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HILLSIDE COMMONS RESIDENTIAL APARTMENTS

Servicing and Stormwater Management Report

Prepared for: Hillside Commons Inc.

Engineering excellence. Planning progress. Liveable landscapes.

HILLSIDE COMMONS RESIDENTIAL APARTMENTS SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

Issued: December 23, 2021
Revised: May 6, 2022
Revised: June 2, 2023
Revised: August 11, 2023

Novatech File: 120237
Ref: R-2021-116

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August 11, 2023

BY EMAIL

City of Ottawa
Planning, Infrastructure and Economic Development Department
Infrastructure Approvals Division,
110 Laurier Avenue West, 4th Floor
Ottawa, ON K1P 1J1

Attention: **Cam Elsby, Project Manager**

Reference: **Hillside Commons Residential Apartments**
Servicing and Stormwater Management Report
Novatech File No.: 120237

Please find enclosed the revised Servicing and Stormwater Management Report for the Hillside Commons Residential Apartments, located in the OTC East development near the St. Joseph/10th Line intersection. The report demonstrates how the proposed site will be serviced with storm, sanitary, watermain, utilities, and stormwater management and is submitted for your review and approval.

If you have any questions or comments, please do not hesitate to contact us.

Sincerely,

NOVATECH

Drew Blair

Drew Blair, P. Eng.
Senior Project Manager | Land Development Engineering

Encl.

cc: Eric Danis, Landric Homes
Michael Boucher, DCR Phoenix

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1.0 INTRODUCTION

Novatech has been retained by Hillside Commons Inc. to prepare this servicing and stormwater management report in support of the site plan application of the Hillside Commons Residential Apartments, located within the Orleans Town Centre (OTC) East lands. The site is located at 3277 St. Joseph Boulevard. The key plan (**Figure 1**) highlights the site location, at the northwest corner of the St. Joseph/Tenth Line intersection. The site will be developed by Hillside Commons Inc. and includes two (2) mid-rise residential apartment buildings with a combined two hundred seventy-two (272) rental units. The proposed development features two (2) nine-storey residential buildings, underground parking, and servicing as shown in **Figure 2** – Concept Plan.

This servicing and stormwater management report will confirm how the proposed Hillside Commons Residential Apartments will be serviced with sanitary, water, stormwater management, and utilities.

1.1 Consultations and Approvals

Since this site is located within the OTC East Lands, this report adheres to the recommendations of the two approved Serviceability and Stormwater Management Reports (SSMR), Hillside Vista Towns, Ottawa, Ontario prepared in June 2015 by Novatech (Ref. R-2014-059) and Hillside Vista Walk-up Condos prepared in June 2019 by Novatech (Ref. R-2016-116). This SSMR outlines the design criteria for the proposed Hillside Commons Residential Apartments. The MOE have been consulted previously as well.

1.2 Planning Context

The subject site is now designated as *Corridor – Mainstreet* for the portion abutting St. Joseph Boulevard as well as *Minor – Corridor* for the portion abutting Tenth Line Road. The property is also marked as an *Evolving Neighbourhood* on *Schedule B8 – Suburban (East) Transect* of the City of Ottawa's Official Plan.

The subject property is dual zoned as Residential Fifth Density, Subzone Z, Urban Exception 1415 – R5Z[1415], and Residential Fifth Density, Subzone Z, Urban Exception 1363 – R5Z[1364] under the City of Ottawa's Zoning By-law 2008-250.

1.3 Existing Land Use and Topography

The proposed site's surface is currently undeveloped and consists of open space, with some shrubbery and tree growth. However, a 10-metre-wide easement for the existing City of Ottawa's Gloucester Cumberland 1200mm sanitary trunk sewer bisects the site in a north-south direction. The site has roughly 58.7m of frontage on St. Joseph Boulevard to the south, existing residential to the north, Hillside Terrace development to the west, and Tenth Line Road to the east.

There is a significant grade difference between St. Joseph Boulevard and Lionel Rheo Private as well as grade differences between Tenth Line Road and Lionel Rheo Private. Generally, sloping downwards, southeast to northwest.

1.4 Geotechnical Investigation

Paterson Group Inc. conducted a geotechnical investigation in support of the proposed development. The principal findings of the geotechnical investigation are as follows:

- Site topography and geotechnical profile vary greatly throughout the site due to its natural slope;

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Engineers, Planners & Landscape Architects

Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone	(613) 254-9643
Facsimile	(613) 254-5867
Website	www.novatech-eng.com

HILLSIDE COMMONS RESIDENTIAL APARTMENTS

KEY PLAN

N.T.S.

JUN 2023	120237	FIG-1

SHT8X11.DWG - 216mmx279mm

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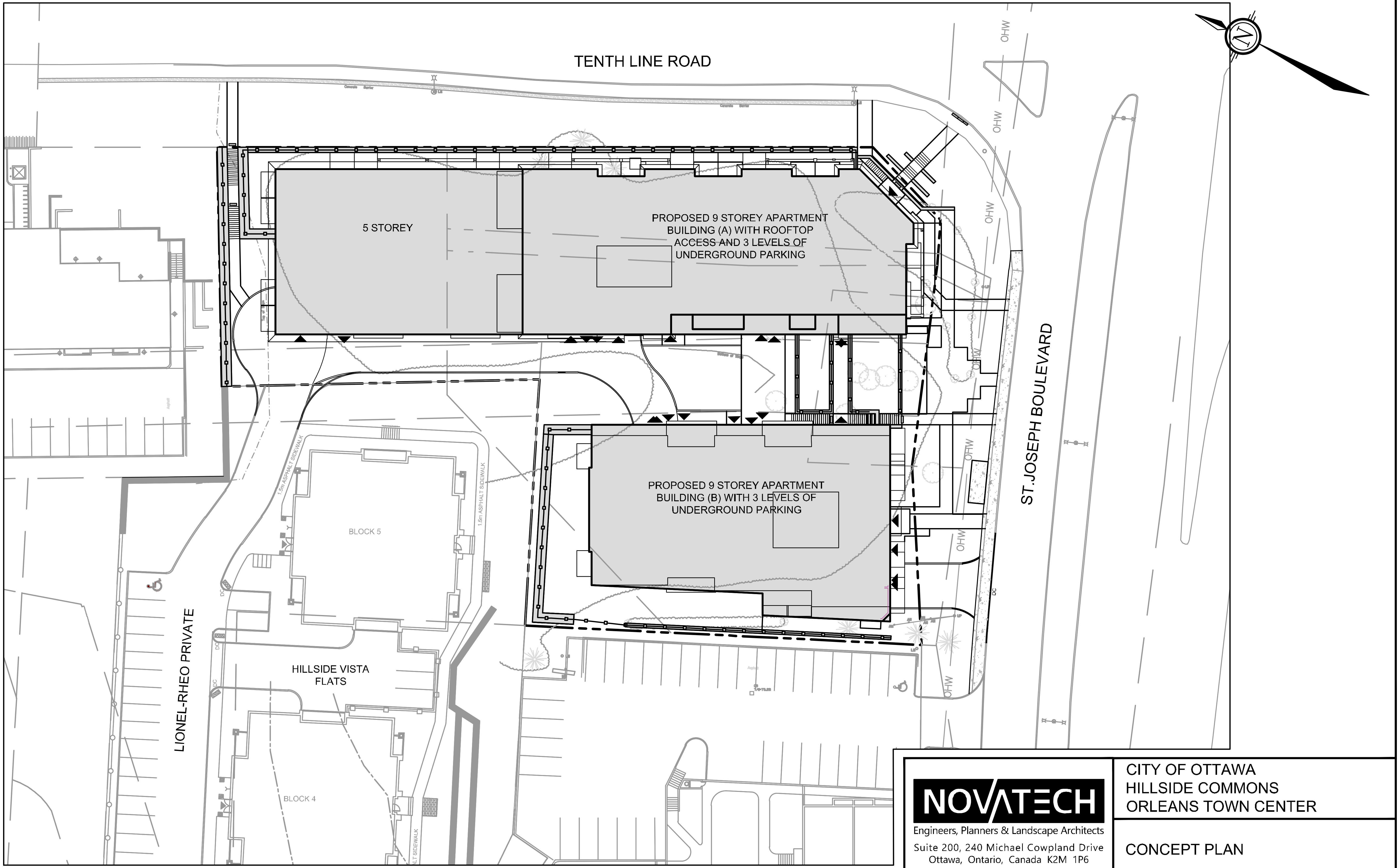

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Suite 200, 240 Michael Cowpland Drive
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Telephone	(613) 254-9643
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CITY OF OTTAWA
HILLSIDE COMMONS
ORLEANS TOWN CENTER

CONCEPT PLAN

1 : 500 0 5 10 15 20

JUN 2023	120237	FIG-2

SHT11X17.DWG - 279mmX432mm

- Surficial soil on site is generally fill material (generally composed of silty sand or silty clay) with a thickness of 1.5m to 8.7m;
- The fill is generally underlain by stiff, brown silty clay with glacial till underlying the silty clay at approximate depths of 5.6m to 7.5m;
- Bedrock was cored at a generally increasing depth from southwest to northeast across the property at approximate depths of 1.5m to 9.2m;
- The groundwater levels were established at depths of 4.75m to 8.52m, or elevations ranging from 57m to 59m.

The report provides engineering guidelines based on Paterson Group's interpretation of the geotechnical information and project requirements. Refer to the Geotechnical Report for complete details.

1.5 Drainage Outlet

Under existing conditions, storm runoff from the site flows overland down Lionel-Rheo Private towards Privé de la Récolte where it flows overland along the roadway and is captured by the roadway catchbasins, then conveyed by the existing storm sewers to Eric Czapnik Way, and ultimately to the existing Brisebois Creek SWM Facility.

1.6 Additional Reports

This report provides information on the considerations and approach by which Novatech has designed and evaluated the proposed servicing for the Hillside Commons Residential Apartments. This report should be read in conjunction with the following:

- *Hillside Vista Walk-Up Condos Stormwater Management Report (August 23, 2019)*
- *Hillside Vista Walk-Up Condos Serviceability Report (August 23, 2019)*
- *Geotechnical Investigation, Proposed Multi-Storey Buildings, Hillside Development, 3277 St. Joseph Boulevard, Ottawa, Ontario* (Report: PG5625-1) *(Paterson Group Inc., April 12, 2021)*.

Additional supporting reports include:

- *Serviceability and Stormwater Management Report, Orleans Town Centre East Lands, Ottawa, Ontario* (Novatech, June 2011/Ref. # R-2008-151);
- *Serviceability and Stormwater Management Report – Hillside Vista Towns (Novatech, June 8, 2015).*

2.0 SANITARY SERVICING

The design criteria used to determine the sanitary flows are based on the City of Ottawa's sewer design guidelines and are as follows:

- Residential Average Flow = 280 L/capita/day
- Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Peak Extraneous Flows (Infiltration) = 0.33 L/s/ha
- Apartment Population Density = 2.1 people per unit
- Minimum Full Flow Velocity = 0.6 m/s
- Maximum Full Flow Velocity = 3.0 m/s

Based on the criteria from the City of Ottawa Sewer Design Guidelines, the calculated peak sanitary design flow for the Hillside Commons Apartments, Hillside Vista Walk-Up Condos and adjacent townhouse blocks is 11.78 L/s. For detailed calculations refer to the Sanitary Sewer Design Sheet located in **Appendix A**.

Previously, the Hillside Vista Condos Serviceability report had assumed a residential average flow of 350 L/capita/day. The City of Ottawa has changed its guidelines in 2018, now requiring a residential average flow of 280 L/capita/day for design criteria. For this report, the peak sanitary design flows for the Hillside Vista Condos and neighboring townhouses have been recalculated using 280 L/capita/day.

The Hillside Commons site is bisected by an existing 1200 mm concrete sanitary trunk sewer located between Buildings A and B. A 10m wide easement in favour of the City of Ottawa is provided for this trunk sewer. As this sewer must remain accessible for future maintenance, the proposed sanitary pipes cross the easement perpendicularly. Sanitary flows from Building B will be conveyed to Building A where the flow will travel through Building A and outlet to the existing manhole 203A on Lionel-Rheo Private. The peak sanitary flows from the site will be directed by gravity sewer into the existing Récolte Private sanitary sewer prior to discharging into the Eric Czapnik Way sanitary sewer as per the approved design in the 2019 Hillside Vista Walk-Up Condos Serviceability Report.

Table 2.1 compares the peak rate of sanitary flow from Hillside Commons, Hillside Vista Walk-Up Condos and the Hillside Townhouses calculated to outlet into the Eric Czapnik municipal sanitary sewer determined in the 2019 approved Hillside Vista Walk-Up Condos Serviceability Report based on the design criteria listed above.

Table 2.1: Comparison of Peak Sanitary Flows

Development	Units		Population Density		Total Population	Area (ha)	Peaking Factor	Peak Sanitary Flow
	Towns	Condos	Towns	Condos				
Hillside Vista Towns (2015)	34	16*	2.7	1.8	121*	2.22	4	10.60 L/s
Hillside Vista Walk-Up Condos (2019)	26	168**	2.7	1.88	389	2.21	4	9.15 L/s
Hillside Commons (2020)	26	364	2.7	2.1	835	2.21	3.3	11.78 L/s

* Future condo buildings not included in total.

** Total includes 90 currently proposed condo units plus 78 possible future units as per 2015 Servicing report (2.48 L/s flows)

There is a proposed 2.63 L/s (30%) increase of peak sanitary flow to the existing Eric Czapnik Way sanitary sewer from the private site including the proposed Hillside Commons compared to the peak sanitary release rate from the approved 2019 report. The approved 2019 Hillside Vista report had assumed 78 future units where the proposed is 274 units. The downstream 1200mm sanitary trunk sewer has a capacity of 1280 L/s at 0.1%. The increased flow represents an increase of 0.2% in flow in the downstream sewer system. There should be no negative impact to the existing sanitary sewers with the increased flow from the Hillside Commons Apartment buildings. For reference, a copy of the Hillside Vista Walk-Up Condos sanitary sewer design sheet is included in **Appendix A**.

3.0 WATERMAIN

The site will be entirely serviced from the existing 400mm watermain on St. Joseph Boulevard. Buildings A and B will be independently connected to the existing 400mm watermain on St. Joseph Boulevard. Two (2) - 200mm watermain services shall be installed for each Buildings A and B to provide a looped watermain system. The mechanical design will accommodate the watermain within both buildings.

The existing and proposed watermain configuration is shown on **Figure 3** – Watermain Layout.

It is proposed that one (1) municipal fire hydrant will be installed to service the site located south of Building A. Additionally, there are two (2) existing hydrants on St. Joseph Blvd. (one east and one west from the site) and one (1) existing hydrant between Blocks 4 and 5 of Hillside Vista Flats. There are fire department connections (Siamese) on both buildings. A fire hydrant coverage plan is shown in **Figure 4** – Fire Hydrant Coverage Plan.

3.1 Design Criteria

As per the City of Ottawa Watermain Design Guidelines for Water Distribution, preliminary watermain analysis of the proposed development was completed based on the following criteria:

Demand Scenarios:

- Average Daily Demand: 280 L/person/day
- Average Person Per Unit: 2.1 person/unit
- Maximum Daily Demand: 2.5 x Average Daily Demand
- Peak Hour Demand: 2.2 x Maximum Daily Demand
- Fire Flow Demand: Fire Underwriter’s Survey

System Requirements:

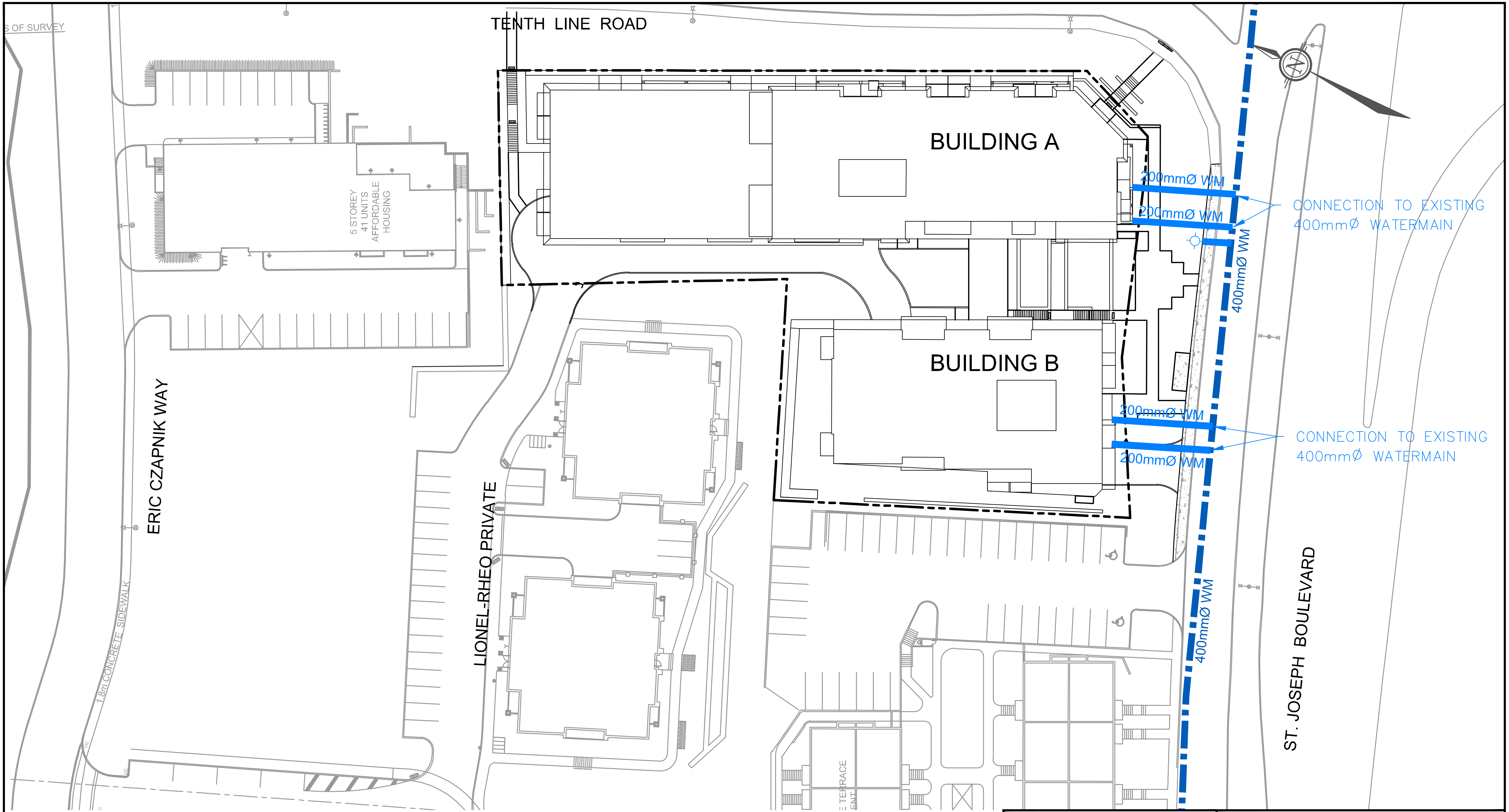
- Maximum Pressure (System): 690kPa (100psi)
- Maximum Pressure (Service): 552kPa (80psi)
- Minimum Pressure: 275kPa (40psi)
- Minimum Pressure (w/ fire flow): 140kPa (20psi)
- Maximum Age Onsite (Quality): 192 hours
- Friction Factor:

Pipe Size	C-Factor
< 200mm	100
200mm-300mm	110

3.2 Hydraulic Analysis

Hydraulic modelling was completed using “EPANET for Windows Version 2.0”.

The Hillside Commons Residential Apartments’ watermain was analyzed under three operating conditions: high pressure, maximum daily demand plus fire flow, and peak hour. The high-pressure condition (average daily demand) was analyzed to ensure the system meets the design criteria for maximum pressure and quality. The maximum daily demand plus fire flow and peak hour conditions were analyzed to ensure the system meets the design criteria for maximum flow and minimum pressure. A fire flow rate has been determined by Quadrant Engineering and Novatech based on the Fire Underwriter’s Survey. As Quadrant Engineering’s fire flow rate is more conservative, it will used and applied to the proposed fire hydrant at Node N3. Both fire flow calculations are detailed in **Appendix B**. The boundary conditions provided by the City of Ottawa have been determined based on the fire flow rate calculated by Quadrant Engineering.



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LEGEND

SITE BOUNDARY

PROPOSED 200mm WATERMAIN

EXISTING 400mm WATERMAIN

PROPOSED FIRE HYDRANT

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone	(613) 254-9643
Facsimile	(613) 254-5867
Website	www.novatech-eng.com

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WATER NETWORK PLAN

SCALE
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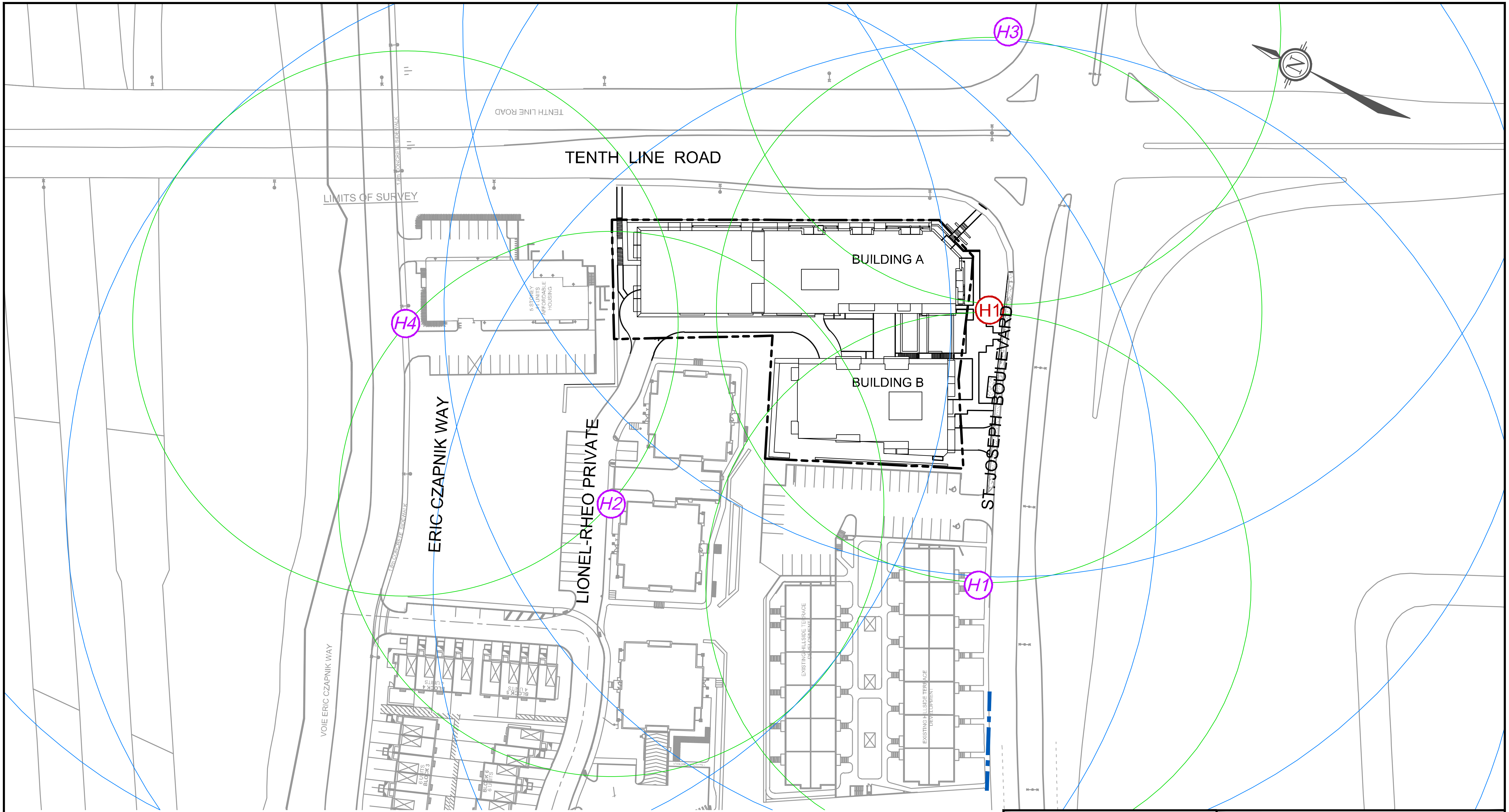
DATE	JOB	FIGURE
JUN 2023	120237	FIG-3

SHT11X17.DWG - 279mmX432mm



LEGEND

○	75mm COVERAGE RADIUS	H1	PROPOSED HYDRANT
○	150mm COVERAGE RADIUS	H1	EXISTING HYDRANT

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Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone	(613) 254-9643
Facsimile	(613) 254-5867
Website	www.novatech-eng.com

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HYDRANT COVERAGE PLAN

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DATE	JOB	FIGURE
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The following table summarizes the demand and performance of the watermain during each of the three operating conditions.

Table 3.1: Hydraulic Model Summary

Operating Conditions	Demand (L/s)	Fire Flow (L/s)	Allowable Pressure (kPa/psi)	Max/Min Pressure (kPa/psi)	Time (hrs)
High Pressure	1.86	N/A	690/80 (Max)	419.87/60.90 (Max)	0.38
Max Daily Demand and Fire Flow	4.66	105	138/20 (Min)	364.93/52.93 (Min)	N/A
Peak Hour	10.26	N/A	276/40 (Min)	359.14/52.09 (Min)	N/A

The analysis of the watermain during all operating conditions confirms the proposed watermain can service the site while maintaining maximum and minimum pressure specifications.

A copy of the City of Ottawa provided boundary conditions, fire flow calculations, and detailed hydraulic analysis input and results are included in **Appendix B**.

4.0 STORMWATER MANAGEMENT CRITERIA

The stormwater management criteria used in the design of the Hillside Commons Residential Apartments have been based on the following:

- *Stormwater Management Report, Hillside Vista Walk-up Condos, Ottawa, Ontario* (Novatech, August 2019/Ref. # R-2018-091);
    - This report outlines the design criteria for all future development within the OTC East Lands, including the proposed Hillside Commons Residential Apartments development;
- *Serviceability Report, Hillside Vista Walk-up Condos, Ottawa, Ontario* (Novatech, August 2019/Ref. # R-2016-116);
- City of Ottawa Sewer Design Guidelines (October 2012).

The following excerpt from the *Stormwater Management Report, Hillside Vista Walk-up Condos, Ottawa, Ontario* (Novatech, August 2019/Ref. # R-2018-091) defines the overall release rate for the Hillside Commons site (Area B-09 in the following excerpt):

Future Development

- Peak flows from the future development areas (B-06 and B-09) are to be controlled to 150L/s/ha. Area B-06 was originally intended as a ROW connecting the future development to Privé de la Récolte. However, under the revised site plan, the area will be left as open space. Area B-06 does not have any proposed infrastructure to control peak flows, so runoff will be directed uncontrolled onto Privé de la Récolte. As a result, the allowable release rate from area B-09 has been adjusted such that the overall release rate from areas B-06 and B-09 meets the 150 L/s/ha requirement.

Allowable release rate = (0.21 ha + 0.51 ha)*(150 L/s/ha)

(B-06 & B-09) = 108 L/s

100-yr peak flow from B-06 = 51.4 L/s

Allowable flow from B-09 = 108 – 51.4

= 56.6 L/s

Under interim conditions, runoff from the open space will be intercepted by two swales (refer to DWG) and directed towards a temporary DICB which is connected to the proposed storm sewer system.

Under ultimate conditions, the temporary DICB will be removed. For modeling purposes area B-09 has been directed to a storage node which represents the required on-site storage for the future development. Flows from this area are controlled to the allowable release rate of 56.6 L/s. The ICD sizes and storage locations will need to be confirmed as a part of the planned future development. These details are included in **Appendix C**.

4.1 Existing Storm Drainage Infrastructure (Privé de la Récolte)

The Privé de la Récolte storm sewers were designed and approved as part of the Hillside Vista Towns development, based on the overall SWM Criteria developed for the OTC East site. The design of the Privé de la Récolte storm sewers accounted for the future development of the Hillside Vista Walk-Up Condos site and the Hillside Commons Residential Apartments. As such, there are no changes proposed to the previously approved design of these sewers.

4.2 Minor System (Storm Sewers)

- Storm sewers (and underground storage systems) are to be designed to store runoff and attenuate peak flows to the allowable release rates established as a part of the OTC East report and the 2019 SWM Report for Hillside Vista Walk-Up Condos;
    - The Hillside Commons site is to be controlled to an allowable release rate of 56.6 L/s as outlined in previous reports and Section 4.0. Refer to **Appendix C.**
- Ensure that the 1:100-year HGL in the storm sewer system is below the T/G elevations of the storm manholes;
- Units within the Hillside Commons Residential Apartments development are to be connected to a separate foundation drain system on Lionel-Rheo Private, and there will be no foundation connections from the units to the underground storage system.

4.3 Major System (Overland Flow)

- Provide on-site storage for storm runoff which exceeds the allowable minor system release rate from the site up to and including the 100-year design event;
- Ensure major system flows do not adversely affect downstream infrastructure;
- Maximum flow depths and elevations on streets shall not exceed 0.35 m and shall be confined to the road right-of-way as well as not be within 0.15 m (vertical) to the nearest building opening;
    - The maximum flow depth on streets under either static and/ or dynamic conditions shall be 0.35 m.

4.4 Water Quality Control

- Water quality control will be provided by the downstream Brisebois Creek SWM facility which has been designed to provide quantity and quality control for the proposed development.

5.0 PROPOSED STORM SYSTEM DEVELOPMENT

Storm servicing for the Hillside Commons Residential Apartments development will be provided using a dual drainage system. Runoff will be stored and conveyed by an underground pipe system (minor system), while flows from large storm events which exceed the capacity of the minor system will be conveyed overland along defined overland flow routes (major system). The outlet for the site is the Lionel-Rheo Private storm sewer, which connects to the Privé de la Récolte storm sewer and the municipal Eric Czapnik Way storm sewers. The ultimate outlet for the proposed development is the existing Brisebois SWM Facility.

A portion of the site along the south property line will have uncontrolled direct runoff to St. Joseph Boulevard (13.4L/s). The minor system outlet will be overcontrolled to maximum 43.2L/s to account for the uncontrolled runoff from this area. The maximum total combined release rate for the site will remain at 56.6 L/s.

The downstream development (Hillside Vista Walk-Up Condos) utilizes in-line storage within the storm sewers; therefore, a separate foundation drain system on Lionel-Rheo Private was designed. The proposed development will also have the foundation drains connect to a separate foundation drain system and there will be no foundation connections from the units to the storm sewer system.

5.1 Storm Sewers

The proposed storm and foundation drain sewer systems are shown on **Figure 5** – Storm Alignment and the General Plan of Services (120237-GP) and Storm Drainage Area Plan (120237-STM) in **Appendix E**.

5.1.1 Allowable Release Rate

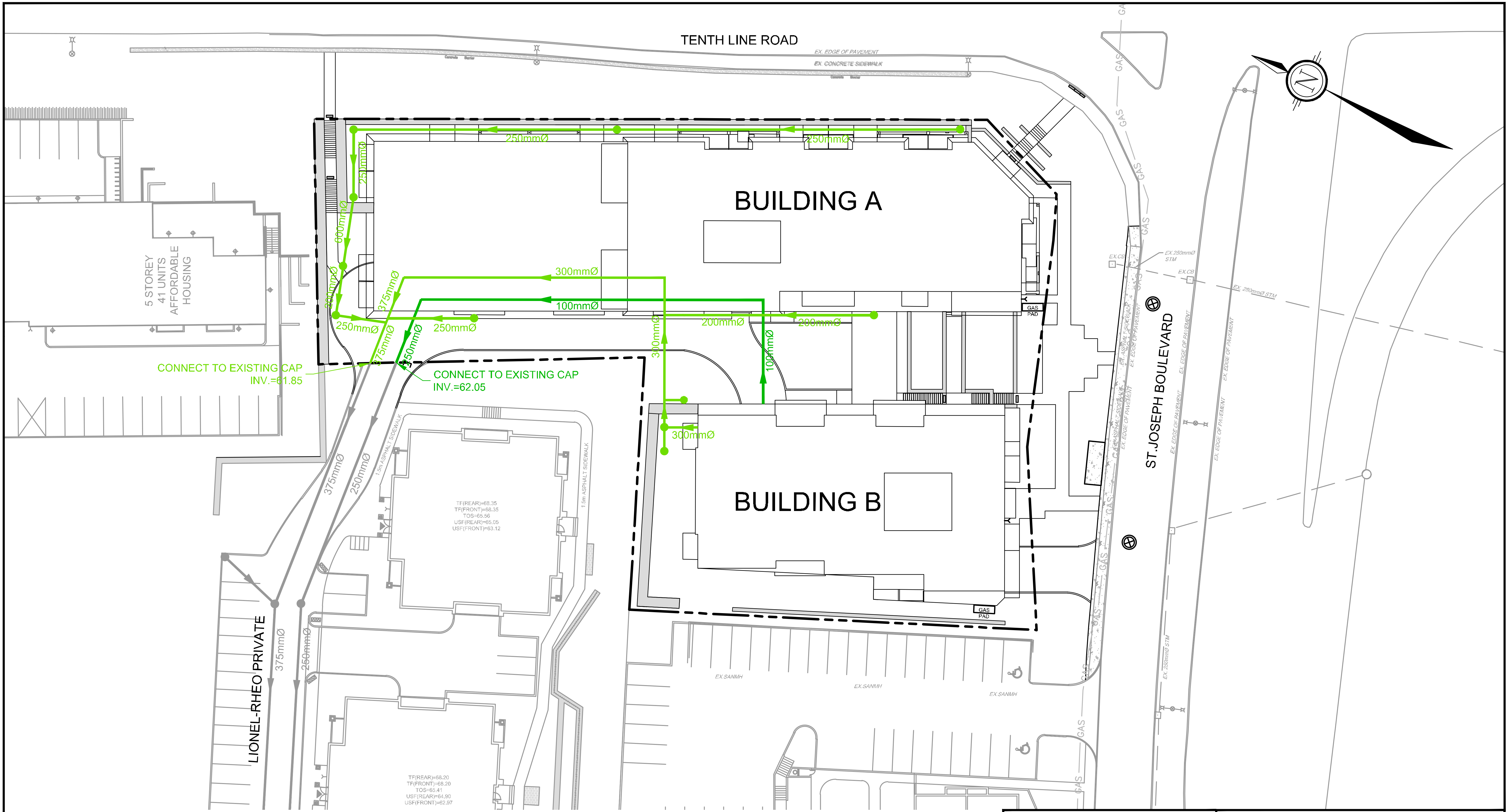
The Hillside Commons development was outlined as a future development area in the 2019 stormwater management report for the Hillside Vista Walk-up Condos development. An allowable release rate of 150 L/s/ha was assigned for the future development areas and the allowable release rate for the portion of the Hillside Commons development was determined to be 56.6 L/s. Refer to the Servicing Plan (**120237-GP**) for details.

5.1.2 Inlet Control Devices

Inflows to the storm sewer system will be controlled using inlet control devices (ICDs) installed in the proposed catchbasins. The ICDs have been sized to restrict the flow from the development to the allowable release rate listed in **Section 4.1**. ICDs specified at each inlet are indicated on the General Plan of Services (**120237-GP**).

5.2 Overland Flow and Surface Storage (Major System)

The paved areas have been designed to store some runoff from storms that exceed the 5-year storm event capacity of the underground sewer system. The Hillside Commons development has been graded to ensure that ponding is confined within the site at a maximum depth of 0.35 m (static ponding + dynamic flow). An overland flow path has been provided to ensure that



LEGEND

- SITE BOUNDARY
- PROPOSED STORM SEWER C/W FLOW DIRECTION
- PROPOSED FOUNDATION DRAIN C/W FLOW DIRECTION
- EXISTING STORM SEWER C/W FLOW DIRECTION

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone	(613) 254-9643
Facsimile	(613) 254-5867
Website	www.novatech-eng.com

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STORM ALIGNMENT

SCALE
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FIGURE
FIG-5

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runoff from extreme storm events that exceeds the available storage can be safely directed onto the adjacent roadway (Lionel-Rheo Private). There is no 2-year ponding.

6.0 HYDROLOGIC & HYDRAULIC MODELING

6.1 Model Selection

The performance of the proposed storm drainage system for the Hillside Commons development was evaluated using a PCSWMM hydrologic/hydraulic model. The previous analysis for the Hillside Vista Walk-Up Condos was done using an *Autodesk Storm and Sanitary Analysis* (SSA) model. Using PCSWMM to model the Hillside Commons development will be consistent with the previous model since both PCSWMM and Autodesk SSA are based on the SWMM 5.0 engine.

For this design, only the proposed development is being modelled in PCSWM. The proposed development was previously modelled in the Autodesk SSA model as single drainage area (a future development area). In the Autodesk SSA model, the proposed development contained all major flows within the site during all storm events up to and including the 100-year event. There were only minor system flows to Lionel-Rheo Private. The PCSWMM model was designed to the same condition as the Autodesk SSA model to avoid significant impacts to the downstream developments.

The allowable release rate used in the previous model was applied to the current PCSWMM model. The hydraulic grade line (HGL) at the minor outlet for the proposed development in the Autodesk SSA model was applied to the PCSWMM minor outlet in the PCSWMM model as a boundary condition.

Refer to **Appendix C** for the PCSWMM model output and model schematics.

6.2 Design Storms

Hydrologic modeling completed for the previously approved serviceability study indicated that the 6-hour Chicago storm distribution generated the highest peak flows and storage requirements for the OTC East site and was chosen as the critical design event. The model of the Hillside Commons development uses the same storm distribution. The 100-year 6-hour storm was also increased by 20% (intensity + total precipitation) to evaluate the impact of an extreme event on the performance of the major and minor system.

6.3 Model Development

6.3.1 Storm Drainage Areas

For modeling purposes, the development lands have been divided into subcatchments based on the drainage areas tributary to each inlet of the proposed storm sewer system. The catchment areas are shown on the Storm Drainage Area Plan (**120237-STM**).

The PCSWMM model accounts for both minor and major system flows, including the routing of flows through the storm sewer network (minor system), and overland along the road network (major system). The results of the analysis were used to:

- Determine the total major and minor system runoff from the site;
- Ensure allowable release rates are not exceeded;
- Ensure no ponding in the right-of-ways following a 2-year event;
- Calculate the storm sewer hydraulic grade line for the 100-year storm event; and
- Evaluate overland flow depths and ponding volumes in the right-of-way during the 100-year event.

6.3.2 *Subcatchment Model Parameters*

Table 6.1 – Model Parameters provides an overview of the model parameters for each subcatchment area shown on the Storm Drainage Area Plan (**120237-STM**).

Table 6.1: Model Parameters

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Equivalent Width (m)	Average Slope (%)
Controlled Areas						
A1	0.027	0.52	46%	0%	12.0	2.0
A2_1	0.021	0.80	86%	0%	19.2	4.5
A2_2	0.036	0.52	46%	0%	29.5	3.0
A3	0.023	0.74	77%	0%	52.3	2.5
A4	0.030	0.43	33%	0%	19.2	1.0
A5	0.035	0.40	29%	0%	25.0	4.0
R-A	0.103	0.90	100%	100%	30.3	0.34
R-AP	0.074	0.90	100%	100%	21.8	0.34
R-B	0.085	0.90	100%	100%	25.0	0.5
Uncontrolled Areas (Direct Runoff)						
U1	0.030	0.76	80%	0%	60.0	1.5

Infiltration

Infiltration losses for all catchment areas were modeled using Horton's infiltration equation, which defines the infiltration capacity of the soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses. The default values for the City of Ottawa were used for all catchments.

Horton's Equation:	Initial infiltration rate: $f_o = 76.2$ mm/hr
$f(t) = f_c + (f_o – f_c)e^{-k(t)}$	Final infiltration rate: $f_c = 13.2$ mm/hr
Decay Coefficient: $k = 4.14$/hr	

Depression Storage

The default values for depression storage in the City of Ottawa were used for all catchments. Residential rooftops were assumed to provide no depression storage.

- Depression Storage (pervious areas): 4.67 mm
- Depression Storage (impervious areas): 1.57 mm

Equivalent Width

'Equivalent Width' refers to the width of the subcatchment flow path. This parameter is calculated as described in the *City of Ottawa Sewer Design Guidelines, October 2012, Section 5.4.5.6.*

Impervious Values

Impervious (%IMP) values for each subcatchment area were calculated based on the concept plan (**Figure 2**). The impervious values correspond to the Runoff Coefficients used in the Rational Method calculations using the equation: *%IMP = (C-0.2)/0.7*

6.3.3 *Minor System*

The proposed on-site storm sewers were sized using the Rational Method based on a 5-year level of service. Refer to the General Plan of Services (**120237-GP**) for the layout of the minor system.

In order to meet the required release rate of 56.6 L/s, an oversized pipe (600 mm diameter) is proposed between RYE1 and RYT1 to provide underground storage.

6.3.4 Inlet Control Devices

Four (4) of the catchbasins will be fitted with ICDs sized to restrict peak flows to the allowable release rates outlined in the SWM Criteria and **Section 4.1**. The ICD parameters are outlined in **Table 6.2** – Inlet Control Device Parameters.

Table 6.2: Inlet Control Device Parameters

Structure	ICD Size & Inlet Rate					
	Diameter (mm)	T/G (m)	Invert (m)	Max Head (m)	5-yr Orifice Peak Flow* (L/s)	100-yr Orifice Peak Flow** (L/s)
CB1	0.059	64.65	63.10	1.55	4.9	7.5
CB2	0.046	64.65	63.10	1.55	4.4	4.5
CB3	0.045	65.75	63.40	2.35	4.9	6.4
CB4	0.045	66.70	65.10	1.60	3.9	5.5
CBMH1	-	67.00	62.77	-	-	-
RYE1	-	70.35	68.86	-	-	-
RYT1	-	65.00	63.17	-	-	-
RYT2	-	69.50	63.72	-	-	-
RYT3	-	69.60	67.99	-	-	-
RYT4	-	69.95	68.40	-	-	-
Trench Drain	-	66.59	64.60	-	-	-

**From PCSWMM Model, 5-year 6-hour Chicago storm distribution*
***From PCSWMM Model, 100-year 6-hour Chicago storm distribution*

6.3.5 Major System

Catchbasins CB1, RYT1, RYE1, and CBMH1 were modeled as storage nodes to account for the surface storage provided by the paved areas of the development. The stage-storage curves for each inlet were calculated based on the proposed surface shown on the Grading Plan (**120237-GR**).

6.3.6 Modeling Files/ Schematic

The PCSWMM model schematics and 100-year model output data are provided in **Appendix C**. Digital copies of the modeling files and model output files for all storm events are provided with this submission.

6.4 Results of Hydrologic Analysis

6.4.1 Minor System

The results of this analysis, as outlined in **Table 6.3**, indicate that the minor or major system peak flows from the Hillside Commons development are within the allowable release rate.

Table 6.3: Summary of Minor & Major System Peak Flows (L/s)

Storm Outlet	6-Hour Chicago Distribution		
	5-year	**100-year**	**100-year (+20%)**
Allowable Release Rate from Site	***56.6***	***56.6***	-
Minor System to Lionel-Rheo Private	27.8	42.0	46.5
Major System to Lionel-Rheo Private	0	1.63	18.3
Direct Runoff to St. Joseph Boulevard	8.14	14.5	17.5
Total Flows from the Site	**35.9**	**58.1**	**82.3**

As outlined in the above table, major and minor system peak flows for the 5-year storm event is below the allowable 100-year release rate of 56.6 L/s. The major and minor system peak flows for the 100-year storm event are roughly 2.5% higher than the allowable release rate. There is a minimal release of major system peak flow (1.63 L/s) in the 100-year storm event with no net negative impact to the downstream storm sewer system.

6.4.2 Major System

The major system network was evaluated to ensure that ponding depths conform to City standards. A summary of ponding depths and volumes for the 100-year event are provided in **Table 6.4**. Model results for all storm events are provided in **Appendix C**.

Table 6.4: 100-Year Major System Ponding Volumes

Structure	T/G (m)	Max. Static Ponding (Spill Depth)		100-yr Event (6hr)				
		Elev. (m)	Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Flow (L/s)
CB1	64.65	64.75	0.10	64.75	0.10	N	0.00	0
CB2	64.65	64.75	0.10	64.70	0.05	N	0.00	0
CB3	65.75	66.05	0.30	65.99	0.24	N	0.00	0
CB4	66.70	67.00	0.30	66.74	0.04	N	0.00	0
CBMH1	67.00	67.00	0.00	63.78	0.00	N	0.00	0
RYE1	70.35	70.35	0.00	68.86	0.00	N	0.00	0
RYT1	65.00	65.00	0.00	64.77	0.00	N	0.00	0
RYT2	69.50	69.80	0.30	64.78	0.00	N	0.00	0
RYT3	69.60	69.80	0.20	67.99	0.00	N	0.00	0
RYT4	69.95	69.95	0.00	68.40	0.00	N	0.00	0
Trench Drain	66.59	66.59	0.00	64.65	0.00	N	0.00	0

6.4.3 Hydraulic Grade Line

Units within the Hillside Commons development with connections to Lionel-Rheo Private will be connected to a separate foundation drain system. As such, there will be no foundation connections from the units to the underground storage system, precluding the requirement for 0.30 m of freeboard between the 100-year HGL elevation and the basement elevations.

Please refer to **Table 6.4: 100-Year Major System Ponding Volumes** as this table indicates the 100-year HGL elevations in all the structures within the site.

7.0 UTILITIES

The development will be serviced by hydro, phone, gas, and cable from the existing services on St Joseph. The composite utility plan will be submitted under separate cover, once approved.

8.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented during construction in accordance with the “Guidelines on Erosion and Sediment Control for Urban Construction Sites” (Government of Ontario, May 1987). Details will be provided on the Erosion and Sediment Control Plan. Erosion and sediment control measures may include:

- Placement of insert in catchbasins and filter fabric under all maintenance holes;
- Silt fences around the area under construction placed as per OPSS 577 and OPSD 219.110;
- Light duty straw bale check dam per OPSD 219.180; and
- Application of topsoil and sod to disturbed areas.

The erosion and sediment control measures are to be installed to the satisfaction of the engineer, the City, and conservation authority prior to construction and will remain in place during construction until vegetation is established. The erosion and sediment control measures will also be subject to regular inspection to ensure the measures are operational.

9.0 CONCLUSIONS

This report confirms the proposed Hillside Commons Residential Apartments development can be adequately serviced for storm, sanitary, and water servicing. The report is summarized below:

- The proposed sanitary sewers have adequate capacity to service the site.
- Proposed connections to the existing 400mm St. Joseph Boulevard watermain will service Buildings A and B independently. Analysis has proven the proposed onsite watermain can adequately service the site. A hydrant is proposed for acceptable level of fire protection.
- The stormwater management design for the Hillside Commons development conforms to the criteria established as a part of this report and the 2019 Hillside Vista Walk-Up Condos Stormwater Management Report.
- The development will be serviced by hydro, phone, gas, and cable from the existing services on St Joseph Boulevard.
- Erosion and sediment control measures will be implemented prior to construction and remain in place until vegetation is established.

This report is respectfully submitted for site plan approval. Please contact the undersigned should you have questions or require additional information.

NOVATECH

Prepared by:

Billy McEwen, B. Eng.

Reviewed by:

LICENSED PROFESSIONAL ENGINEER
Drew Blair
D. D. BLAIR
100122737
Aug 11 2023
PROVINCE OF ONTARIO

Drew Blair, P. Eng.
Senior Project Manager | Land Development Engineering

Appendix A
Sanitary Sewer Design Sheets

LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
100122737
Jan.27
2023
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects

SANITARY SEWER DESIGN SHEET
Hillside Commons
Developer: DCR Phoenix Homes / Landric Homes

PROJECT # : 120237
DESIGNED BY : BM
CHECKED BY : DDB
DATE PREPARED : 22-Dec-21
DATE REVISED : 21-Apr-22
DATE REVISED : 27-Jan-23

LOCATION				RESIDENTIAL									PARK			INFILTRATION			FLOW	PROPOSED SEWER								
				INDIVIDUAL					CUMULATIVE																			
STREET	FROM MH	TO MH	Area	Single Units	Townhouse Units	Apartment Units	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)	PEAK FACTOR M	POPULATION FLOW Qr(p) (L/s)	AREA (ha.)	Accu. AREA (ha.)	PARK FLOW Qc(p) (L/s)	Total Area (ha.)	Accu. Total AREA (ha.)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap	d/ D_{full}
	Building B	Building A				102	0.2142	0.22	0.214	0.22	3.5	2.44						0.07	2.51	10.3	200	203.20	DR 35	1.00	34.2	1.06	7.3%	0.19
	Building A	CAP				172	0.3612	0.00	0.575	0.22	3.4	6.25						0.00	6.25	47.0	200	203.20	DR 35	0.50	24.2	0.75	25.8%	0.34
	CAP	203A					0.0000	0.28	0.575	0.50	3.4	6.25						0.17	6.42	14.0	200	203.20	DR 35	3.00	59.3	1.83	10.8%	0.19
	203A	203				18	0.0378	0.17	0.613	0.67	3.3	6.64						0.22	6.86	26.6	200	203.20	DR 35	0.34	20.0	0.62	34.4%	0.41
Lionel-Rheo Private	203	201				18	0.0378	0.20	0.651	0.87	3.3	7.03						0.29	7.31	36.1	200	203.20	DR 35	0.36	20.5	0.63	35.6%	0.41
Lionel-Rheo Private	201	153					0.0000	0.06	0.651	0.93	3.3	7.03						0.31	7.33	12.3	200	203.20	DR 35	0.63	27.2	0.84	27.0%	0.34
Easement	Existing	153																0.00	2.18	18.9	200	203.20	DR 35	1.00	34.2	1.06	6.4%	0.16
Recolte Private	173	171			8	18	0.0594	0.49	0.059	0.49	3.6	0.70						0.16	0.86	48.0	200	203.20	DR 35	3.10	60.2	1.86	1.4%	0.00
Recolte Private	171	169			5	18	0.0513	0.23	0.111	0.72	3.6	1.29						0.24	1.52	25.4	200	203.20	DR 35	1.00	34.2	1.06	4.5%	0.12
Recolte Private	169	167			5		0.0135	0.28	0.124	1.00	3.6	1.44						0.33	1.77	36.2	200	203.20	DR 35	1.00	34.2	1.06	5.2%	0.16
Recolte Private	167	153				18	0.0378	0.10	0.162	1.10	3.5	1.86						0.36	2.22	18.9	200	203.20	DR 35	1.00	34.2	1.06	6.5%	0.16
Recolte Private	153	151			8		0.0216	0.18	0.835	2.21	3.3	8.87						0.73	11.78	50.1	200	203.20	DR 35	3.99	68.3	2.11	17.2%	0.25
Recolte Private	151	Outlet					0.0000	0.00	0.835	2.21	3.3	8.87						0.73	11.78	18.9	200	203.20	DR 35	1.00	34.2	1.06	34.4%	0.41

Notes:
1. Q(d) = Qr(p) + Q(i) + Qc(p)
2. Q(i) = 0.33 L/sec/ha
3. Qr(p) = (PxqxM/86,400)
3. Qc(p) = (A*q*Pf)/86,400

Definitions:
Q(d) = Design Flow (L/sec)
Qr(p) = Population Flow (L/sec), Residential
Q(i) = Extraneous Flow (L/sec)
Qc(p) = Population Flow (L/sec), Commercial/Institutional/Park

P = Population (3.4 persons per single unit, 2.7 persons per townhouse unit, 2.1 persons per apartment unit)
q = Average per capita flow = 280 L/cap/day - Residential
q = Average per gross ha. flow = 3700 L/gross ha/day - Park (20L/day/person, 185 persons/ha - as per Appendix 4-A of the City of Ottawa Sewer Design Guidelines)
M = Harmon Formula (maximum of 4.0)
Min pipe size 200mm @ min. slope 0.32%
Mannings n = 0.013
Pf = Peak factor (Commercial/Instiitional/Park) = 1.0 (less than 20% of total contributing areas), 1.5 (if area is 20% or greater of total contributing area)

Note: The average per capita flow has been updated for the downstream areas on Recolte Private to 280 L/cap/day from the previously approved 350 L/cap/day. The infiltration rate has been updated to the City approved 0.33 L/s/Ha for the downstream sewers on Recolte Private as well.

SANITARY SEWER DESIGN SHEET

DESIGNED BY : Mark Bowen
CHECKED BY : Drew Blair, P. Eng.
DATE: Sept. 6, 2017
Revised: Dec. 15, 2017
Revised: June 27, 2018
Revised: August 23, 2019

PROJECT: **Hillside Vista Walkup Condos (OTC East)**
DEVELOPER: **DCR Phoenix**
PROJECT: **106011B**

Drew Blair
D. D. BLAIR
100122737
Aug 23 2019

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CONSULTANTS LTD.
ENGINEERS & PLANNERS

FROM MH	TO MH	UNITS					INDIVIDUAL		CUMULATIVE		PEAK FACTOR (M)	POPULATION FLOW (p) (L/s)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	PROPOSED SEWER					
		Single	Town	Apt Condo	Future Apt/Condo		Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)					LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
FUT	203A	0	0	78	0	0.146	0.147	0.39	0.147	0.39	4.0	2.38	0.11	2.49	50.0	200	PVC	0.32	**19.36**	0.60
203A	203	0	0	18	0	0.034	0.034	0.28	0.181	0.67	4.0	2.93	0.19	3.12	41.3	200	PVC	0.34	**19.95**	0.62
203	201	0	0	18	0	0.034	0.034	0.20	0.215	0.87	4.0	3.48	0.24	3.73	36.1	200	PVC	0.36	**20.53**	0.63
201	153	0	0	0	0	0.000	0.000	0.06	0.215	0.93	4.0	3.48	0.26	**3.74**	12.3	200	PVC	1.00	**34.22**	1.06
173	171	0	8	18	0	0.055	0.056	0.49	0.056	0.49	4.0	0.91	0.14	1.04	48.0	200	PVC	3.10	**60.24**	1.86
171	169	0	5	18	0	0.047	0.048	0.23	0.104	0.72	4.0	1.69	0.20	1.89	25.4	200	PVC	1.00	**34.22**	1.06
169	167	0	5	0	0	0.014	0.014	0.28	0.118	1.00	4.0	1.91	0.28	2.19	36.2	200	PVC	1.00	**34.22**	1.06
167	153	0	0	18	0	0.034	0.034	0.10	0.152	1.10	4.0	2.46	0.31	**2.77**	18.9	200	PVC	1.00	**34.22**	1.06
Existing*	153	0	0	0	0	0.000	0.000	0.00	0.000	0.00	0.0	0.00	0.00	**2.18**	52.0	200	PVC	3.00	**59.26**	1.83
153	151	0	8	0	0	0.022	0.022	0.18	0.389	2.21	4.0	6.35	0.62	9.15	50.1	200	PVC	3.99	**68.35**	2.11
151	Outlet	0	0	0	0	0.000	0.000	0.00	0.389	2.21	4.0	6.35	0.62	**9.15**	18.9	200	PVC	1.00	**34.22**	1.06

Notes:
1. Population Densities: 3.4 people/single, 2.7people/townhouse, 1.88 people/apartment (average of 2.1 people/2 bedroom and 1.4 people/1 bedroom)
2. Peaking Factor (M) = Harmon Formula (4.0 max) = 1+(14/4+(Population/1000)^(1/2))
3. Population Flow = Q(p) = (Population X 350L/day/person X Peaking Factor) ÷ 86,400s/day
4. Infiltration Inflow = Q(i) = 0.28 L/sec/ha
5. Peak Flow = Q(d) = Q(p) + Q(i)
6. Existing* = The existing sanitary flows from the Hillside Terrace building as calculated in the approved 2015 Servicing Report by Novatech

Appendix B
Boundary Conditions, Fire Flow Calculations, and Hydraulic Analysis Results

Boundary Conditions
3277 St Joseph Blvd

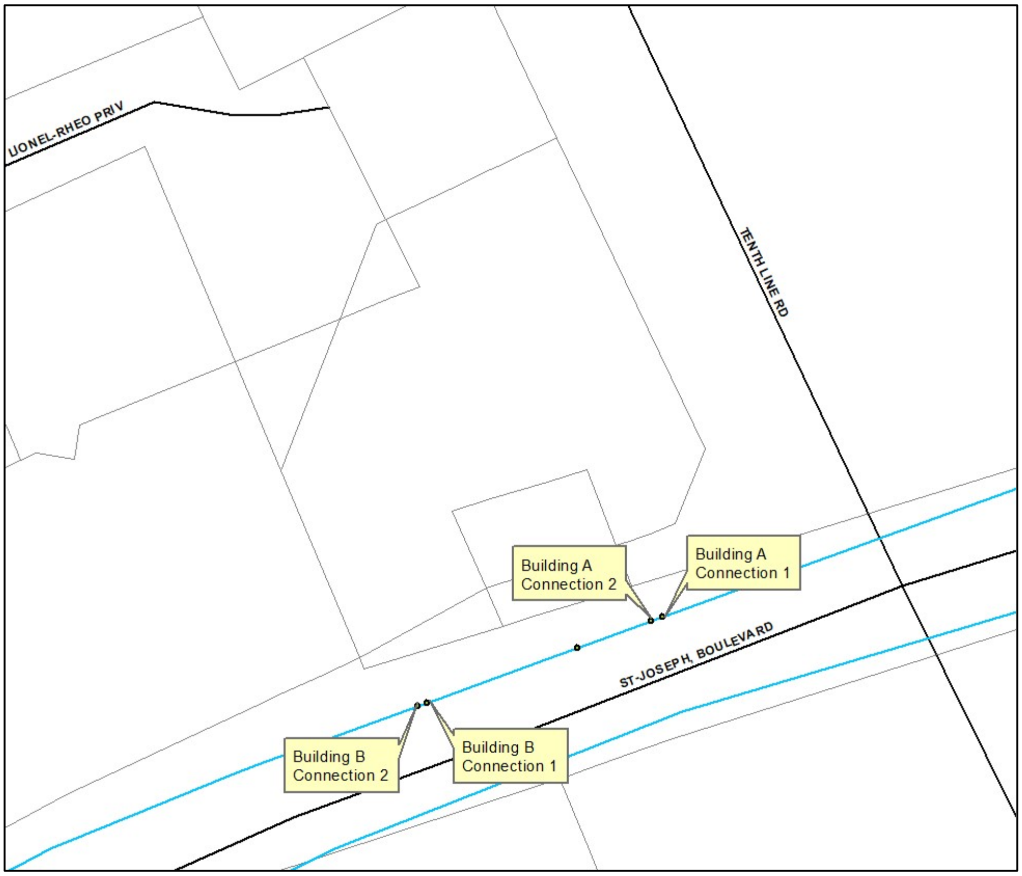
Provided Information – Building A

Scenario	Demand	
	L/min	L/s
Average Daily Demand	70	1.17
Maximum Daily Demand	232	3.87
Peak Hour	352	5.87
Fire Flow Demand #1	6,300	105.00

Provided Information – Building B

Scenario	Demand	
	L/min	L/s
Average Daily Demand	42	0.70
Maximum Daily Demand	180	3.00
Peak Hour	268	4.46
Fire Flow Demand #1	6,300	105.00

Location



Results – Building A

Connection 1 – St Joseph Blvd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	113.9	58.6
Peak Hour	112.6	56.8
Max Day plus Fire 1	109.3	52.0

Ground Elevation = 72.7 m

Connection 2 – St Joseph Blvd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	113.9	58.5
Peak Hour	109.0	51.5
Max Day plus Fire 1	109.3	51.9

Ground Elevation = 72.8 m

Results – Building B

Connection 1 – St Joseph Blvd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	113.9	57.7
Peak Hour	109.0	50.7
Max Day plus Fire 1	109.3	51.1

Ground Elevation = 73.3 m

Connection 2 – St Joseph Blvd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	113.9	57.7
Peak Hour	109.0	50.7
Max Day plus Fire 1	109.3	51.1

Ground Elevation = 73.3 m

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Hillside Commons
Water Demand - Building A

	Number of Units	Area (ha)	Design Population	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Multi-Unit Residential	172.00		362.00	1.17	3.87	5.87
Total	172.00	0.00	362.00	**1.17**	**3.87**	**5.87**

Water Demand Parameters

Multi-Unit Residential Apartments	2.1	persons/unit
Residential Demand	280.0	L/c/day
Residential Max Day	3.3	x Avg Day
Residential Peak Hour	5.0	x Max Day
Commercial Demand	28000.0	L/gross ha/day
Commercial Max Day	1.5	x Avg Day
Commercial Peak Hour	1.8	x Avg Day
Fireflow - Max Fire Flow (From Quadrant Engineering)	**105.00**	L/s

Notes:
1) Water demand based on MOE Design Guidelines - Water Distribution 2008 (< 500 population)
2) Fireflows calculated as per 1999 Fire Underwriter's Survey Guidelines.

Date: October 18, 2021
Revised: March 23, 2022
Revised: April 13, 2022

Job No.: 120237

Hillside Commons
Water Demand - Building B

	Number of Units	Area (ha)	Design Population	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Multi-Unit Residential	102.00		215.00	0.70	3.00	4.46
Total	102.00	0.00	215.00	**0.70**	**3.00**	**4.46**

Water Demand Parameters

Multi-Unit Residential Apartments	2.1	persons/unit
Residential Demand	280.0	L/c/day
Residential Max Day	4.3	x Avg Day
Residential Peak Hour	6.4	x Max Day
Commercial Demand	28000.0	L/gross ha/day
Commercial Max Day	1.5	x Avg Day
Commercial Peak Hour	1.8	x Avg Day

Fireflow - Max Fire Flow (From Quadrant Engineering) **105.00** L/s

Notes:
1) Water demand based on MOE Design Guidelines - Water Distribution 2008 (< 500 population)
2) Fireflows calculated as per 1999 Fire Underwriter's Survey Guidelines.

Fire Flow Calculations as per Ontario Building Code (Appendix A-3.2.5.7.)

Job# 21-Q076

BUILDING A Rev02

Date 20-Oct-21

Description: 9-Storey Res.

$$Q = KVS_{tot}$$

Q = Volume of water required (L)

V = Total building volume (m3)

K = Water supply coefficient from Table 1

S_{tot} = Sotal of spatial coefficeint values from property line exposures on all sides as obtained from the formula

$S_{tot} = 1.0 + [S_{side1} + S_{side2} + S_{side3} + S_{side4}]$

1	Type of construction	Building Classification		Water Supply Coefficient
	Non-Combustible with Fire-Resistance Ratings	A-2, B-1, B-2, B-3, C, D		10
2	Area of one floor (m^2)	number of floors	Avg. height of ceiling (m)	Total Building Volume (m^3)
	1045.60	9	2.94	27,666
3	Side	Exposure Distance (m)	Spatial Coefficient	Total Spatial Coeffecient
	North	12.5	0	1
	East	45	0	
	South	45	0	
	West	13.6	0	
4				**Total Volume 'Q' (L)**
				193,662
			Minimum Required Fire Flow (L/min)	**6,300**
			L/s	**105**

Fire Flow Calculations as per Ontario Building Code (Appendix A-3.2.5.7.)

Job# 21-Q076 **BUILDING B** Rev02
Date 20-Oct-21

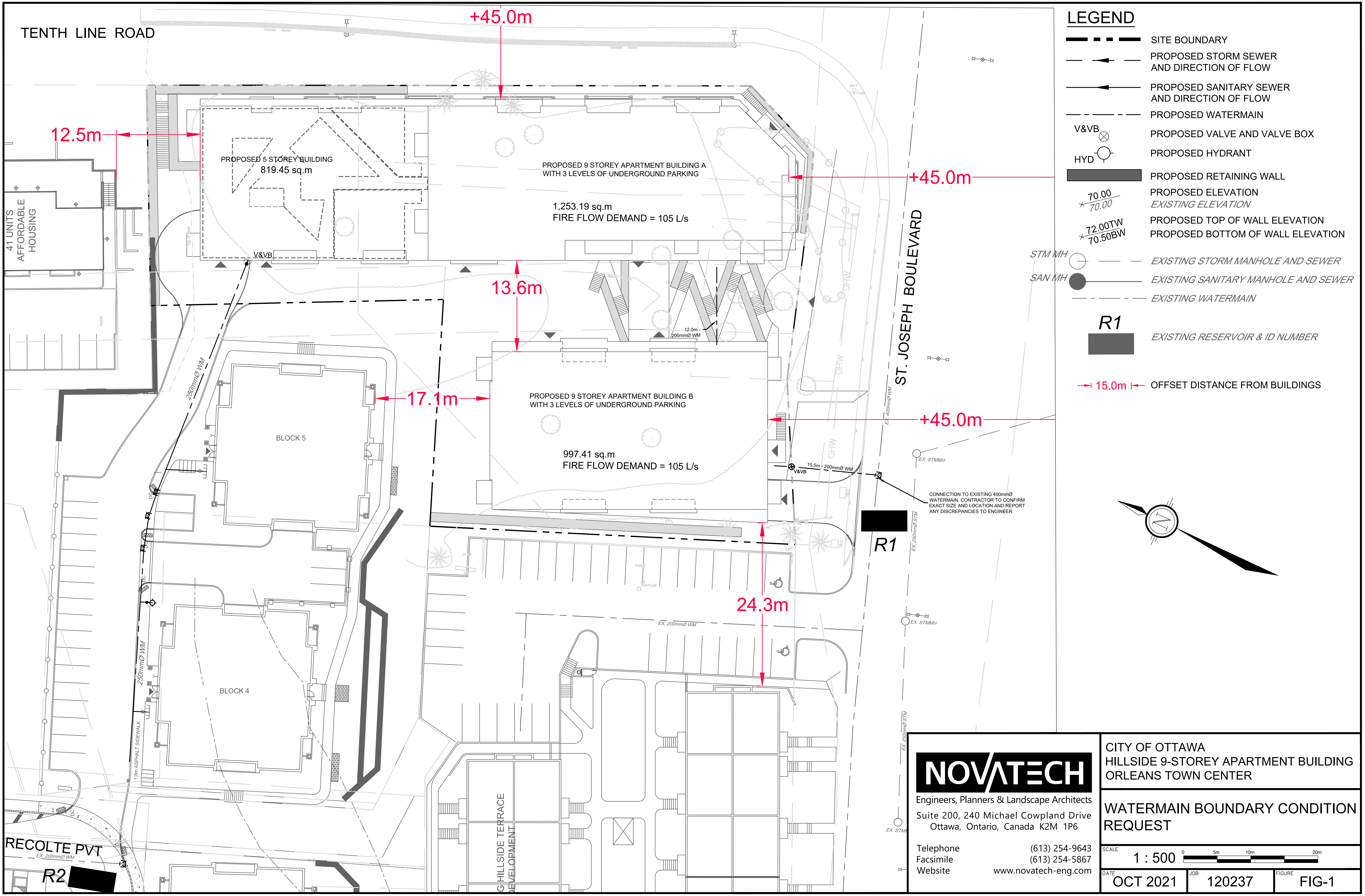
Description: 9-Storey Res.

$$Q = KVS_{tot}$$

Q = Volume of water required (L)
V = Total building volume (m3)
K = Water supply coefficient from Table 1
S_{tot} = Sotal of spatial coefficeint values from property line exposures on all sides as obtained from the formula

$$S_{tot} = 1.0 + [S_{side1} + S_{side2} + S_{side3} + S_{side4}]$$

1	Type of construction	Building Classification		Water Supply Coefficient
	Non-Combustible with Fire-Resistance Ratings	A-2, B-1, B-2, B-3, C, D		10
2	Area of one floor (m^2)	number of floors	Avg. height of ceiling (m)	Total Building Volume (m^3)
	1067.30	9	2.94	28,241
3	Side	Exposure Distance (m)	Spatial Coefficient	Total Spatial Coeffecient
	North	17.1	0	1
	East	13.6	0	
	South	45	0	
	West	24.3	0	
4				**Total Volume 'Q' (L)**
				197,687
			Minimum Required Fire Flow (L/min)	**6,300**
			L/s	**105**



M:\2020\120237\CAD\Design\Figures\Hydraulic\120237-WBCR.dwg, FIG-1, Oct 20, 2021 - 7:51am, aechlin

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone	(613) 254-9643
Facsimile	(613) 254-5867
Website	www.novatech-eng.com

CITY OF OTTAWA
HILLSIDE 9-STOREY APARTMENT BUILDING
ORLEANS TOWN CENTER

WATERMAIN BOUNDARY CONDITION REQUEST

SCALE	DATE	JOB	FIGURE
1 : 500	OCT 2021	120237	FIG-1

SHT11X17.DWG - 279mmX432mm

Attachment B3 - Fire Resistive (Tower with a Podium)

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 120237
Project Name: Hillside Commons - Building A
Date: 10/18/2021
Input By: Drew Blair
Reviewed By: Project Manager

Legend	
	Input by User
	No Information or Input Required

Building Description: 9 Storey Building with 5 Storey Podium
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame		1.5	0.6	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	2150			
		Total Floors/Storeys (Podium)	5			
		Tower Footprint (m^2)	1300			
		Total Floors/Storeys (Tower)	4			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**3,225**	
	F	**Base fire flow without reductions** F = 220 C $(A)^{0.5}$				**7,000**
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,950**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,380**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	No	-10%		
				Cumulative Total	**-40%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**1,785**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**30%**	
Results						
6	(1) + (2) + (3)	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**5,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**83**
				or	USGPM	1,321
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	1.75
		Required Volume of Fire Flow (m^3)			m^3	525

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Attachment B2 - Fire Resistive

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

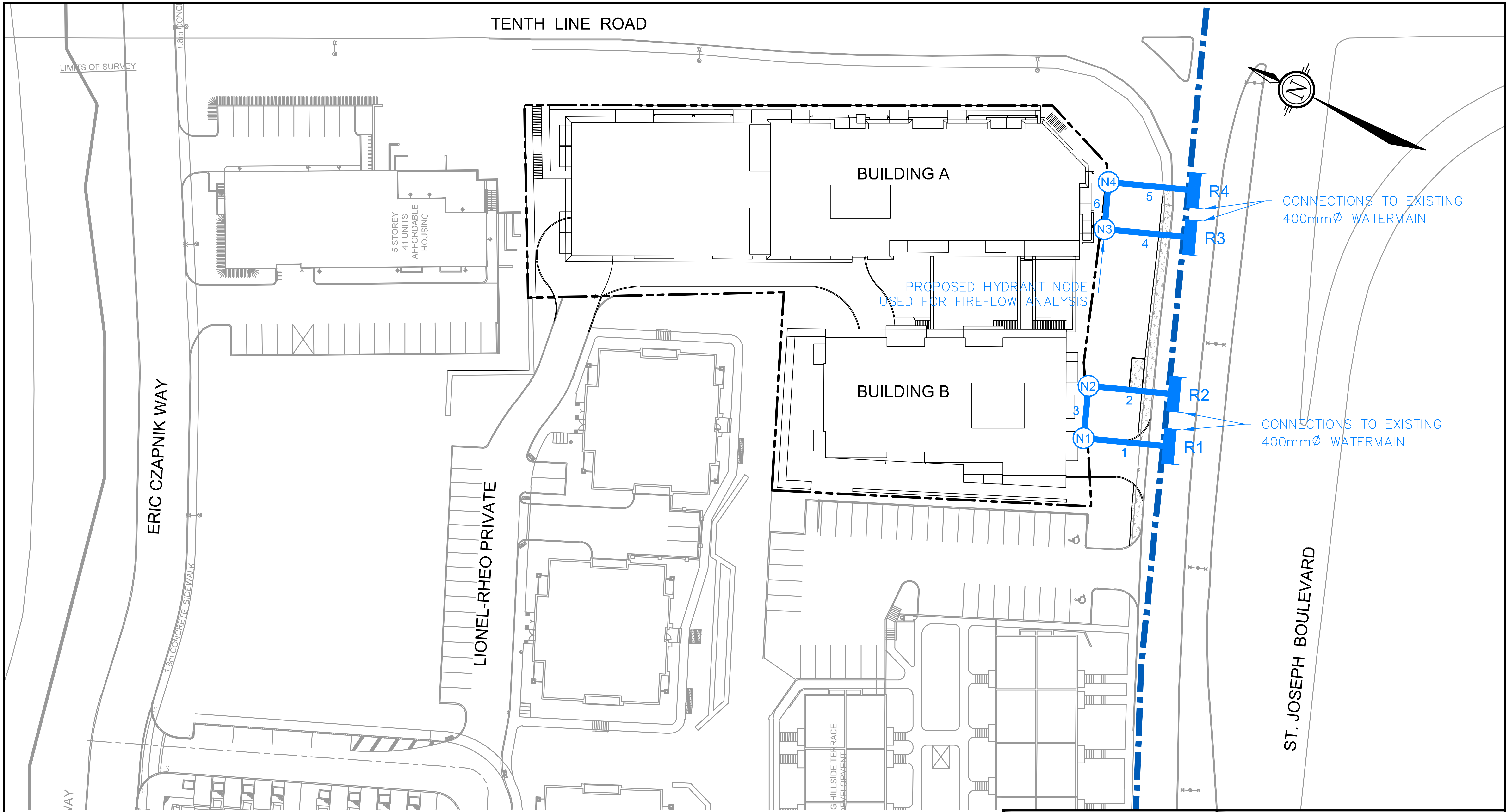
NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 120237
Project Name: Hillside Commons - Building B
Date: 10/18/2021
Input By: Drew Blair
Reviewed By: Project Manager

Legend
Input by User
No Information or Input Required

Building Description: Multi-Storey Tower
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame		1.5	0.6	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)	Yes	0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1050			
		Number of Floors/Storeys	9			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**1,575**	
	F	**Base fire flow without reductions**				**5,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**4,250**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-1,700**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	No	-10%		
				Cumulative Total	**-40%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**1,700**
		East Side	10.1 - 20 m		15%	
		South Side	> 45.1m		0%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**40%**	
Results						
6	(1) + (2) + (3)	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**4,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**67**
				or	USGPM	1,057
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	1.5
		Required Volume of Fire Flow (m^3)			m^3	360



LEGEND

— - — SITE BOUNDARY

— · — EXISTING 400mm WATERMAIN

— PROPOSED 200mm WATERMAIN

R1 ▬ EXISTING RESERVOIR AND ID NUMBER

Ⓝ2 PROPOSED NODE AND ID NUMBER

NOVATECH

Engineers, Planners & Landscape Architects

Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone	(613) 254-9643
Facsimile	(613) 254-5867
Website	www.novatech-eng.com

CITY OF OTTAWA
HILLSIDE COMMONS
ORLEANS TOWN CENTER

PROPOSED WATERMAIN NODES
NETWORK

SCALE
1 : 750
0 10 20 30

DATE	JOB	FIGURE
MAY 2022	120237	WM

M:\2020\120237\DATA\Calculations\Sewer Calcs\Water\2nd Submission\120237-NodeNetwork.dwg, GP, May 06, 2022 - 10:44am, bmcewen

SHT11X17.DWG - 279mmX432mm

May 2022

WATERMAIN DESIGN SHEET

File No.: 120237
Hillside Commons

Population and Consumption Rate Calculations

Node	Number of Units	Persons per Unit	Population	Consumption Rates (L/s) Average Daily	Maximum Daily	Maximum Hourly
R1	0	2.10	0	0.00	0.00	0.00
R2	0	2.10	0	0.00	0.00	0.00
R3	0	2.10	0	0.00	0.00	0.00
R4	0	2.10	0	0.00	0.00	0.00
N1	102	2.10	214	0.69	1.74	3.82
N2	0	2.10	0	0.00	0.00	0.00
N3	172	2.10	361	1.17	2.93	6.44
N4	0	2.10	0	0.00	0.00	0.00
Total	**274**	**2.10**	**575**	**1.86**	**4.66**	**10.26**

Water Demand Parameters

Avg Person/Unit	2.10	persons/unit
Residential Demand	280	L/c/day
Residential Max Day	2.50	x Avg Day
Residential Peak Hour	2.20	x Max Day
Fireflow (Quadrant Eng)	105.00	L/s

May 2022

AVERAGE DAY DEMAND / HIGH PRESSURE CHECK

File No.:120237
Hillside Commons

Junction Report

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi	Max. Age Hours
Junc N1	72.1	0.69	113.9	41.8	410.06	59.47	0.38
Junc N2	72.1	0.00	113.9	41.8	410.06	59.47	0.36
Junc N3	71.1	1.17	113.9	42.8	419.87	60.90	0.26
Junc N4	71.1	0	113.9	42.8	419.87	60.90	0.23
Resvr R1	113.9	-0.36	113.9	0.0	0.00	0.00	0
Resvr R2	113.9	-0.33	113.9	0.0	0.00	0.00	0
Resvr R3	113.9	-0.60	113.9	0.0	0.00	0.00	0
Resvr R4	113.9	-0.57	113.9	0.0	0.00	0.00	0

🟧 Maximum Pressure
🟦 Maximum Age

AVERAGE DAY DEMAND / HIGH PRESSURE CHECK

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	14	200	110	0.36	0.01	0.00	0.062
Pipe 2	13.6	200	110	0.33	0.01	0.00	0.048
Pipe 3	2	200	110	0.33	0.01	0.00	0.163
Pipe 4	15	200	110	0.60	0.02	0.00	0.053
Pipe 5	15	200	110	0.57	0.02	0.00	0.053
Pipe 6	2	200	110	0.57	0.02	0.00	0.056

MAXIMUM HOUR DEMAND

Junction Report

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc N1	72.1	3.82	109.00	36.90	361.99	52.50
Junc N2	72.1	0.00	109.00	36.90	361.99	52.50
Junc N3	71.1	6.44	110.61	39.51	387.59	56.22
Junc N4	71.1	0.00	110.84	39.74	389.85	56.54
Resvr R1	109.0	-1.98	109.00	0	0.00	0.00
Resvr R2	109.0	-1.84	109.00	0	0.00	0.00
Resvr R3	109.0	133.19	109.00	0	0.00	0.00
Resvr R4	112.6	-139.63	112.60	0	0.00	0.00

🟧 Minimum Pressure

MAXIMUM HOUR DEMAND

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	13.6	200	110	1.98	0.06	0.04	0.044
Pipe 2	13.6	200	110	1.84	0.06	0.04	0.044
Pipe 3	2.0	200	110	1.84	0.06	0.04	0.048
Pipe 4	15.0	200	110	133.19	4.24	107.29	0.023
Pipe 5	15.0	200	110	139.63	4.44	117.10	0.023
Pipe 6	2.0	200	110	139.63	4.44	117.10	0.023

MAXIMUM DAY + FIRE FLOW DEMAND AT N1

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi
Junc N1	72.1	1.74	109.30	37.20	364.93	52.93
Junc N2	72.1	0	109.30	37.20	364.93	52.93
Junc N3	71.1	107.93	108.98	37.88	371.60	53.90
Junc N4	71.1	0	109.02	37.92	372.00	53.95
Resvr R1	109.3	-0.9	109.30	0	0.00	0.00
Resvr R2	109.3	-0.84	109.30	0	0.00	0.00
Resvr R3	109.3	-55.79	109.30	0	0.00	0.00
Resvr R4	109.3	-52.14	109.30	0	0.00	0.00

🟧 Minimum Pressure
🟦 Applied Fire Flow

MAXIMUM DAY + FIRE FLOW DEMAND AT N1

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	13.6	200	110	0.9	0.03	0.01	0.049
Pipe 2	13.6	200	110	0.84	0.03	0.01	0.049
Pipe 3	2.0	200	110	0.84	0.03	0.01	0.051
Pipe 4	15.0	200	110	55.79	1.78	21.41	0.027
Pipe 5	15.0	200	110	52.14	1.66	18.89	0.027
Pipe 6	2.0	200	110	52.14	2	19	0.027

May 2022

MAXIMUM DAY + FIRE FLOW DEMAND SUMMARY

File No.:120237
Hillside Commons

Maximum day plus fire flow demand was modeled for node N1.
The following is a summary of the minimum pressures that occurred for this operating condition.

	Demand (L/s)						
Fire at Junction	**Maximum Daily**	**Fire Flow**	**Max Day + Fire**	**Minimum Pressure**			
				(m)	**kPa**	**psi**	**Node**
N3	2.93	105.00	107.93	37.20	364.93	52.93	N1

Appendix C
Stormwater Management

Hillside Commons
Phoenix Homes / Landric Homes
Project No.: 120237

STORM SEWER DESIGN SHEET
Hillside Commons
FLOW RATES BASED ON RATIONAL METHOD

Drew Blair
D. D. BLAIR
100122737
Jan.27 2023

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION				AREA (ha)			FLOW							TOTAL FLOW	SEWER DATA								
Street	Catchment ID	From MH	To MH	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
	A1	CBMH1	Building A	0.027	0.52	0.01	0.039	0.039	10.00		104.19		4.1	35.7	0.305	300	PVC	0.50	13.9	71.3	0.98	0.24	50%
						0.00	0.000	0.000	10.00														
						0.00	0.000	0.000	10.00														
	A2-2			0.036	0.52	0.02	0.052	0.091	10.00		104.19		9.5										
						0.00	0.000	0.000	10.00														
						0.00	0.000	0.000	10.00														
	A5			0.035	0.40	0.01	0.039	0.130	10.00		104.19		13.5										
						0.00	0.000	0.000	10.00														
						0.00	0.000	0.000	10.00														
	R-B			0.085	0.90	0.08	0.213	0.343	10.00		104.19		35.7										
						0.00	0.000	0.000	10.00														
						0.00	0.000	0.000	10.00														
									10.24														
	R-A	Building A	Ex MH412	0.103	0.90	0.09	0.258	0.600	10.24		102.96		61.8	94.2	0.381	375	PVC	0.34	40.5	106.6	0.93	0.72	88%
						0.00	0.000	0.000	10.24														
						0.00	0.000	0.000	10.24														
	R-AP			0.074	0.90	0.07	0.185	0.786	10.24		102.96		80.9										
						0.00	0.000	0.000	10.24														
						0.00	0.000	0.000	10.24														
	A4			0.030	0.43	0.01	0.036	0.821	10.24		102.96		84.6										
						0.00	0.000	0.000	10.24														
						0.00	0.000	0.000	10.24														
	A3			0.023	0.74	0.02	0.047	0.869	10.24		102.96		89.4										
						0.00	0.000	0.000	10.24														
						0.00	0.000	0.000	10.24														
	A2-1			0.021	0.80	0.02	0.047	0.915	10.24		102.96		94.2										
						0.00	0.000	0.000	10.24														
						0.00	0.000	0.000	10.24														
									10.96														

Q = 2.78 AIC, where
Q = Peak Flow in Litres per Second (L/s)
C = Runoff Coefficient
A = Area in hectares (ha)
I = Rainfall Intensity (mm/hr)

Consultant:	**Novatech**	
Date:	December 23, 2021	
Revised:	April 21, 2022	
Revised:	August 29, 2022	
Revised:	January 27, 2023	
Design By:	Billy McEwen	
Client:	**Dwg. Reference:**	**Checked By:**
Phoenix Homes / Landric Homes	120237-STM	Drew Blair

Legend:		
	*	Areas/Runoff Coefficients/Time of Concentration based on detailed storm design sheet and drawing (120237-STM)
	10.00	Storm sewers designed to the 2 year event (without ponding) for local roads
	10.00	Storm sewers designed to the 5 year event (without ponding) for collector roads
	10.00	Storm sewers designed to the 10 year event (without ponding) for arterial roads

Building A Tower Roof Drain Calculations Summary

5-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (5-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-A1	360.5	0.036	0.90	10.00	104.19	9.4	Watts Flow Control	1/2 Open	0.95	0.11	7.34	18.03
R-A2	329.5	0.033	0.90	10.00	104.19	8.6	Watts Flow Control	1/2 Open	0.95	0.11	6.48	16.48
R-A3	342.7	0.034	0.90	10.00	104.19	8.9	Watts Flow Control	1/2 Open	0.95	0.11	6.84	17.14
TOTAL		**0.103**									**20.66**	**51.64**

100-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (100-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-A1	360.5	0.036	1.00	10.00	178.56	17.9	Watts Flow Control	1/2 Open	1.26	0.14	15.67	18.03
R-A2	329.5	0.033	1.00	10.00	178.56	16.4	Watts Flow Control	1/2 Open	1.26	0.14	13.90	16.48
R-A3	342.7	0.034	1.00	10.00	178.56	17.0	Watts Flow Control	1/2 Open	1.26	0.14	14.65	17.14
TOTAL		**0.103**				**51.3**					**44.21**	**51.64**

Building A Podium Roof Drain Calculations Summary

5-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (5-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-AP1	370	0.037	0.90	10.00	104.19	9.6	Watts Flow Control	1/2 Open	0.95	0.11	7.61	18.50
R-AP2	370	0.037	0.90	10.00	104.19	9.6	Watts Flow Control	1/2 Open	0.95	0.11	7.61	18.50
TOTAL		**0.074**									**15.21**	**37.00**

100-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (100-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-AP1	370	0.037	1.00	10.00	178.56	18.4	Watts Flow Control	1/2 Open	1.26	0.14	16.22	18.50
R-AP2	370	0.037	1.00	10.00	178.56	18.4	Watts Flow Control	1/2 Open	1.26	0.14	16.22	18.50
TOTAL		**0.074**				**36.7**					**32.44**	**37.00**

Building B Tower Roof Drain Calculations Summary

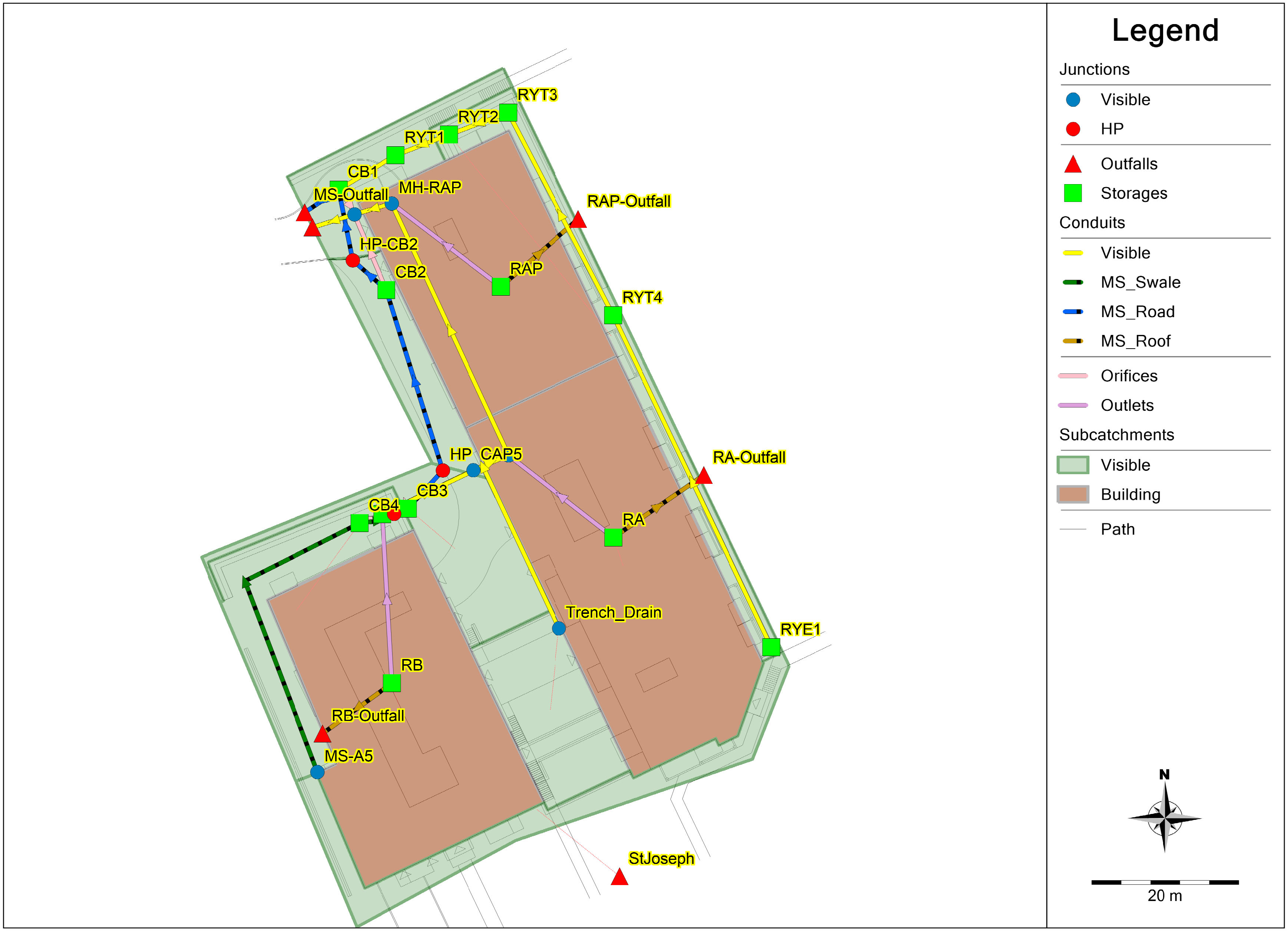
5-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (5-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-B1	271.3	0.027	0.90	10.00	104.19	7.1	Watts Flow Control	1/2 Open	0.95	0.107	4.92	13.57
R-B2	283.3	0.028	0.90	10.00	104.19	7.4	Watts Flow Control	1/2 Open	0.95	0.107	5.24	14.17
R-B3	295.5	0.030	0.90	10.00	104.19	7.7	Watts Flow Control	1/2 Open	0.95	0.108	5.56	14.78
TOTAL		**0.085**									**15.72**	**42.51**

100-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (100-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-B1	271.3	0.027	1.00	10.00	178.56	13.5	Watts Flow Control	1/2 Open	1.26	0.138	10.69	13.57
R-B2	283.3	0.028	1.00	10.00	178.56	14.1	Watts Flow Control	1/2 Open	1.26	0.139	11.34	14.17
R-B3	295.5	0.030	1.00	10.00	178.56	14.7	Watts Flow Control	1/2 Open	1.26	0.140	12.01	14.78
TOTAL		**0.085**				**42.2**					**34.03**	**42.51**

PREPARED BY: NOVATECH
DATE: December 6, 2021


RYT3
RYT2
RYT1
CB1
MS-Outfall
MH-RAP
RAP-Outfall
HP-CB2
CB2
RAP
RYT4
HP
CAP5
RA-Outfall
CB3
CB4
RA
Trench_Drain
RYE1
RB
RB-Outfall
MS-A5
StJoseph
Legend
Junctions
Visible
HP
Outfalls
Storages
Conduits
Visible
MS_Swale
MS_Road
MS_Roof
Orifices
Outlets
Subcatchments
Visible
Building
Path
N
20 m

Hillside Vista Walk-Up Condos
Post-Development Model Parameters

NOVATECH
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Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Flow Path Length (m)	Equivalent Width (m)	Average Slope (%)
A1	0.027	0.52	46%	0%	25	10.8	2
A2_1	0.021	0.80	86%	0%	11	19.1	4.5
A2_2	0.036	0.52	46%	0%	11	32.7	3
A3	0.023	0.74	77%	0%	4.4	52.3	2.5
A4	0.03	0.43	33%	0%	15.6	19.2	1
A5	0.035	0.40	29%	0%	14	25.0	4
R-A	0.103	0.90	100%	100%	34	30.3	0.34
R-AP	0.074	0.90	100%	100%	34	21.8	0.34
R-B	0.085	0.90	100%	100%	34	25.0	0.5
U1	0.03	0.76	80%	0%	5	60.0	1.5

Hillside Vista Walk-Up Condos

HGL Elevations

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Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	HGL Elevation - 100yr6hr (m)	HGL Elevation - 100yr6hr+20% (m)	T/G Clearance (100yr) (m)	T/G Clearance (100yr+20%) (m)
CB1	63.10	64.65	64.75	64.76	-0.10	-0.11
CB2	63.10	64.65	64.70	64.76	-0.05	-0.11
CB3	63.40	65.75	65.99	66.06	-0.24	-0.31
CB4	65.10	66.70	66.74	66.79	-0.04	-0.09
CBMH1	62.77	67.00	63.78	63.80	3.22	3.20
RYE1	68.86	70.35	68.86	68.86	1.49	1.49
RYT1	63.17	65.00	64.77	64.79	0.23	0.21
RYT2	63.72	69.50	64.78	64.79	4.72	4.71
RYT3	67.99	69.60	67.99	67.99	1.61	1.61
RYT4	68.40	69.95	68.40	68.40	1.55	1.55
Trench Drain	64.60	66.59	64.65	64.66	1.94	1.93

Hillside Vista Walk-Up Condos

Ponding in Road Calculations

Structure	T/G	Max. Static Ponding (Spill Depth)		2-yr Event (6hr)				5-yr Event (6hr)				100-yr Event (6hr)					100-yr Event (+20%) (6hr)			
	(m)	Elev. (m)	Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Flow (L/s)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)
CB1	64.65	64.75	0.10	63.97	0.00	N	0.00	64.16	0.00	N	0.00	64.75	0.10	N	0.00	0	64.76	0.11	Y	0.01
CB2	64.65	64.75	0.10	64.27	0.00	N	0.00	64.65	0.00	N	0.00	64.70	0.05	N	0.00	0	64.76	0.11	Y	0.01
CB3	65.75	66.05	0.30	64.26	0.00	N	0.00	65.01	0.00	N	0.00	65.99	0.24	N	0.00	0	66.06	0.31	Y	0.01
CB4	66.70	67.00	0.30	65.38	0.00	N	0.00	65.95	0.00	N	0.00	66.74	0.04	N	0.00	0	66.79	0.09	N	0.00
CBMH1	67.00	67.00	0.00	63.72	0.00	N	0.00	63.74	0.00	N	0.00	63.78	0.00	N	0.00	0	63.80	0.00	N	0.00
RYE1	70.35	70.35	0.00	68.86	0.00	N	0.00	68.86	0.00	N	0.00	68.86	0.00	N	0.00	0	68.86	0.00	N	0.00
RYT1	65.00	65.00	0.00	63.97	0.00	N	0.00	64.16	0.00	N	0.00	64.77	0.00	N	0.00	0	64.79	0.00	N	0.00
RYT2	69.50	69.80	0.30	63.97	0.00	N	0.00	64.16	0.00	N	0.00	64.78	0.00	N	0.00	0	64.79	0.00	N	0.00
RYT3	69.60	69.80	0.20	67.99	0.00	N	0.00	67.99	0.00	N	0.00	67.99	0.00	N	0.00	0	67.99	0.00	N	0.00
RYT4	69.95	69.95	0.00	68.40	0.00	N	0.00	68.40	0.00	N	0.00	68.40	0.00	N	0.00	0	68.40	0.00	N	0.00
Trench Drain	66.59	66.59	0.00	64.63	0.00	N	0.00	64.63	0.00	N	0.00	64.65	0.00	N	0.00	0	64.66	0.00	N	0.00

Hillside Vista Walk-Up Condos

Inlet Control Device Parameters

NOVATECH
Engineers, Planners & Landscape Architects

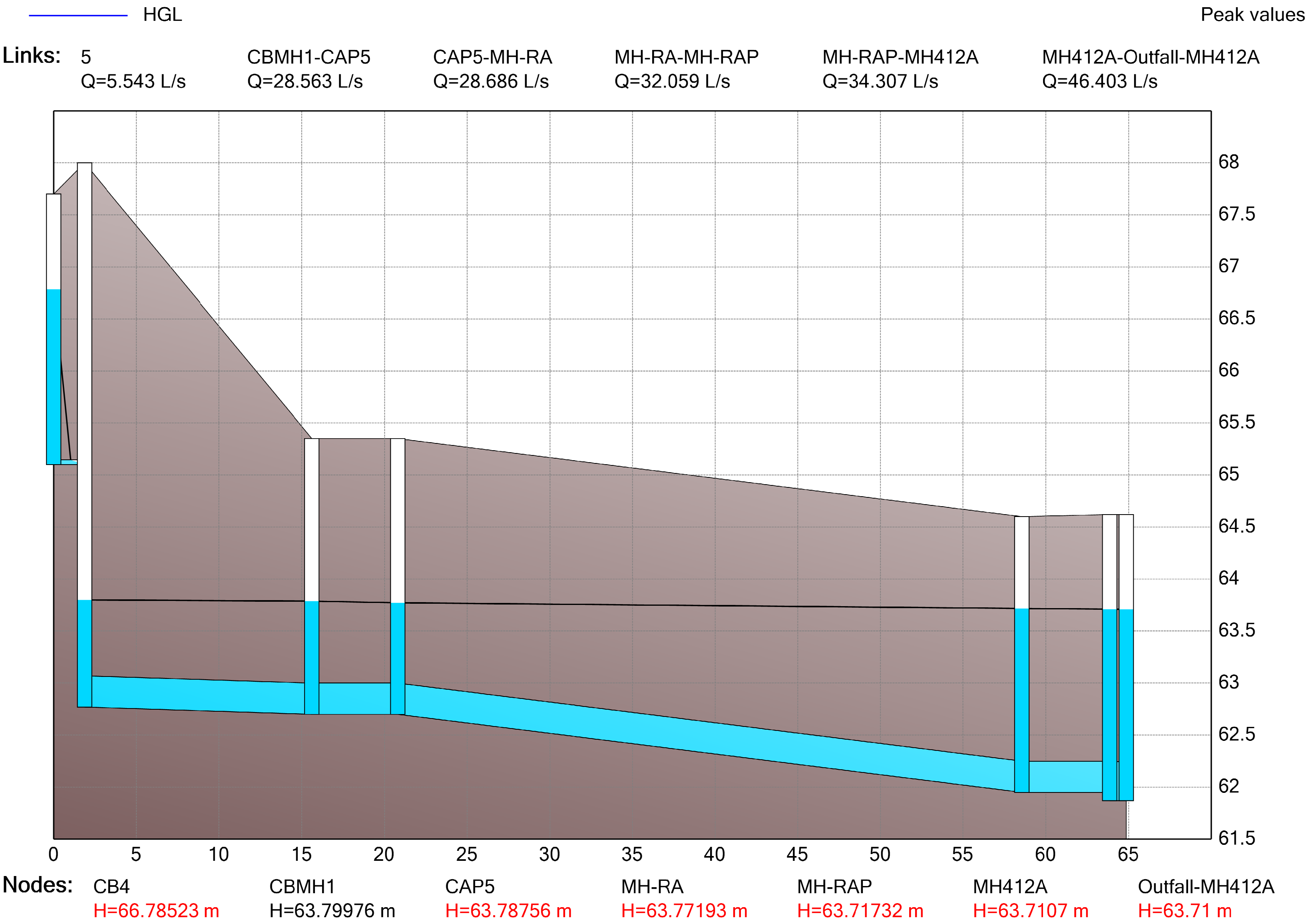
Structure	ICD Size & Inlet Rate					
	Diameter (m)	T/G (m)	Invert (m)	Max Head (m)	Ultimate Conditions	
					5-yr Orifice Peak Flow* (L/s)	100-yr Orifice Peak Flow** (L/s)
CB1	0.059	64.65	63.10	1.55	4.9	7.5
CB2	0.046	64.65	63.10	1.55	4.4	4.5
CB3	0.045	65.75	63.40	2.35	4.9	6.4
CB4	0.045	66.70	65.10	1.60	3.9	5.5
CBMH1	-	67.00	62.77	-	-	-
RYE1	-	70.35	68.86	-	-	-
RYT1	-	65.00	63.17	-	-	-
RYT2	-	69.50	63.72	-	-	-
RYT3	-	69.60	67.99	-	-	-
RYT4	-	69.95	68.40	-	-	-
Trench Drain	-	66.59	64.60	-	-	-

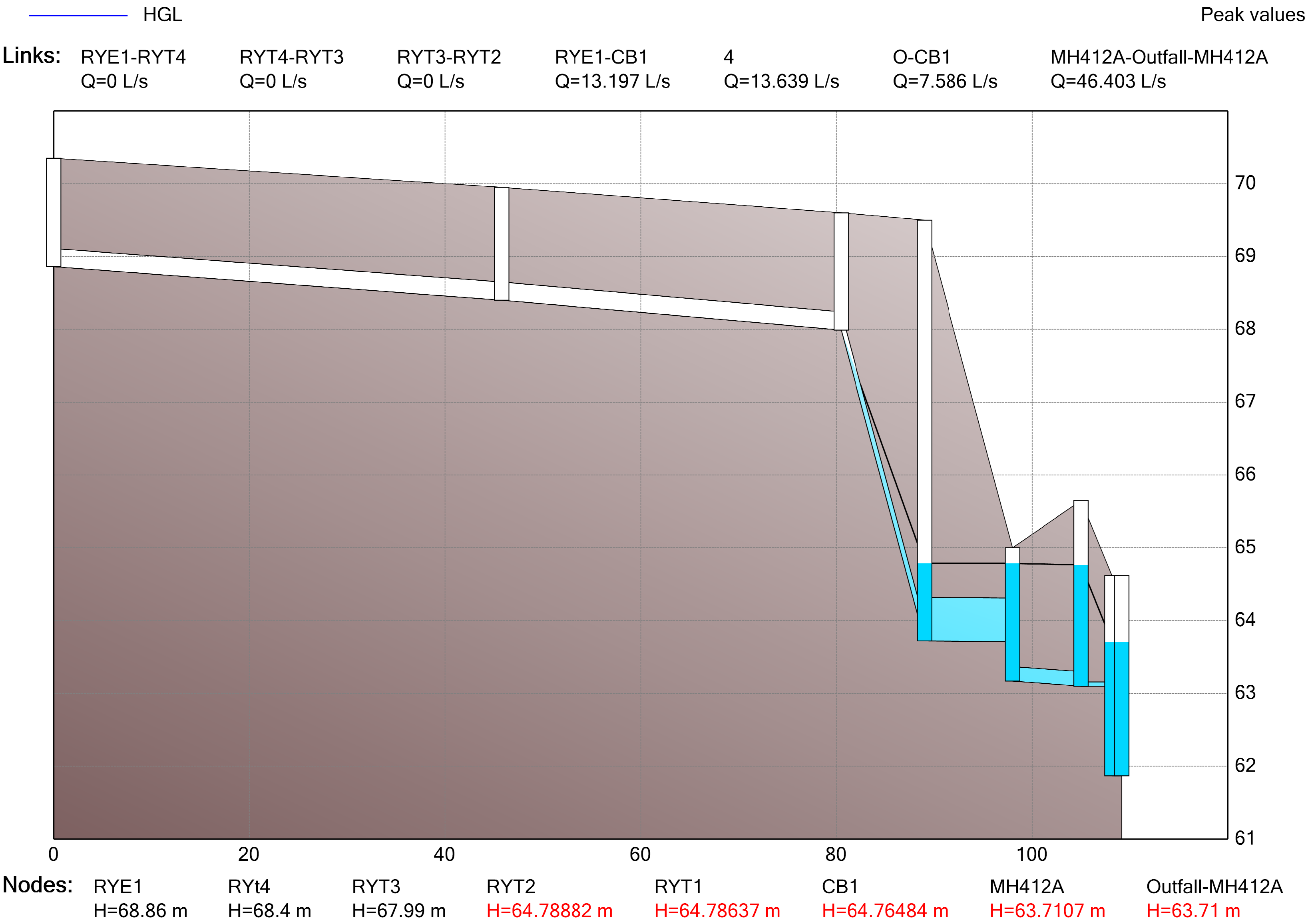
**From PCSWMM Model, 5-year 6-hour Chicago storm distribution*

DATE: 8/31/2022
PREPARED BY: NOVATECH

M:\2020\120237\DATA\Calculations\Sewer Calcs\SWM\PCSWMM\Submission 3\20220831-120237-Model Parameters.xlsx

	Flow		
Node	5yr (L/s)	100yr (L/s)	100+20%(L/s)
MH412A Outfall	27.81	41.98	46.44
Major system Outfall	0	1.63	18.33
Uncontrolled St Joseph	8.14	14.51	17.52


HGL
Peak values
Links:
5
Q=5.543 L/s
CBMH1-CAP5
Q=28.563 L/s
CAP5-MH-RA
Q=28.686 L/s
MH-RA-MH-RAP
Q=32.059 L/s
MH-RAP-MH412A
Q=34.307 L/s
MH412A-Outfall-MH412A
Q=46.403 L/s
68
67.5
67
66.5
66
65.5
65
64.5
64
63.5
63
62.5
62
61.5
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Nodes:
CB4
H=66.78523 m
CBMH1
H=63.79976 m
CAP5
H=63.78756 m
MH-RA
H=63.77193 m
MH-RAP
H=63.71732 m
MH412A
H=63.7107 m
Outfall-MH412A
H=63.71 m


HGL
Peak values
Links:
RYE1-RYT4
Q=0 L/s
RYT4-RYT3
Q=0 L/s
RYT3-RYT2
Q=0 L/s
RYE1-CB1
Q=13.197 L/s
4
Q=13.639 L/s
O-CB1
Q=7.586 L/s
MH412A-Outfall-MH412A
Q=46.403 L/s
70
69
68
67
66
65
64
63
62
61
0
20
40
60
80
100
Nodes:
RYE1
H=68.86 m
RYt4
H=68.4 m
RYT3
H=67.99 m
RYT2
H=64.78882 m
RYT1
H=64.78637 m
CB1
H=64.76484 m
MH412A
H=63.7107 m
Outfall-MH412A
H=63.71 m

TEMPEST Product Submittal Package

Date: December 2, 2022

Customer: Novatech

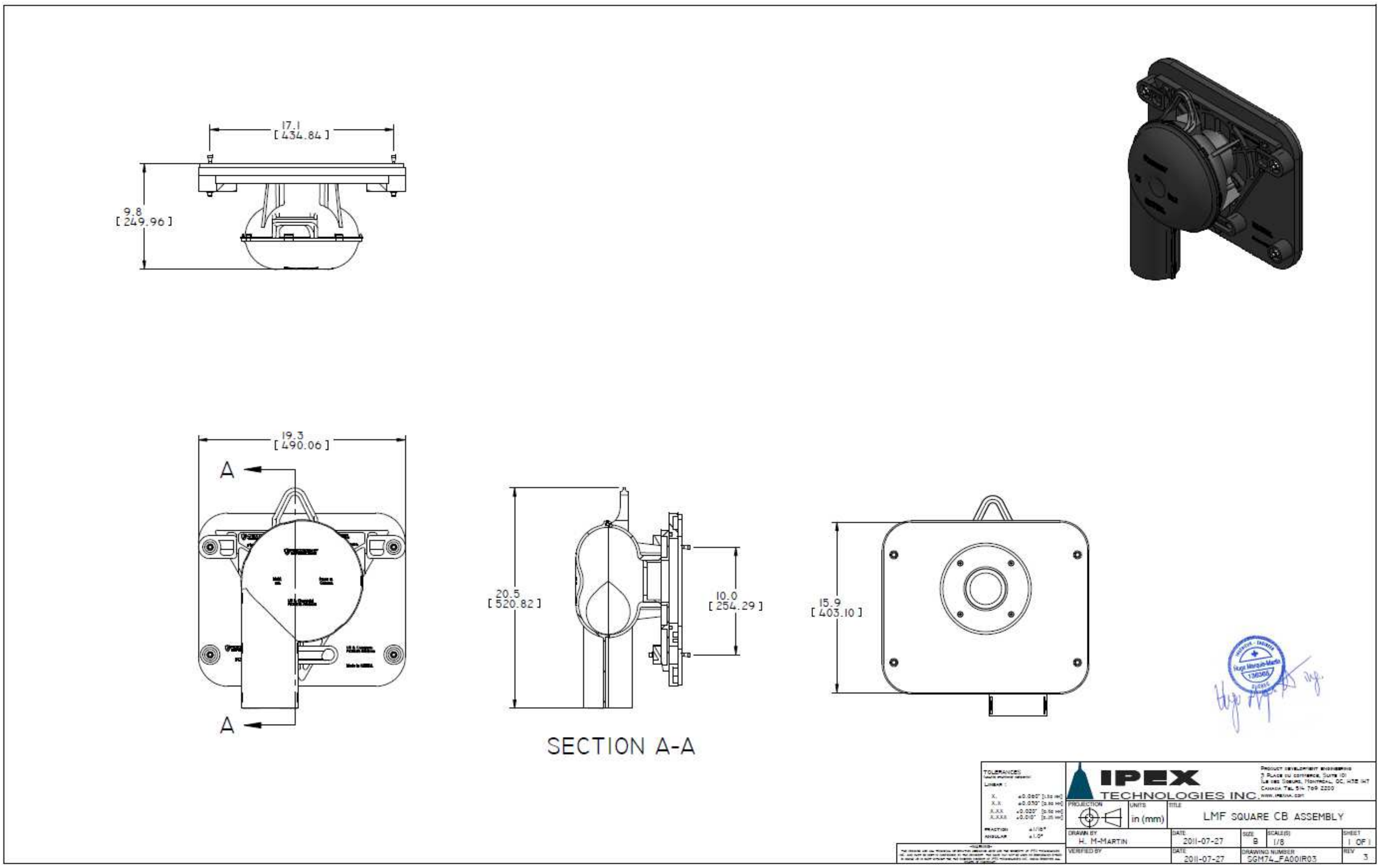
Contact: Lucas Wilson

Location: - -

Project Name: Hillside Commons

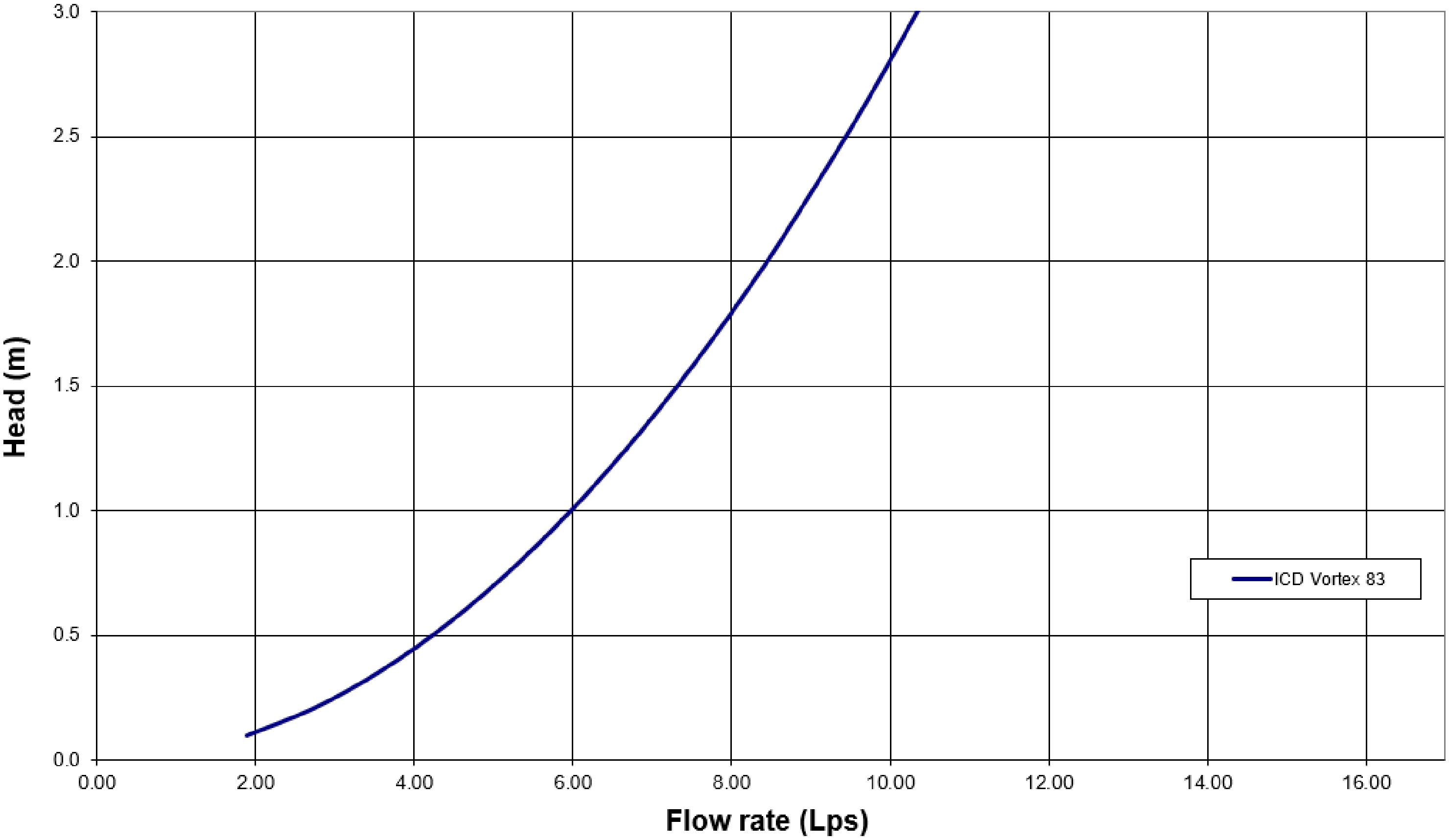
IPEX

Tempest LMF ICD Sq Shop Drawing



Tempest LMF ICD Flow Curve

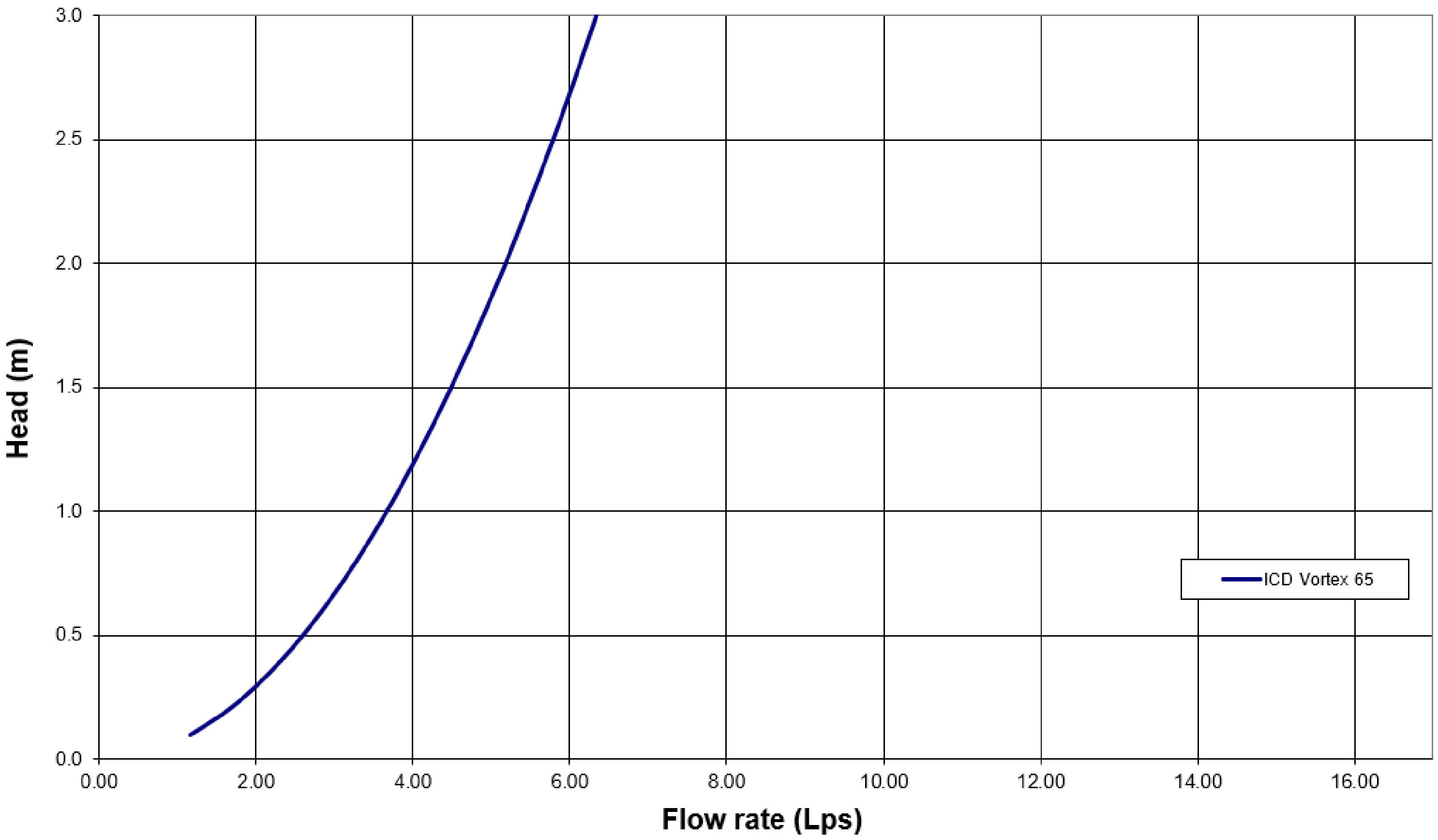
Flow: 7.5 L/s
Head: 1.55 m
CB1



IPEX

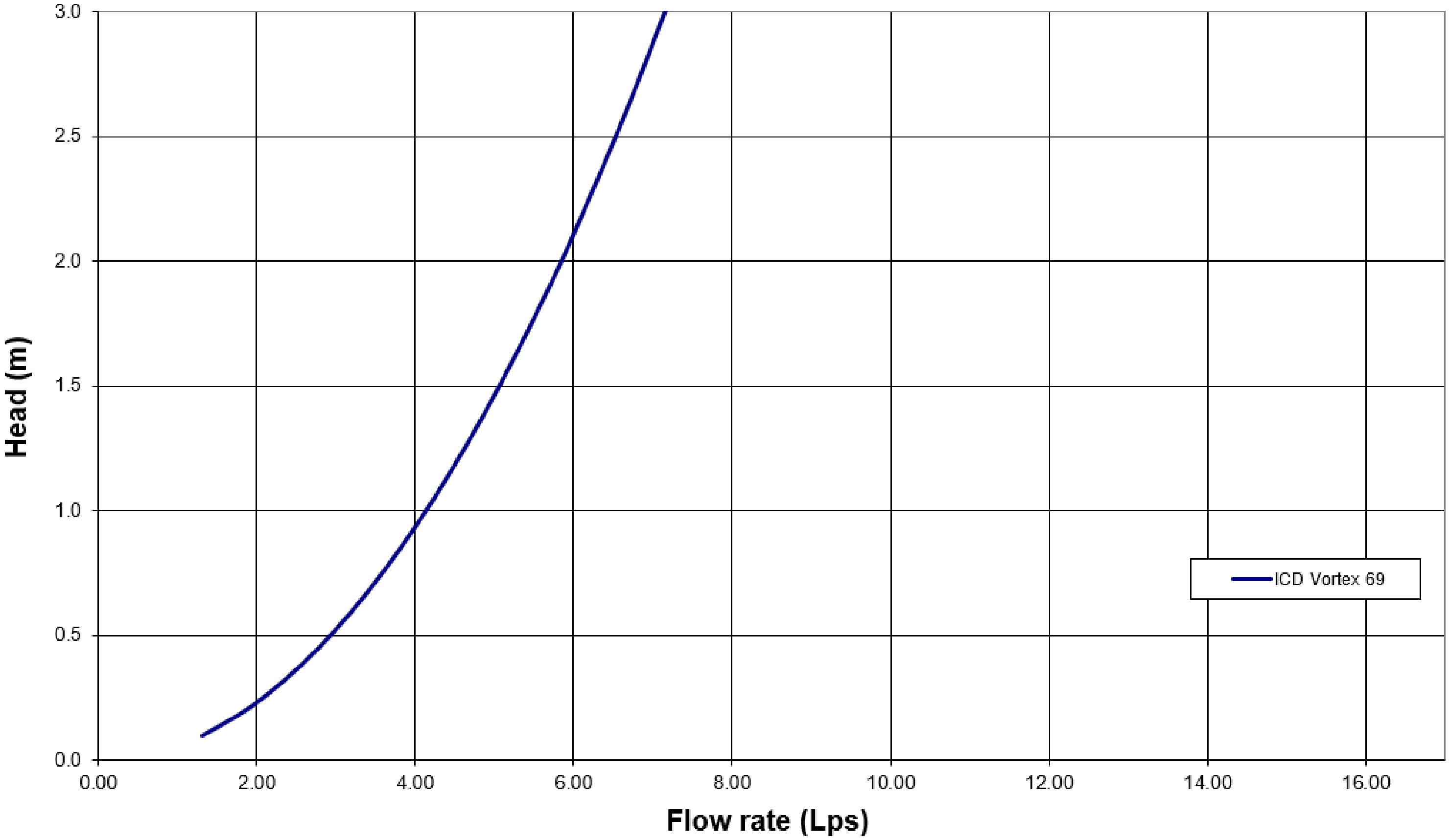
Tempest LMF ICD Flow Curve

Flow: 4.5 L/s
Head: 1.55 m
CB2



Tempest LMF ICD Flow Curve

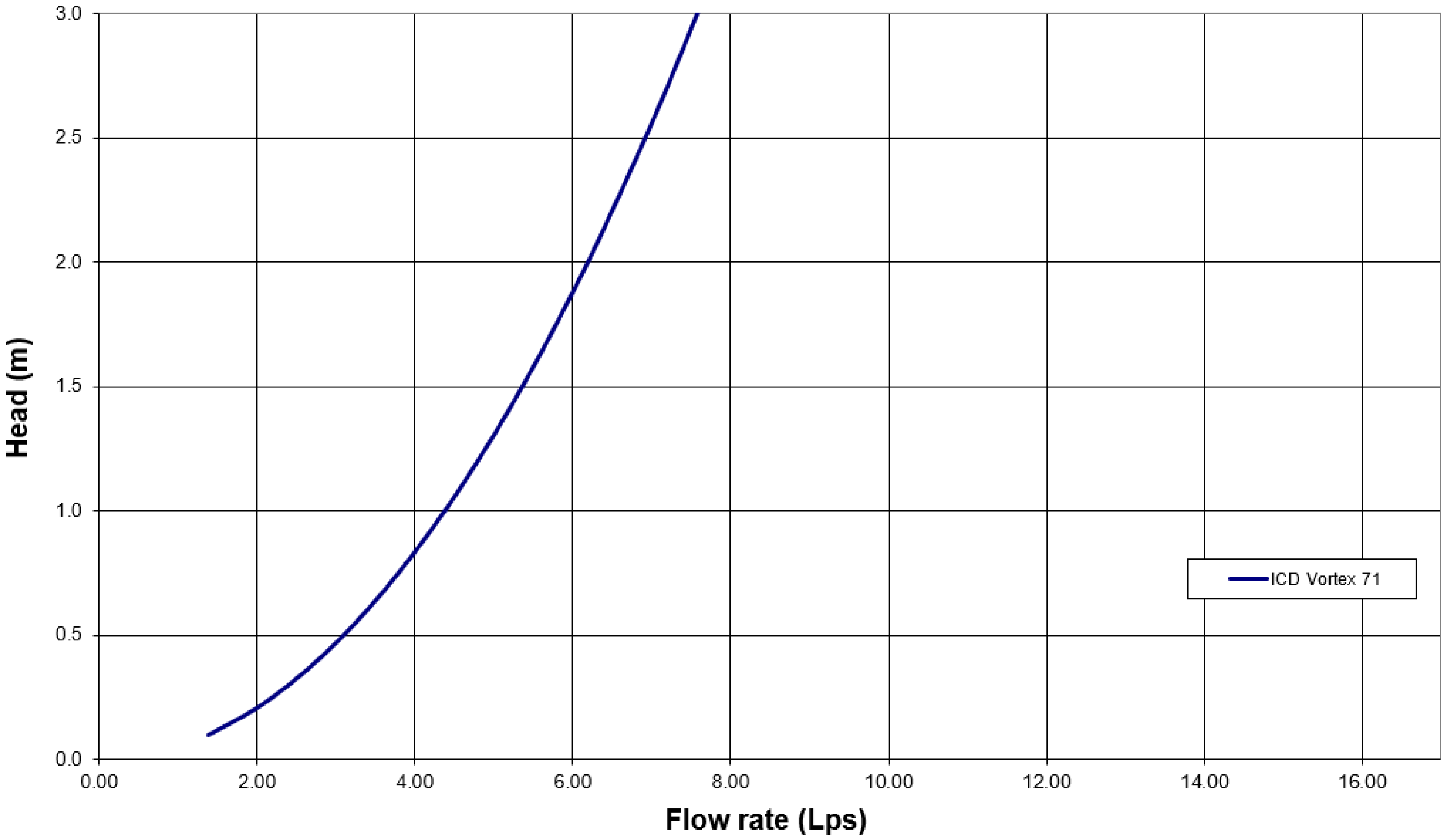
Flow: 6.4 L/s
Head: 2.35 m
CB3



IPEX

Tempest LMF ICD Flow Curve

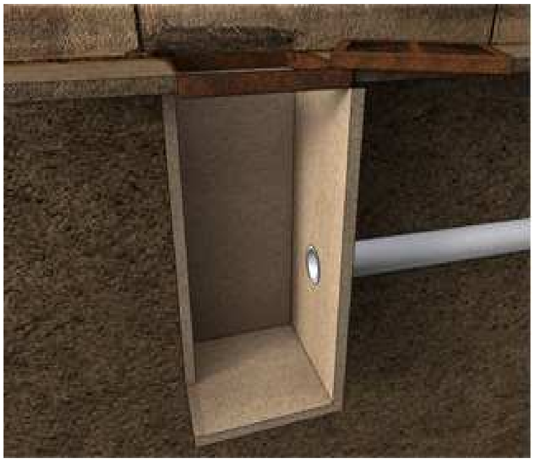
Flow: 5.5 L/s
Head: 1.6 m
CB4

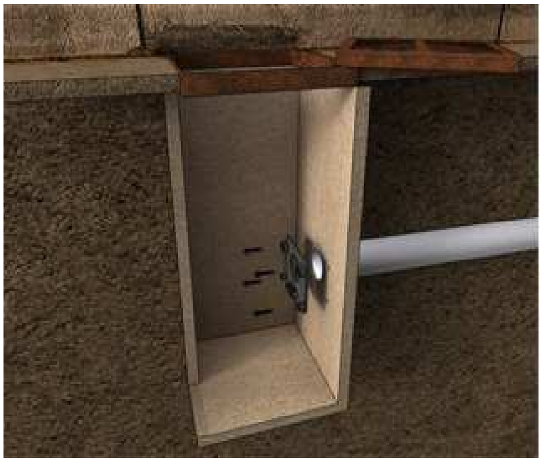


IPEX

Square CB Installation Notes:

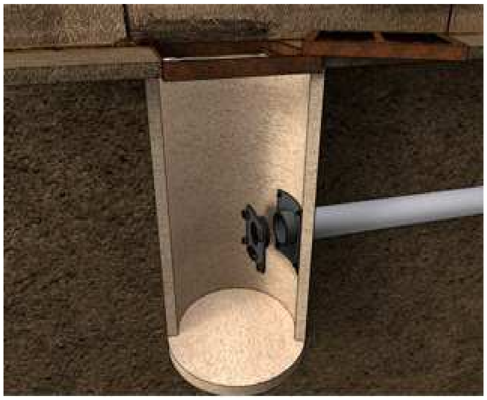
1. Materials and tooling verification:
   - Tooling: impact drill, 3/8’’ concrete bit, torque wrench for 9/16’’nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8x3-1/2, (4) washers, (4) nuts
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8’’ concrete bit to make the four holes at a minimum of 1-1/2’’ depth up to 2-1/2’’. Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you will hit the anchors with the hammer. Remove the nuts on the ends of the anchors
5. Install the wall mounting plate on the anchors and screw the nut in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the LMF device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.





Round CB Installation Notes: (Refer to square install notes above for steps 1 , 3, & 4)

2. Use spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lb-ft). There should be no gap between the CB spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate and the spigot of the spigot CB wall plate. Slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered into the mounting plate and has created a seal.



CAUTION/WARNING/DISCLAIM:

- Verify that the inlet(s) pipe(s) is not protruding into the catch basin. If it is, cut it back so that the inlet pipe is flush with the catch basin wall.
- Any required cement in the installation must be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Please refer to the IPEX solvent cement guide to confirm required curing times or attend the IPEX **Online Solvent Cement Training Course**.
- Call your IPEX representative for more information or if you have any questions about our products.

IPEX TEMPEST Inlet Control Devices Technical Specification

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control where specified. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's must have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

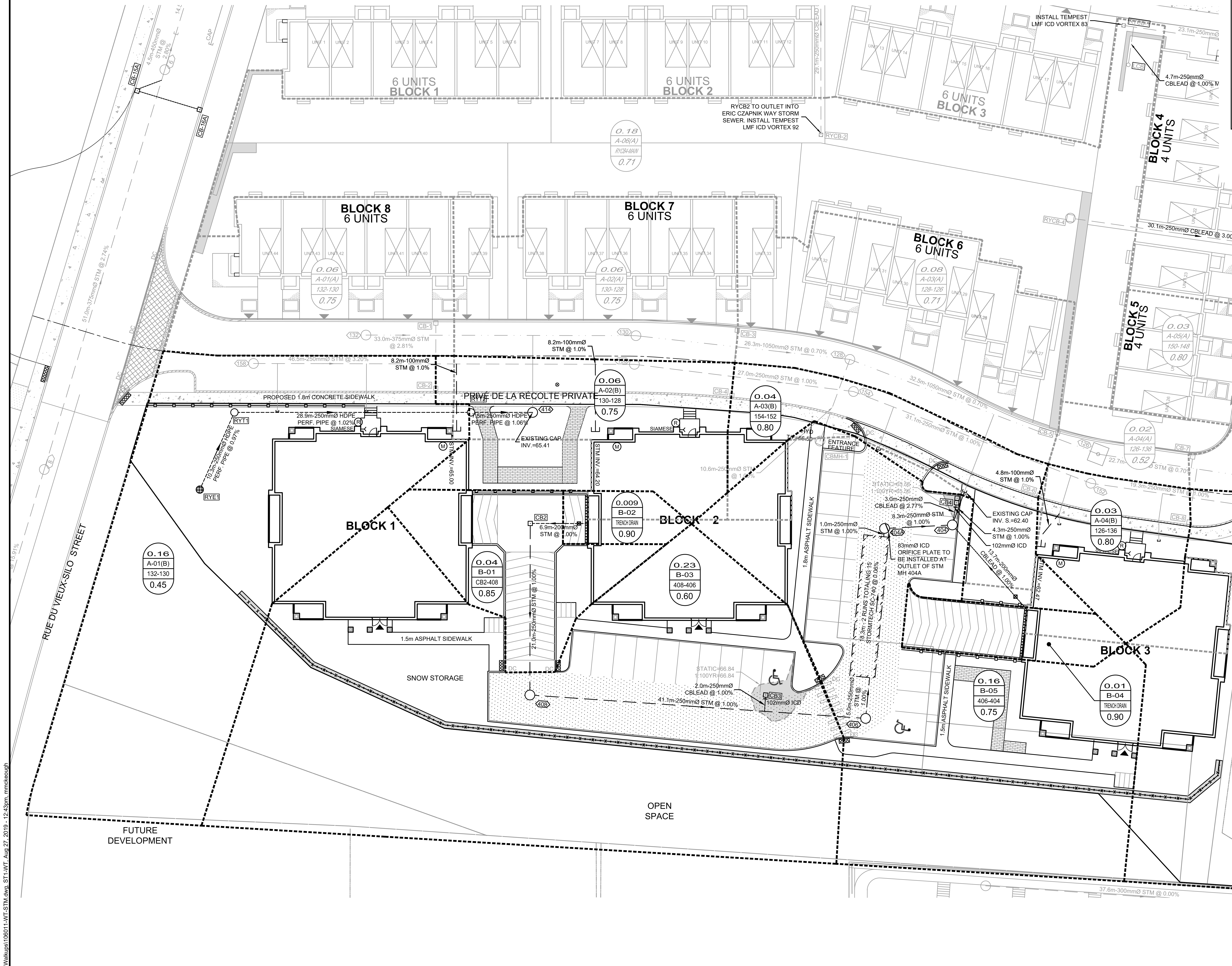
All hardware will be made from 304 stainless steel.

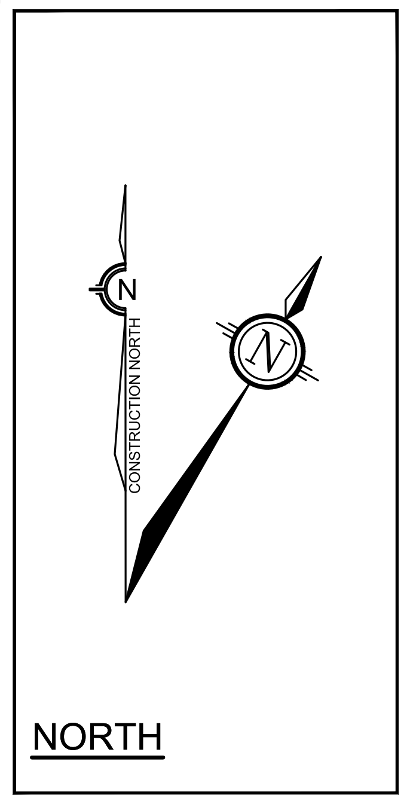
Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

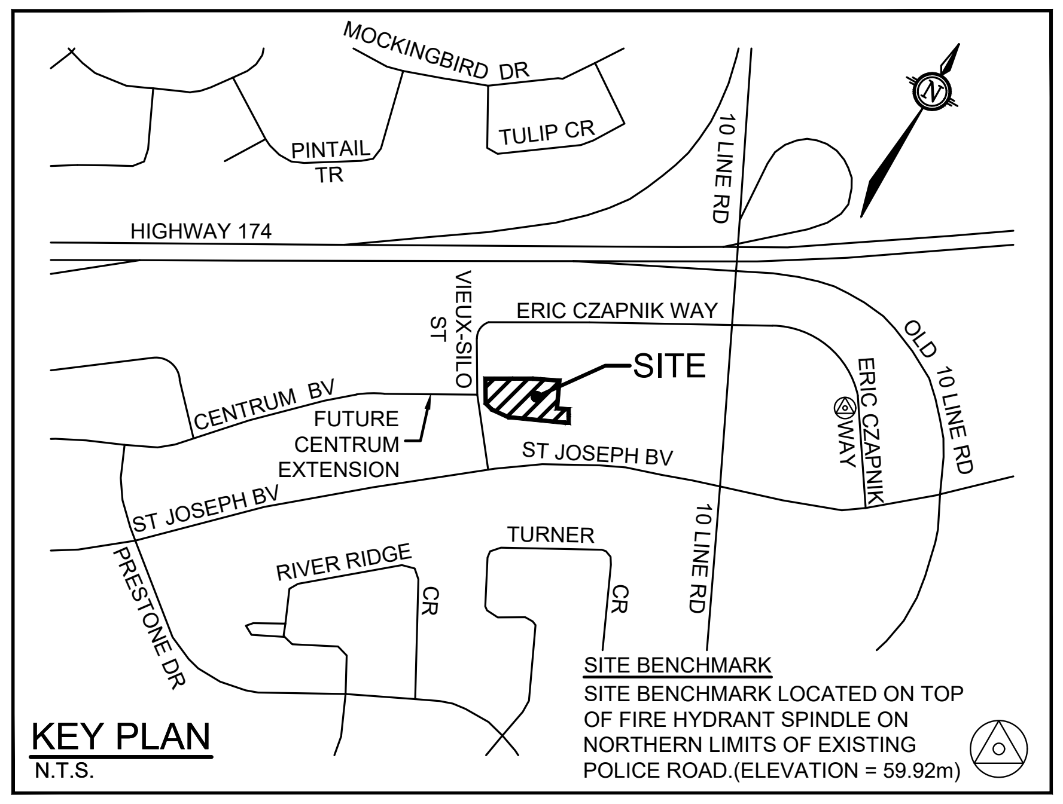
Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.





NORTH



KEY PLAN
N.T.S.

SITE BENCHMARK
SITE BENCHMARK LOCATED ON TOP OF FIRE HYDRANT SPINDLE ON NORTHERN LIMITS OF EXISTING POLICE ROAD.(ELEVATION = 59.92m)

LEGEND

A	AREA NUMBER
0.38	AREA (ha)
114-116	MANHOLE TO MANHOLE
0.45	RUNOFF COEFFICIENT
0.06	*EXISTING AREA NUMBER*
A-01(A)	*AREA (ha)*
132-130	*MANHOLE TO MANHOLE*
0.75	*RUNOFF COEFFICIENT*
1:100YR / STATIC	PONDING AREA WITH 1:100 YEAR & STATIC PONDING ELEVATION
▬ ▬ ▬	STORM DRAINAGE AREA BOUNDARY
▬ ▬ ▬	EXISTING STORM DRAINAGE AREA BOUNDARY
STMMH 100	PROPOSED STORM MH & SEWER WITH DIRECTION OF FLOW
□ CB 2	PROPOSED CATCHBASIN
222	*EXISTING STORM MH & SEWER WITH DIRECTION OF FLOW*
□ CB 2	*EXISTING CATCHBASIN*
CBMH	*EXISTING CATCHBASIN MANHOLE*
136	*EXISTING STORM BOX MANHOLE WITH ICD ORIFICE PLATE*

PONDING[1]

CB No.	RIM ELEV. (m)	EVENT	WATER LEVEL ELEV. (DEPTH) (m)	STORAGE VOLUME (m³)
CB 2	66.20	5yr	0.00m (64.51m)	2.75m³
		100yr	0.00m (65.91m)	
		Static	0.15m (66.35m)	
CB 3	66.75	5yr	0.02m (66.77m)	7.78m³
		100yr	0.09m (66.84m)	
		Static	0.09m (66.84m)	
CB 4	65.44	5yr	0.04m (65.48m)	0.15m³
		100yr	0.12m (65.56m)	
		Static	0.12m (65.56m)	

[1] BASED ON AUTODESK SSA MODEL (6-HOUR CHICAGO STORM DISTRIBUTION)

CATCHBASIN ICD DATA TABLE

CB No.	ICD DIA.	5-YEAR		100-YEAR	
		HEAD (m)	FLOW RATE (L/s)	HEAD (m)	FLOW RATE (L/s)
CB 2	-	0.09m	14L/s	1.49m	36.6L/s
CB 3	102mm PLUG	1.52m	27.0L/s	1.59m	27.5L/s
CB 4	102mm PLUG	1.44m	26.2L/s	1.52m	27.0L/s

D07-12-16-0133

PRELIMINARY

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
4.	ISSUED FOR SITE PLAN SUBMISSION	AUG 23/19	DDB
3.	ISSUED FOR SITE PLAN SUBMISSION	OCT 5/18	DDB
2.	ISSUED FOR SITE PLAN SUBMISSION	DEC 15/17	DDB
1.	ISSUED FOR SITE PLAN APPROVAL	AUG 26/16	KJA

SCALE
1:250
1:250
0 2 4 6 8 10

DESIGN DDB
CHECKED DDB
DRAWN SAM
CHECKED DDB
APPROVED DDB

FOR REVIEW ONLY

D.D. BLAIR
100122737
Aug 23 2019

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone	(613) 254-9643
Facsimile	(613) 254-5867
Website	www.novatech-eng.com

LOCATION
CITY OF OTTAWA
HILLSIDE VISTA WALKUP CONDOS

DRAWING NAME
STORM DRAINAGE AREA PLAN

PROJECT No.
106011

REV
REV # 4

DRAWING No.
106011-ST1-WT

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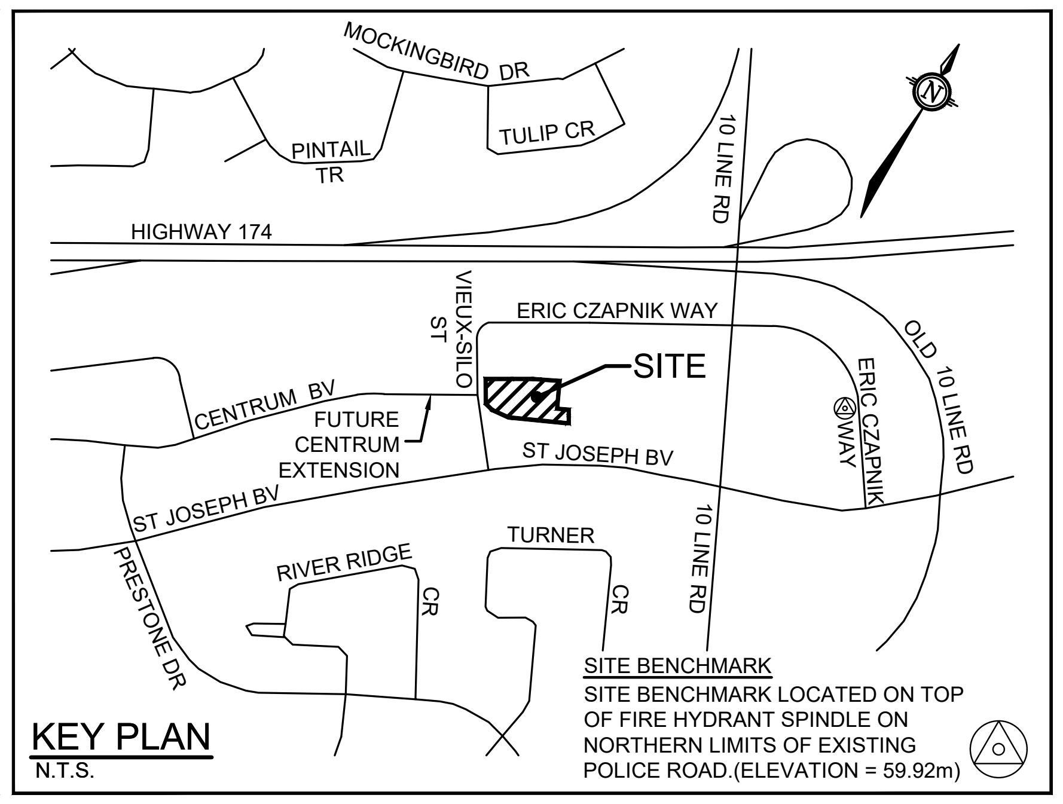
NORTH



SITE BENCHMARK
SITE BENCHMARK LOCATED ON TOP OF FIRE HYDRANT SPINDLE ON NORTHERN LIMITS OF EXISTING POLICE ROAD.(ELEVATION = 59.92m)

KEY PLAN
N.T.S.

LEGEND

A	AREA NUMBER
0.38	AREA (ha)
114-116	MANHOLE TO MANHOLE
0.45	RUNOFF COEFFICIENT
0.06	*EXISTING AREA NUMBER*
A-01(A)	*AREA (ha)*
132-130	*MANHOLE TO MANHOLE*
0.75	*RUNOFF COEFFICIENT*
▨	PONDING AREA WITH 1:100 YEAR & STATIC PONDING ELEVATION
- - - -	STORM DRAINAGE AREA BOUNDARY
- - - -	EXISTING STORM DRAINAGE AREA BOUNDARY
STMMH 100	PROPOSED STORM MH & SEWER WITH DIRECTION OF FLOW
☐ CB 2	PROPOSED CATCHBASIN
DICB 1	PROPOSED DITCH INLET CATCHBASIN
	EXISTING STORM MH & SEWER WITH DIRECTION OF FLOW
CB 2	*EXISTING CATCHBASIN*
CBMH	*EXISTING CATCHBASIN MANHOLE*
136	*EXISTING STORM BOX MANHOLE WITH ICD ORIFICE PLATE*

PONDING[1]

CB No.	RIM ELEV. (m)	EVENT	WATER LEVEL ELEV. (DEPTH) (m)	STORAGE VOLUME (m³)
CB 5	63.95	5yr	0.00m (62.94m)	1.14m³
		100yr	0.00m (63.72m)	
		Static	0.15m (64.10m)	
CB 6	63.95	5yr	0.02m (63.97m)	1.22m³
		100yr	0.14m (64.09m)	
		Static	0.15m (64.10m)	
RYCB 1	64.85	5yr	0.00m (63.82m)	3.62m³ (MAX)
		100yr	0.00m (64.77m)	
		Static	0.15m (65.00m)	

[1]BASED ON AUTODESK SSA MODEL (6-HOUR CHICAGO STORM DISTRIBUTION)

CATCHBASIN ICD DATA TABLE

CB No.	ICD DIA.	5-YEAR		100-YEAR	
		HEAD (m)	FLOW RATE (L/s)	HEAD (m)	FLOW RATE (L/s)
CB 5	83mm PLUG	0.63m	8.50L/s	1.41m	13.40L/s
CB 6	102mm PLUG	1.66m	27.70L/s	1.78m	27.60L/s
RYCB 1	83mm PLUG	0.37L/s	8.50L/s	1.32m	16.50L/S
DICB 1	178mm PLUG	1.31m	-	1.63m	-

PRELIMINARY

D07-12-16-0133

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NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

APPROVED ☐ REFUSED ☐
THIS _____ DAY OF ____________, 20____
JEFF MCEWEN, P.ENG., MANAGER
DEVELOPMENT REVIEW, SUBURBAN SERVICES

No.	REVISION	DATE	BY
5.	ISSUED FOR SITE PLAN APPROVAL	OCT 30/19	DDB
4.	ISSUED FOR SITE PLAN SUBMISSION	AUG 23/19	DDB
3.	ISSUED FOR SITE PLAN SUBMISSION	OCT 5/18	DDB
2.	ISSUED FOR SITE PLAN SUBMISSION	DEC 15/17	DDB
1.	ISSUED FOR SITE PLAN APPROVAL	AUG 26/16	KJA

SCALE
1:250
1:250
0 2 4 6 8 10

DESIGN DDB
CHECKED DDB
DRAWN SAM
CHECKED DDB
APPROVED DDB

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
D.D. BLAIR
100122737
Oct.30 2019
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
HILLSIDE VISTA WALKUP CONDOS

DRAWING NAME
STORM DRAINAGE AREA PLAN

PROJECT No. 106011
REV REV # 5
DRAWING No. 106011-ST2-WT

PLANA1.DWG - 841mmx594mm

#17571

The report provides engineering guidelines based on EXP's interpretation of the geotechnical information and project requirements. Refer to the Geotechnical Report as referenced in **Section 1.1** for complete details.

2.3 Drainage Outlet

Under existing conditions, storm runoff from the site flows overland towards Privé de la Récolte where it flows overland along the roadway and is captured by the roadway catchbasins, then conveyed by the existing storm sewers to Eric Czapnik Way, and ultimately to the existing Brisebois Creek SWM Facility.

3.0 STORMWATER MANAGEMENT CRITERIA

The stormwater management criteria used in the design of the Hillside Vista Condos have been based on the following:

- *Serviceability and Stormwater Management Report, Orleans Town Centre East Lands, Ottawa, Ontario* (Novatech, June 2011/Ref. # R-2008-151);
  - This report outlines the design criteria for all future development within the OTC East Lands, including the proposed Hillside Vista Walk-Up Condos development;
- City of Ottawa Sewer Design Guidelines (October 2012).

3.1 Existing Storm Drainage Infrastructure (Privé de la Récolte)

The Privé de la Récolte storm sewers were designed and approved as part of the Hillside Vista Towns development, based on the overall SWM Criteria developed for the OTC East site. The design of the Privé de la Récolte storm sewers accounted for the future development of the Hillside Vista Walk-Up Condos site. As such, there are no changes proposed to the previously approved design of these sewers.

3.2 Minor System (Storm Sewers)

- Storm sewers (and underground storage systems) are to be designed to store runoff and attenuate peak flows to the allowable release rates established as a part of the OTC East report;
  - Blocks 1-5 and the surrounding area are to be controlled to 127 L/s/ha;
  - The future development area (south of Blocks 4 & 5) is to be controlled to 150 L/s/ha;
- Ensure that the 1:100 year HGL in the storm sewer system is below the T/G elevations of the storm manholes;
- Units within the Hillside Vista Walk-Up Condos development are to be connected to a separate foundation drain system on Privé de la Récolte, and there will be no foundation connections from the units to the underground storage system.

3.3 Major System (Overland Flow)

- Provide on-site storage for storm runoff which exceeds the allowable minor system release rate from the site up to and including the 100-year design event;
- Ensure major system flows do not adversely affect downstream infrastructure;
- Maximum flow depths and elevations on streets shall not exceed 0.30 m and shall be confined to the road right-of-way as well as not be within 0.30 m (vertical) to the nearest building opening;
  - The maximum flow depth on streets under either static and/ or dynamic conditions shall be 0.30 m.

3.4 Water Quality Control

- Water quality control will be provided by the downstream Brisebois Creek SWM facility which has been designed to provide quantity and quality control for the proposed development;

3.5 Erosion and Sediment Control

- A qualified inspector should conduct daily visits during construction to ensure that the contractor is working in accord with the design drawings and that mitigation measures are being implemented as specified;
- Filter cloth is to be placed under all proposed and existing catchbasins and storm manhole covers;
- After complete build-out, all sewers are to be inspected and cleaned and all sediment and construction fencing is to be removed.

4.0 PROPOSED DEVELOPMENT

Storm servicing for the Hillside Vista Walk-Up Condos Development will be provided using a dual drainage system. Runoff will be stored and conveyed by an underground storage chamber system (minor system), while flows from large storm events which exceed the capacity of the minor system will be conveyed overland along defined overland flow routes (major system). The outlet for the site is the Privé de la Récolte storm sewer, which eventually outlets to the existing Brisebois SWM Facility. Due to the in-line storage provided by the storm sewers, units within the Hillside Vista Walk-Up Condos development are to be connected to a separate foundation drain system on Privé de la Récolte, and there will be no foundation connections from the units to the underground storage system.

4.1 Storm Sewers

The proposed storm and foundation drain sewer systems are shown on the General Plan of Services and Storm Drainage Area Plans in **Appendix B**.

4.1.1 Allowable Release Rate

The approved 2011 subdivision servicing report for the OTC East development provided release rates for the individual blocks within the OTC East study area. The layouts of the blocks have been revised, but the total allowable release rate to the storm sewer system has been maintained.

The allowable release rate for the proposed Hillside Vista Condos Development has been calculated based on the allowable per-hectare release rate of 127 L/s/ha, as identified in the *Serviceability and Stormwater Management Report – Hillside Vista Towns (Novatech, June 8, 2015)*.

The Hillside Vista Condos Development is split into two areas: Blocks 1, 2, and 3; and Blocks 4 and 5. To meet the target release rate, quantity control will be provided in each of the two areas using a combination of surface storage (parking lots) and underground storage (StormTech chambers). Refer to the Storm Drainage Area Plans (**106011-ST1-WT, 106011-ST2-WT**).

Blocks 1, 2 & 3

$Q_{allowable}$ = 0.43 ha x 127 L/s/ha
= 54.6 L/s

Block 4 & 5

$Q_{allowable}$ = 0.28 ha x 127 L/s/ha
= 35.6 L/s

Future Development

In the 2011 subdivision servicing report for the OTC East development there were two areas outlined for future development; the area south of Blocks 4 and 5 (B09 - 0.51 ha), which is to be developed at a later date, and the area between Blocks 3 and 4 (B06 - 0.21 ha), which was originally intended to be a right-of-way connection from the future development blocks to Privé de la Récolte. As identified in the *Serviceability and Stormwater Management Report – Hillside Vista Towns (Novatech, June 8, 2015)*, these blocks will have a release rate of 150L/s/ha.

4.1.2 Inlet Control Devices

Inflows to the storm sewer system will be controlled using inlet control devices (ICDs) installed in the parking lot catchbasins. The ICDs have been sized to restrict the flow from the development to the allowable release rates listed in **Section 4.1.1**. ICDs specified at each inlet are indicated on the General Plan of Services (**106011-GP-WT1, 106011-GP-WT2**).

4.2 Overland Flow and Surface Storage (Major System)

The parking areas have been designed to store some runoff from storms that exceed the capacity of the underground storage systems. The Hillside Vista Condos development has been graded to ensure that ponding is confined within the parking areas at a maximum depth of 0.30 m (static ponding + dynamic flow). An overland flow path has been provided to ensure that runoff from extreme storm events that exceeds the available storage can be safely directed onto the adjacent roadway.

5.0 HYDROLOGIC & HYDRAULIC MODELING

5.1 Model Selection

The performance of the proposed storm drainage system for the Hillside Vista Walk-Up Condos Development was evaluated using the *Autodesk Storm and Sanitary Analysis* (SSA) hydrologic/hydraulic model.

PCSWMM modeling software was not used since the Walk-Up Condos model has been built on the previously approved SSA model for the Hillside Vista Towns development. While both PCSWMM and Autodesk SSA are based on the SWMM 5.0 engine, the SSA model uses 'Inlet Nodes' to simulate the flow capture and bypass of roadway catchbasins on-grade. These 'Inlet Nodes' are not directly compatible with PCSWMM and would require modification of the previously approved model, resulting in slightly different model results.

Refer to **Appendix A** for a description of the Autodesk SSA model, model output, and model schematics.

5.2 Design Storms

Hydrologic modeling completed for the previously approved serviceability study indicated that the 6-hour Chicago storm distribution generated the highest peak flows and storage requirements for the OTC East site and was chosen as the critical design event. The model of the Hillside Vista Walk-Up Condos development uses the same storm distribution. The 100-year 6-hour storm was also increased by 20% (intensity + total precipitation) to evaluate the impact of an extreme event on the performance of the major and minor system.

5.3 Model Development

5.3.1 Storm Drainage Areas

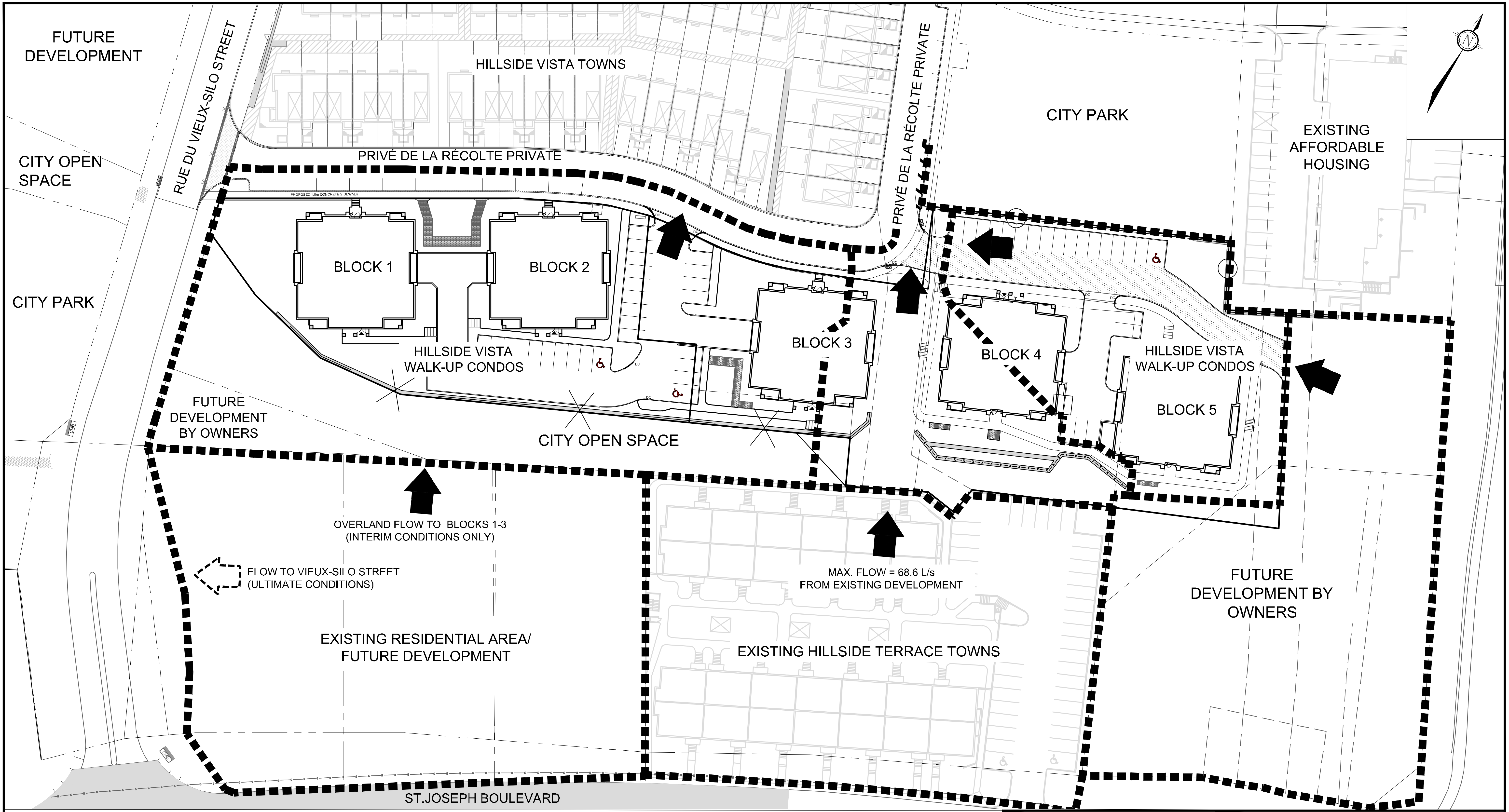
For modeling purposes, the development lands have been divided into subcatchments based on the drainage areas tributary to each inlet of the proposed storm sewer system. The catchment areas are shown on the Storm Drainage Area Plan (**106011-ST1-WT, 106011-ST2-WT**).

Storm drainage areas have shifted slightly from those included as a part of the original Serviceability and Stormwater Management report for the OTC lands, due to the realignment of property lines for the future development areas.

Also updated are the storm drainage areas along Privé de la Récolte for the fronting townhouses, as well as the rear-yard drainage areas behind the townhouses. The front yard drainage areas have been updated based on the adjacent drainage areas for the walk-up condos. The rear-yard areas have been updated based on the memo *Hillside Vista Walkouts – Revised ICD for RYCB-1* (Novatech, May 29, 2017). Refer to **Figure 3** – Overall Drainage Area Plan.

Interim Conditions Model

Under interim conditions, runoff from the existing residential lands (0.56 ha) to the south Blocks 1-3 will be picked up by CB-03. Runoff from the undeveloped lands to the south-east of Blocks 4-5 (0.51 ha) will flow overland (uncontrolled) towards a temporary DICB at the eastern corner of the subject site (DICB1). To account for these flows and determine how the proposed major & minor systems will function under interim conditions, an interim-conditions SSA model has been developed. Flows which exceed the capacity of the storm sewer system, and available ponding depths above the catchbasins will flow overland onto Privé de la Récolte.



▬ ▬ ▬ OVERALL DRAINAGE AREA BOUNDARY

➡ DRAINAGE AREA OUTLET

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

HILLSIDE VISTA WALK-UP CONDOS

OVERALL DRAINAGE AREA PLAN

SCALE 1 :750 0 10m 20m 30m

DATE AUG 2019

JOB 106011

FIGURE FIGURE 3

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Ultimate Conditions Model

Under ultimate conditions, runoff from the existing residential lands (0.56 ha) to the south of Blocks 1-3 has not been included in the SSA model as runoff from this area is to be captured by a private sewer and directed to the storm sewer system in Eric Czapnik Way. The ultimate conditions model also accounts for the future development of the lands to the south-east of Blocks 4-5 (0.51 ha), controlled to the allowable release rate of 150 L/s/ha.

Both Models

Both the interim conditions and ultimate conditions SSA models account for both minor and major system flows, including the routing of flows through the storm sewer network (minor system), and overland along the road network (major system). The results of the analysis were used to:

- Determine the total major and minor system runoff from the site;
- Ensure allowable release rates are not exceeded;
- Ensure no ponding in the right-of-ways following a 5-year event;
- Calculate the storm sewer hydraulic grade line for the 100-year storm event; and
- Evaluate overland flow depths and ponding volumes in the right-of-way during the 100-year event.

5.3.2 Subcatchment Model Parameters

Table 5.1 provides an overview of the model parameters for each subcatchment area shown on the Storm Drainage Area Plan (**106011-ST1-WT**, **106011-ST2-WT**). Interim conditions for two subcatchments that are only included in the Interim Conditions SSA model have been included at the bottom of the table.

Table 5.1: Model Parameters – Ultimate Conditions

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Equivalent Width (m)	Average Slope (%)
Existing Development - Hillside Vista Townhouses						
A-01(A)	0.060	0.75	79%	44%	35	3.2%
A-01(B)*	0.160	0.45	36%	50%	35	3.2%
A-02(A)	0.060	0.75	78%	48%	35	3.2%
A-02(B)*	0.060	0.75	79%	50%	35	3.2%
A-03(A)	0.080	0.71	72%	33%	40	3.2%
A-03(B)*	0.040	0.80	86%	35%	40	3.2%
A-04(A)	0.020	0.52	45%	0%	45	2.6%
A-04(B)*	0.030	0.80	86%	50%	45	2.6%
A-05(A)	0.030	0.80	85%	44%	30	6.7%
A-06(A)	0.020	0.71	72%	47%	30	6.7%
A-06(B)	0.005	0.88	97%	0%	5	6.7%
A-06(C)	0.045	0.71	72%	47%	30	6.7%
A-06(D)	0.010	0.88	97%	0%	30	6.7%
A-07*	0.180	0.25	7%	100%	18	3.1%
A-08(A)	0.040	0.73	76%	60%	20	1.0%

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	No Depression (%)	Equivalent Width (m)	Average Slope (%)
A-08(B)	0.110	0.73	76%	60%	20	1.0%
Proposed Development - Hillside Vista Walk-Up Condos						
B-01	0.040	0.85	93%	50%	20	4.0%
B-02	0.009	0.90	100%	95%	9	8.0%
B-03	0.230	0.60	57%	25%	58	1.5%
B-04	0.010	0.90	100%	40%	7	5.0%
B-05	0.160	0.75	79%	40%	46	3.0%
B-06	0.210	0.40	29%	50%	35	5.0%
B-07	0.040	0.75	79%	40%	27	2.5%
B-08	0.180	0.77	81%	50%	36	2.5%
B-09	0.510	0.75	79%	70%	54	5.0%
B-10	0.060	0.56	51%	80%	24	5.0%
Interim Conditions - Subcatchments						
*EX.RES**	*0.560*	*0.27*	*10%*	*50%*	*60*	*7.5%*
*B-10**	*0.510*	*0.27*	*10%*	*50%*	*54*	*5.0%*

**Area B-10 is present in both models, with different parameters for Interim and Ultimate conditions*

Infiltration

Infiltration losses for all catchment areas were modeled using Horton's infiltration equation, which defines the infiltration capacity of the soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses. The default values for the City of Ottawa were used for all catchments.

Horton's Equation:
$f(t) = f_c + (f_o - f_c)e^{-k(t)}$

Initial infiltration rate: $f_o = 76.2$ mm/hr
Final infiltration rate: $f_c = 13.2$ mm/hr
Decay Coefficient: $k = 4.14$/hr

Depression Storage

The default values for depression storage in the City of Ottawa were used for all catchments. Residential rooftops (including the Hillside Vista Walk-Up Condos) were assumed to provide no depression storage.

- Depression Storage (pervious areas): 4.67 mm
- Depression Storage (impervious areas): 1.57 mm

Equivalent Width

'Equivalent Width' refers to the width of the subcatchment flow path. This parameter is calculated as described in the *City of Ottawa Sewer Design Guidelines, October 2012, Section 5.4.5.6.*

Impervious Values

Impervious (%IMP) values for each subcatchment area were calculated based on the concept plan (**Figure 2**). The impervious values correspond to the Runoff Coefficients used in the Rational Method calculations using the equation: $\%IMP = (C-0.2)/0.7$

5.3.3 Minor System

The proposed on-site storm sewers were sized using the Rational Method based on a 5-year level of service. Refer to the General Plan of Services (**106011-GP-WT1** & **106011-GP-WT2**) for the layout of the minor system.

Blocks 1, 2, & 3

The storm sewer pipe between MH408 and MH406 has been sized to convey flows from the 5-year storm. An underground storage system, using StormTech's SC-740 chambers is to be installed between MH406 and MH404A to provide the required storage to meet the allowable release rate of 54.6 L/s from the site. The underground storage chambers will provide 34.0 m^3 of storage. Refer to **Appendix A** for the proposed layouts of the underground storage units.

Blocks 4 & 5

The storm sewer pipes between the CAP and MH412 has been sized to convey flows from the 5-year storm. An underground storage system, using StormTech's SC-740 chambers is to be installed between MH406 and MH404A to provide the required storage to meet the allowable release rate of 35.6 L/s. The underground storage chambers will provide 110.4 m^3 of storage. Refer to **Appendix A** for the proposed layouts of the underground storage units.

Future Development

Peak flows from the future development areas (B-06 and B-09) are to be controlled to 150L/s/ha. Area B-06 was originally intended as a ROW connecting the future development to Privé de la Récolte. However, under the revised site plan, the area will be left as open space. Area B-06 does not have any proposed infrastructure to control peak flows, so runoff will be directed uncontrolled onto Privé de la Récolte. As a result, the allowable release rate from area B-09 has been adjusted such that the overall release rate from areas B-06 and B-09 meets the 150 L/s/ha requirement.

Allowable release rate = (0.21 ha + 0.51 ha)*(150 L/s/ha)
(B-06 & B-09) = 108 L/s

100-yr peak flow from B-06 = 51.4 L/s

Allowable flow from B-09 = 108 – 51.4
= 56.6 L/s

Under interim conditions, runoff from the open space will be intercepted by two swales (refer to DWG) and directed towards a temporary DICB which is connected to the proposed storm sewer system.

Under ultimate conditions, the temporary DICB will be removed. For modeling purposes area B-10 has been directed to a storage node which represents the required on-site storage for the future development. Flows from this area are controlled to the allowable release rate of 56.6 L/s. The ICD sizes and storage locations will need to be confirmed as a part of the planned future development.

5.3.4 Inlet Control Devices

Four (4) of the catchbasins and the single RYCB across Blocks 1 though 5 will be fitted with ICDs sized to restrict peak flows to the allowable release rates outlined in the SWM Criteria and **Section 4.1.1.** CB02 will not be fitted with an ICD. The ICD parameters are outlined in **Table 5.2.**

Table 5.2: Inlet Control Device Parameters

Structure	**ICD Size & Inlet Rate**					
	Diameter **(mm)**	**Max Head** **(m)**	**Interim Conditions**		**Ultimate Conditions**	
			5-yr Orifice Peak Flow* **(L/s)**	**100-yr Orifice Peak Flow*** **(L/s)**	**5-yr Orifice Peak Flow*** **(L/s)**	**100-yr Orifice Peak Flow*** **(L/s)**
Blocks 1, 2, 3						
CB-02	250	1.27	13.8	38.6	14.0	36.6
CB-03	102	1.35	27.4	27.6	27.0	27.5
CB-04	102	1.35	26.1	27.1	26.2	27.0
MH404A	83	3.12	21.6	23.8	15.2	23.5
Blocks 4 & 5						
CB-05	83	1.60	8.7	14.9	8.5	13.4
CB-06	102	1.59	27.8	28.4	27.7	27.6
RYCB01	83	1.36	8.5	16.7	8.5	16.5
DICB-01	178	1.31	15.6	66.7	-	-
MH410	209	2.42	24.8	74.1	75.9	83.5

**From SSA model, 6-hour Chicago Storm distribution*

In addition to the ICDs in the six catchbasins, ICDs will also be installed upstream of MH404A (at the outlet of the underground storage) and in the downstream side of MH410 to control flows from the underground storage for Blocks 1-3 and Blocks 4-5. Refer to the General Plan of Services (**106011-GP-WT1** & **106011-GP-WT2**).

5.3.5 Major System

Catchbasins CB-02 through CB-06, and RYCB01 were modeled as storage nodes to account for the surface storage provided by the parking areas of the development. The stage-storage curves for each inlet were calculated based on the proposed surface shown on the Grading Plan (**106011-GR-WT1** & **106011-GR-WT2**).

In the previously approved model, storm connections for the future blocks (including the proposed Hillside Vista Condos development) were restricted to the allowable post-development release rates for those blocks. Major system flows were uncontrolled and followed existing drainage patterns. The areas from the Walk-Up Condos development that will flow uncontrolled onto Privé de la Récolte have changed slightly from the previously approved SSA model. Changes in the amount of runoff directed to the roadway are discussed in **Section 5.4.1**.

5.3.6 Modeling Files/ Schematic

The SSA model schematics and 100-year model output data are provided in **Appendix A.** Digital copies of the modeling files and model output files for all storm events are provided on the enclosed CD.

5.4 Results of Hydrologic Analysis

5.4.1 Minor System

The results of this analysis, as outlined in **Table 5.3**, indicate that there is no significant change to the minor or major system peak flows from the Walk-Up Condos development, as calculated in the previously approved model.

Table 5.3: Summary of Minor & Major System Peak Flows – Interim & Ultimate (L/s)

Storm Outlet*	Model Version	6-Hour Chicago Distribution			Allowable (L/s)
		5-year	100-year	100-year (+20%)	
Hillside Vista Towns Development (existing) (L/s)					
114 (STM)_OUT *Minor system outlet to Eric Czapnik Way*	*June 2015*	218	317	335	317
	Aug 2019 Interim	195	307	334	
	Aug 2019 Ultimate	216	312	335	
OUT-MAJOR *Major system outlet to Eric Czapnik Way*	*June 2015*	32	60	74	60
	Aug 2019 Interim	32	60	79	
	Aug 2019 Ultimate	32	60	96	
Proposed Hillside Vista Condos Development (L/s)					
HVC-OUT(1-3) *Walk-Up Condos Blocks 1-3 outlet to Privé De La Récolte*	*Aug 2019 Interim*	40	54	57	55
	Aug 2019 Ultimate	39	52	56	
HVC-OUT(4-5) + EXT-FUT(orifice) *Walk-Up Condos Blocks 4-5 outlet to Privé De La Récolte, flows from Future Development through B4-5*	*Aug 2019 Interim*	25	74	75	92
	Aug 2019 Ultimate	76	83	83	

**Outlet node & orifice IDs are from the Autodesk SSA model*

As outlined in the above table, major and minor system peak flows for the 5-year and 100-year storm events are at or below the allowable 100-year release rate

5.4.2 Major System

The major system network was evaluated using the interim and ultimate SSA models to ensure that ponding depths conform to City standards. A summary of ponding depths and volumes for the 100-year event are provided in **Table 5.5 and Table 5.5**. Model results for all storm events are provided in **Appendix A**.

Table 5.4: 100-Year Major System Ponding Volumes – Interim Conditions

Structure ID	T/G	Max. Static Ponding (Spill Depth)			100-yr Event (6hr)					
	(m)	Elev. (m)	Depth (m)	Volume (m^3)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Ponding Volume (m^3)	Flow (L/s)
CB02	66.20	66.35	0.15	2.75	65.97	0.00	N	0.00	0.6	66
CB03	66.75	66.83	0.08	7.78	66.85	0.10	Y	0.01	1.3	67
CB04	65.44	65.55	0.11	0.15	65.57	0.13	Y	0.01	0.7	66
CB05	63.95	64.10	0.15	1.14	63.81	0.00	N	0.00	0.5	64
CB06	63.95	64.10	0.15	1.22	64.07	0.12	N	0.00	1.0	64
RYCB01	64.85	65.00	0.15	3.62	64.77	0.00	N	0.00	0.5	65

Table 5.5: 100-Year Major System Ponding Volumes – Ultimate Conditions

Structure ID	T/G	Max. Static Ponding (Spill Depth)			100-yr Event (6hr)					
	(m)	Elev. (m)	Depth (m)	Volume (m^3)	Elev. (m)	Depth (m)	Cascading Flow?	Cascade Depth (m)	Ponding Volume (m^3)	Flow (L/s)
CB02	66.20	66.35	0.15	2.75	65.91	0.00	N	0.00	0.5	37
CB03	66.75	66.83	0.08	7.78	66.84	0.09	N	0.00	1.2	61
CB04	65.44	65.55	0.11	0.15	65.56	0.12	N	0.00	0.7	66
CB05	63.95	64.10	0.15	1.14	63.72	0.00	N	0.00	0.5	64
CB06	63.95	64.10	0.15	1.22	64.09	0.14	N	0.00	1.2	64
RYCB01	64.85	65.00	0.15	3.62	64.77	0.00	N	0.00	0.5	65

5.4.3 Hydraulic Grade Line

Table 5.6 and **Table 5.7** outline the HGL results from the interim and ultimate SSA models.

Units within the Hillside Vista Condos development with connections to Privé de la Récolte will be connected to a separate foundation drain system. As such, there will be no foundation connections from the units to the underground storage system, precluding the requirement for 0.30 m of freeboard between the 100-year HGL elevation and the basement elevations.

A hydraulic grade line (HGL) analysis was completed to verify that the HGL within the underground storage does not exceed the top of grate elevations of each manhole.

Table 5.6: 100-Year Hydraulic Grade Line Elevations - Interim Conditions

Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	HGL Elev. 100yr4hr (m)	HGL Elev. 100yr4hr+20% (m)	T/G Clearance (100yr) (m)	T/G Clearance (100yr+20%) (m)
404	62.14	65.60	63.48	64.40	2.12	1.20
406	63.13	66.96	65.97	66.23	0.99	0.73
408	63.60	67.19	65.97	66.24	1.22	0.95
410	61.35	64.17	63.77	64.17	0.40	0.00
412	59.70	64.25	63.80	64.20	0.45	0.05

Table 5.7: 100-Year Hydraulic Grade Line Elevations – Ultimate Conditions

Manhole ID	MH Invert Elevation (m)	T/G Elevation (m)	HGL Elev. 100yr4hr (m)	HGL Elev. 100yr4hr+20% (m)	T/G Clearance (100yr) (m)	T/G Clearance (100yr+20%) (m)
404	62.14	65.60	63.67	64.36	1.93	1.24
406	63.13	66.96	65.90	66.22	1.06	0.74
408	63.60	67.19	65.90	66.22	1.29	0.97
410	61.35	64.17	63.68	64.17	0.49	0.00
412	59.70	64.25	63.71	64.19	0.54	0.06

As shown in the above table, the 100-year HGL within the storm sewer will not exceed the T/G elevations of the manholes within the Hillside Vista Walk-Up Condos development. The 100-year+20% HGL elevations will be at or lower than the T/G elevations of the manholes.

NOVATECH
Engineers, Planners & Landscape Architects

March 4, 2022

City of Ottawa
Planning, Infrastructure, and Economic Development Department
110 Laurier Ave. West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: **Will Curry, C.E.T. – Project Manager**

Reference: **Hillside Commons Residential Apartments**
3277 St. Joseph Boulevard
Site Plan Control Application – 1st Submission
Our File No.: 120237
City File No.: D07-12-21-0229

We wanted to provide a preliminary response to some of the comments received from you on February 9, 2022 in regards to the proposed Hillside Commons development at 3277 St. Joseph Boulevard.

The specific comments we wish to address are:

Comment A4: The City needs to ensure their assets are protected and may have to take a STUPID Ridiculous amount of $ (say 1.5 Million or more) from the applicant up front and hold 100% until the project is complete specifically just for the protection of the sanitary sewer. It is in your best interest to represent your client whereby you propose Engineering controls to protect the City Sanitary pipe 1.) Just to get approval; 2.) To ensure your engineering controls can be satisfactorily accomplished on site. INFO.

Response: It is understood that the City may require a security deposit for work in proximity to the existing sanitary trunk sewer. These securities must still be reasonable and to the same scale as on other similar situations or projects such as any sewer work performed within a roadway or easement block adjacent to a large existing sanitary trunk sewer.

Comment B12: Note: I am not circulating this FILE to AMB until you improve the Design layout eliminating additional crossings as much as possible. INFO. You should make it look like you have designed everything to create the least amount of easement crossings required. EXTREMLY IMPORTANT AT THIS STAGE.

Response: We have not presented anything that is different from the pre-consult meeting we had with the City in March of 2021. The services are designed to enter Building A from the lower private drive, continue through Building A and cross over the sanitary sewer easement to Building B. We have not proposed any services parallel within the easement and have minimized the placement of any structures and sewers in the easement as requested by the City. All proposed sewer services are perpendicular to the sanitary trunk sewer and could be supported if any work is required to the existing sanitary sewer in the future. This is typical sewer support work that would reasonably be expected to be

performed on any repair/rehabilitation project for a large sanitary trunk sewer within a City street or easement.

Comment B13: Building B: Provide 2 water services off St. Joseph with an isolation valve in-between. This eliminates the watermain in the easement. Or via block 5 and no connection to St. Joseph other than the Hydrant. Revise.

Response: A second watermain connection to St Joseph and Building A is possible as suggested and this would remove the watermain crossing between Building A to Building B as requested in the comments.

Comment B15: Building B: Connect your storm through Block 5 or connect it to St. Joseph on the other side of the building so you are not located within the sewer easement. Store your water in an internal cistern first if need be. You must eliminate the unwanted easement crossings.

Response: The comment to service Building B through DCR Phoenix's Hillside Vista Flats Block 5 is also not possible. There is just under 4.0m clearance from the sanitary easement edge to the foundation of Block 5 which would not leave sufficient space for a sanitary sewer, a storm sewer and a foundation drain sewer in typical City required easement widths. The City typically requires a 6.0m wide easement for only one sewer; there are 3 sewers in this situation which would require over 9.0m of space wherein there is less than 4.0m currently. Any pipes proposed through Block 5 would require changes to the approved Hillside Vista Flats site plan and would require easements in favour of the Hillside Commons site for an outlet over the separately owned Block 5 Hillside Vista Flats DCR Phoenix site.

Comment B16: Take the sani and storm between the 2 buildings in the easement out and place it in Block 5 if you can't take it to St. Joseph. Revise.

Response: The comment to service Building B to St. Joseph is not practical as there is no sanitary sewer on St. Joseph and the storm sewer is understood to be of a smaller size meant only to service the St Joseph roadway itself. Furthermore, the overall OTC East subdivision approved design included this parcel of land at 3277 St Joseph and was always intended to be serviced via Recolte Private and then outlet to the municipal services on Eric Czapnik Way.

Comment C3: File will be circulated to AMB once revisions have been made.

Response: In summary, we had an understanding from the pre-consultations with the City that the proposed second crossing of services within the easement between Building A to Building B would be acceptable as presented. We moved forward with detailed design based on that understanding. The proposed servicing between Building A and B (the watermain crossing could be removed) should be considered acceptable and supported by your office and then presented to Asset Management for their review and comment during the initial technical circulation.

Comment B28: Building A: Mid-block on the Tenth Line Road Side you have a proposed elevation of 70.00 at the property line. The Tenth Line Road Concrete jersey wall has higher elevation behind it thereby draining towards the building. Note BCS requires a 2% slope away from buildings in

order to provide Building Permit. You must show it on the Grading Plan. If the water goes via the culvert you propose you will cause surface flooding at 205 voie Eric Czapnik Way, a previous Novatech file. You should consider a deep swale in the greenspace between your Bldg. A and the concrete jersey barrier with a large perf pipe system and no culvert pipe under the walkway. Surface water only in very extreme events would have to pond and spill over the walkway. In addition by you providing a lower elevation swale this lets you show minimum slopes of 2% away from the building and then you can obtain Building Permits. Please review and revise.
If it were me I would set the elevation at the building higher and slope all to tie into the sidewalk, sheet flowing to the sidewalk elevation and REMOVE THE JERSEY BARRIER from the corner all the way to the proposed walkway. This then affords a better surface drainage solution and a better looking product with an area where landscape items could even enhance to the building esthetics even more.

Response: Raising of Building A is not possible because of the maximum height of the building. The maximum the architect could raise the floor is approximately 0.5m which would require building and grading redesign work with no apparent net benefit to the applicant or substantial improvement to the existing grading and drainage along Tenth Line Road.

The current stormwater drainage is from the Tenth Line Road ROW from behind the sidewalk down-slope onto the subject site as well as the adjacent 205 Eric Czapnik site. The proposed grading for the subject site will provide the minimum 2.0% away from the building and the existing flow path of drainage from Tenth Line ROW will continue to flow downstream past 205 Eric Czapnik as it does currently.

The comment to remove the jersey barriers from along the Tenth Line Road sidewalk maybe a road safety issue and must be reviewed by the City of Ottawa to determine if in fact the barrier removal is allowable. The applicant has no control over removing existing City of Ottawa infrastructure.

Comment C4: Modeling will be reviewed once the ICDs and Storm Design is revised.

Response: We request that the SWM modelling files be provided to the City group responsible to review the SWM design. The site plan submission was deemed complete by the City and should be circulated to all City departments as required to receive all comments from all departments so that the applicant can reasonably respond to all City comments on their subsequent resubmission. This would also apply to circulating the design to Asset Management.

We would like to set up a meeting to review these comments.

Please provide dates and times that work for you.

Yours truly,

NOVATECH

Drew Blair

Drew Blair, P. Eng.
Senior Project Manager

Cc: Greg Winters, MCIP, RPP, Senior Project Manager – Novatech
Robert Tran, M.PL., Planner – Novatech
Mike Burgess, Multi Family Construction Manager –- Phoenix Homes
Mike Boucher, MCIP, RPP, Vice President of Land Development – Phoenix Homes
Matthew Firestone, Project Manager – Landric Homes
Tim Moore, General Manager – Landric Homes
Lludd ap Gwynn, Project Lead – Rossman Architects

Drew Blair

From: Curry, William <William.Curry@ottawa.ca>
Sent: Wednesday, March 9, 2022 8:21 AM
To: Drew Blair
Cc: Greg Winters; Robert Tran; mburgess@phoenixhomes.ca; Michael Boucher; Tim Moore; Lludd ap Gwyn; Belan, Steve; Matthew Firestone
Subject: Re: 3277 St. Joseph Blvd.

Drew,

Everything you presented is acceptable.

thanks

Will

From: Drew Blair <D.Blair@novatech-eng.com>
Sent: Wednesday, March 9, 2022 7:32 AM
To: Curry, William <William.Curry@ottawa.ca>
Cc: Greg Winters <g.winters@novatech-eng.com>; Robert Tran <r.tran@novatech-eng.com>; mburgess@phoenixhomes.ca <mburgess@phoenixhomes.ca>; Michael Boucher <mboucher@phoenixhomes.ca>; Tim Moore <tim.moore@landrichomes.com>; Lludd ap Gwyn <lgwyn@rossmannarchitecture.ca>; Belan, Steve <Steve.Belan@ottawa.ca>; Matthew Firestone <matthew.firestone@landrichomes.com>
Subject: RE: 3277 St. Joseph Blvd.

Hi Will,

We have marked up the attached grading plan and servicing plan with proposed solutions for the comments you have raised. They are:

1. We could raise the retaining wall along Tenth Line and have the grading away from the property line out to Tenth Line at 2% slope. This would also address the comments you have about additional stormwater flows to the adjacent private property.
2. The grading from the building to the existing grades along the perimeter of the buildings will all be a minimum 2% and will be indicated on the next grading plan submission.
3. The garage entrance to Building A is right on the sanitary easement and there is no space to provide any more than the 0.15m of vertical clearance from the spill point to the garage entrance.
4. A perforated pipe to be installed along the inside of the retaining wall next to Tenth Line to improve drainage along that side of the building.
5. The trench drain is moved completely out of the sanitary easement and connected to the storm sewer separately from CB3 so as not to be controlled by an ICD. CB3 is outside of the sanitary easement.
6. CB2 and the lead to CB1 are moved outside of the sanitary easement.

7. An additional CB can be added upstream of CBMH1 and thus no ICD controls will be on the roof drain storm outlet from Building B to CBMH1.
8. The watermain connection between Building A and B can be removed and a new watermain connection to Building A from St Joseph could be provided.

Please review and confirm if these suggested revisions will address your concerns.

Thanks,

Drew

Drew Blair, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 236 | Fax: 613.254.5867

From: Curry, William <William.Curry@ottawa.ca>
Sent: Tuesday, March 8, 2022 8:18 AM
To: Drew Blair <D.Blair@novatech-eng.com>
Cc: Greg Winters <G.Winters@novatech-eng.com>; Robert Tran <r.tran@novatech-eng.com>; mburgess@phoenixhomes.ca; Michael Boucher <mboucher@phoenixhomes.ca>; Tim Moore <tim.moore@landrichomes.com>; Lludd ap Gwyn <lgwyn@rossmannarchitecture.ca>; Belan, Steve <Steve.Belan@ottawa.ca>; Matthew Firestone <matthew.firestone@landrichomes.com>
Subject: Re: 3277 St. Joseph Blvd.

Drew,

If I am taking the time to respond here, I hope you all take the time to review my response. I am trying to say this nicely here....don't know if I can.......for the amount of time individuals have spent digging in and saying what they had to say and getting items off their chest with long winded emails I think we would all be better by following a process that expedites approval rather than trying to prove some points for each side or team. I think we are all a little guilty here and we should all work as a team rather as opposing teams.

Those items I listed, 1-4 was a generality rule (in general) that those items are required to be accurate prior to sending any modeling for review **on any file**. They were not provided to offend anyone.

Does your client know that modeling is not a submission requirement for Site Plan Approval. Maybe someone should tell him that the only reason Consultants now all at the same time started submitting modeling with their Site Plan Applications is solely because the patents are lifted, and the Modeling software is free to anyone who has a PC and but most importantly it promotes more Chargeable Time for the Consultant firm if included with the submission.

As Project Manager I do not even have to send Modeling to the City Modeling staff for review. Just because you submitted it, when it was not requested does not mean I need to send it for review by City Modeling staff. **If everything such as Items 1-4 are accurate I can provide approval immediately.** Most cases, or frequently as Site Plans are minor in terms of impact to the ROW we provide approvals without even sending the modeling for review or we reply with no modeling comments. City Modeling staff and the external consultant they have working for the City are overtaxed with Subdivision files so unless there are some significant issues noticeable then and only then are we supposed to send the modeling for review.

P.S. I had no intention of sending the modeling for review and was going to just provide approvals with the revised plans. That group is just overtaxed with Modeling files to review, and they don't need one more in their basket.

If you feel the need a response for Modeling Comments, here it is below.

City Modeling has no comments.

Items 2, 3 & 4 are slightly wrong with this file.

item 2: you have already received my comments. They are very minor in nature if I recall.
Item 3: maybe you should re-read my comments because you are off on a tangent with verbiage that is not even applicable to this file. There are no controlled interconnected CBs.
item 4: Ponding locations, depth and spill points are wrong and hence the modeling will be wrong. It is irrelevant as modeling is not required with this file. Section 5.5.2 from Technical Bulletin PIEDTB-2016-01 was intended for Dual Drainage Design and Subdivision and not Site Plan. I have confirmed this with the author today, Eric Tousignant. If you wish you're maximum ponding at 150mm below any garage or door opening, then fine. We ask for 300mm because it is practical common sense approach. You as the engineer will be sued, not me when water cascades into their garage.....remember that. Keep it 150...I don't care...your risk. I will even write a condition to that effect in that you chose to ignore City of Ottawa practical engineering guidelines that the applicant will relieve the City of all perils.....something like that.

I await the next submission and look forward to providing approval then.

Note I am not willing to circulate to AMB for comments. I don't want their comments, rather their consent. To that end all I need are the Geotechnical cross section plans revised with the requested no dig or excavation lines.

Thanks

Will

From: Drew Blair <D.Blair@novatech-eng.com>
Sent: Monday, March 7, 2022 6:08 PM
To: Curry, William <William.Curry@ottawa.ca>
Cc: Greg Winters <g.winters@novatech-eng.com>; Robert Tran <r.tran@novatech-eng.com>; mburgess@phoenixhomes.ca <mburgess@phoenixhomes.ca>; Michael Boucher <mboucher@phoenixhomes.ca>; Tim Moore <tim.moore@landrichomes.com>; Lludd ap Gwyn <lgwyn@rossmannarchitecture.ca>; Belan, Steve <Steve.Belan@ottawa.ca>; Matthew Firestone <matthew.firestone@landrichomes.com>
Subject: RE: 3277 St. Joseph Blvd.

Hi Will,

I wish to respond to your SWM modelling comments below and hopefully we can clear these things up and keep the project moving forward:

1. Conforms to the MSS and FSR

1. Response: We have generally followed the City Sewer Design Guidelines and the approved Master Servicing Study (MSS) for OTC East. We have adhered to the previously approved modelling for all the downstream system of OTC including the latest Hillside Vista Flats (Blocks 1-5) that included the current Hillside Commons site. As you may recall, the SWM design for Hillside Vista Flats (Blocks 1-5) and all the modelling information was provided to the City and it included the SWM parameters including the required release rate for this Hillside Commons site. The current Hillside Commons SWM submission does not deviate from the previously approved release rates and other relevant SWM parameters for this site. We acknowledge you have some questions/comments as to the presentation of the release rates, a minimum 6.0 L/s release rate for ICD's (please note private sites can have less than 6.0 L/s as per attached City spec MS-18.4) and other minor report comments however this has no impact on the SWM modelling and should not affect the submission from being sent to the City's SWM group for their review of the actual SWM computer modelling files.

2. Grading and slopes are correct and acceptable.

2. Response: You may have some concerns regarding some minor grading around the buildings however this does not impact the overall storm drainage areas including the imperviousness of these areas within the site. The SWM modelling information contained in the submission remains valid and should be submitted for review by the SWM modelling group. We will review and address your grading comments on the next submission once we have a complete set of City comments provided to us.

*3. **CB locations and ICDs are correct***

3. Response: As per your comments regarding CB's and ICD's, there may be some minor adjustments to CB locations to pull them completely out of the sanitary easement however this does not affect the SWM modelling itself. I assume your ICD comments refer to controls on the roof drain at CBMH1 and possibly the trench drain controlled by an ICD in CB3. As per Section 8.3.8 in the City's Sewer Design Guidelines (excerpt attached), ICDs are allowed to be connected in series if they are dynamically modelled by computer software which is what has been completed as part of the submitted SWM modelling. In practical terms, there is no ponding at CBMH1 in the 100-year storm event and 0.01m of ponding in the 100-year plus 20% storm stress event which indicates there is relatively negligible risk to the building. The roof drains are approximately 9 storeys above CBMH1 and would spill over in an emergency event. The trench drain connected in series would also spill over at CB3 before it backed up to the trench drain as the trench drain grate is 2.3m higher in elevation than CB3.

4. Ponding locations, depth and spill points are correct

4. Response: The ponding locations and depths are determined in the modelling analysis and thus the SWM modelling should be reviewed by the City modelling department as they have the specialized skills to determine if it has been analyzed and indicated correctly. I am assuming that your comment regarding spill points refers to the overflow depth from the highpoint downstream from the lower garage entrance to Building A. I have attached an excerpt from Section 5.5.2 from Technical Bulletin PIEDTB-2016-01 which clearly defines that a building opening in proximity of ponding or a

major system flow route must be a minimum 0.15m above the spill elevation on the street. This 15cm clearance is from any sag, depression and/or street and does not specifically state only a street in a public ROW be considered. In this case, the street is the roadway that is allowing access to Building A and we have provided the required minimum 0.15m clearance above the spillover point on this street. Furthermore, the 100-year + 20% stress event ponding does not touch the building opening as required in the City guidelines. These ponding elevations can be reviewed and confirmed within the modelling files by the City modelling group once they have been circulated.

We recognize that you have comments on this first submission for Hillside Commons and we will certainly review, consider and address them all with a subsequent submission. We respectively request that all the relevant City departments get circulated now and we receive all comments from the City departments based on this first submission. Once we have a compiled list of all the comments from all stakeholders (Asset Management and SWM Modelling Group included), then we can review and address all the comments as a whole team (owners, planners, architects, civil/structural/mechanical/geotechnical engineers, landscape architects, etc.). As you can appreciate for such a challenging site, it is much more efficient for our entire team to respond to one complete set of comments than for small independent groups making some stand-alone revisions based on a few City comments and providing multiple smaller resubmissions with no cohesive overall design process.

I trust this responds to your comments and will allow you to proceed with circulating this first submission to the City's SWM modelling group for their comments.

Regards,

Drew

Drew Blair, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 236 | Fax: 613.254.5867

From: Curry, William <William.Curry@ottawa.ca>
Sent: Monday, March 7, 2022 8:19 AM
To: Matthew Firestone <matthew.firestone@landrichomes.com>; Drew Blair <D.Blair@novatech-eng.com>; Belan, Steve <Steve.Belan@ottawa.ca>
Cc: Greg Winters <G.Winters@novatech-eng.com>; Robert Tran <r.tran@novatech-eng.com>; mburgess@phoenixhomes.ca; Michael Boucher <mboucher@phoenixhomes.ca>; Tim Moore <tim.moore@landrichomes.com>; Lludd ap Gwyn <lgwyn@rossmannarchitecture.ca>; Wildman, Geraldine <Geraldine.Wildman@ottawa.ca>
Subject: Re: 3277 St. Joseph Blvd.

Matt,

My apologies but I have no time currently. If you want to meet in say 3 weeks fine, say so, I just assume you would appreciate a quick response rather than further delays.

The most important item is the Geotechnical plans to be updated and included in the set whereby they show a **no dig or protection line** on their cross-sections. That should be adequate to convince AMB and then I would circulate to them.

Note:
Modeling does not get circulated until the following items are satisfied.

1. Conforms to the MSS and FSR
2. Grading and slopes are correct and acceptable.
3. **CB locations and ICDs are correct**
4. **Ponding locations, depth and spill points are correct**

please advise

thanks

Will

From: Matthew Firestone <matthew.firestone@landrichomes.com>
Sent: Monday, March 7, 2022 8:10 AM
To: Curry, William <William.Curry@ottawa.ca>; Drew Blair <d.blair@novatech-eng.com>; Belan, Steve <Steve.Belan@ottawa.ca>
Cc: Greg Winters <g.winters@novatech-eng.com>; Robert Tran <r.tran@novatech-eng.com>; mburgess@phoenixhomes.ca <mburgess@phoenixhomes.ca>; Michael Boucher <mboucher@phoenixhomes.ca>; Tim Moore <tim.moore@landrichomes.com>; Lludd ap Gwyn <lgwyn@rossmannarchitecture.ca>; Wildman, Geraldine <Geraldine.Wildman@ottawa.ca>
Subject: RE: 3277 St. Joseph Blvd.

Hey Will,

I hope all is well and that you had a great weekend. Unfortunately I must insist that you make time for this meeting. Without meeting we cannot move this development forward as your comments are extremely wide in scope and we are unable to address them for a variety of reasons. I would really appreciate it if you could find sometime for us. You have already stated that you will not circulate our application as is and that is of major concern to us. The bulk of this issues is not the jersey barrier and is the minor service crossings of the easement which is the only way to service the building along 10th line.

Please let me know when you have time to meet with us. Thank you for all your time and help!

Best regards,

Matt

Matthew Firestone
Project Manager
Chef de Projet
Landric HOMES LaVérendrye CONSTRUCTION
O. 613.794.5560
matthew.firestone@landrichomes.com
www.landrichomes.com

From: Curry, William <William.Curry@ottawa.ca>
Sent: Monday, March 7, 2022 7:12 AM
To: Drew Blair <d.blair@novatech-eng.com>; Belan, Steve <Steve.Belan@ottawa.ca>
Cc: Greg Winters <g.winters@novatech-eng.com>; Robert Tran <r.tran@novatech-eng.com>; mburgess@phoenixhomes.ca; Michael Boucher <mboucher@phoenixhomes.ca>; Matthew Firestone <matthew.firestone@landrichomes.com>; Tim Moore <tim.moore@landrichomes.com>; Lludd ap Gwyn <lgwyn@rossmannarchitecture.ca>
Subject: Re: 3277 St. Joseph Blvd.

Drew

I am sorry but I must cancel the meeting. My workload is too heavy.

Maybe discuss the jersey barriers with the planner and he can coordinate with Transportation staff. Your simple answer just not wanting to remove them is not adequate.

I provided quick responses and hopefully that is suffice.

Thanks

Will

From: Drew Blair <D.Blair@novatech-eng.com>
Sent: Friday, March 4, 2022 10:31 AM
To: Curry, William <William.Curry@ottawa.ca>
Cc: Belan, Steve <Steve.Belan@ottawa.ca>; Greg Winters <g.winters@novatech-eng.com>; Robert Tran <r.tran@novatech-eng.com>; mburgess@phoenixhomes.ca <mburgess@phoenixhomes.ca>; Michael Boucher <mboucher@phoenixhomes.ca>; Matthew Firestone <matthew.firestone@landrichomes.com>; Tim Moore <tim.moore@landrichomes.com>; Lludd ap Gwyn <lgwyn@rossmannarchitecture.ca>
Subject: RE: 3277 St. Joseph Blvd.

Hello Will,

Please see attached letter with some of our responses to comments provided by the City for the Hillside Commons project at 3277 St Joseph Blvd.

We would like the opportunity to meet and discuss the comments with you at your earliest convenience.

Thanks,

Drew

Drew Blair, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 236 | Fax: 613.254.5867

From: Curry, William <William.Curry@ottawa.ca>
Sent: Wednesday, February 9, 2022 2:11 PM
To: Belan, Steve <Steve.Belan@ottawa.ca>
Cc: mboucher@phoenixhomes.ca; erik@rossmannarchitecture.ca; carlosd@Patersongroup.ca; Drew Blair <D.Blair@novatech-eng.com>
Subject: 3277 St. Joseph Blvd.

Please wait for all stakeholder comments from Steve.

Will Curry, C.E.T.
Project Manager
Planning, Real Estate and Economic Development Department /
Direction générale de la planification, des biens immobiliers et du développement économique
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 16214
110 Laurier Ave., 4th Fl East;
Ottawa ON K1P 1J1

William.Curry@Ottawa.ca

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Appendix D
Development Servicing Study Checklist

Project Name: Hillside Commons Residential Apartments
Project Number: 120237
Date: January 27, 2023

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Executive Summary (for larger reports only).	NA		
Date and revision number of the report.	Y	Cover	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y	1	Fig 1
Plan showing the site and location of all existing services.	Y	1	Fig 2, Engineering Drawings
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	N		The site was included in the approved Hillside Vista Towns (2014) and OTC East (2011) approved site plan applications. This report follows the recommendations of the previously approved reports.
Summary of Pre-consultation Meetings with City and other approval agencies.	N		
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Y	1.0	
Statement of objectives and servicing criteria.	Y	1.0	
Identification of existing and proposed infrastructure available in the immediate area.	Y		Engineering Drawings
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Y	4.0	
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Y		Engineering Drawings

Development Servicing Study Checklist

4.1 General Content	**Addressed (Y/N/NA)**	**Section**	**Comments**
Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A		
Proposed phasing of the development, if applicable.	N/A		
Reference to geotechnical studies and recommendations concerning servicing.	N		Geotechnical Report submitted under separate cover
All preliminary and formal site plan submissions should have the following information:			
Metric scale	Y		Engineering Drawings
North arrow (including construction North)	Y		Engineering Drawings
Key plan	Y		Engineering Drawings, Fig 1
Name and contact information of applicant and property owner	Y		Engineering Drawings
Property limits including bearings and dimensions	Y		Engineering Drawings
Existing and proposed structures and parking areas	Y		Engineering Drawings
Easements, road widening and rights-of-way	Y		Engineering Drawings
Adjacent street names	Y		Engineering Drawings

Development Servicing Study Checklist

4.2 Water	**Addressed (Y/N/NA)**	**Section**	**Comments**
Confirm consistency with Master Servicing Study, if available.	N		
Availability of public infrastructure to service proposed development.	Y	3.0	
Identification of system constraints.	Y	3.0	
Identify boundary conditions.	Y	3.0	Appendix A
Confirmation of adequate domestic supply and pressure.	Y	3.0	
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Y	3.0	Appendix A
Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Y	3.0	
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	Y	3.0	
Address reliability requirements such as appropriate location of shut-off valves.	Y	3.0	
Check on the necessity of a pressure zone boundary modification.	NA		
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Y	3.0	Appendix A
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Y	3.0	Fig 3, Fig 4
Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	Y	3.0	
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	3.0	Appendix A
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Y	3.0	Appendix A

Development Servicing Study Checklist

4.3 Wastewater	**Addressed (Y/N/NA)**	**Section**	**Comments**
Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Y	2.0	
Confirm consistency with Master Servicing Study and/or justifications for deviations.	Y	2.0	
Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	NA		
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Y	2.0	
Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Y	2.0	
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Y	2.0 App B	Appendix B
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	2.0	Appendix B
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	NA		
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	NA		
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	NA		
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	NA		
Special considerations such as contamination, corrosive environment etc.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	4.0	
Analysis of the available capacity in existing public infrastructure.	Y	6.0	Appendix C
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	Y		Fig. 1, 2, GR1,STM1
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y	4.0	
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Y	4.0	
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	5.0	
Set-back from private sewage disposal systems.	N/A		
Watercourse and hazard lands setbacks.	N/A		
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Y		
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A		
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y	6.0	Appendix C
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A		
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Y	6.0	Appendix C
Any proposed diversion of drainage catchment areas from one outlet to another.	Y	5.0	
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	Y	5.0	
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	NA		

Development Servicing Study Checklist

4.4 Stormwater	**Addressed (Y/N/NA)**	**Section**	**Comments**
Identification of municipal drains and related approval requirements.	N/A		
Description of how the conveyance and storage capacity will be achieved for the development.	Y	4.0	
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Y		
Inclusion of hydraulic analysis including HGL elevations.	Y	6.0	Appendix C
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	8.0	
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A		
Identification of fill constrains related to floodplain and geotechnical investigation.	NA		

Development Servicing Study Checklist

4.5 Approval and Permit Requirements	**Addressed (Y/N/NA)**	**Section**	**Comments**
Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Y		This was achieved during the 2011/2014 site plan applications.
Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	NA		
Changes to Municipal Drains.	NA		
Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	NA		

4.6 Conclusion	**Addressed (Y/N/NA)**	**Section**	**Comments**
Clearly stated conclusions and recommendations.	Y	9.0	
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	N		
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y		

Appendix E
Drawings

GENERAL

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL, AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN AND PAY ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
5. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES DURING CONSTRUCTION. GAS, HYDRO, TELEPHONE OR ANY OTHER UTILITY THAT MAY EXIST ON SITE OR WITHIN THE STREETLINES MUST BE LOCATED BY ITS OWN UTILITIES AND VERIFIED PRIOR TO CONSTRUCTION.
6. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA AND ENGINEER.
7. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
8. ALL UNDERGROUND SERVICES MATERIALS AND INSTALLATIONS TO BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND CODES OF THE MUNICIPALITY.
9. ALL SURFACE DRAINAGE SHALL BE SELF-CONTAINED, COLLECTED AND DISCHARGED AT A LOCATION TO BE APPROVED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.
10. WHEREVER PIPES ARE PASSING THROUGH UNCOMPACTED FILL AREA, THE BEDDING TRENCH SHALL BE EXCAVATED TO THE UNDISTURBED GROUND LEVEL AND BACKFILLED WITH GRANULAR "A" COMPACTED TO 100% STANDARD PROCTOR DENSITY.
11. BEFORE COMMENCING CONSTRUCTION PROVIDE PROOF OF COMPREHENSIVE ALL RISK AND OPERATIONAL LIABILITY INSURANCE INCLUDING BLASTING (ONLY IF REQUIRED). INSURANCE POLICY TO NAME THE OWNER, ENGINEER AND ARCHITECT AS CO-INSURED. AMOUNT OF INSURANCE TO BE SPECIFIED BY OWNERS AGENT.
12. CONNECTION TO EXISTING SYSTEMS AS DETAILED, INCLUDING ALL RESTORATION WORK NECESSARY TO REINSTATE SURFACES TO THE CONDITION THAT EXISTED PRIOR TO CONSTRUCTION OR BETTER.
13. STANDARD ROAD CUT SHALL BE IN ACCORDANCE WITH CITY STANDARD R10.
14. ASPHALT REINSTATEMENT SHALL BE IN ACCORDANCE WITH CITY STANDARD R25.
15. CONCRETE SIDEWALK TO BE CONSTRUCTED AS PER CITY STANDARDS SC-3, SC-5, SC-7, AND SC-8
16. CONTRACTOR TO PROVIDE LINE/PARKING PAINT LINES
17. BOULEVARDS SHALL BE REINSTATED WITH 150mm OF TOPSOIL AND SODDED.
18. INVESTIGATION REPORT FOR SUBSURFACE INFORMATION PREPARED BY THE GEOTECHNICAL CONSULTANT. INTERPRETATION OF INFORMATION IS THE RESPONSIBILITY OF THE CONTRACTOR.
19. REMOVE TOPSOIL AND STOCKPILE ONSITE IN A SUITABLE LOCATION.
20. TOPSOIL IN FILL AREA TO BE STRIPPED AND CLEAN FILL TO BE PLACED AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
21. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
22. THE ORIGINAL TOPOGRAPHY AND GROUND ELEVATIONS, SERVICING AND SURVEY DATA SHOWN ON THIS PLAN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE ACCURACY OF ALL INFORMATION OBTAINED FROM THESE PLANS.
23. THICKNESS OF GRANULAR MATERIAL AND ASPHALT LAYERS SHALL BE IN ACCORDANCE WITH CITY STANDARD ROAD CROSS SECTION AND AS PER THE GEOTECHNICAL CONSULTANTS RECOMMENDATIONS.
24. ALL ELEVATIONS ARE GEODETIC AND UTILITIZE METRIC UNITS. ALL MEASUREMENTS UTILIZE METRIC UNITS.
25. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INDICATE:PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANTS LOCATIONS, T/WM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.
26. REFER TO ARCHITECTS AND LANDSCAPE ARCHITECTS DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS

SEWERS

1. ALL SEWER MATERIALS AND CONSTRUCTION METHODS MUST FOLLOW CITY OF OTTAWA STANDARDS.
2. ALL CATCHBASIN MANHOLES AND MANHOLES SHALL BE PRECAST AND CONFORM TO CITY OF OTTAWA DETAILS S24, S24.1, S25, S28, S28.1 AND OPSD 701.010.
3. ALL CATCHBASINS SHALL BE PRECAST AND CONFORM TO OPSD 705.010.
4. ALL CATCHBASIN MANHOLES AND CATCHBASINS TO HAVE A MINIMUM 0.6m SUMP AS PER OPSD UNLESS NOTED OTHERWISE.
5. REARYARD CATCHBASINS SHALL BE IN ACCORDANCE WITH CITY STANDARD DETAIL S29,S30 AND S31.
6. ALL CATCHBASINS SHALL INCLUDE 6.0m OF 150mmØ PERFORATED SUBDRAIN C/W FILTER CLOTH.
7. STORM SEWER SHALL BE CONCRETE CL III WITH TYPE "B" BEDDING OR PVC PIPE SDR 35 THROUGHOUT EXCEPT AT RISERS, UNLESS OTHERWISE NOTED, AS PER OPSD.
8. ALL PROPOSED FOUNDATION DRAINS SHALL BE CONNECTED TO STORM SEWER.
9. SEWER TRENCHING AND BEDDING SHALL BE MINIMUM 150mm GRANULAR 'A' AND AS PER CITY OF OTTAWA STANDARDS, UNLESS NOTED OTHERWISE. BEDDING SHALL BE COMPACTED TO MINIMUM 95% STANDARD PROCTOR DRY DENSITY. CLEAR STONE BEDDING SHALL NOT BE PERMITTED.
10. SANITARY SEWERS AND CONNECTIONS 150mmØ AND SMALLER TO BE PVC SDR 28.
11. SANITARY SEWERS AND CONNECTIONS 200mmØ AND LARGER TO BE PVC SDR 35 WITH MINIMUM 150mm GRANULAR 'A' BEDDING THROUGHOUT, UNLESS OTHERWISE NOTED.
12. ALL STORM AND SANITARY SERVICES ARE TO BE THE SIZES INDICATED AND THE MATERIAL SHALL BE PVC DR-28 @ 1.0% MINIMUM SLOPE.
13. INSULATE ALL STORM AND SANITARY SEWERS THAT HAVE LESS THAN 2.0m AND 2.5m OF EFFECTIVE COVER RESPECTIVELY WITH THERMAL INSULATION. PROVIDE 150mm OF CLEARANCE BETWEEN PIPE AND INSULATION.
14. SANITARY AND STORM SERVICES ARE TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, AT A MINIMUM SLOPE OF 1.0% UNLESS OTHERWISE INDICATED.
15. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS, LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS
16. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mm OR GREATER PRIOR TO BASE COURSE ASPHALT.UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH, CLEAN AND RE-TELEVISE (CCTV) ALL SEWERS & APPURTENANCES.
17. FULL PORT BACKWATER VALVES ARE REQUIRED ON THE SANITARY SERIES INSTALLED AS PER THE MANUFACTURERS BUILDING; INSTALLED AS PER ST. DWG S14.
18. MANHOLE FRAMES REQUIRING ADJUSTMENT WITHIN THE SANITARY EASEMENT ARE TO BE BOLTED TO THE CONCRETE MANHOLES. MANHOLE REBUILDING AND/OR ADJUSTMENTS TO FOLLOW CITY OF OTTAWA SPECIFICATION F-4080.
19. INLET CONTROL DEVICES (ICD) ARE TO BE IPEX TEMPEST LMF (OR EQUIVALENT) MODELS WITH FLOW RATES AS NOTED ON THE DRAWINGS.

WATERMAINS

1. CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. WATERMAIN TO BE PVC DR 18. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY CONTRACTOR. CONNECTION TO EXISTING WATERMAIN BY CITY OF OTTAWA. NO WORK TO COMMENCE UNLESS A CITY WATER WORKS INSPECTOR IS ON SITE.
2. WATERMAIN MUST HAVE A MINIMUM VERTICAL CLEARANCE OF 0.25m OVER AND 0.50m UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
3. WATERMAINS ARE TO HAVE A MINIMUM COVER OF 2.4m WITH A MINIMUM HORIZONTAL SPACING OF 2.0m FROM THEMSELVES AND OTHER UTILITIES, AS PER CITY OF OTTAWA STANDARD DETAIL R-20.
4. PROVIDE THERMAL INSULATION FOR WATERMAIN AT OPEN STRUCTURES PER CITY OF OTTAWA STANDARD DETAIL W-23.
5. IF WATERMAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.
6. ALL CURB STOPS TO BE INSTALLED ON THE PROPERTY LINE UNLESS OTHERWISE NOTED.
7. WATERMAIN TRENCHING AND BEDDING TO CONFORM TO CITY OF OTTAWA STANDARD DETAIL W-17.
8. VALVES AND VALVE BOXES TO CONFORM WITH CITY OF OTTAWA STANDARD DETAIL W-24.
9. FIRE HYDRANT C/W VALVE AND BOX SHALL CONFORM TO CITY OF OTTAWA STANDARD DETAIL W-19.
10. CONCRETE THRUST BLOCKS ARE TO BE CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS W25.3 AND W25.4.
11. ALL WATERMAIN SERVICE INSTALLATIONS AT SEWER CROSSINGS PER CITY OF OTTAWA STANDARD DETAIL W-38.
12. WATER METER SHALL CONFORM TO CITY OF OTTAWA STANDARDS. INSTALLATION BY CITY OF OTTAWA.
13. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0M OF FOUNDATION WALL AND LEAVE 6.0M OF COIL UNLESS OTHERWISE INDICATED.

TYPICAL SERVICING NOTES:

1. NO HORIZONTAL BENDS IN RIGHT-OF-WAY UNLESS OTHERWISE APPROVED BY THE CITY. MAXIMUM OF TWO 22.5° HORIZONTAL BENDS FOR SANITARY AND STORM SERVICES.
2. 1.0 % MINIMUM SANITARY AND STORM SERVICE GRADIENT WITH 2% PREFERRED.
3. STORM SERVICE LATERAL SHALL BE LOCATED TO THE LEFT OF SANITARY SERVICE LATERAL WHEN LOOKING AT THE STRUCTURE FROM THE STREET. SERVICE SIZES IN CONFORMANCE WITH S11.
4. SEE S7 FOR PIPE FOUNDATION, EMBEDMENT AND FINAL BACKFILL REQUIREMENTS.
5. MULTIPLE TAPS WITH SADDLES IN PVC WATERMAIN SHALL BE STAGGERED AND MINIMUM 600mm APART.
6. ELEVATION OF SERVICES VARIABLE DEPENDING ON GRADIENT AND/OR DEPTH OF COVER.
7. ALL DIMENSIONS ARE IN MILLIMETRES.
8. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELVEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.
9. GRADE AND/OR FILL BEHIND PROPOSED CURB AND BETWEEN BUILDINGS AND CURBS, WHERE REQUIRED TO PROVIDE POSITIVE DRAINAGE.
10. REFER TO ELECTRICAL DESIGN FOR UTILITY LOCATIONS.
11. SEE W27 FOR ADDITIONAL WATER SERVICING SCENARIOS.

GRADING

1. CONTACT CITY FOR ROUGH GRADING INSPECTION PRIOR TO PLACEMENT OF TOPSOIL OR TOPSOIL AND SOD.
2. FINISHED GRADING WILL NOT ADVERSELY AFFECT DRAINAGE PATTERNS OF ADJACENT LANDS.
3. MAXIMUM (3:1) SLOPES AT PROPERTY LINE AND WITHIN THE SITE UNLESS OTHERWISE INDICATED.
4. MATCH EXISTING ELEVATIONS AT ALL PROPERTY LINES. ENSURE POSITIVE DRAINAGE WHETHER INDICATED OR NOT.
5. WHERE EXISTING GRADE IS FOUND TO BE MORE THAN 300mm BELOW THE PROPOSED GRADES INDICATED ON THIS GRADING PLAN, CONTACT ENGINEER IMMEDIATELY.
6. SWALES LESS THAN 1.5% SHALL HAVE A 250mm SUBDRAIN AS PER CITY OF OTTAWA STANDARD S29, S30 AND S31.
7. MINIMUM OF 2% AND MAXIMUM OF 6% GRADE FOR GRASSED AREAS UNLESS OTHERWISE NOTED. SIDEWALK CROSSFALL NOT TO EXCEED 2%.
8. CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SC1.1).
9. ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED
10. ALL PROPOSED STEPS IN WALKWAYS ARE TO BE WITHIN THE PROPERTY BOUNDARY.
11. ALL RETAINING WALLS GREATER THAN 1.0m IN HEIGHT ARE TO BE DESIGNED, REVIEWED, INSPECTED AND APPROVED BY THE GEOTECHNICAL ENGINEER.
12. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS

UTILITY NOTES:

1. CONTRACTOR TO CONTACT RESPECTIVE UTILITY COMPANIES TO DETERMINE EXACT LOCATION OF EXISTING UTILITIES BEFORE COMMENCING WORK. CONTRACTOR TO ASSUME ALL LIABILITY FOR DAMAGE TO EXISTING UTILITIES.
2. EXTEND ENCASED DUCT CROSSINGS 1.0m FROM BACK OF CURB OR SIDEWALK ON EACH SIDE.
3. CONTRACTOR SHALL EXCAVATE, BACKFILL, AND RESTORE ALL SURFACES TO EXISTING CONDITIONS FOR HYDRO PRIMARY, BELL, AND CABLEVISION CABLES.
4. CONTRACTOR SHALL SUPPLY AND INSTALL ALL DUCT WORK AND TRANSFORMER PAD. SINGLE PHASE TRANSFORMER PAD PER HYDRO OTTAWA DETAIL UCS0003.
5. TEMPORARILY COIL ALL SERVICE WIRES ON A 76mm X 76mm X 2.4m WOODEN POST FOR EACH UNIT WITH ENOUGH CONDUCTOR TO ALLOW FOR COMPLETION OF TRENCHING AND BUILDING CONNECTION.
6. MINIMUM 1.5m CLEARANCE TO BE PROVIDED FROM WATER SERVICES TO ALL PEDESTALS, TRANSFORMER PADS, ROAD DUCT CROSSINGS, AND STREET LIGHTS.
7. MINIMUM 3.0m CLEARANCE TO BE PROVIDED FROM HYDRANT TO ALL ABOVE GROUND STRUCTURES INCLUDING STREETLIGHTS, BELL PEDESTALS, CABLE PEDESTALS, TRANSFORMERS, SECTIONALIZERS, ETC.

PAVEMENT STRUCTURE NOTES

1. SUBGRADE MATERIAL SHALL BE PLACED IN MAXIMUM 300mm LIFTS AND COMPACTED TO AT LEAST 98% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY
2. ROADWAY GRANULAR MATERIAL SHALL BE PLACED IN MAXIMUM 300mm LIFTS AND COMPACTED TO AT LEAST 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY
3. ASPHALTIC CONCRETE TO BE COMPACTED TO AT LEAST 97% OF MARSHALL DENSITY
4. ROADWAY SUBGRADE TO BE INSPECTED BY THE GEOTECHNICAL ENGINEER AT THE TIME OF CONSTRUCTION TO REVIEW THE GRANULAR 'B' DEPTH AND FOR THE NECESSITY OF A WOVEN GEOTEXTILE BELOW THE GRANULAR MATERIALS.
5. PRIOR TO THE PLACEMENT OF TOPLIFT, CONTRACTOR IS TO ADJUST ALL STRUCTURES AS PER CITY OF OTTAWA STANDARD R-2.

EROSION AND SEDIMENT CONTROL NOTES:

1. THE OWNER AGREES TO PREPARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS AND DURING ALL PHASES OF THE SITE PREPARATION AND CONSTRUCTION IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL SUCK AS BUT NOT LIMITED TO INSTALLING CATCHBASIN INSERTS ACROSS MH & CBS AND INSTALLING AND MAINTAINING LIGHT DUTY SILT FENCE BARRIERS AND STRAW BALE/ROCK CHECK DAMS AS REQUIRED.
2. CONDITIONS OF THE SILT FENCE AND STRAW BALE/ROCK CHECK DAMS TO BE INSPECTED REGULARLY AND REPLACED OR REPAIRED AS INSTRUCTED BY THE ENGINEER.
3. THE CONTRACTOR SHALL ENSURE THAT ROADS ARE KEPT CLEAN AT ALL TIMES USING SUCH PRACTICES AS WASHING DOWN TRUCK TIRES, ROAD SWEEPING AND FLUSHING ETC.
4. THE CONTRACTOR ACKNOWLEDGES THAT SURFACE EROSION AND SEDIMENT RUNOFF RESULTING FROM HIS CONSTRUCTION OPERATIONS WILL HAVE A DETRIMENTAL IMPACT TO ANY DOWNSTREAM WATERCOURSE OR SEWER, AND THAT ALL CONSTRUCTION OPERATIONS THAT MAY IMPACT UPON WATER QUALITY SHALL BE CARRIED OUT IN A MANNER THAT STRICTLY MEETS THE REQUIREMENTS OF ALL APPLICABLE LEGISLATION AND REGULATIONS.
5. AS SUCH, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CARRYING OUT HIS OPERATIONS, AND SUPPLYING AND INSTALLING ANY APPROPRIATE CONTROL MEASURES, SO AS TO PREVENT SEDIMENT LADEN RUNOFF FROM ENTERING ANY SEWER OR WATERCOURSE WITHIN DOWNSTREAM OF THE WORKING AREA. FOR THIS PROJECT THE SUGGESTED ON-SITE MEASURES SHALL INCLUDE BUT SHALL NOT BE LIMITED TO THE FOLLOWING METHODS:
   -CATCH BASIN SILTSACKS
   -MAINTENANCE HOLE AND REAR YARD CATCH BASIN FILTERS
   -LIGHT DUTY SILT FENCE
   -MUD MATS
   -STRAW BALE CHECK DAMS

   SPECIFIC MEASURES SHALL BE INSTALLED AT THE SPECIFIED LOCATIONS AND IN ACCORDANCE WITH THE REQUIREMENTS OF OPSS 577 WHERE APPROPRIATE, OR IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
6. WHERE, IN THE OPINION OF THE CONTRACT ADMINISTRATOR OR ANY REGULATORY AGENCY, THE INSTALLED CONTROL MEASURES FAIL TO PERFORM ADEQUATELY, THE CONTRACTOR SHALL SUPPLY AND INSTALL ADDITIONAL OR ALTERNATIVE MEASURES AS DIRECTED BY THE CONTRACT ADMINISTRATOR OR THE REGULATORY AGENCY. AS SUCH, THE CONTRACTOR SHALL HAVE ADDITIONAL CONTROL MATERIALS ON SITE AT ALL TIMES WHICH ARE EASILY ACCESSIBLE AND MAY BE IMPLEMENTED BY HIM AT A MOMENT'S NOTICE.
7. THE CONTRACTOR SHALL ENSURE THAT ALL WORKERS, INCLUDING IN THE WORKING AREA ARE AWARE OF THE IMPORTANCE OF THE EROSION AND SEDIMENT CONTROL MEASURES AND INFORMED OF THE CONSEQUENCES OF THE FAILURE TO COMPLY WITH THE REQUIREMENTS OF ALL REGULATORY AGENCIES AND THE SPECIFICATIONS DETAILED HEREIN.
8. THE CONTRACTOR SHALL PERIODICALLY, OR WHEN REQUESTED BY THE CONTRACT ADMINISTRATOR, CLEAN OUT ACCUMULATED SEDIMENT DEPOSITS AS REQUIRED AT THE SEDIMENT CONTROL DEVICES, INCLUDING THOSE DEPOSITS THAT MAY ORIGINATE FROM OUTSIDE THE CONSTRUCTION AREA. ACCUMULATED SEDIMENT SHALL BE REMOVED IN SUCH A MANNER THAT PREVENTS THE DEPOSITION OF THIS MATERIAL INTO ANY SEWER OR WATERCOURSE AND AVOIDS DAMAGE TO THE CONTROL MEASURE. THE SEDIMENT SHALL BE REMOVED FROM THE SITE AT THE CONTRACTOR'S EXPENSE AND MANAGED IN COMPLIANCE WITH THE REQUIREMENTS FOR EXCESS EARTH MATERIAL, AS SPECIFIED ELSEWHERE IN THE CONTRACT.

PAVEMENT STRUCTURE:

REFER TO GEOTECHNICAL REPORT FOR SUBSURFACE CONDITIONS AND CONSTRUCTION RECOMMENDATIONS.

☐	LIGHT DUTY 50mm SUPERPAVE 12.5 (PG 58-34) 150mm GRAN 'A' 300mm GRAN 'B' TYPE II
▨	HEAVY DUTY 40mm SUPERPAVE 12.5 (PG 58-34) 50mm SUPERPAVE 19.0 (PG 58-34) 150mm GRAN 'A' 400mm GRAN 'B' TYPE II

* GRANULAR BASE TO BE COMPACTED TO 99% STANDARD PROCTOR DRY DENSITY.

LEGEND

— - - —	SITE BOUNDARY
97.75	PROPOSED ELEVATION
98.00	EXISTING ELEVATION
98.85TW	PROPOSED TOP OF WALL ELEVATION
97.75BW	PROPOSED BOTTOM OF WALL ELEVATION
96.00CLD	PROPOSED CENTERLINE OF DITCH ELEVATION
97.55(S)	PROPOSED SWALE ELEVATION
97.40	PROPOSED TERRACE ELEVATION
← 1.3%	PROPOSED SLOPE
— - — - —	PROPOSED CENTRELINE SWALE
	PROPOSED TERRACING (MAXIMUM 3:1 SLOPE)
BARRIER CURB	PROPOSED BARRIER CURB AS PER SC1.1
▬	PROPOSED RETAINING WALL
▨	PROPOSED SIDEWALK
97.32	STATIC PONDING AREA AND SPILL DEPTH ELEVATION
97.44	1:100yr PONDING AREA AND ELEVATION
97.27	1:5yr PONDING AREA AND ELEVATION
98.00 97.50 97.00	*EXISTING* CONTOUR LINE AND CONTOUR ELEVATION
USF	PROPOSED UNDERSIDE OF FOOTING ELEVATION
HYD. T/F	PROPOSED HYDRANT TOP OF FLANGE ELEVATION
T/G	PROPOSED TOP OF GRATE ELEVATION
⇨	PROPOSED MAJOR OVERLAND FLOW ROUTE
AREA 1	AREA ID
815-813	MANHOLE TO MANHOLE
89.1	POPULATION EQUIVALENT
0.81	AREA IN HECTARES
▬ ▬ ▬	SANITARY DRAINAGE AREA BOUNDARY
1.00	DRAINAGE AREA (hectares)
1	AREA IDENTIFICATION
105-103	MANHOLE TO MANHOLE
0.50	RUN-OFF COEFFICIENT
▬ ▬ ▬	DRAINAGE AREA BOUNDARY
101 ●	PROPOSED SANITARY MANHOLE
100 ○	PROPOSED STORM MANHOLE
CBMH1	PROPOSED CATCHBASIN/MANHOLE
CB1 ☐	PROPOSED CATCHBASIN
CB 2 ☐— — —	PROPOSED CATCHBASIN & LEAD
RYE 1	PROPOSED REAR YARD ELBOW
RYT 1 ○	PROPOSED REAR YARD TEE
V&VB ⊗	PROPOSED VALVE & VALVE BOX LOCATION
⌖—⊗—	PROPOSED HYDRANT C/W VALVE & LEAD
200mmØ	PROPOSED WATERMAIN AND DIAMETER
HYD —⊗— - —	PROPOSED VALVE LOCATION
V&VB	VALVE & VALVE BOX
V&VC	VALVE & VALVE CHAMBER
T/F=98.45	PROPOSED TOP OF BOTTOM FLANGE
BEND 11.25	PROPOSED BEND AND THRUSTBLOCK 11.25°, 22.5°, 45° or TEE
PRV	PRESSURE REDUCING VALVE
◄	PROPOSED DIRECTION OF FLOW
CBMH 101	PROPOSED CATCHBASIN MANHOLE INSERT
☒	PROPOSED CATCHBASIN INSERT
▬ ▬ ▬	PROPOSED SILT FENCE (SEE OPSD
	PROPOSED ROCK CHECK DAM (SEE OPSD 219.210)
	PROPOSED MUD MAT
	PROPOSED STRAW BALE (SEE OPSD 219.180)
☒☒☒☒	PROPOSED TWSI AS PER SC7.3
	CONCRETE
▨	ROAD CUT AS PER CITY OF OTTAWA DETAIL R10
STM MH	*EXISTING STORM MANHOLE AND SEWER*
SAN MH	*EXISTING SANITARY MANHOLE AND SEWER*
VVB ⊗	*EXISTING VALVE AND VALE BOX*
⌖	*EXISTING FIRE HYDRANT*
EX.CB ☐	*EXISTING CATCHBASIN*
T/G	*EXISTING TOP OF GRATE*
EX UP	*EXISTING UTILITY POLE C/W GUY WIRES*
LS	*EXISTING LIGHT STANDARD*
— - ► - —	*EXISTING ℄ DITCH*
7A *450mmØ*	*EXISTING SANITARY MANHOLE & SEWER*
300mmØ	*EXISTING WATERMAIN*
HYD	*EXISTING FIRE HYDRANT C/W LEAD*
V&VB	*EXISTING VALVE & VALVE BOX LOCATION*
V&VC	*EXISTING VALVE & VALVE CHAMBER LOCATION*
UP ○	*EXISTING UTILITY POLE*
OHW	*EXISTING OVER HEAD WIRE*
	EXISTING SIDEWALK
MH 101	*EXISTING SANITARY MH & SEWER*
MH 102	*EXISTING STORM MH & SEWER*
200mmØ WM	*EXISTING WATERMAIN*

POLYETHYLENE CATCH BASINS*
Custom made to order only

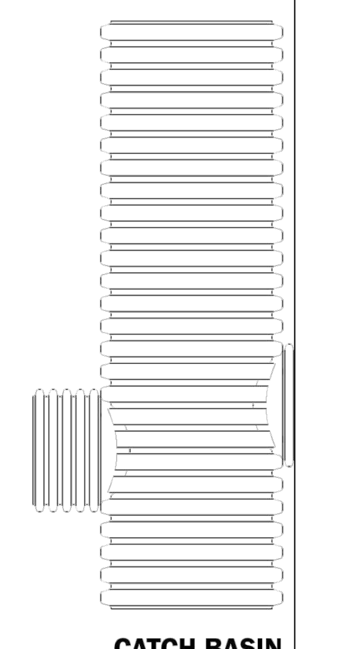
RISER DIAMETER	RISER HEIGHT	STUB** DIAMETER
12" - 36" (300mm-900mm)	2' - 8' (0.6m-2.4m)	4" - 30" (100mm-750mm)

**RISERS MUST BE PROPERLY BACKFILLED VERTICALLY PER DRAINAGE HANDBOOK – INSTALLATIONS/ VERTICAL. USE FITTING LIMITATION SHEET TO INFORM AND ENSURE PROPER INSTALLATION COMPLIANCE. 42" THROUGH 60" (1050 THROUGH 1500MM) HDPE NOT AVAILABLE FOR VERTICAL APPLICATIONS.*

STUBS MUST FIT ON CIRCUMFERENCE AND HEIGHT OF RISER AND MUST NOT BE OVERLAPPING. STUBS ARE STANDARD LENGTH FOR COUPLING AND MUST BE A SMALLER DIAMETER THAN THE RISER. NO MORE THAN THREE STUBS PER STRUCTURE UNDER MOST CIRCUMSTANCES.

*LIDS SHOULD BE INSTALLED PER LIGHT DUTY CATCH BASIN DETAIL AND ARE AVAILABLE THROUGH OTHER MANUFACTURERS. CATCH BASIN LIDS ARE NOT FABRICATED BY ADS/HANCOR. HDPE BOTTOM DOES NOT COME STANDARD WITH RISERS. MUST BE REQUESTED. **STUBS AVAILABLE IN N-12® (HUB), N-12® PLAIN END OR SMOOTH HDPE.*

END CAPS ARE FOR HORIZONTAL APPLICATIONS ONLY. END CAPS ARE NOT PERMITTED TO BE USED IN ANY VERTICAL APPLICATIONS. MISUSE OR FAILURE TO PROPERLY SECURE END CAPS MAY RESULT IN DAMAGE TO PERSONS OR PROPERTY OR MAY RESULT IN INJURY OR DEATH.



CATCH BASIN

NOTE:
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CONSTRUCTION

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4.	ISSUED FOR CITY OF OTTAWA REVIEW	JUN 2/23	DDB
3.	ISSUED FOR CITY OF OTTAWA REVIEW	JAN 27/23	DDB
2.	ISSUED FOR CITY OF OTTAWA REVIEW	MAY 6/22	DDB
1.	ISSUED FOR CITY OF OTTAWA REVIEW	DEC 23/21	DDB

SCALE

DESIGN DDB
CHECKED DDB
DRAWN AE
CHECKED DDB
APPROVED DDB

FOR REVIEW ONLY

D. D. BLAIR
100122737
Aug 11 2023

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
HILLSIDE 10-STOREY APARTMENT BUILDING
ORLEANS TOWN CENTER

DRAWING NAME
NOTES, LEGENDS AND DETAILS

PROJECT No. 120237-00
REV REV # 5
DRAWING No. 120237-NLD

PLANA1.DWG - 841mmx594mm

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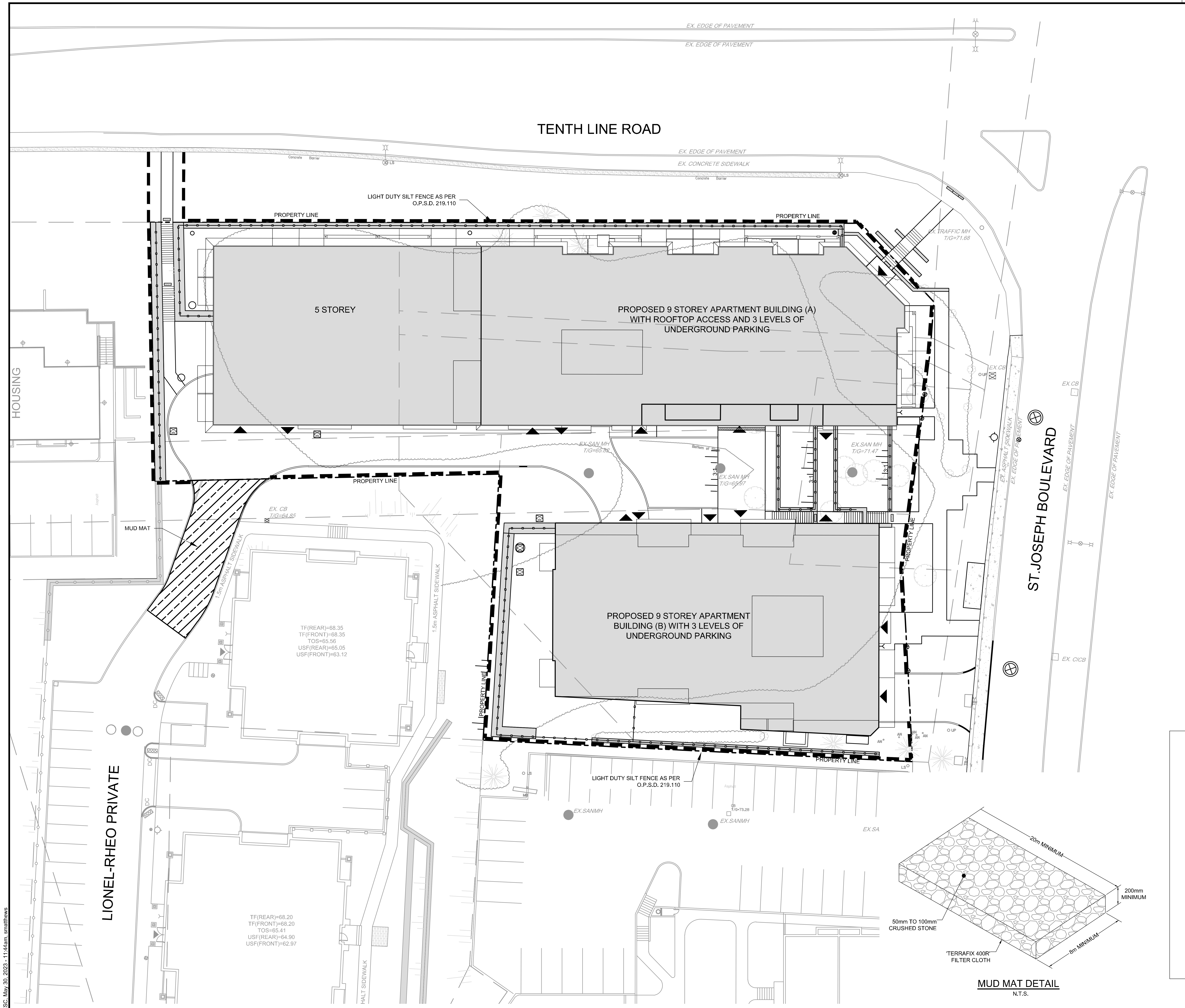
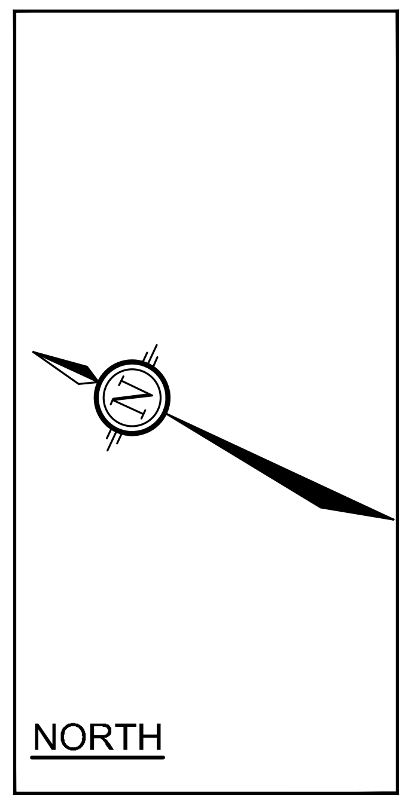
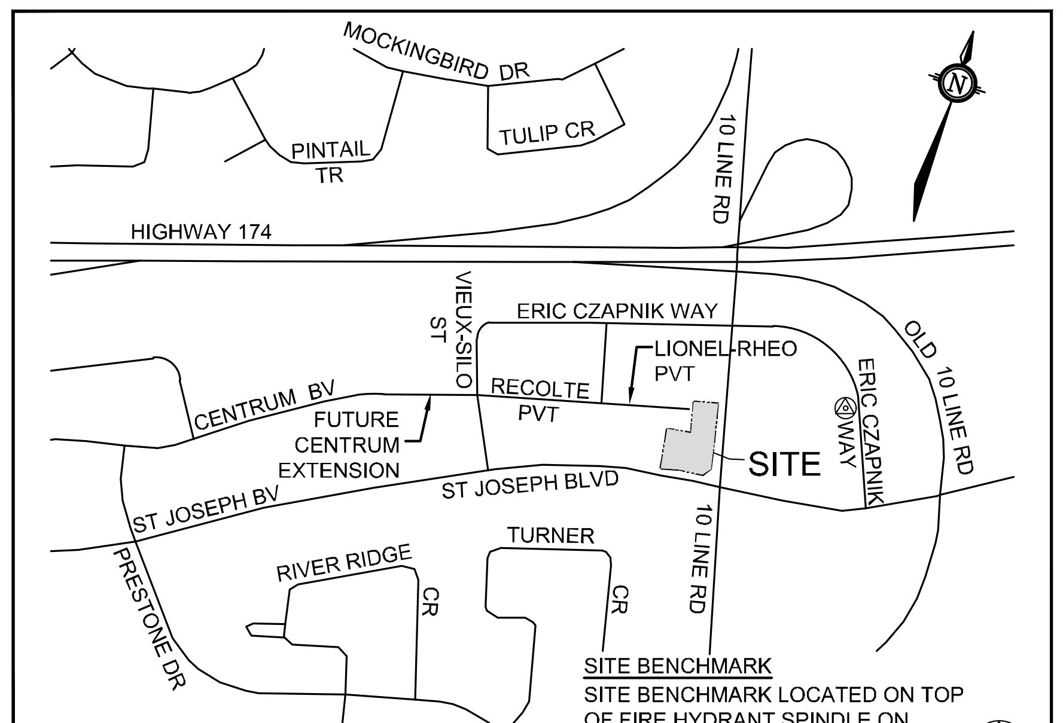
D07-12-21-0229

#18628




NORTH

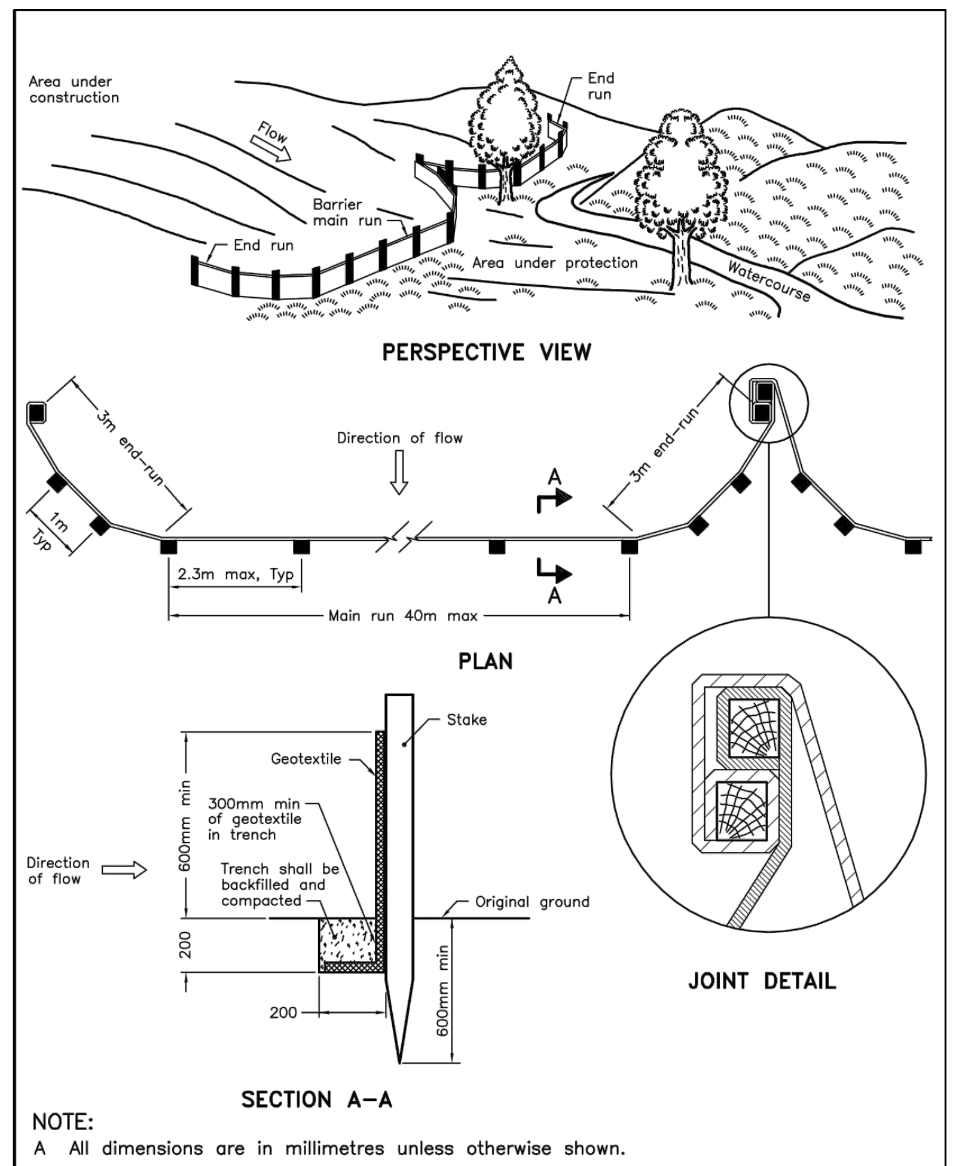


KEY PLAN
N.T.S.

SITE BENCHMARK
SITE BENCHMARK LOCATED ON TOP OF FIRE HYDRANT SPINDLE ON NORTHERN LIMITS OF EXISTING ERIC CZAPNIK.(ELEVATION = 59.92m)

LEGEND

▬ ▬ ▬	SITE BOUNDARY	⊠	PROPOSED CATCHBASIN MANHOLE INSERT
	MAXIMUM 3:1 SIDESLOPE	⊠	PROPOSED CATCHBASIN INSERT
	PROPOSED CENTRELINE SWALE	▬ ▬ ▬	PROPOSED SILT FENCE (SEE OPSD 219.110)
HYD	PROPOSED HYDRANT LOCATION	▨	PROPOSED MUD MAT
●	PROPOSED SANITARY MANHOLE		
○	PROPOSED STORM MANHOLE		
	PROPOSED CATCHBASIN MANHOLE		
□	PROPOSED CATCHBASIN		
●	*EXISTING SANITARY MANHOLE*		
○	*EXISTING STORM MANHOLE*		
	EXISTING CATCHBASIN MANHOLE		
□	*EXISTING CATCHBASIN*		



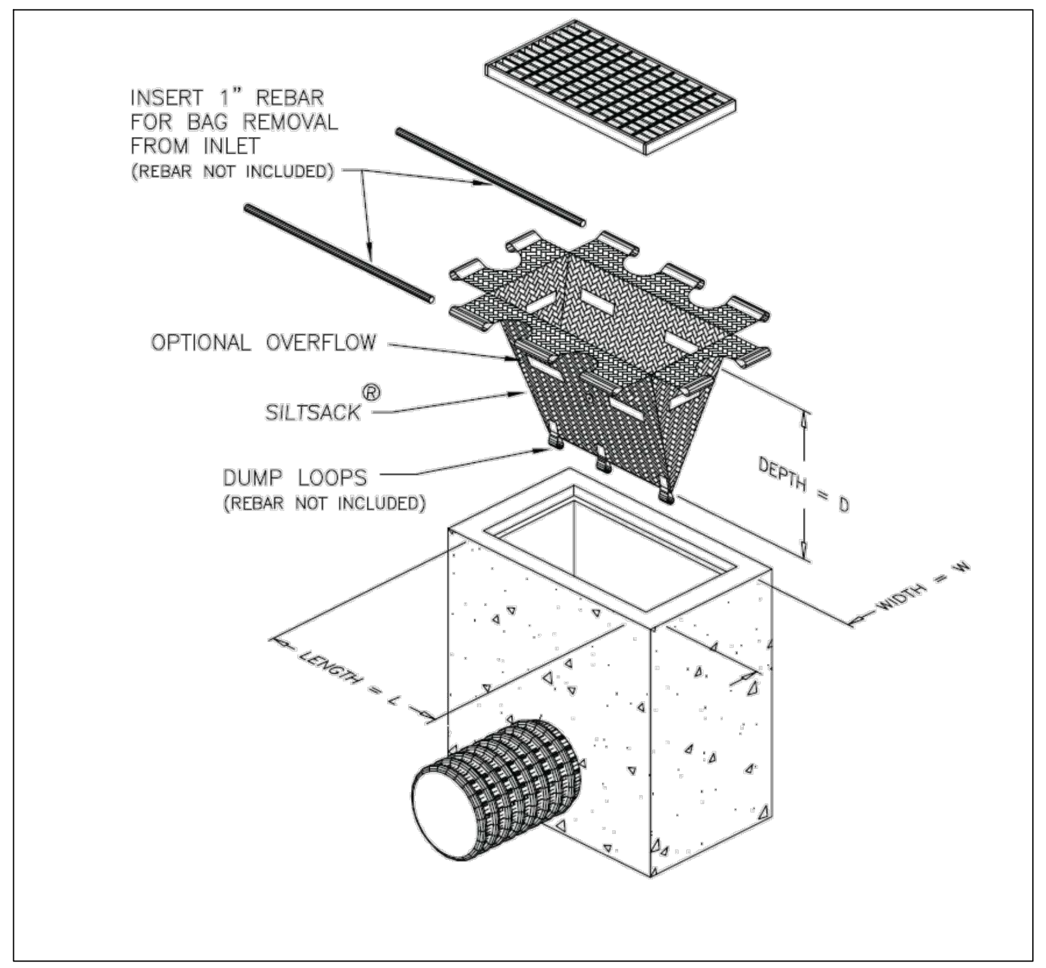
NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING Nov 2015 Rev 2

LIGHT-DUTY
SILT FENCE BARRIER

OPSD 219.110

MUD MAT DETAIL
N.T.S.



CATCHBASIN INSERT DETAIL
N.T.S.

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1.	ISSUED FOR CITY OF OTTAWA REVIEW	DEC 23/21	DDB

SCALE
1:250

1:250
0 2 4 6 8 10

DESIGN DDB
CHECKED DDB
DRAWN MTM
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APPROVED DDB

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
100122737
Aug 11 2023
PROVINCE OF ONTARIO

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CITY OF OTTAWA
HILLSIDE COMMONS
ORLEANS TOWN CENTER

DRAWING NAME
EROSION & SEDIMENT CONTROL PLAN

PROJECT No. 120237-00
REV REV # 5
DRAWING No. 120237-ESC

D07-12-21-0229

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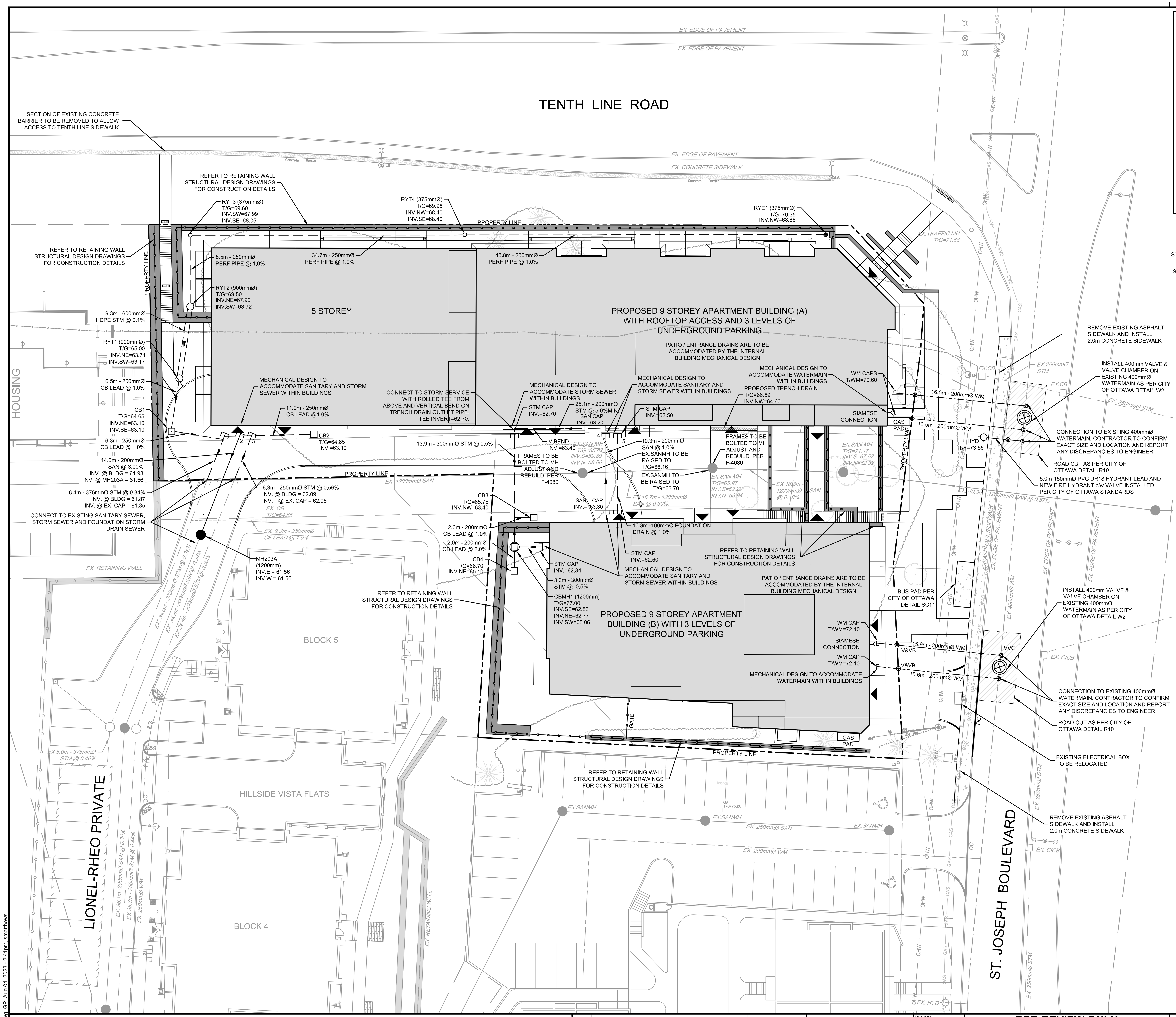

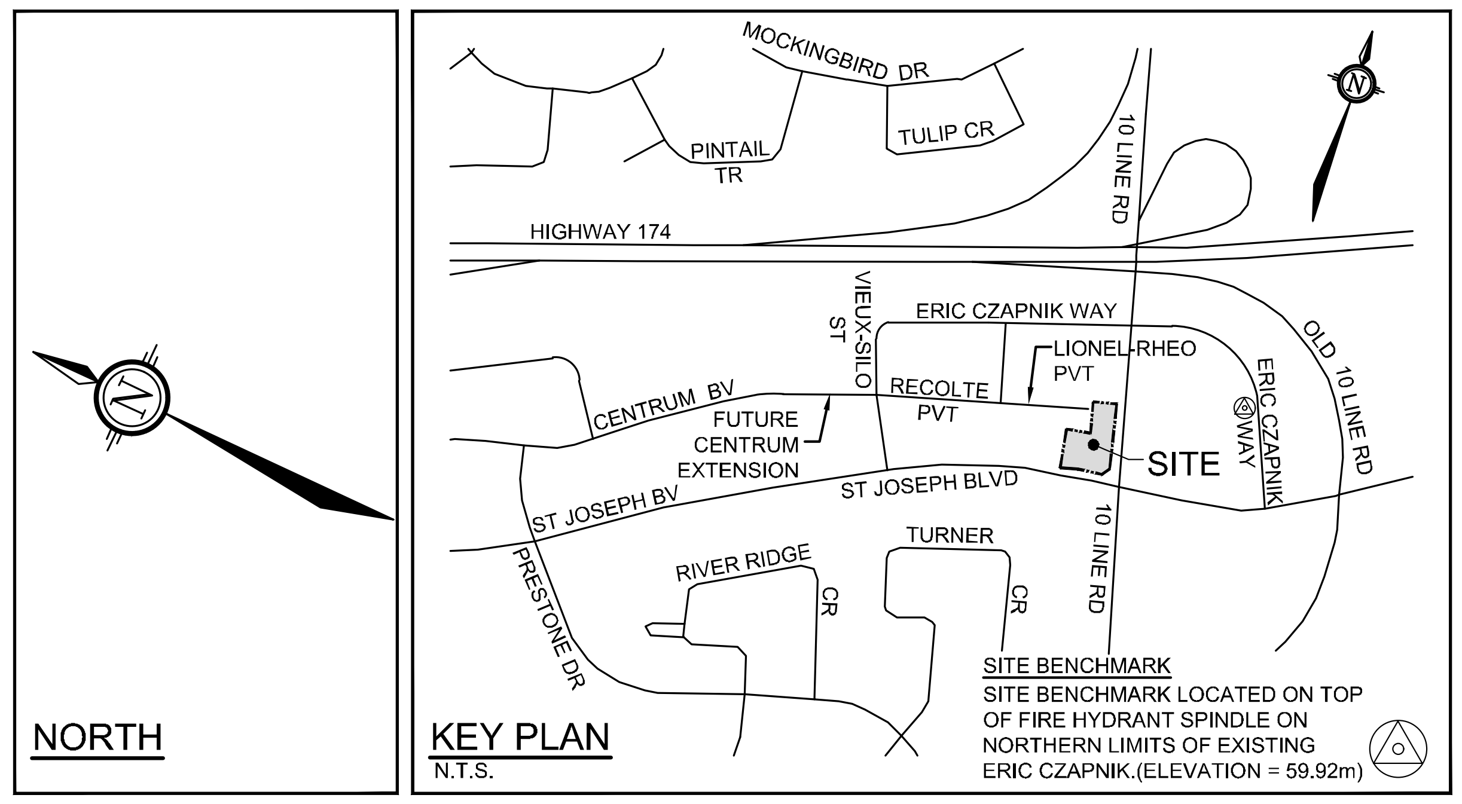

SITE BENCHMARK
SITE BENCHMARK LOCATED ON TOP OF FIRE HYDRANT SPINDLE ON NORTHERN LIMITS OF EXISTING ERIC CZAPNIK.(ELEVATION = 59.92m)

LEGEND

SITE BOUNDARY
STM MH — PROPOSED STORM MANHOLE AND SEWER WITH DIRECTION OF FLOW
SAN MH — PROPOSED SANITARY MANHOLE AND SEWER WITH DIRECTION OF FLOW
PROPOSED WATERMAIN
VVB ⊗ PROPOSED VALVE AND VALVE BOX
HYD PROPOSED HYDRANT
PROPOSED RETAINING WALL
PROPOSED RETAINING WALL C/W CHAIN LINK FENCE
CBMH PROPOSED CATCHBASIN MANHOLE
CB1 ☐ PROPOSED CATCHBASIN
RYE1 PROPOSED REAR YARD ELBOW
RYT1 ○ PROPOSED REAR YARD TEE
PROPOSED TRENCH DRAIN
▲ PROPOSED BUILDING ENTRANCE / EXIT

STM MH EXISTING STORM MANHOLE AND SEWER
SAN MH EXISTING SANITARY MANHOLE AND SEWER
EXISTING WATERMAIN
OHW *EXISTING OVERHEAD WIRES*
VVB ⊗ EXISTING VALVE AND VALE BOX
EX. HYD EXISTING FIRE HYDRANT
EX.CB ☐ EXISTING CATCHBASIN
EX.CICB ☐ EXISTING CURB INLET CATCHBASIN
EXISTING ADJACENT LEGAL LINE
EXISTING TREES
EXISTING STREETLIGHT
UP ○ EXISTING UTILITY POLE

PIPE CROSSING TABLE

CROSSING #	WATERMAIN	SANITARY	STORM
1		INV = 61.63 OBV = 61.83	INV = 63.53 OBV = 63.78
2		INV = 61.97 OBV = 62.17	INV = 62.99 OBV = 63.24
3		INV = 62.08 OBV = 62.33	INV = 63.01 OBV = 63.26
4		INV = 63.20 OBV = 63.40	INV = 63.90 OBV = 64.10
5		INV = 62.50 OBV = 62.60	INV = 64.00 OBV = 64.20

* WATERMAIN CROSSING AS PER W25 & W25.2
PROVIDE THERMAL INSULATION AS PER W22
WHERE THERE IS LESS THAN 2.4m COVER.

CATCHBASIN / ICD TABLE

CB No.	SIZE (mm)	MATERIAL	T/G ELEV (m)	INVERT (m)	ICD DIA. (mm) (EQUIVALENT)	IPEX TEMPEST LMF ICD MODEL
1	600x600	CONC	64.65	INV.SE=63.10 INV.NE=63.10	0.059	LMF 83
2	600x600	CONC	64.65	INV.SE=63.10	0.046	LMF 65
3	600x600	CONC	65.75	INV.SE=63.40 INV.NW=63.40	0.045	LMF 69
4	600x600	CONC	66.70	INV.NE=65.10	0.045	LMF 71
CBMH 1	1200	CONC	67.00	INV.SE=62.83 INV.NE=62.77		
RYT 1	900	HDPE	65.00	INV.NE=63.71 INV.SW=63.17		
RYT 2	900	HDPE	69.50	INV.NE=67.90 INV.SW=63.72		
RYT 3	375	HDPE	69.60	INV.SW=67.99 INV.SE=68.05		
RYT 4	375	HDPE	69.95	INV.NW=68.40 INV.SE=68.40		
RYE 1	375	HDPE	70.35	INV.NW=68.86		
TRENCH DRAIN			66.59	INV.NW=64.60		

RELEASE RATE TABLE

STRUCTURE	5-YEAR RELEASE RATE	100-YEAR RELEASE RATE
CB 1	4.9 L/S	7.5 L/S
CB 2	4.4 L/S	4.5 L/S
CB 3	4.9 L/S	6.4 L/S
CB 4	3.9 L/S	5.5 L/S
TRENCH DRAIN (UNCONTROLLED)	4.7 L/S	11.1 L/S
ROOF DRAINS BUILDING A	4.8 L/S	6.3 L/S
ROOF DRAINS BUILDING B	2.9 L/S	3.8 L/S
*STORM OUTLET TO EXISTING 375mmØ PIPE	*27.8 L/S	*42.0 L/S
UNCONTROLLED OFFSITE FLOWS	8.1 L/S	14.5 L/S
TOTAL CALCULATED SITE RELEASE RATE	35.9 L/S	56.5 L/S
TOTAL ALLOWABLE RELEASE RATE FROM SITE	56.6 L/S	56.6 L/S

* THE TOTAL MODELLED FLOW TO THE EXISTING STORM OUTLET PIPE IS SLIGHTLY LESS THAN SIMPLY ADDING UP THE INDIVIDUAL AREAS AS THERE IS FLOW ATTENUATION PROVIDED BY THE PIPE NETWORK ITSELF, BASED ON TIME OF FLOW IN THE PIPE AS WELL AS FRICTIONAL/HEAD LOSSES.

SAN MANHOLE TABLE

MANHOLE ID	SIZE (mm)	T/G ELEV (m)	INVERT (m)
MH203A	1200	64.70	INV.E = 61.56 INV.W = 61.56

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4.	ISSUED FOR CITY OF OTTAWA REVIEW	MAY 06/22	DDB
3.	ISSUED FOR COORDINATION	APR 6/22	DDB
2.	ISSUED FOR CITY OF OTTAWA REVIEW	MAR 22/22	DDB
1.	ISSUED FOR CITY OF OTTAWA REVIEW	DEC 23/21	DDB

SCALE
1:250
1:250
0 2 4 6 8 10

DESIGN DDB
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CITY OF OTTAWA
HILLSIDE COMMONS
ORLEANS TOWN CENTER

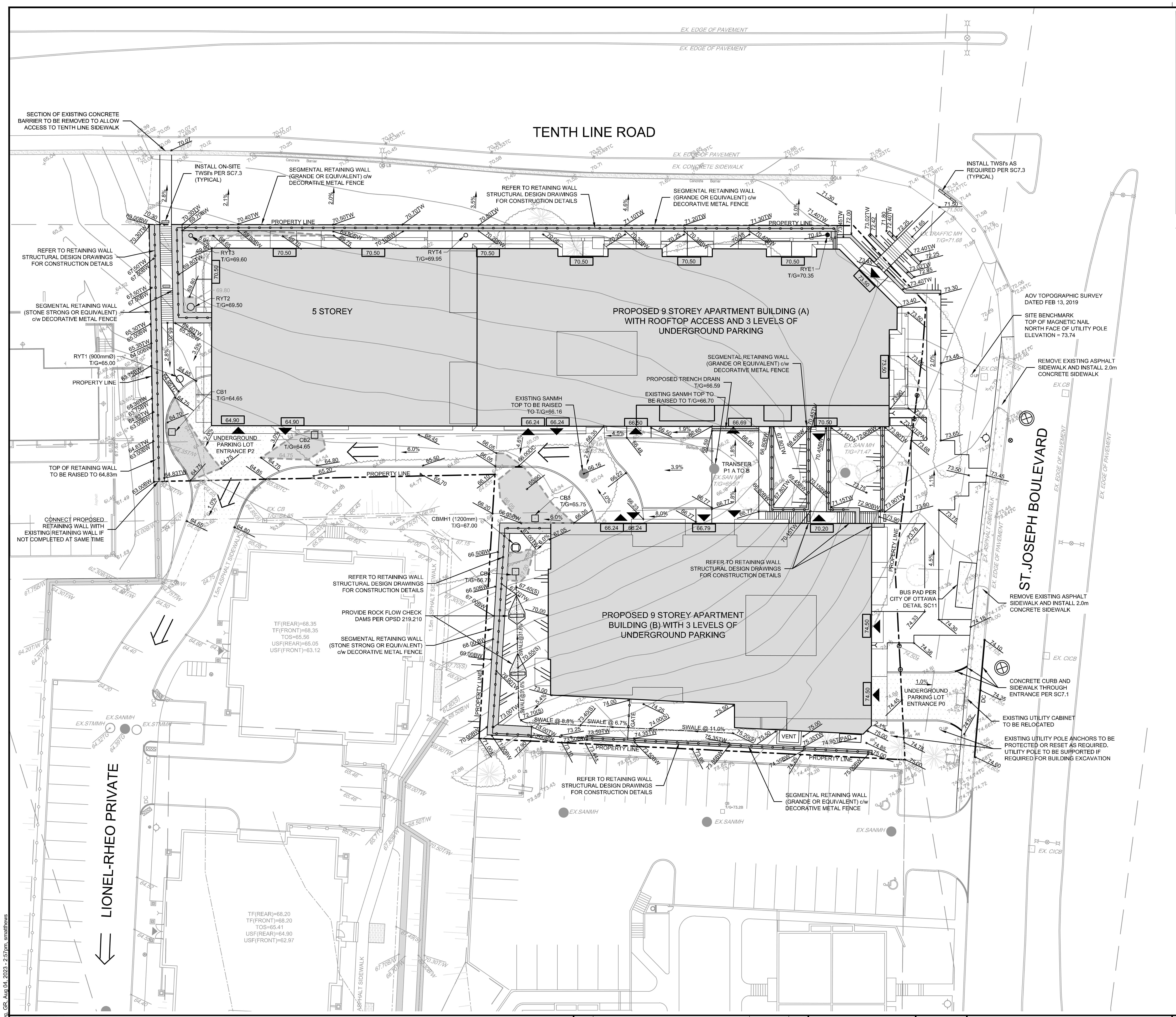
DRAWING NAME
GENERAL PLAN OF SERVICES

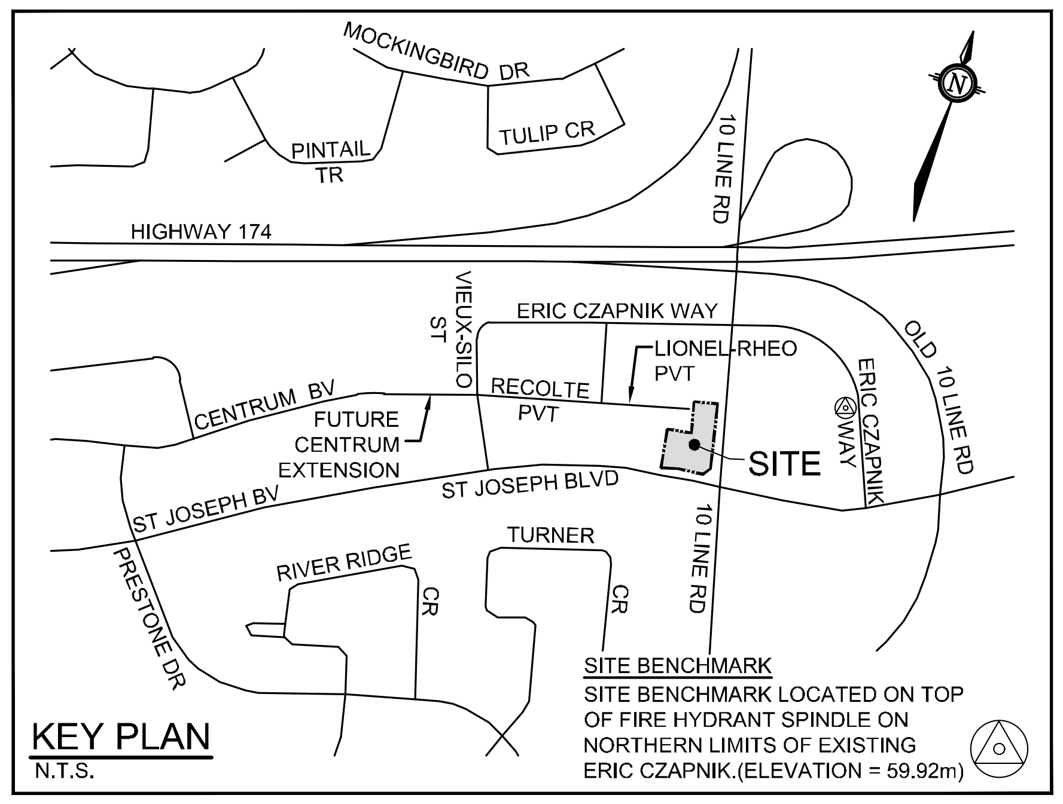
PROJECT No. 120237-00
REV REV # 7
DRAWING No. 120237-GP

PLANA1.DWG - 841mmx594mm

D07-12-21-0229

#18628





KEY PLAN
N.T.S.

SITE BENCHMARK
SITE BENCHMARK LOCATED ON TOP OF FIRE HYDRANT SPINDLE ON NORTHERN LIMITS OF EXISTING ERIC CZAPNIK.(ELEVATION = 59.92m)

LEGEND

	SITE BOUNDARY	⇒	DIRECTION OF MAJOR OVERLAND FLOW ROUTE
V&VB ⊗	PROPOSED VALVE AND VALVE BOX	97.32	STATIC PONDING AREA AND SPILL DEPTH ELEVATION
HYD	PROPOSED HYDRANT	VVB ⊗	*EXISTING VALVE AND VALE BOX*
	PROPOSED RETAINING WALL	EX. HYD	*EXISTING FIRE HYDRANT*
	PROPOSED RETAINING WALL C/W CHAIN LINK FENCE	EX.CB ☐	*EXISTING CATCHBASIN*
70.00 70.00	PROPOSED ELEVATION *EXISTING ELEVATION*	EX.CICB ☐	*EXISTING CURB INLET CATCHBASIN*
72.00TW 70.50BW	PROPOSED TOP OF WALL ELEVATION PROPOSED BOTTOM OF WALL ELEVATION		*EXISTING ADJACENT LEGAL LINE*
66.75(S)	EXISTING SWALE ELEVATION		*EXISTING TREES*
	PROPOSED SWALE		*EXISTING STREETLIGHT*
VVB ⊗	PROPOSED VALVE AND VALVE BOX	UP ○	*EXISTING UTILITY POLE*
HYD	PROPOSED HYDRANT	STM MH ○	*EXISTING STORM MANHOLE*
CBMH	PROPOSED CATCHBASIN MANHOLE	SAN MH ●	*EXISTING SANITARY MANHOLE*
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RYT1 ○	PROPOSED REAR YARD TEE		
▨	PROPOSED TRENCH DRAIN		
▲	PROPOSED BUILDING ENTRANCE / EXIT		
	PROPOSED ROCK FLOW CHECK DAM (OPSD 219.210)		

PAVEMENT STRUCTURE:

☐	LIGHT DUTY 50mm SUPERPAVE 12.5 (PG58-34) 150mm GRAN 'A' 300mm GRAN 'B' TYPE II
▨	HEAVY DUTY 40mm SUPERPAVE 12.5 (PG 58-34) 50mm SUPERPAVE 19.0 (PG 58-34) 150mm GRAN 'A' 400mm GRAN 'B' TYPE II

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1:250
0 2 4 6 8 10

DESIGN DDB
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DRAWING NAME
GRADING PLAN

PROJECT No. 120237-00
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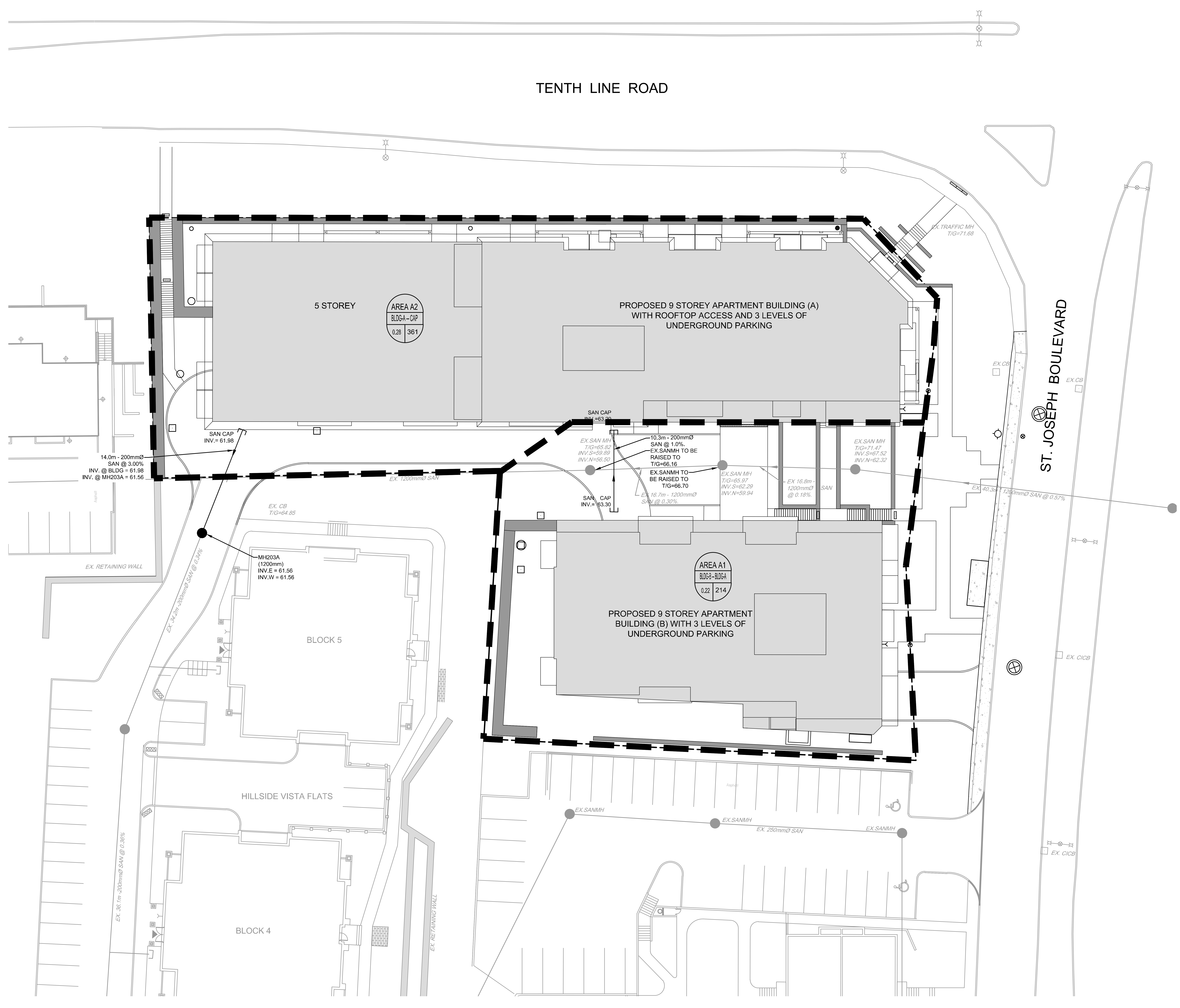
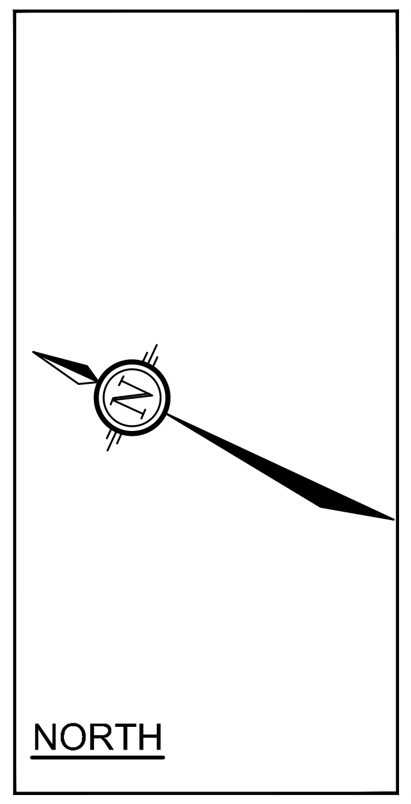
PLANA1.DWG - 841mmx594mm

#18628





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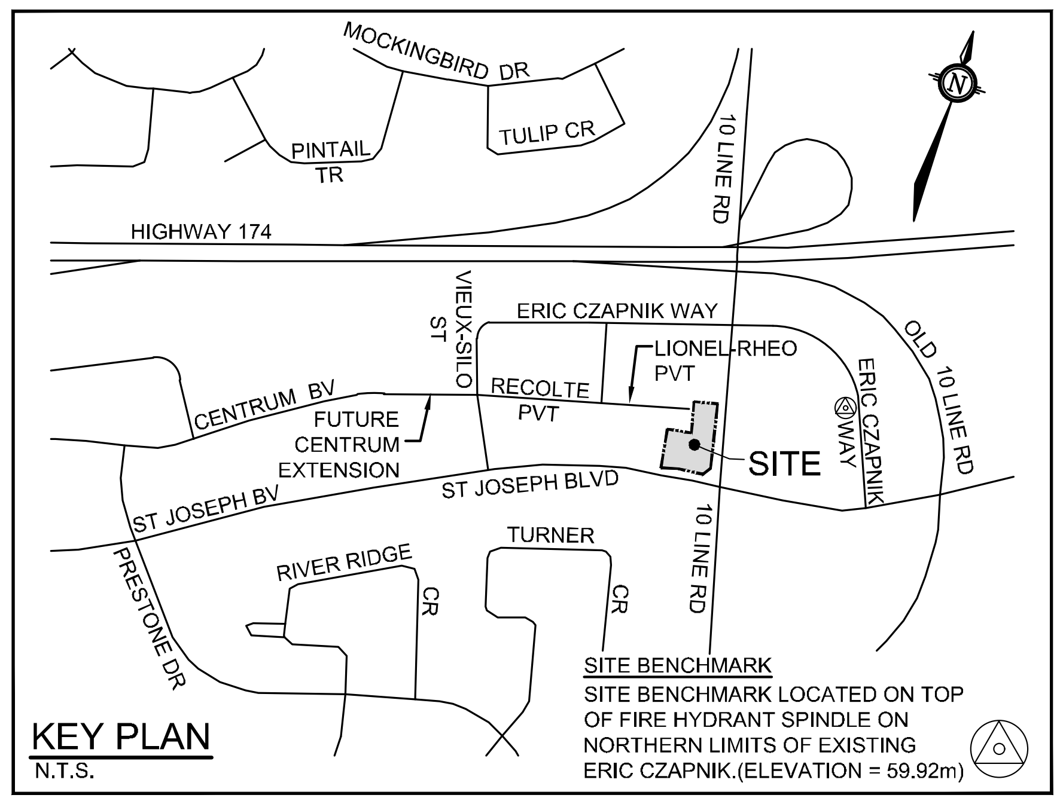

KEY PLAN
N.T.S.

SITE BENCHMARK
SITE BENCHMARK LOCATED ON TOP OF FIRE HYDRANT SPINDLE ON NORTHERN LIMITS OF EXISTING ERIC CZAPNIK.(ELEVATION = 59.92m)

LEGEND

SITE BOUNDARY

EX. SAN MH — EXISTING 200mm SANITARY MANHOLE AND SEWER

EX. SAN MH — EXISTING 1200mm SANITARY MANHOLE AND SEWER

SAN MH — PROPOSED SANITARY MANHOLE AND SEWER WITH DIRECTION OF FLOW

SANITARY AREA DRAINAGE BOUNDARY

AREA A1 — AREA ID
BLDG-B -- BLDG-A — FLOW PATH
214 — POPULATION
0.22 — DRAINAGE AREA (hectare)

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
5.	ISSUED FOR SITE PLAN APPROVAL	AUG 11/23	DDB
4.	ISSUED FOR CITY OF OTTAWA REVIEW	JUN 2/23	DDB
3.	ISSUED FOR CITY OF OTTAWA REVIEW	JAN 27/23	DDB
2.	ISSUED FOR CITY OF OTTAWA REVIEW	MAY 6/22	DDB
1.	ISSUED FOR CITY OF OTTAWA REVIEW	DEC 23/21	DDB

SCALE
1:250

1:250
0 2 4 6 8 10

DESIGN DDB
CHECKED DDB
DRAWN AE / SM
CHECKED DDB
APPROVED DDB

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
Drew Blair
D. D. BLAIR
100122737
Aug 11 2023
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
HILLSIDE COMMONS
ORLEANS TOWN CENTER

DRAWING NAME

SANITARY DRAINAGE AREA PLAN

PROJECT No. 120237-00
REV REV # 5
DRAWING No. 120237-SAN

D07-12-21-0229

PLANA1.DWG - 841mmx594mm

#18628

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Building A Tower Roof Drain Calculations Summary

5-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (5-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-A1	360.5	0.036	0.90	10.00	104.19	9.4	Watts Flow Control	1/2 Open	0.95	0.11	7.34	18.03
R-A2	329.5	0.033	0.90	10.00	104.19	8.6	Watts Flow Control	1/2 Open	0.95	0.11	6.48	16.48
R-A3	342.7	0.034	0.90	10.00	104.19	8.9	Watts Flow Control	1/2 Open	0.95	0.11	6.84	17.14
TOTAL		0.103							2.85		20.66	51.64

100-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (100-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-A1	360.5	0.036	1.00	10.00	178.56	17.9	Watts Flow Control	1/2 Open	1.26	0.14	15.67	18.03
R-A2	329.5	0.033	1.00	10.00	178.56	16.4	Watts Flow Control	1/2 Open	1.26	0.14	13.90	16.48
R-A3	342.7	0.034	1.00	10.00	178.56	17.0	Watts Flow Control	1/2 Open	1.26	0.14	14.65	17.14
TOTAL		0.103				51.3			3.78		44.21	51.64

Building A Podium Roof Drain Calculations Summary

5-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (5-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-AP1	370	0.037	0.90	10.00	104.19	9.6	Watts Flow Control	1/2 Open	0.95	0.11	7.61	18.50
R-AP2	370	0.037	0.90	10.00	104.19	9.6	Watts Flow Control	1/2 Open	0.95	0.11	7.61	18.50
TOTAL		0.074							1.9		15.21	37.00

100-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (100-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-AP1	370	0.037	1.00	10.00	178.56	18.4	Watts Flow Control	1/2 Open	1.26	0.14	16.22	18.50
R-AP2	370	0.037	1.00	10.00	178.56	18.4	Watts Flow Control	1/2 Open	1.26	0.14	16.22	18.50
TOTAL		0.074				36.7			2.52		32.44	37.00

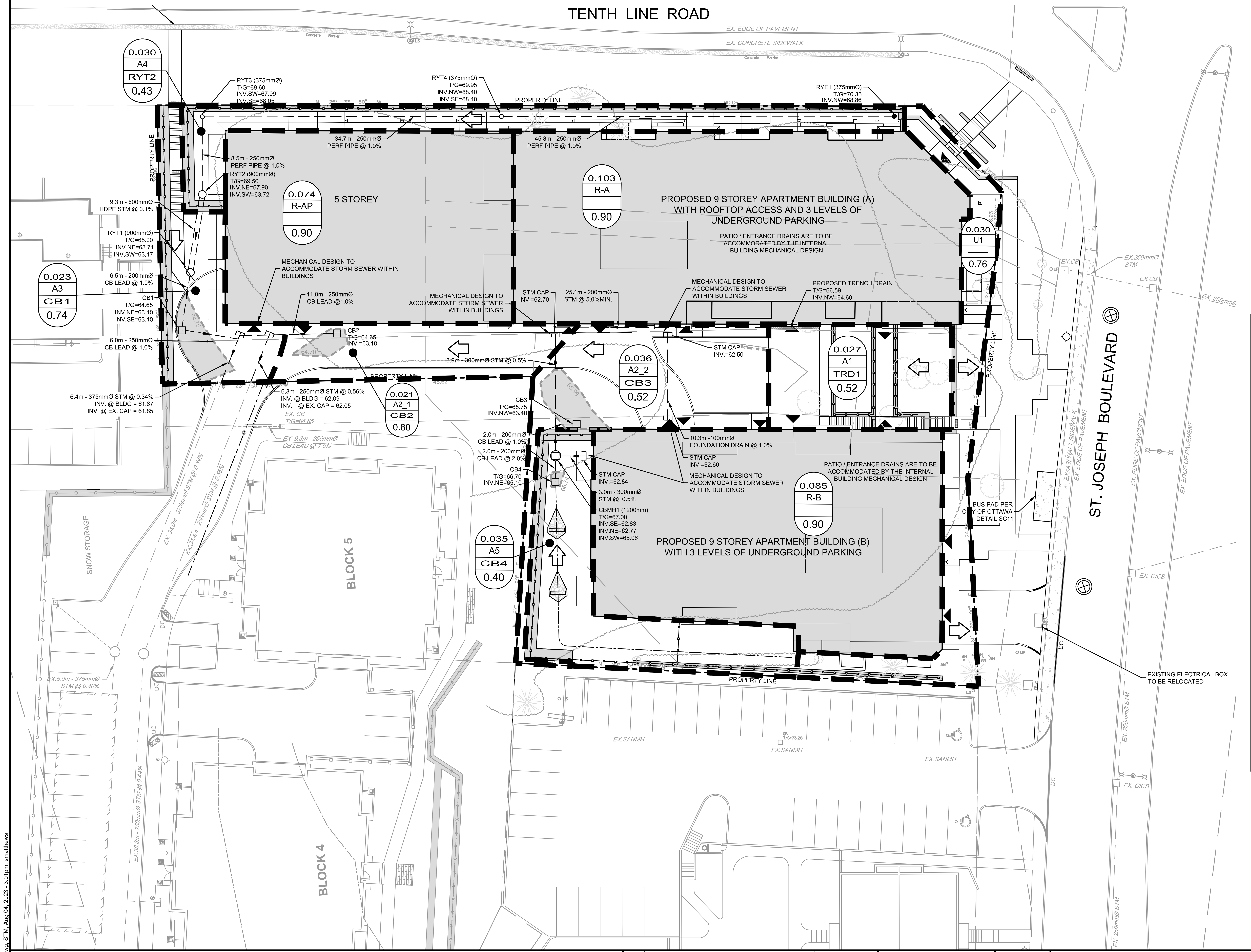
Building B Tower Roof Drain Calculations Summary

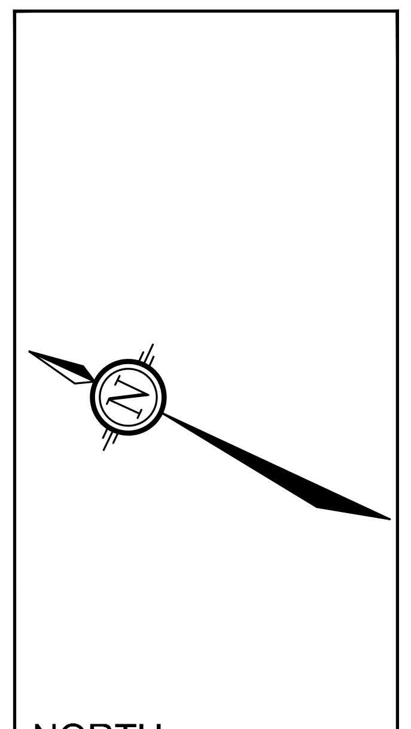
5-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (5-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-B1	271.3	0.027	0.90	10.00	104.19	7.1	Watts Flow Control	1/2 Open	0.95	0.107	4.92	13.57
R-B2	283.3	0.028	0.90	10.00	104.19	7.4	Watts Flow Control	1/2 Open	0.95	0.107	5.24	14.17
R-B3	295.5	0.030	0.90	10.00	104.19	7.7	Watts Flow Control	1/2 Open	0.95	0.108	5.56	14.78
TOTAL		0.085							2.85		15.72	42.51

100-Year

Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (100-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-B1	271.3	0.027	1.00	10.00	178.56	13.5	Watts Flow Control	1/2 Open	1.26	0.138	10.69	13.57
R-B2	283.3	0.028	1.00	10.00	178.56	14.1	Watts Flow Control	1/2 Open	1.26	0.139	11.34	14.17
R-B3	295.5	0.030	1.00	10.00	178.56	14.7	Watts Flow Control	1/2 Open	1.26	0.140	12.01	14.78
TOTAL		0.085				42.2			3.78		34.03	42.51

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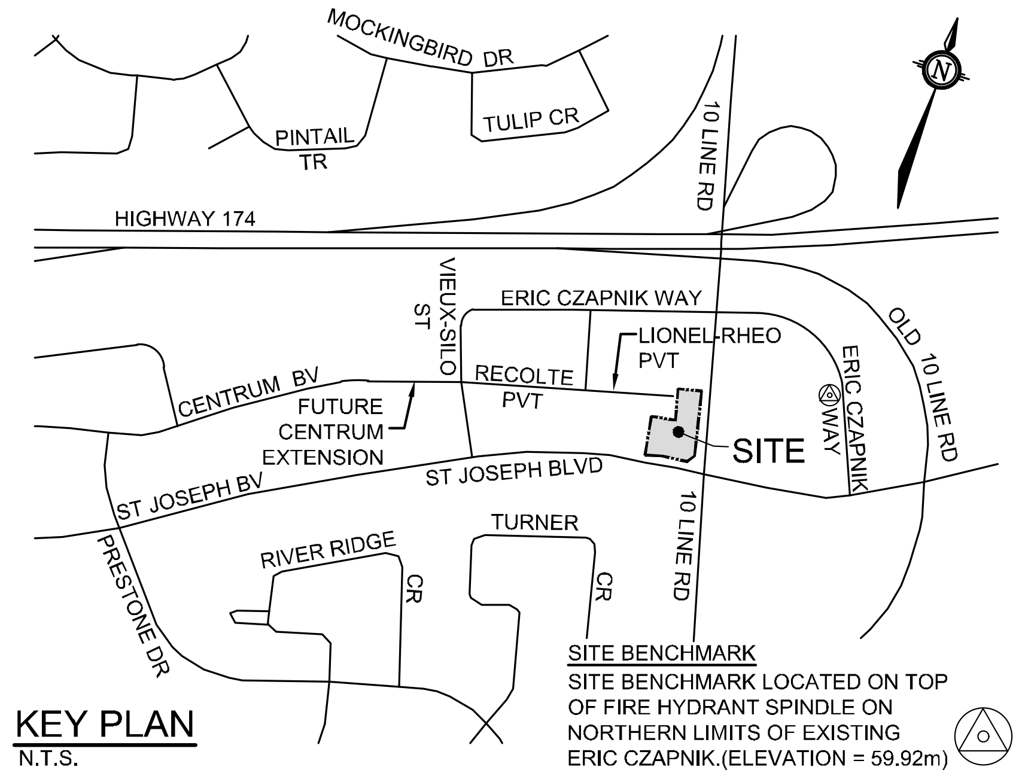

KEY PLAN
N.T.S.

SITE BENCHMARK
SITE BENCHMARK LOCATED ON TOP
OF FIRE HYDRANT SPINDLE ON
NORTHERN LIMITS OF EXISTING
ERIC CZAPNIK.(ELEVATION = 59.92m)

LEGEND

SITE BOUNDARY
PROPOSED STORM SEWER AND DIRECTION OF FLOW
PROPOSED RETAINING WALL
PROPOSED RETAINING WALL C/W CHAINLINK FENCE
▲ PROPOSED BUILDING ENTRANCE
Y PROPOSED SIAMESE CONNECTION
▬ ▬ STORM DRAINAGE AREA
0.033 — DRAINAGE AREA (HECTARES)
A2_2 — DRAINAGE AREA I.D.
CB3 — MANHOLE TO MANHOLE
0.62 — RUNOFF COEFFICIENT
⇨ DIRECTION OF MAJOR OVERLAND FLOW ROUTE
97.44 — 1:100yr PONDING AREA AND ELEVATION
97.27 — 1:5yr PONDING AREA AND ELEVATION

STM MH — EXISTING STORM MANHOLE AND SEWER
SAN MH ● EXISTING SANITARY MANHOLE
VVB ⊗ EXISTING VALVE AND VALE BOX
EXISTING FIRE HYDRANT
EX.CB ☐ EXISTING CATCHBASIN
T/G EXISTING TOP OF GRATE
EX UP EXISTING UTILITY POLE C/W GUY WIRES
LS EXISTING LIGHT STANDARD

PONDING[1]			
CB No.	RIM ELEV. (m)	EVENT	WATER LEVEL ELEV. (DEPTH) (m)
CB1	64.65	2yr	(0.00) 63.97
		5yr	(0.00) 64.16
		100yr	(0.09) 64.75
		Static	(0.10) 64.75
		100yr + 20%	(0.11) 64.76
CB2	64.65	2yr	(0.00) 64.27
		5yr	(0.00) 64.65
		100yr	(0.05) 64.70
		Static	(0.10) 64.75
		100yr + 20%	(0.11) 64.76
CB3	65.75	2yr	(0.00) 64.26
		5yr	(0.00) 65.01
		100yr	(0.24) 65.99
		Static	(0.30) 66.05
		100yr + 20%	(0.31) 66.06
CB4	66.70	2yr	(0.00) 65.38
		5yr	(0.00) 65.95
		100yr	(0.04) 66.74
		Static	(0.30) 67.00
		100yr + 20%	(0.09) 66.79
CBMH1	67.00	2yr	(0.00) 63.72
		5yr	(0.00) 63.74
		100yr	(0.00) 63.78
		Static	(0.00) 67.00
		100yr + 20%	(0.00) 63.80
RYE1	70.35	2yr	(0.00) 68.86
		5yr	(0.00) 68.86
		100yr	(0.00) 68.86
		Static	(0.00) 70.35
		100yr + 20%	(0.00) 68.86

PONDING[1]			
CB No.	RIM ELEV. (m)	EVENT	WATER LEVEL ELEV. (DEPTH) (m)
RYT1	65.00	2yr	(0.00) 63.97
		5yr	(0.00) 64.16
		100yr	(0.00) 64.77
		Static	(0.00) 65.00
		100yr + 20%	(0.00) 64.79
RYT2	69.50	2yr	(0.00) 63.97
		5yr	(0.00) 64.16
		100yr	(0.00) 64.78
		Static	(0.30) 69.80
		100yr + 20%	(0.00) 64.79
RYT3	69.60	2yr	(0.00) 67.99
		5yr	(0.00) 67.99
		100yr	(0.00) 67.99
		Static	(0.20) 69.80
		100yr + 20%	(0.00) 67.99
RYT4	69.95	2yr	(0.00) 68.40
		5yr	(0.00) 68.40
		100yr	(0.00) 68.40
		Static	(0.00) 69.95
		100yr + 20%	(0.00) 68.40
TRENCH DRAIN	66.59	2yr	(0.00) 64.63
		5yr	(0.00) 64.63
		100yr	(0.00) 64.65
		Static	(0.00) 66.59
		100yr + 20%	(0.00) 64.66

[1] BASED ON PCSWMM MODEL
(6-HOUR CHICAGO STORM DISTRIBUTION)

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**PRELIMINARY
NOT FOR
CONSTRUCTION**

No.	REVISION	DATE	BY
5.	ISSUED FOR SITE PLAN APPROVAL	AUG 11/23	DDB
4.	ISSUED FOR CITY OF OTTAWA REVIEW	JUN 2/23	DDB
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2.	ISSUED FOR CITY OF OTTAWA REVIEW	MAY 6/22	DDB
1.	ISSUED FOR CITY OF OTTAWA REVIEW	DEC 23/21	DDB

SCALE
1:250

1:250
0 2 4 6 8 10

DESIGN BM
CHECKED DDB
DRAWN SAB / SM
CHECKED DDB
APPROVED DDB

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
100122737
Aug 11 2023
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
HILLSIDE COMMONS
ORLEANS TOWN CENTER

DRAWING NAME
STORMWATER MANAGEMENT PLAN

PROJECT No. 120237-00
REV REV # 5
DRAWING No. 120237-STM

D07-12-21-0229

PLANA1.DWG - 841mmx594mm
#18628