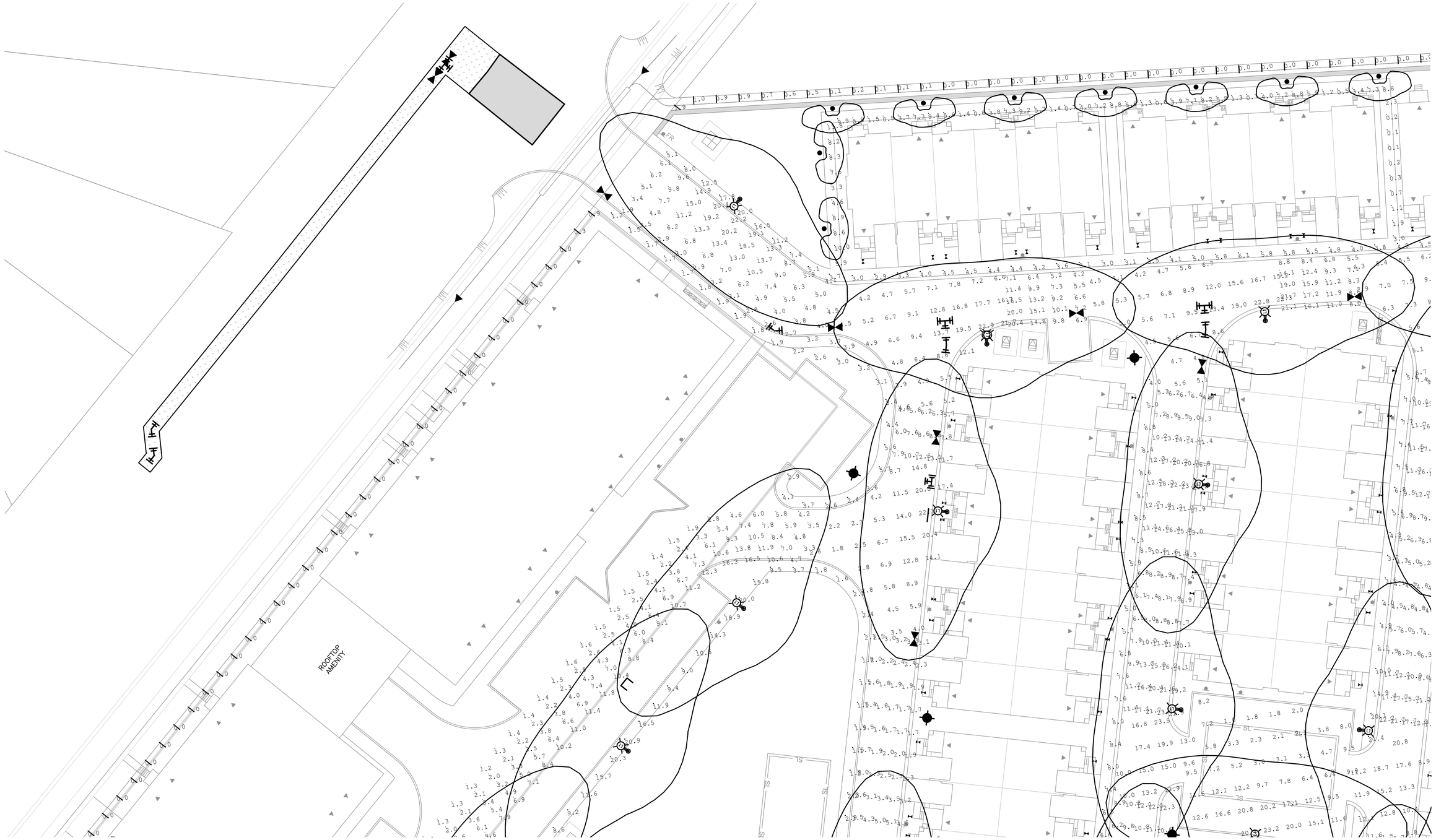
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100223176
04OCT'24
PROVINCE OF ONTARIO

MAPLEVIEW DRIVE WEST & ESSA ROAD
BEAR CREEK CHANNEL IMPROVEMENTS
CITY OF BARRIE

TATHAM ENGINEERING

PHOTOMETRICS

DESIGN: AD	FILE: 422433	DWG: L3
DRAWN: RB	DATE: FEB. 2024	
CHECK: AD	SCALE: AS SHOWN	



1 L4 SITE PLAN PHOTOMETRICS

1: 750

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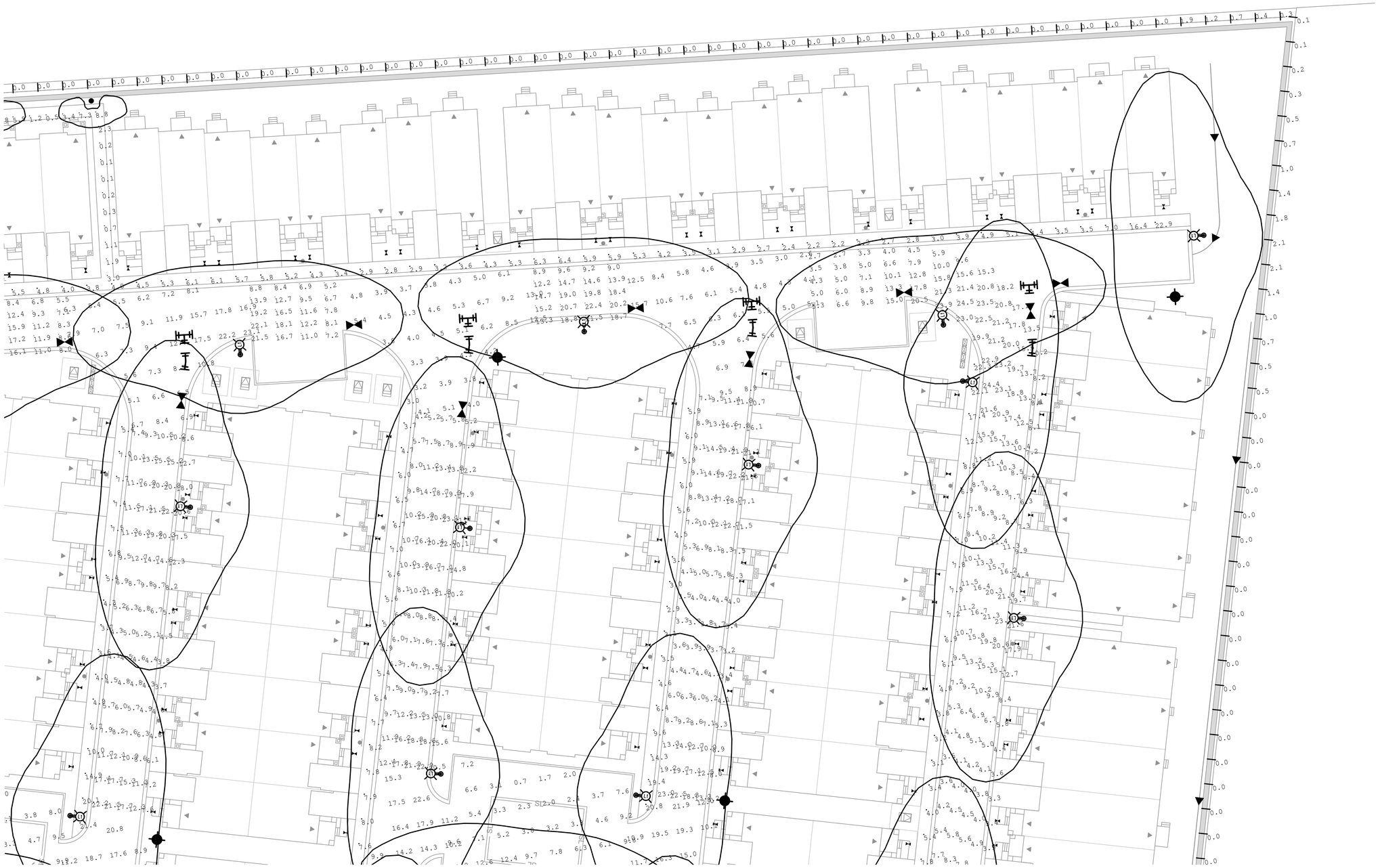
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PHOTOMETRICS

DESIGN: AD	FILE: 422433	DWG: L4
DRAWN: RB	DATE: FEB. 2024	
CHECK: AD	SCALE: AS SHOWN	



1 L5 SITE PLAN PHOTOMETRICS

1: 750

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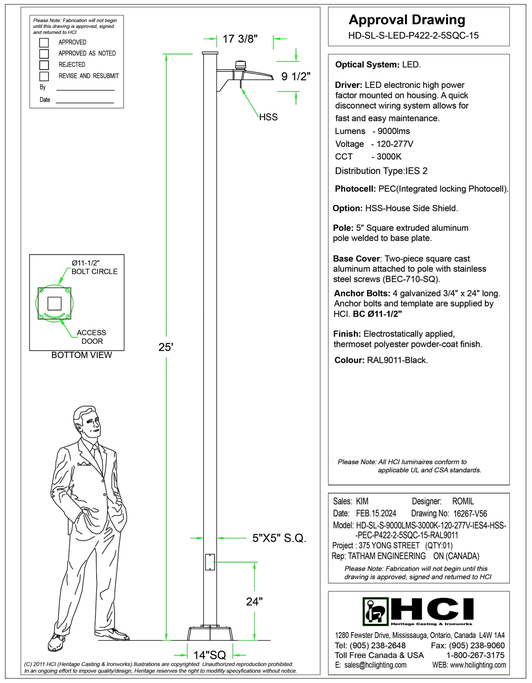
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TATHAM ENGINEERING

DESIGN: AD	FILE: 422433	DWG: L5
DRAWN: RB	DATE: FEB. 2024	
CHECK: AD	SCALE: AS SHOWN	



Approval Drawing

HD-SL-S-LED-P422-2-5SQC-15

Optical System: LED.

Driver: LED electronic high power factor mounted on housing. A quick disconnect wiring system allows for fast and easy maintenance.
Lumens - 9000lms
Voltage - 120-277V
CCT - 3000K
Distribution Type:IES 2

Photocell: PEC(Integrated locking Photocell).

Option: HSS-House Side Shield.

Pole: 5" Square extruded aluminum pole welded to base plate.

Base Cover: Two-piece square cast aluminum attached to pole with stainless steel screws (BEC-710-SQ).

Anchor Bolts: 4 galvanized 3/4" x 24" long. Anchor bolts and template are supplied by HCI. **BC Ø11-1/2"**

Finish: Electrostatically applied, thermoset polyester powder-coat finish.

Colour: RAL9011-Black.

Please Note: All HCI luminaires conform to applicable UL and CSA standards.

Sales: KIM Designer: ROMIL
Date: FEB.15.2024 Drawing No: 16267-V56
Model: HD-SL-S-9000LMS-3000K-120-277V-IES4-HSS--PEC-P422-2-5SQC-15-RAL9011
Project : 375 YONG STREET (QTY:01)
Rep: TATHAM ENGINEERING ON (CANADA)
Please Note: Fabrication will not begin until this drawing is approved, signed and returned to HCI

HCI Heritage Casting & Ironworks
1280 Fewster Drive, Mississauga, Ontario, Canada L4W 1A4
Tel: (905) 238-2648 Fax: (905) 238-9060
Toll Free Canada & USA 1-800-267-3175
E: sales@hcilighting.com WEB: www.hcilighting.com

HCI Heritage Casting & Ironworks **P1**

Heritage Casting & Ironworks, Ltd.
www.hcilighting.com
T: 1.905.238.2648 or 1.800.267.3175 | F: 1.905.238.9060
1280 Fewster Drive, Mississauga, ON L4W 1A4 CANADA

PRODUCT TECHNICAL DATA SHEET IES BUG Rating B0-U0-G2 Uplight Component = 0 (Dark Sky Compliant) **LED STREET LIGHTING**

LUMINAIRES

HD-SL SERIES

5 Year Warranty



Sizes

Sizes	L	W	H
Large	30"	12"	4-1/8"
Medium	24"	12"	3-5/8"
Small	17"	12"	3-1/2"

Specification Features

- LED Wattage up to 500W
- Color Temperature 3000K/4000K/5000K
- Lumen Efficacy: 140 Lm/W
- CRI > 80
- Die-Cast aluminum housing
- Quick disconnect driver system mounted on removable plate
- 1-10V dimmable optional
- Twist lock photocell optional
- Suitable for wet locations, IP66
- IES II, III, IV and V
- Warranty: 50,000 hrs
- Working Temperature: -40°C ~ + 55°C
- Bronze powder coated finish (RAL 8019)
- Variety of Mountings
- House Side Shield Option

Product Ordering Number

HD-SL SERIES

Product #	LED WATTAGE	LUMEN OUTPUT	COLOR TEMPERATURE	VOLTAGE	OPTICS	OPTIONS	COLOR
HD-SL-L	500W 400W	68000 Lm 56000 Lm	3000K 4000K 5000K	120V ~ 277V or 240V ~ 480V	IES Type II, III, IV and V	PEC- Twist Lock Photocell Optional	RAL 9011 Black HSS House Side Shield
HD-SL-M	300W 240W	41400 Lm 28800 Lm					
HD-SL-S	185W 150W 100W 80W 40W	25160 Lm 21000 Lm 14000 Lm 11200 Lm 5600 Lm					

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SB40 SOLAR BOLLARD

COMMERCIAL SOLAR LED BOLLARD

SB40 ORDERING CODE

Serie	LED Power Selection	OPERATING PROFILE SELECTION ACCORDING TO POWER		Color Temperature (°K)	Light Distribution
		if 2w is selected	if 3w is selected		
SB40	2W = 2 Watts				
	3W = 3 Watts	**A** = Dusk 3 hrs, 30%, 1hr morning	**F** = Dusk 1 hrs, 30%, 1h morning	**4000** = 4 000°K	**SYM** = Symmetrical
		B = Dusk 5 hrs, OFF, 2h morning	**G** = Dusk 4 hrs, OFF, 1h morning	**3000** = 3 000°K	**ASYM** = Asymmetrical
		C = Dusk to Dawn @ 50%	**H** = Dusk to Dawn @ 40%		
		D = Dusk 4 hrs, then 30%	**J** = Dusk 2 hrs, then 30%		
		E = Dusk 7 hrs, then OFF	**K** = Dusk 5 hrs, then OFF		
		SM1 = Custom	**SM2** = Sur mesure		

Example: **SB40-2W-B-4000-SYM** (**SB40** - _____ - _____ - _____-_____)

ACCESSORIES SOLD SEPERATLY

DESCRIPTION	PART NUMBER	NOTES
REMOTE CONTROL	**#RC01**	Not required for system installation and operation.

SOLAR VISION

MANUFACTURED BY:
Solar Vision inc.
www.solar-vision.ca
info@solar-vision.ca
T. : 819-729-0450

10 ANNIVERSARY

LICENSED FOR CANADIAN WINTERS

P.3/3

HCI LIGHTING
HERITAGE CASTING & IRONWORKS LTD.

1280 Fewster Drive
Mississauga, ON L4W 1A4 Canada

HD-SL LED Series



Description

HD-SL is designed for sustained, long-term performance with advanced thermal management, an elegantly simple heat sink and industry leading surge protection. The economical product line provides value-oriented area lighting solutions for a variety of applications without compromising quality or performance



Specification

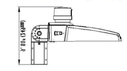
Housing
Die cast aluminum housing finished standard in a black powder coating.
Hardware
All exposed hardware is made of durable stainless steel, with industrial strength seals. Vertical heat fins that are optimal for heat dissiopation while keeping smooth outer surface.
Interior Design & Optical
Big driver compartment.Several types of drivers available and enough space to install intelligent devices.
Exterior Design & Finish
Luminaire is designed to fit post top mounting or pendant mounting with our ornamental arms and poles, and is suitable for wet locations.
Finish is electrostatically applied with thermoset polyester powder-coat.

HCI LIGHTING
HERITAGE CASTING & IRONWORKS LTD.

1280 Fewster Drive
Mississauga, ON L4W 1A4 Canada

Dimensions

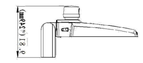
Models 30W-40W-60W (Side View)

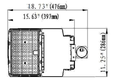


Top View

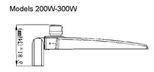


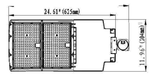
Models 100W-150W





Models 200W-300W





Product Ordering Number

PRODUCT	LUMENS	CCT	VOLTAGE	OPTICS	OPTIONS	FITTER	FINIALS
HD-SL	FROM 3,750 TO 42,000 LUMENS	4000K 5000K =10% Variance	120v-277v	IES TYPE II (2) III (3) IV (4) V (5)	**DIM** Dimming control **PCB** Button type photocell **HSS** House side shield **TWL** Twist lock system	N/A	N/A

DIFFUSER TYPE
N/A

Color
Standard RAL
6005 Green
7012 Grey
8019 Bronze
9011 Black/Txt
9016 White
Custom RAL

LED Light C UL US LISTED

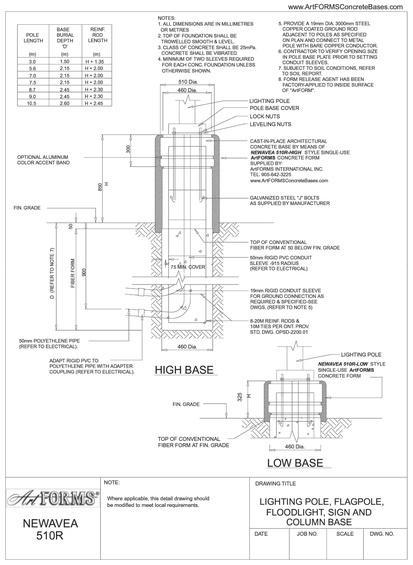
WARRANTY 7 YEAR LIMITED

ETL verified

www.ArtFORMSConcreteBases.com

POLE LENGTH	BASE BURIAL DEPTH 'D'	REINF ROD LENGTH
(m)	(m)	(m)
3.0	1.50	H + 1.35
5.0	2.15	H + 2.00
7.0	2.15	H + 2.00
7.5	2.15	H + 2.00
8.7	2.45	H + 2.30
9.0	2.45	H + 2.30
10.5	2.80	H + 2.45

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES OR METRES
2. TOP OF FOUNDATION SHALL BE LEVEL AND SMOOTH FINISH.
3. CLASS OF CONCRETE SHALL BE 25mPa. CONCRETE SHALL BE VIBRATED.
4. MINIMUM OF TWO SLEEVES REQUIRED FOR EACH CONC. FOUNDATION UNLESS OTHERWISE SHOWN.
5. PROVIDE A 19mm DIA. 3000mm STEEL GROUNDING ROD AT 1500mm ADJACENT TO POLES AS SPECIFIED ON PLAN AND CONNECT TO METAL POLE WITH BARE COPPER CONDUCTOR.
6. CONTRACTOR TO VERIFY OPENING SIZE OF BASE PLATE PRIOR TO SETTING CONDUIT SLEEVES.
7. SUBJECT TO SOIL CONDITIONS, REFER TO SOIL REPORT.
8. FORM RELEASE AGENT HAS BEEN CUSTOM APPLIED TO INSIDE SURFACE OF "ArtFORMS".



ArtFORMS
NEWAVEA 510R

NOTE:
Where applicable, this detail drawing should be modified to meet local requirements.

DRAWING TITLE
LIGHTING POLE, FLAGPOLE, FLOODLIGHT, SIGN AND COLUMN BASE

DATE	JOB NO.	SCALE	DWG. NO.

PLOT @ 3/32"=1"

1 L6 **PROPOSED POLE & LUMINAIRE SPECIFICATIONS**
NTS

2 L6 **PROPOSED CONCRETE BASE (914mm TALL)**
NTS

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CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

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DRAWING REFERENCES

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CONCEPT SITE PLAN INFORMATION AND ROAD WIDENING SHOWN ON THIS PLAN BASED ON DRAWING PREPARED BY IBI GROUP, DATED DECEMBER 7, 2022.

ELEVATION

TBM#1 ELEV. 308.395 m
TOP OF OPERATING NUT OF HYDRANT #6 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 210m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

TBM#2 ELEV. 308.080 m
TOP OF OPERATING NUT OF HYDRANT #4 LOCATED ON NORTH SIDE OF MAPLEVIEW DRIVE WEST APPROXIMATELY 400m EAST OF INTERSECTION OF MAPLEVIEW DRIVE WEST AND ESSA ROAD.

No.	REVISION DESCRIPTION	DATE
1.	ISSUED FOR COORDINATION	FEB/24
2.	SPA – FIRST SUBMISSION	SEP/24
3.	ISSUED FOR 1ST SPA SUBMISSION	OCT/24

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
A.DIXON
100223176
04OCT'24
PROVINCE OF ONTARIO

MAPLEVIEW DRIVE WEST & ESSA ROAD BEAR CREEK CHANNEL IMPROVEMENTS CITY OF BARRIE

SPECIFICATIONS

TATHAM ENGINEERING

DESIGN: AD	FILE: 422433	DWG: L6
DRAWN: RB	DATE: FEB. 2024	
CHECK: AD	SCALE: AS SHOWN	