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39 Years

HILLSIDE COMMONS RESIDENTIAL APARTMENTS

SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared for: Hillside Commons Inc.

HILLSIDE COMMONS RESIDENTIAL APARTMENTS
SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared By:

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

December 23, 2021

Novatech File: 120237
Ref: R-2021-116

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December 23, 2021

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: **Mr. William Curry, C.E.T.**

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

Please find enclosed the 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, P. Eng.
Senior Project Manager | Land Development Engineering

Encl.

cc: Matthew Firestone, Landrich Homes
Michael Boucher, DCR Phoenix

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF DRAWINGS

LIST OF APPENDICIES

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;

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

Telephone (613) 254-9643
Facsimile (613) 254-5867
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HILLSIDE COMMONS RESIDENTIAL APARTMENTS

KEY PLAN

N.T.S.

DEC 2021	120237	FIG-1

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SHT8X11.DWG - 216mmx279mm

TENTH LINE ROAD

5 STOREY

PROPOSED 9 STOREY APARTMENT BUILDING (A) WITH ROOFTOP ACCESS AND 3 LEVELS OF UNDERGROUND PARKING

PROPOSED 9 STOREY APARTMENT BUILDING (B) WITH 3 LEVELS OF UNDERGROUND PARKING

BLOCK 5

BLOCK 4

HILLSIDE VISTA FLATS

LIONEL-RHEO PRIVATE

ST.JOSEPH BOULEVARD

1.5m ASPHALT SIDEWALK

OHW

N

M:\2020\120237\CADDesign\Figures\Design Brief\120237-ConceptPlan.dwg, FIG 2, Dec 23, 2021 - 12:33pm, mmckeough

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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
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CITY OF OTTAWA
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CONCEPT PLAN

1 : 500 (0, 5, 10, 15, 20)

DEC 2021 | 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 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 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 serviced from the existing 400mm watermain on St. Joseph Boulevard and a 250mm dia. watermain on Lionel-Rheo Private within Hillside Vista Flats. Building A will be connected to the existing 250mm watermain and Building B will be connected to the existing 400mm watermain. A 200mm watermain shall be installed within and between Building 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.

There is one private hydrant proposed to service the site located just south of Building B. Additionally, there are two existing hydrants on St. Joseph Blvd. (one east and one west from the site) and one 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 N1. 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.

TENTH LINE ROAD

LIMITS OF SURVEY

1.8m CONC

ERIC CZAPNIK WAY

1.8m CONCRETE SIDEWALK

5 STOREY
41 UNITS
AFFORDABLE
HOUSING

BUILDING A

BUILDING B

200mmØ WM

250mmØ WM

250mmØ WM to BLDG A

200mmØ WM

200mmØ WM

200mmØ WM

400mmØ WM

400mmØ WM

CONNECTION TO EXISTING
400mmØ WATERMAIN

CONNECTION TO EXISTING
200mmØ WATERMAIN

200mmØ WM

LIONEL-RHEO PRIVATE

250mmØ WM

HILLSIDE TERRACE
DEVELOPMENT

ST. JOSEPH BOULEVARD

N

LEGEND

- SITE BOUNDARY
- EXISTING 200mm WATERMAIN
- EXISTING 250mm WATERMAIN
- EXISTING 400mm WATERMAIN
- PROPOSED 200mm WATERMAIN
- PROPOSED 250mm WATERMAIN

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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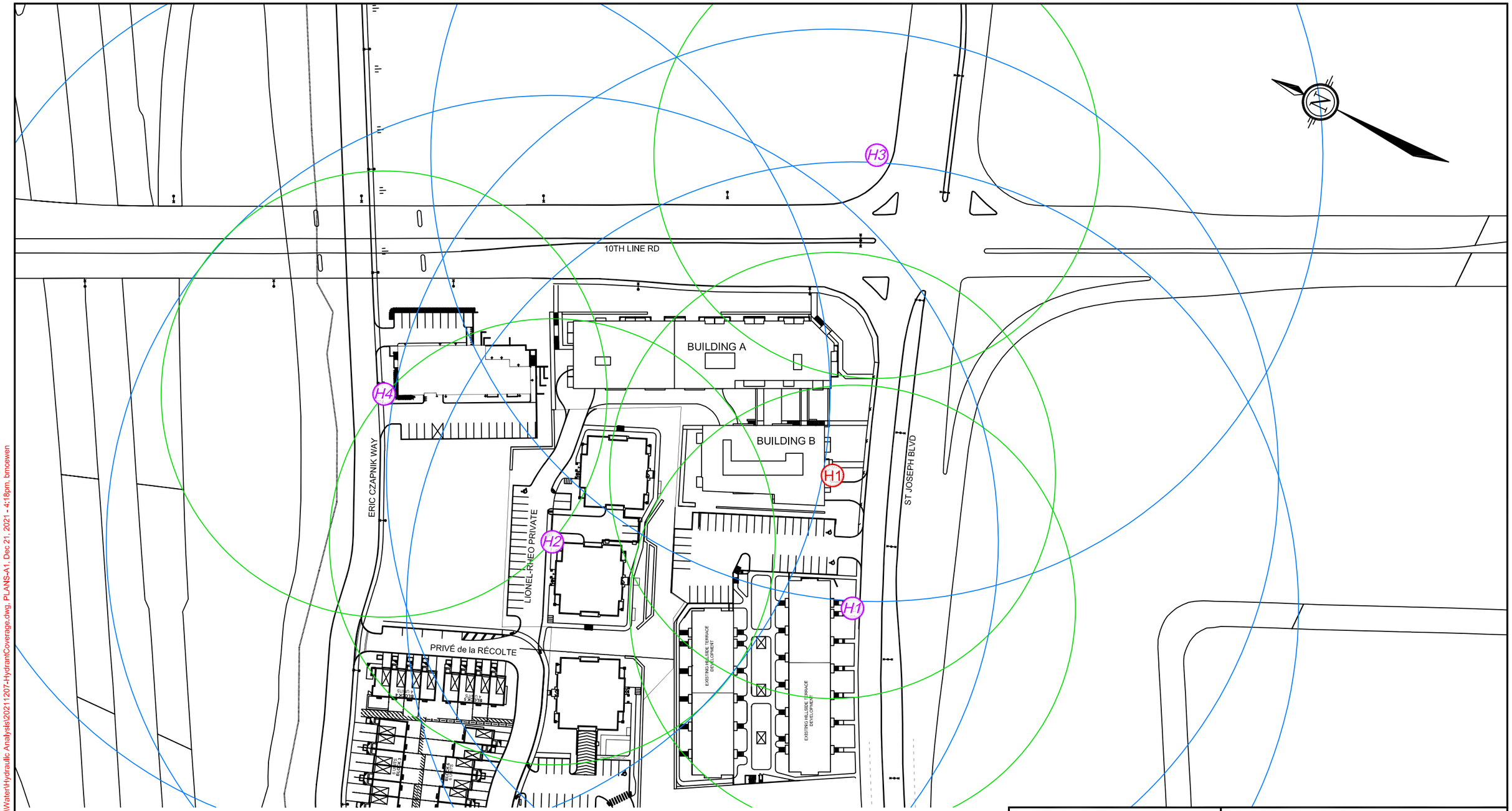
WATER NETWORK PLAN

SCALE 1 : 750 (0, 10, 20, 30)

DATE DEC 2021 | JOB 120237 | FIGURE FIG-3



LEGEND

- 75mm COVERAGE RADIUS
- 150mm COVERAGE RADIUS
- H1 PROPOSED HYDRANT
- H3 EXISTING 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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FIRE HYDRANT COVERAGE PLAN

SCALE 1 : 1250 (0 10 20 30 40 50)

DATE DEC 2021 | JOB 120237 | FIGURE FIG-4

SHT11X17.DWG - 279mmX432mm

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

Table 2: 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	2.86	N/A	690/80 (Max)	505.22/73.28 (Max)	2.08
Max Daily Demand and Fire Flow	7.15	105	138/20 (Min)	347.57/50.41 (Min)	N/A
Peak Hour	15.72	N/A	276/40 (Min)	363.85/52.77 (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).

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;
    - The Hillside Commons site is to be controlled to 56.6 L/s;
- 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. The minor system outlet will be overcontrolled to account for the uncontrolled runoff from this area.

The downstream development (Hillside Vista Walk-Up Condos) use 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**.

TENTH LINE ROAD

EX. EDGE OF PAVEMENT

EX. CONCRETE SIDEWALK

Concrete Barrier

BUILDING A

BUILDING B

5 STOREY
41 UNITS
AFFORDABLE
HOUSING

600mmØ

300mmØ

375mmØ

250mmØ

200mmØ

CONNECT TO EXISTING CAP
INV.=61.85

CONNECT TO EXISTING CAP
INV.=62.05

1.5m ASPHALT SIDEWALK

TF(REAR)=68.35
TF(FRONT)=68.35
TOS=65.56
USF(REAR)=65.05
USF(FRONT)=63.12

TF(REAR)=68.20
TF(FRONT)=68.20
TOS=65.41
USF(REAR)=64.90
USF(FRONT)=62.97

LIONEL-RHEO PRIVATE

EX.SANMH

EX.CB

EX. ASPHALT SIDEWALK

EX. EDGE OF PAVEMENT

EX.250mmØ STM

ST.JOSEPH BOULEVARD

N

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 1 : 500 (0 5 10 15 20)

DATE DEC 2021 | JOB 120237 | FIGURE FIG-5

SHT11X17.DWG - 279mmX432mm

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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 Hillside Commons development was determined to be 56.6 L/s. Refer to the Storm Drainage Area Plans (**120237-STM**).

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 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 runoff from extreme storm events that exceeds the available storage can be safely directed onto the adjacent roadway (Lionel-Rheo Private).

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	0.03	0.50	43%	0%	12.0	1
A2_1	0.0211	0.62	60%	0%	19.2	1
A2_2	0.0325	0.62	60%	0%	29.5	1
A3	0.023	0.74	77%	0%	52.3	1
A4	0.03	0.43	33%	0%	19.2	1
A5	0.035	0.40	29%	0%	25.0	1
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%	283.3	0.5
Uncontrolled Areas (Direct Runoff)						
U1	0.03	0.41	30%	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: $f(t) = f_c + (f_o - f_c)e^{-k(t)}$
Decay Coefficient: $k = 4.14$/hr
Initial infiltration rate: $f_o = 76.2$ mm/hr
Final infiltration rate: $f_c = 13.2$ mm/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

Three (3) of the catchbasins and the CBMH1 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	0.065	64.65	63.10	1.55	5.8	9.1
CB2	0.07	64.65	63.10	1.55	4.5	10.4
CB3	0.05	65.00	63.40	1.60	6.2	6.6
CBMH1	0.05	66.70	62.77	3.93	3.7	8.1
RYE1	-	69.50	63.72	-	-	-
RYT1	-	65.00	63.17	-	-	-
Trench Drain	-	67.30	64.30	-	-	-

**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	*56.6*	*56.6*	-
Minor System to Lionel-Rheo Private	25.8	43.1	45.6
Major System to Lionel-Rheo Private	0	0	31.1
Direct Runoff to St. Joseph Boulevard	5.9	13.4	16.6
Total Site Flows	**31.7**	**56.5**	**93.3**

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.

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	64.71	0.06	N	0.00	0
CB3	65.00	65.30	0.30	65.31	0.31	Y	0.01	17
CBMH1	66.70	67.00	0.30	66.10	0.00	N	0.00	0
RYE1	69.50	69.80	0.30	64.76	0.00	N	0.00	0
RYT1	65.00	65.00	0.00	64.76	0.00	N	0.00	0
Trench Drain	67.30	67.30	0.00	65.34	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 with storm and sanitary sewers and watermain. 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 and existing 250mm Lionel-Rheo Private watermain by 200mm watermain including on-site 200mm watermain between and inside the buildings. Once looped, the proposed onsite watermain can adequately service the site. An onsite 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:

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

Appendix A
Sanitary Sewer Design Sheets

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

NOVATECH
Engineers, Planners & Landscape Architects

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

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/Institional/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**

LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
100122737
Aug 23 2019
PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS

		UNITS					INDIVIDUAL		CUMULATIVE						PROPOSED SEWER					
FROM MH	TO MH	Single	Town	Apt Condo	Future Apt/Condo		Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)	PEAK FACTOR (M)	POPULATION FLOW (p) (L/s)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	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

Scenario	Demand	
	L/min	L/s
Average Daily Demand	112	1.87
Maximum Daily Demand	280	4.67
Peak Hour	616	10.27
Fire Flow Demand #1	6,300	105.00

Location

Results

Connection 1 – St. Joseph Blvd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	114.0	57.9
Peak Hour	109.2	51.1
Max Day plus Fire 1	109.4	51.4

Ground Elevation = 73.2 m

Connection 2 – Eric Czapnik Way

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	114.0	75.7
Peak Hour	109.2	68.9
Max Day plus Fire 1	104.8	62.7

Ground Elevation = 60.7 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

	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 - Zen	274.00		576.00	1.87	4.67	10.27
Total	274.00	0.00	576.00	**1.87**	**4.67**	**10.27**

Water Demand Parameters

Multi-Unit Residential Apartments	2.1	persons/unit
Residential Demand	280.0	L/c/day
Residential Max Day	2.5	x Avg Day
Residential Peak Hour	2.2	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 City of Ottawa Design Guidelines - Water Distribution 2010 (> 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 Coeffiecient
	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 Coeffiecient
	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**

TENTH LINE ROAD

+45.0m

12.5m

PROPOSED 5 STOREY BUILDING
819.45 sq.m

PROPOSED 9 STOREY APARTMENT BUILDING A
WITH 3 LEVELS OF UNDERGROUND PARKING

1,253.19 sq.m
FIRE FLOW DEMAND = 105 L/s

+45.0m

41 UNITS AFFORDABLE HOUSING

V&VB

13.6m

12.0m - 200mmØ WM

250mmØ WM

17.1m

PROPOSED 9 STOREY APARTMENT BUILDING B
WITH 3 LEVELS OF UNDERGROUND PARKING

997.41 sq.m
FIRE FLOW DEMAND = 105 L/s

+45.0m

ST. JOSEPH BOULEVARD

OHW

EX. 400mmØ WM

EX. STMMH

15.5m - 200mmØ WM

V&VB

CONNECTION TO EXISTING 400mmØ WATERMAIN. CONTRACTOR TO CONFIRM EXACT SIZE AND LOCATION AND REPORT ANY DISCREPANCIES TO ENGINEER

R1

EX. 250mmØ STM

BLOCK 5

BLOCK 4

250mmØ WM

1.8m ASPHALT SIDEWALK

24.3m

EX. 200mmØ WM

EX. STMMH

EX. 250mmØ STM

EX. STMMH

RECOLTE PVT

EX. 200mmØ WM

R2

G HILLSIDE TERRACE
DEVELOPMENT

LEGEND

- SITE BOUNDARY
- PROPOSED STORM SEWER AND DIRECTION OF FLOW
- PROPOSED SANITARY SEWER AND DIRECTION OF FLOW
- PROPOSED WATERMAIN
- V&VB — PROPOSED VALVE AND VALVE BOX
- HYD — PROPOSED HYDRANT
- PROPOSED RETAINING WALL
- 70.00 / *70.00* — PROPOSED ELEVATION / *EXISTING ELEVATION*
- 72.00TW / 70.50BW — PROPOSED TOP OF WALL ELEVATION / PROPOSED BOTTOM OF WALL ELEVATION
- STM MH — *EXISTING STORM MANHOLE AND SEWER*
- SAN MH — *EXISTING SANITARY MANHOLE AND SEWER*
- *EXISTING WATERMAIN*
- *R1* — *EXISTING RESERVOIR & ID NUMBER*
- 15.0m — OFFSET DISTANCE FROM BUILDINGS

N

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 1 : 500 (0, 5m, 10m, 20m)

DATE OCT 2021 | JOB 120237 | FIGURE FIG-1

SHT11X17.DWG - 279mmX432mm

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

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**				**7,000**
		F = 220 C (A)$^{0.5}$				
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

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

TENTH LINE ROAD

LIMITS OF SURVEY

1.8m CONC

ERIC CZAPNIK WAY

1.8m CONCRETE SIDEWALK

5 STOREY
41 UNITS
AFFORDABLE
HOUSING

LIONEL-RHEO PRIVATE

N1 N2 N3 N4 N5 N6

1 2 3 4 5 6 7

R1 R2

CONNECTION TO EXISTING
200mmØ WATERMAIN

CONNECTION TO EXISTING
400mmØ WATERMAIN

PROPOSED HYDRANT NODE
USED FOR FIREFLOW ANALYSIS

GHILLSIDE TERRACE
DEVELOPMENT

ST. JOSEPH BOULEVARD

LEGEND

- SITE BOUNDARY
- 7 EXISTING 200mm WATERMAIN
- 6 EXISTING 250mm WATERMAIN
- EXISTING 400mm WATERMAIN
- 6 PROPOSED 250mm WATERMAIN
- 2 PROPOSED 200mm WATERMAIN
- R1 EXISTING RESERVOIR AND ID NUMBER
- N2 PROPOSED NODE AND ID NUMBER
- N6 EXISTING 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

SCALE 1 : 750 (0 10 20 30)
DATE DEC 2021
JOB 120237
FIGURE XXX

SHT11X17.DWG - 279mmX432mm

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
N1	0	2.10	0	0.00	0.00	0.00
N2	102	2.10	214	0.69	1.74	3.82
N3	172	2.10	361	1.17	2.93	6.44
N4	0	2.10	0	0.00	0.00	0.00
N5	0	2.10	0	0.00	0.00	0.00
N6	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

Junction Report

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi	Max. Age Hours
Resvr R1 - StJoseph	114.0	-1.16	114.0	0	0.00	0.00	0
Resvr R2 - EricCzapnik	114.0	-0.70	114.0	0	0.00	0.00	0
Junc N1	72.1	0.00	114.0	41.9	411.04	59.62	0.08
Junc N2	67.6	0.69	114.0	46.4	455.18	66.02	0.27
Junc N3	63.0	1.17	114.0	51.0	500.31	72.56	1.61
Junc N4	62.5	0.00	114.0	51.5	505.22	73.28	2.08
Junc N5	64.6	0.00	114.0	49.4	484.61	70.29	1.17
Junc N6	64.4	0.00	114.0	49.6	486.58	70.57	0.46

Maximum Pressure
Maximum Age

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	1.16	0.04	0.02	0.047
Pipe 2	34.4	200	110	1.16	0.04	0.02	0.047
Pipe 3	36.0	200	110	0.47	0.02	0.00	0.054
Pipe 4	43.8	200	110	0.70	0.02	0.01	0.051
Pipe 5	46.5	250	110	0.70	0.01	0.00	0.054
Pipe 6	52.0	250	110	0.70	0.01	0.00	0.052
Pipe 7	64.5	200	110	0.70	0.02	0.01	0.051

Junction Report

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Resvr R1 - StJoseph	109.2	-6.42	109.20	0.00	0.00	0.00
Resvr R2 - EricCzapnik	109.2	-3.84	109.20	0.00	0.00	0.00
Junc N1	72.1	0.00	109.19	37.09	363.85	52.77
Junc N2	67.6	3.82	109.18	41.58	407.90	59.16
Junc N3	63.0	6.44	109.18	46.18	453.03	65.71
Junc N4	62.5	0.00	109.19	46.69	458.03	66.43
Junc N5	64.6	0.00	109.19	44.59	437.43	63.44
Junc N6	64.4	0.00	109.19	44.79	439.39	63.73

Minimum Pressure

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	6.42	0.20	0.39	0.037
Pipe 2	34.4	200	110	6.42	0.20	0.39	0.037
Pipe 3	36.0	200	110	2.60	0.08	0.07	0.042
Pipe 4	43.8	200	110	3.84	0.12	0.15	0.040
Pipe 5	46.5	250	110	3.84	0.08	0.05	0.041
Pipe 6	52.0	250	110	3.84	0.08	0.05	0.041
Pipe 7	64.5	200	110	3.84	0.12	0.15	0.040

MAXIMUM DAY + FIRE FLOW DEMAND AT N1

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi
Resvr R1 - StJoseph	109.4	-151.02	109.40	0.00	0.00	0.00
Resvr R2 - EricCzapnik	104.8	41.35	104.80	0.00	0.00	0.00
Junc N1	72.1	105	107.56	35.46	347.86	50.45
Junc N2	67.6	1.74	107.04	39.44	386.91	56.12
Junc N3	63.0	2.93	106.54	43.54	427.13	61.95
Junc N4	62.5	0.00	106.00	43.50	426.74	61.89
Junc N5	64.6	0.00	105.81	41.21	404.27	58.63
Junc N6	64.4	0.00	105.59	41.19	404.07	58.61

Minimum Pressure
Applied Fire Flow

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	151.02	4.81	135.40	0.023
Pipe 2	34.4	200	110	46.02	1.46	14.99	0.027
Pipe 3	36.0	200	110	44.28	1.41	13.96	0.028
Pipe 4	43.8	200	110	41.35	1.32	12.30	0.028
Pipe 5	46.5	250	110	41.35	0.84	4.15	0.029
Pipe 6	52.0	250	110	41.35	0.84	4.15	0.029
Pipe 7	64.5	200	110	41.35	1.32	12.30	0.028

MAXIMUM DAY + FIRE FLOW DEMAND SUMMARY

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)			Minimum Pressure			
Fire at Junction	Maximum Daily	Fire Flow	Max Day + Fire	(m)	kPa	psi	Node
N1	0.00	105.00	105.00	35.46	347.86	50.45	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

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	0.030	0.50	0.02	0.042	0.042	10.00		104.19		4.3	36.5	0.305	300	PVC	0.50	13.9	71.3	0.98	0.24	51%
						0.00	0.000	0.000	10.00														
						0.00	0.000	0.000	10.00														
	A2-2			0.033	0.62	0.02	0.057	0.099	10.00		104.19		10.3										
						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	0.137	10.00		104.19		14.3										
						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	0.350	10.00		104.19		36.5										
						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	0.608	10.24		102.96		62.6	93.9	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	0.793	10.24		102.96		81.6										
						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	0.829	10.24		102.96		85.3										
						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	0.876	10.24		102.96		90.2										
						0.00	0.000	0.000	10.24														
						0.00	0.000	0.000	10.24														
	A2-1			0.021	0.62	0.01	0.036	0.912	10.24		102.96		93.9										
						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:	
Revised:	
Revised:	
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

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Engineers, Planners & Landscape Architects

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**

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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**

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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**

TENTH LINE ROAD

EX. EDGE OF PAVEMENT
EX. CONCRETE SIDEWALK
Concrete Barrier
Concrete Barrier

BUILDING A

0.037 R-AP1 0.90
0.037 R-AP2 0.90
0.036 R-A1 0.90
0.033 R-A2 0.90
0.034 R-A3 0.90

BUILDING B

0.027 R-B1 0.90
0.028 R-B2 0.90
0.030 R-B3 0.90

5 STOREY
41 UNITS
AFFORDABLE
HOUSING

Asphalt

1.5m ASPHALT SIDEWALK

TF(REAR)=68,35
TF(FRONT)=68,35
TOS=65,56
USF(REAR)=65,05
USF(FRONT)=63,12

LIONEL-RHEO PRIVATE

TF(REAR)=68,20
TF(FRONT)=68,20

1.5m ASPHALT SIDEWALK

EX.SANMH
EX.SANMH
EX.SANMH

EX.CB
EX.CB
EX.250mmØ STM
EX.250mmØ STM

EX. ASPHALT SIDEWALK
EX. EDGE OF PAVEMENT
EX. EDGE OF PAVEMENT
EX. EDGE OF PAVEMENT

ST.JOSEPH BOULEVARD

EX. 250mmØ STM

N

LEGEND

CBMH	PROPOSED CATCHBASIN MANHOLE
CB1	PROPOSED CATCHBASIN
RYE1	PROPOSED REAR YARD ELBOW
RYT1	PROPOSED REAR YARD TEE
EX.CB	*EXISTING CATCHBASIN*
	SITE BOUNDARY
	SUBCATCHMENT AREA BOUNDARY
	PROPOSED STORM PIPE AND CAP
	EXISTING STORM PIPE

0.054 — DRAINAGE AREA (hectare)
A2 — AREA ID
CB2 — AREA OUTLET
0.90 — C-VALUE

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

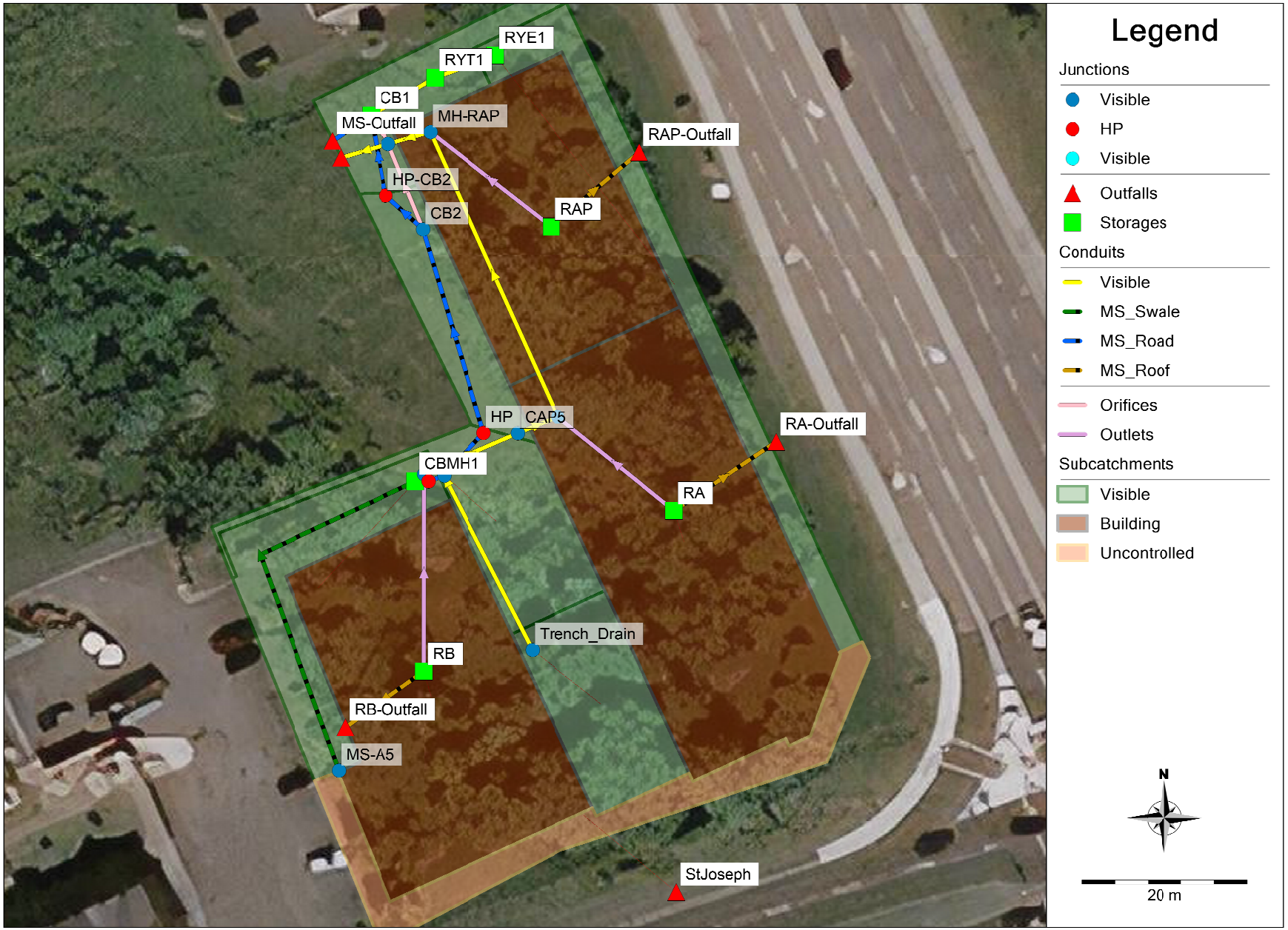
CITY OF OTTAWA
HILLSIDE COMMONS
ORLEANS TOWN CENTER

STORMWATER ROOFDRAIN AREA PLAN

SCALE 1 : 500 (0 5 10 15 20)
DATE DEC 2021
JOB 120237
FIGURE

SHT11X17.DWG - 279mmX432mm

M:\2020\120237\CAD\Design\Figures\STM\120237-STM-RoofDrainAreas.dwg, GR, Dec 23, 2021 - 1:01pm, bmcewen


RYE1
RYT1
CB1
MS-Cutfall
MH-RAP
RAP-Outfall
HP-CB2
CB2
RAP
HP
CAP5
RA-Outfall
CBMH1
RA
Trench_Drain
RB
RB-Outfall
MS-A5
StJoseph
Legend
Junctions
Visible
HP
Visible
Outfalls
Storages
Conduits
Visible
MS_Swale
MS_Road
MS_Roof
Orifices
Outlets
Subcatchments
Visible
Building
Uncontrolled
N
20 m

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Model Hydraulic Grade Line Elavations Output

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	64.77	-0.10	-0.12
CB2	63.10	64.65	64.71	64.77	-0.06	-0.12
CB3	63.40	65.00	65.31	65.31	-0.31	-0.31
CBMH1	62.77	66.70	66.10	66.71	0.60	-0.01
RYE1	63.72	69.50	64.76	64.79	4.74	4.71
RYT1	63.17	65.00	64.76	64.79	0.24	0.21
Trench Drain	64.30	67.30	65.34	65.36	1.96	1.94

HILLSIDE COMMONS
120237

NOVATECH
Engineers, Planners & Landscape Architects

Model Ponding Volumes Output

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	63.94	0.00	N	0.00	64.12	0.00	N	0.00	64.75	0.10	N	0.00	0	64.77	0.12	Y	0.02
CB2	64.65	64.75	0.10	63.78	0.00	N	0.00	63.90	0.00	N	0.00	64.71	0.06	N	0.00	0	64.77	0.12	Y	0.02
CB3	65.00	65.30	0.30	64.61	0.00	N	0.00	65.09	0.09	N	0.00	65.31	0.31	Y	0.01	17	65.31	0.31	Y	0.01
CBMH1	66.70	67.00	0.30	63.89	0.00	N	0.00	64.23	0.00	N	0.00	66.10	0.00	N	0.00	17	66.71	0.01	N	0.00
RYE1	69.50	69.80	0.30	63.94	0.00	N	0.00	64.12	0.00	N	0.00	64.76	0.00	N	0.00	0	64.79	0.00	N	0.00
RYT1	65.00	65.00	0.00	63.94	0.00	N	0.00	64.12	0.00	N	0.00	64.76	0.00	N	0.00	0	64.79	0.00	N	0.00
Trench Drain	67.30	67.30	0.00	64.61	0.00	N	0.00	65.09	0.00	N	0.00	65.34	0.00	N	0.00	0	65.36	0.00	N	0.00

HGL

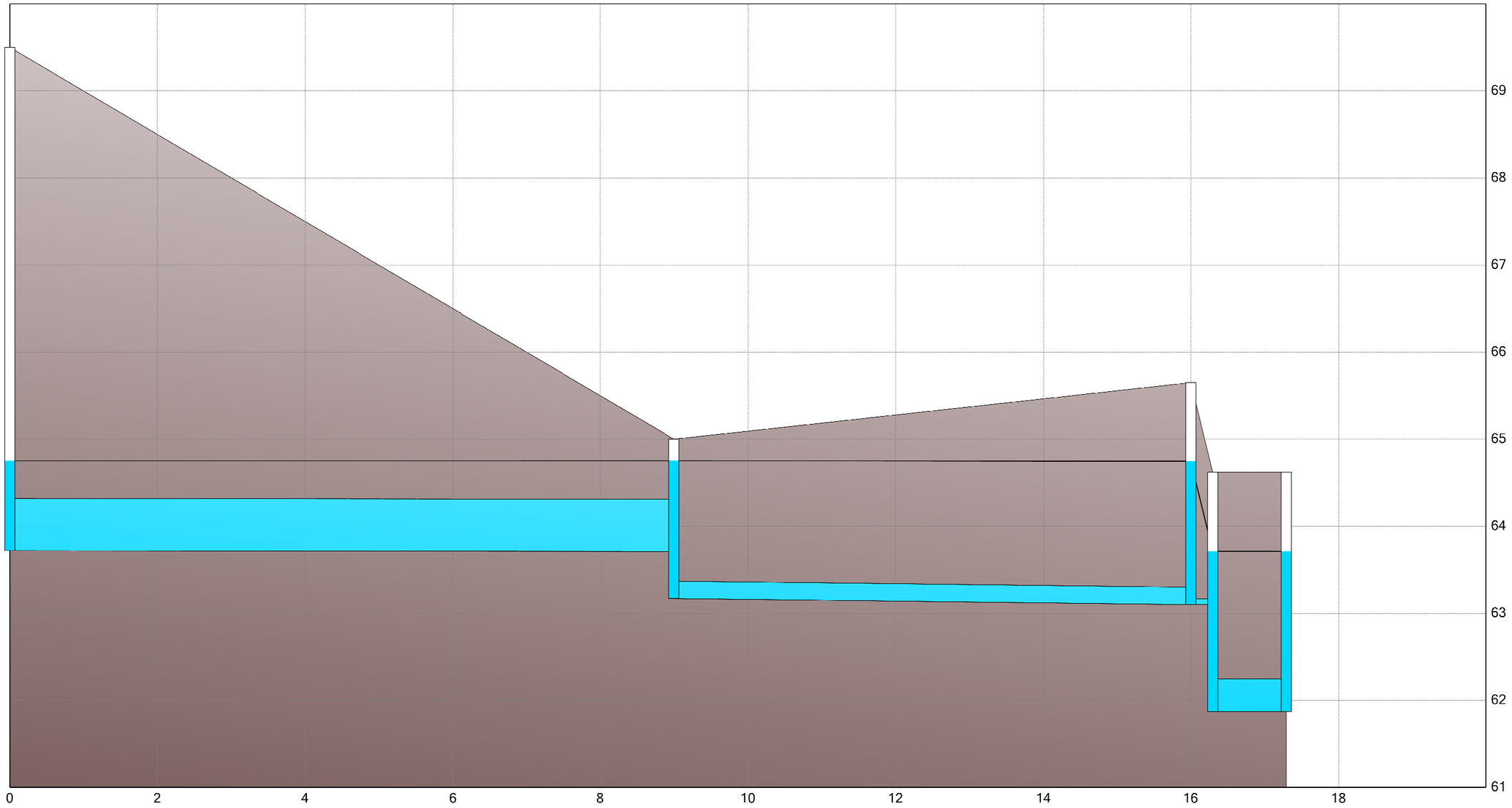
Peak values

Conduit RYE1-CB1
Flow = 10.79 L/s

Conduit 4
Flow = 9.36 L/s

Orifice O-CB1
Flow = 9.131 L/s

Conduit MH412A-Outfall-MH412A
Flow = 43.092 L/s



Storage RYE1
CWSEL = 64.75093 m
12/02/2021 02:15AM

Storage RYT1
CWSEL = 64.7526 m
12/02/2021 02:14AM

Storage CB1
CWSEL = 64.74715 m
12/02/2021 02:15AM

Junction MH412A
CWSEL = 63.71061 m
12/02/2021 02:14AM

Outfall Outfall-MH412A
CWSEL = 63.71 m
12/02/2021 12:01AM

HGL

Peak values

Orifice O-CBMH1
Flow = 8.119 L/s

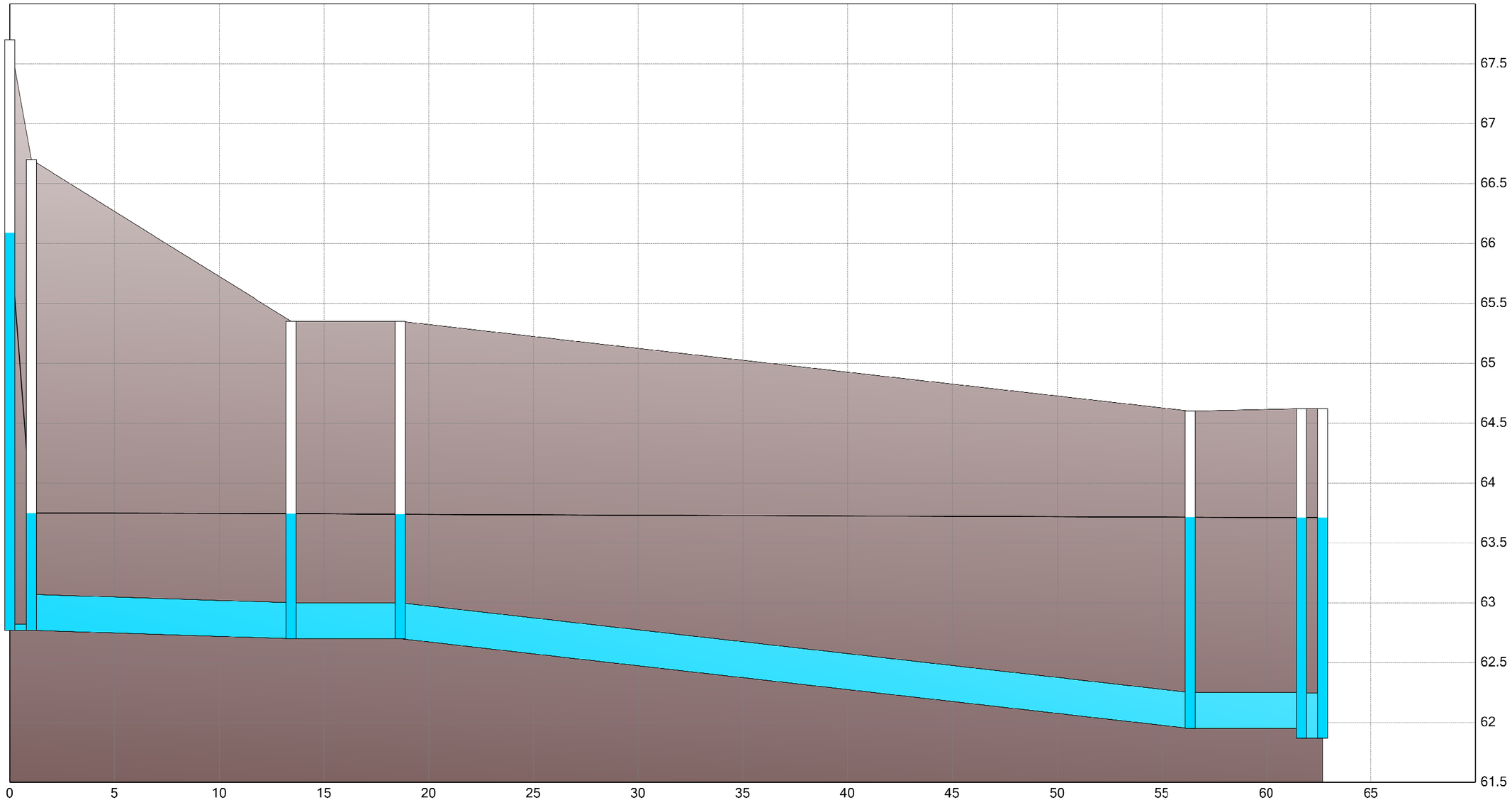
Conduit CBMH1-CAP5
Flow = 18.093 L/s

Conduit CAP5-MH-RA
Flow = 18.092 L/s

Conduit MH-RA-MH-RAP
Flow = 21.335 L/s

Conduit MH-RAP-MH412A
Flow = 23.537 L/s

Conduit MH412A-Outfall-MH412A
Flow = 43.092 L/s



Storage CBMH1
CWSEL = 66.08862 m
12/02/2021 02:14AM

Junction Dummy
CWSEL = 63.7489 m
12/02/2021 02:14AM

Junction CAP5
CWSEL = 63.74456 m
12/02/2021 02:14AM

Junction MH-RA
CWSEL = 63.73834 m
12/02/2021 02:14AM

Junction MH-RAP
CWSEL = 63.71377 m
12/02/2021 02:14AM

Junction MH412A
CWSEL = 63.71061 m
12/02/2021 02:14AM

Outfall Outfall-MH412A
CWSEL = 63.71 m
12/02/2021 12:01AM

Appendix D
Development Servicing Study Checklist

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. ROAD CATCHBASINS WITH SOLID COVER TO BE AS PER S19 SOLID COVER ALTERNATIVE.
8. ALL CATCHBASIN LEADS TO BE 200MM DIAMETER AND ALL REAR YARD CATCHBASIN LEADS TO BE 250MM DIAMETER, UNLESS OTHERWISE NOTED.
9. 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.
10. ALL PROPOSED FOUNDATION DRAINS SHALL BE CONNECTED TO STORM SEWER.
11. MANHOLE BENCHING SHALL FOLLOW MUNICIPALITY STANDARD DETAIL.FOR MANHOLES WITH CONNECTING PIPES 900mm OR LARGER.
12. SEWER TRENCHING AND BEDDING SHALL BE AS PER CLASS "B" BEDDING CITY OF OTTAWA STANDARD DRAWING S-7, UNLESS NOTED OTHERWISE. BEDDING SHALL BE COMPACTED TO MINIMUM 98% STANDARD PROCTOR DRY DENSITY. CLEAR STONE BEDDING SHALL NOT BE PERMITTED.
13. SANITARY SEWERS AND CONNECTIONS 150mmØ AND SMALLER TO BE PVC SDR 28.
14. SANITARY SEWERS AND CONNECTIONS 200mmØ AND LARGER TO BE PVC SDR 35 WITH TYPE "B" BEDDING THROUGHOUT EXCEPT AT RISERS, UNLESS OTHERWISE NOTED.
15. ALL STORM AND SANITARY SERVICES ARE TO BE THE SIZES INDICATED AND THE MATERIAL SHALL BE PVC DR-28 @ 1.0% MINIMUM SLOPE.
16. 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.
17. 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.
18. 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
19. 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 ALL SEWERS & APPURTENANCES.
20. FULL PORT BACKWATER VALVES ARE REQUIRED ON THE SANITARY SERIES INSTALLED AS PER THE MANUFACTURERS BUILDING; INSTALLED AS PER ST. DWG S14.
21. WATERTIGHT COVERS TO BE LOCATED WITHIN STORMWATER MANAGEMENT PONDING AREAS AS PER OPSD 401.030. REFER TO SANITARY AND STORM WATERTIGHT LID TABLES.

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 STANDARD DETAIL W-32. 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
- 97.35 — STATIC PONDING AREA AND SPILL DEPTH ELEVATION
- 98.45 / 97.25 — 1:100yr PONDING AREA AND ELEVATION / 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 / 815-813 / 0.81 / 89.1 — AREA ID; MANHOLE TO MANHOLE; POPULATION EQUIVALENT; AREA IN HECTARES
- SANITARY DRAINAGE AREA BOUNDARY
- 1.00 / 1 / 105-103 / 0.50 — DRAINAGE AREA (hectares); AREA IDENTIFICATION; MANHOLE TO MANHOLE; 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

NOTE:
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PRELIMINARY NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
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

LICENSED PROFESSIONAL ENGINEER — D. D. BLAIR — 100122737 — Dec 23 2021 — 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 10-STOREY APARTMENT BUILDING
ORLEANS TOWN CENTER

DRAWING NAME
NOTES, LEGENDS AND DETAILS

PROJECT No. 120237-00
REV REV # 1
DRAWING No. 120237-NLD

D07-12-21-0080

#18539

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TENTH LINE ROAD

EX. EDGE OF PAVEMENT

EX. CONCRETE SIDEWALK

Concrete Barrier

LS

LIGHT DUTY SILT FENCE AS PER O.P.S.D. 219.110

PROPERTY LINE

5 STOREY

PROPOSED 9 STOREY APARTMENT BUILDING (A) WITH ROOFTOP ACCESS AND 3 LEVELS OF UNDERGROUND PARKING

EX.TRAFFIC MH T/G=71.68

EX.CB

O UP

EX.SAN MH T/G=65.97

EX.SAN MH T/G=71.47

EX.SAN MH T/G=65.82

3:1

1% of Slope

EX. ASPHALT SIDEWALK

EX. EDGE OF PAVEMENT

ST.JOSEPH BOULEVARD

EX.CB

EX. CICB

MUD MAT

EX. CB T/G=64.85

1.5m ASPHALT SIDEWALK

TF(REAR)=68.35
TF(FRONT)=68.35
TOS=65.56
USF(REAR)=65.05
USF(FRONT)=63.12

PROPOSED 9 STOREY APARTMENT BUILDING (B) WITH 3 LEVELS OF UNDERGROUND PARKING

LIONEL-RHEO PRIVATE

TF(REAR)=68.20
TF(FRONT)=68.20
TOS=65.41
USF(REAR)=64.90
USF(FRONT)=62.97

LIGHT DUTY SILT FENCE AS PER O.P.S.D. 219.110

EX.SANMH

EX.SANMH

T/G=73.28

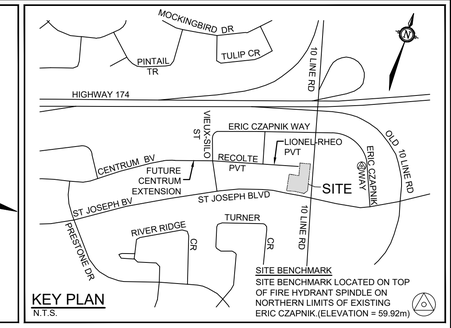
EX.SA

Asphalt

BY-C

AN

NORTH

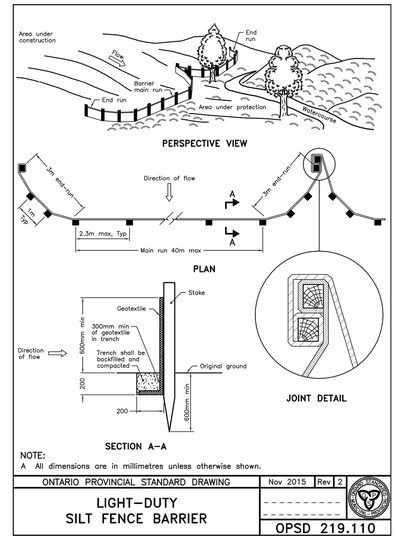


KEY PLAN
N.T.S.

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

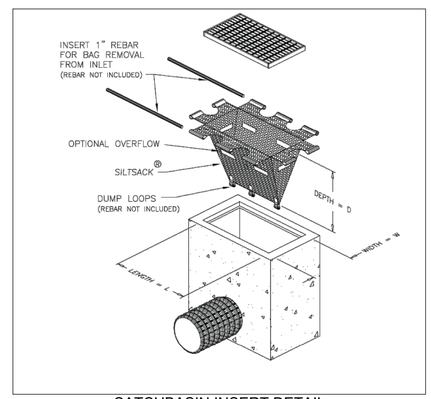
LEGEND

- SITE BOUNDARY
- MAXIMUM 3:1 SIDESLOPE
- PROPOSED CENTRELINE SWALE
- HYD PROPOSED HYDRANT LOCATION
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- EXISTING SANITARY MANHOLE
- EXISTING STORM MANHOLE
- EXISTING CATCHBASIN MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN MANHOLE INSERT
- PROPOSED CATCHBASIN INSERT
- PROPOSED SILT FENCE (SEE OPSD 219.110)
- PROPOSED MUD MAT

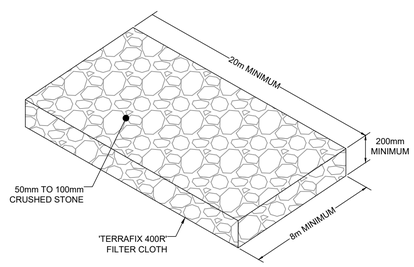


NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
LIGHT–DUTY SILT FENCE BARRIER		OPSD 219.110



CATCHBASIN INSERT DETAIL
N.T.S.



MUD MAT DETAIL
N.T.S.

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SCALE 1:250

1:250
0 2 4 6 8 10

DESIGN DDB
CHECKED DDB
DRAWN MTM
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CITY OF OTTAWA
HILLSIDE COMMONS
ORLEANS TOWN CENTER

DRAWING NAME
EROSION & SEDIMENT CONTROL PLAN

PROJECT No. 120237-00
REV REV # 1
DRAWING No. 120237-ESC

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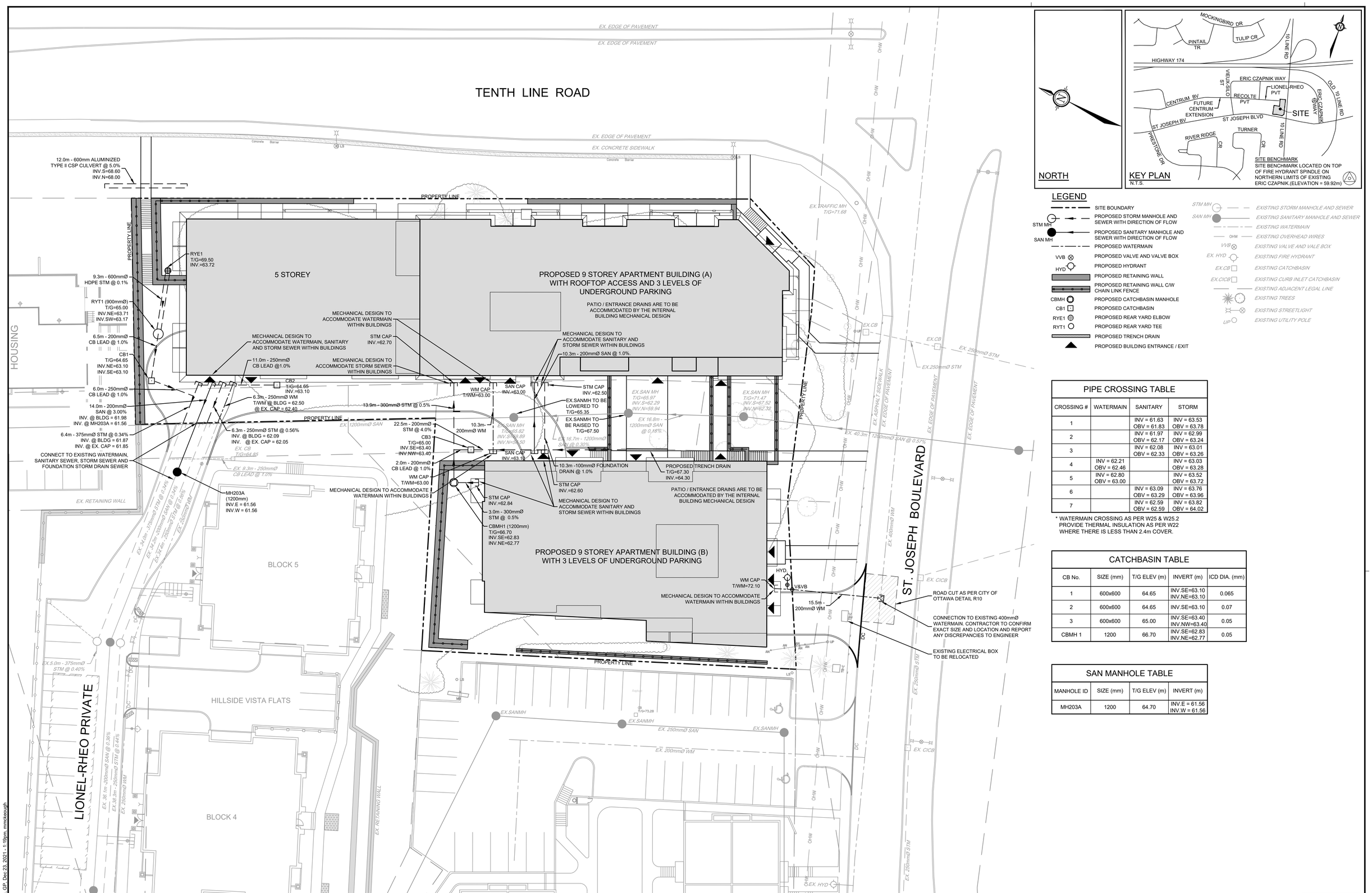
PLAN1 DWG - 24 hmm/594mm



LEGEND

- SITE BOUNDARY
- PROPOSED STORM MANHOLE AND SEWER WITH DIRECTION OF FLOW
- PROPOSED SANITARY MANHOLE AND SEWER WITH DIRECTION OF FLOW
- PROPOSED WATERMAIN
- PROPOSED VALVE AND VALVE BOX
- PROPOSED HYDRANT
- PROPOSED RETAINING WALL
- PROPOSED RETAINING WALL C/W CHAIN LINK FENCE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED REAR YARD ELBOW
- PROPOSED REAR YARD TEE
- PROPOSED TRENCH DRAIN
- PROPOSED BUILDING ENTRANCE / EXIT

- EXISTING STORM MANHOLE AND SEWER
- EXISTING SANITARY MANHOLE AND SEWER
- EXISTING WATERMAIN
- EXISTING OVERHEAD WIRES
- EXISTING VALVE AND VALE BOX
- EXISTING FIRE HYDRANT
- EXISTING CATCHBASIN
- EXISTING CURB INLET CATCHBASIN
- EXISTING ADJACENT LEGAL LINE
- EXISTING TREES
- EXISTING STREETLIGHT
- 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 = 62.21 OBV = 62.46		INV = 63.03 OBV = 63.28
5	INV = 62.80 OBV = 63.00		INV = 63.52 OBV = 63.72
6		INV = 63.09 OBV = 63.29	INV = 63.76 OBV = 63.96
7		INV = 62.59 OBV = 62.59	INV = 63.82 OBV = 64.02

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

CATCHBASIN TABLE

CB No.	SIZE (mm)	T/G ELEV (m)	INVERT (m)	ICD DIA. (mm)
1	600x600	64.65	INV.SE=63.10 INV.NE=63.10	0.065
2	600x600	64.65	INV.SE=63.10	0.07
3	600x600	65.00	INV.SE=63.40 INV.NW=63.40	0.05
CBMH 1	1200	66.70	INV.SE=62.83 INV.NE=62.77	0.05

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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1:250
0 2 4 6 8 10

DESIGN: DDB
CHECKED: DDB
DRAWN: MTM
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LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
100122737
DEC 27 2021
PROVINCE OF ONTARIO

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CITY OF OTTAWA
HILLSIDE COMMONS
ORLEANS TOWN CENTER

DRAWING NAME
GENERAL PLAN OF SERVICING

PROJECT No. 120237-00
REV # 1
DRAWING No. 120237-GP

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PLANA1.DWG - 841mmx594mm

TENTH LINE ROAD

EX. EDGE OF PAVEMENT

EX. CONCRETE SIDEWALK

SECTION OF EXISTING CONCRETE BARRIER TO BE REMOVED TO ALLOW ACCESS TO TENTH LINE SIDEWALK

12.0m - 600mm ALUMINIZED TYPE II CSP CULVERT
INV.S=68.60
INV.N=68.00

SEGMENTAL RETAINING WALL (GRANDE OR EQUIVALENT)

PROPERTY LINE

PROPOSED RETAINING WALL

SEGMENTAL RETAINING WALL (STONE STRONG OR EQUIVALENT)

RYT1 (900mmØ)
T/G=65.00

RYE1
T/G=69.50

5 STOREY

PROPOSED 9 STOREY APARTMENT BUILDING (A)
WITH ROOFTOP ACCESS AND 3 LEVELS OF
UNDERGROUND PARKING

CONCRETE STAIRS, RAMP AND LANDING C/W RAILINGS

EX. TRAFFIC MH
T/G=71.68

TOP OF LANDING=72.80
BOTTOM OF LANDING=71.90

CB1
T/G=64.65

CB2
T/G=64.65

UNDERGROUND PARKING LOT ENTRANCE P2

TOP OF RETAINING WALL TO BE RAISED TO 64.83m

EXISTING SANMH TOP TO BE LOWERED TO T/G=65.35

SEGMENTAL RETAINING WALL (GRANDE OR EQUIVALENT)

EXISTING SANMH TOP TO BE RAISED TO T/G=67.50

EX.SAN MH
T/G=65.97

TRANSFER
P1 A TO B

EX.SAN MH
T/G=71.47

CB3
T/G=65.00

CBMH1 (1200mm)
T/G=66.70

EX. CB
T/G=64.65

PROPOSED TRENCH DRAIN

PROPOSED 9 STOREY APARTMENT BUILDING (B)
WITH 3 LEVELS OF UNDERGROUND PARKING

1.5m ASPHALT SIDEWALK

SWALE @ 27.2%

SWALE @ 25.8%

SWALE @ 8.8%

SWALE @ 6.7%

SWALE @ 11.0%

TF(REAR)=68.35
TF(FRONT)=68.35
TOS=65.56
USF(REAR)=65.05
USF(FRONT)=63.12

SEGMENTAL RETAINING WALL (STONE STRONG OR EQUIVALENT)

UNDERGROUND PARKING LOT ENTRANCE P9

EXISTING UTILITY CABINET TO BE RELOCATED

EXISTING UTILITY POLE ANCHORS TO BE PROTECTED OR RESET AS REQUIRED. UTILITY POLE TO BE SUPPORTED IF REQUIRED FOR BUILDING EXCAVATION

SEGMENTAL RETAINING WALL (GRANDE OR EQUIVALENT)

ST.JOSEPH BOULEVARD

LIONEL-RHEO PRIVATE

ASPHALT SIDEWALK

TF(REAR)=68.20
TF(FRONT)=68.20
TOS=65.41
USF(REAR)=64.90
USF(FRONT)=62.97

EX.SANMH
EX.STMMH

EX. CB
EX. CICB
EX. ASPHALT SIDEWALK
EX. EDGE OF PAVEMENT

NORTH

KEY PLAN
N.T.S.

MOCKINGBIRD DR
PINTAIL TR
TULIP CR
10 LINE RD
HIGHWAY 174
ERIC CZAPNIK WAY
VIEUX SILO ST
LIONEL RHEO PVT
RECOLTE PVT
CENTRUM BV
FUTURE CENTRUM EXTENSION
ST JOSEPH BLVD
ST JOSEPH BV
TURNER
RIVER RIDGE CR
PRESTONE DR
OLD 10 LINE RD
SITE

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 VALVE AND VALVE BOX (V&VB)
- PROPOSED HYDRANT (HYD)
- PROPOSED RETAINING WALL
- PROPOSED RETAINING WALL C/W CHAIN LINK FENCE
- PROPOSED ELEVATION (70.00 / 70.40)
- PROPOSED TOP OF WALL ELEVATION (72.00TW)
- PROPOSED BOTTOM OF WALL ELEVATION (70.50BW)
- EXISTING SWALE ELEVATION (66.75(S))
- PROPOSED SWALE
- PROPOSED VALVE AND VALVE BOX (VVB)
- PROPOSED HYDRANT (HYD)
- PROPOSED CATCHBASIN MANHOLE (CBMH)
- PROPOSED CATCHBASIN (CB1)
- PROPOSED REAR YARD ELBOW (RYE1)
- PROPOSED REAR YARD TEE (RYT1)
- PROPOSED TRENCH DRAIN
- PROPOSED BUILDING ENTRANCE / EXIT
- DIRECTION OF MAJOR OVERLAND FLOW ROUTE
- STATIC PONDING AREA AND SPILL DEPTH ELEVATION (97.30)
- EXISTING VALVE AND VALE BOX (VVB)
- EXISTING FIRE HYDRANT (EX. HYD)
- EXISTING CATCHBASIN (EX.CB)
- EXISTING CURB INLET CATCHBASIN (EX.CICB)
- EXISTING ADJACENT LEGAL LINE
- EXISTING TREES
- EXISTING STREETLIGHT
- EXISTING UTILITY POLE (UP)
- EXISTING STORM MANHOLE (STM MH)
- EXISTING SANITARY MANHOLE (SAN MH)

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

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

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

DESIGN DDB
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APPROVED DDB

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LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
100122737
Dec 23 2021
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
GRADING PLAN

PROJECT No. 120237-00
REV REV # 1
DRAWING No. 120237-GR

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PLAN-T.DWG - 24 Trans.SM.mm

TENTH LINE ROAD

ST. JOSEPH BOULEVARD

5 STOREY

AREA A2
BLDG4 - CAP
0.28 | 361

PROPOSED 9 STOREY APARTMENT BUILDING (A)
WITH ROOFTOP ACCESS AND 3 LEVELS OF
UNDERGROUND PARKING

AREA A1
BLDG8 - BLDG4
0.22 | 214

PROPOSED 9 STOREY APARTMENT BUILDING (B)
WITH 3 LEVELS OF UNDERGROUND PARKING

SAN CAP
INV.= 61.98

14.0m - 200mmØ
SAN @ 3.0%

10.3m - 200mmØ
SAN @ 1.0%

SAN CAP
INV.= 63.00

SAN CAP
INV.=63.10

EX. 16.7m - 1200mmØ
SAN @ 0.30%.

EX.SAN MH
T/G=65.97
INV.S=62.29
INV.N=59.94

EX.SAN MH
T/G=71.47
INV.S=67.52
INV.N=62.32

EX. 1200mmØ SAN

EX.SAN MH
T/G=65.82
INV.S=59.89
INV.N=56.50

EX. 16.8m - 1200mmØ SAN
@ 0.16%

EX. 40.3m - 1200mmØ SAN @ 0.57%

MH203A
INV.E = 61.56
INV.W = 61.56

EX. RETAINING WALL

EX. 34.4m - 450mmØ SAN @ 0.45%

BLOCK 5

HILLSIDE VISTA FLATS

EX. 36.1m - 200mmØ SAN @ 0.98%

BLOCK 4

EX. RETAINING WALL

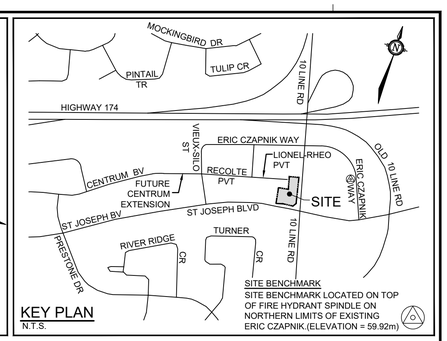
EX.SANMH

EX.SANMH

EX. 250mmØ SAN

EX.SANMH

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
- EXISTING 200mm SANITARY MANHOLE AND SEWER (EX. SAN MH)
- EXISTING 1200mm SANITARY MANHOLE AND SEWER (EX. SAN MH)
- PROPOSED SANITARY MANHOLE AND SEWER WITH DIRECTION OF FLOW (SAN MH)
- SANITARY AREA DRAINAGE BOUNDARY
- AREA ID (AREA A1)
- FLOW PATH (BLDG8 - BLDG4)
- POPULATION (214)
- DRAINAGE AREA (hectare) (0.22)

NOTE:
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APPROVED DDB

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LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
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CITY OF OTTAWA
HILLSIDE COMMONS
ORLEANS TOWN CENTER

DRAWING NAME
SANITARY DRAINAGE AREA PLAN

PROJECT No. 120237-00
REV REV # 1
DRAWING No. 120237-SAN

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PLEASE PLOT USING - 84 mm x 594 mm

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

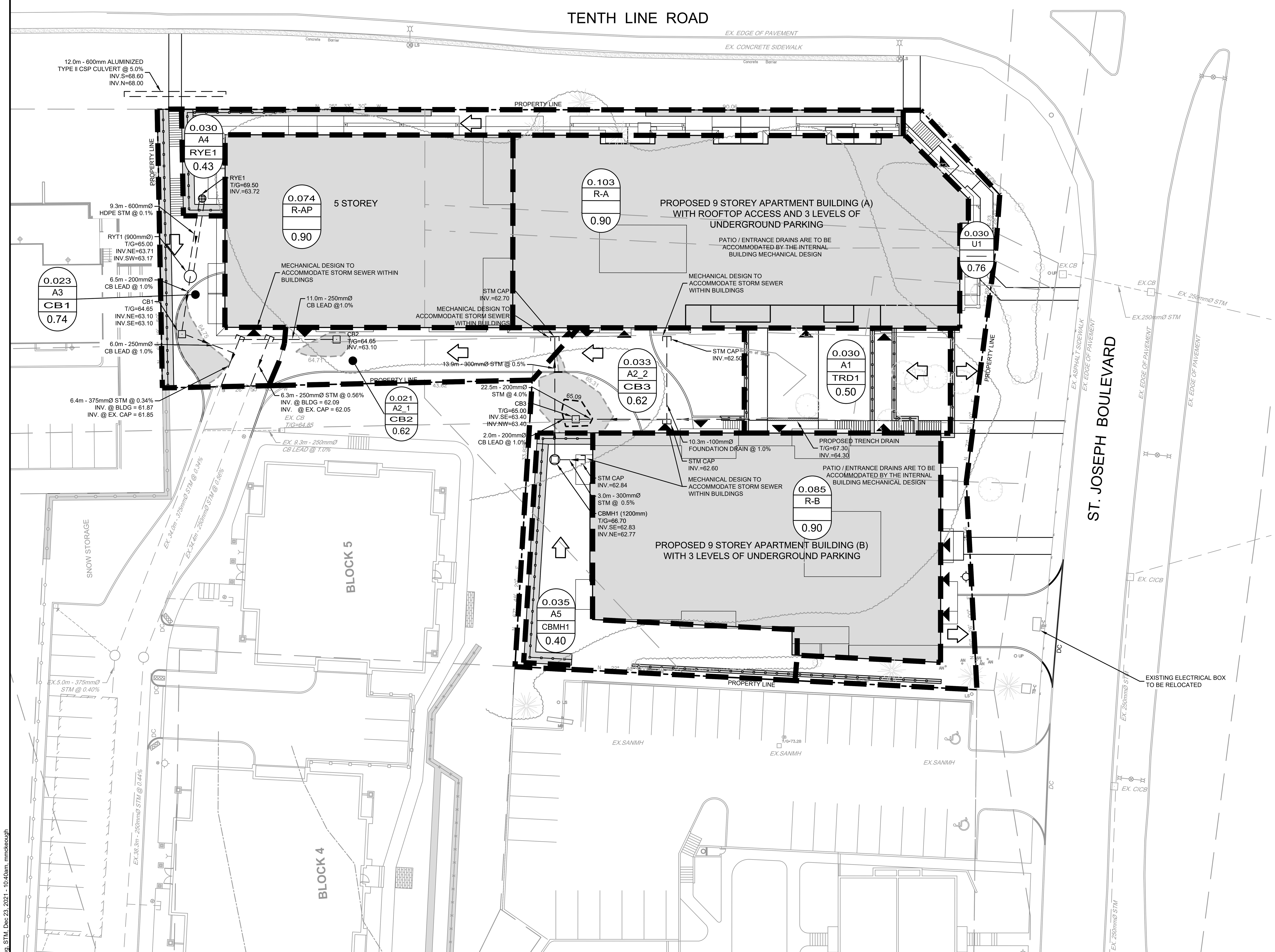
Building B Tower Roof Drain Calculations Summary

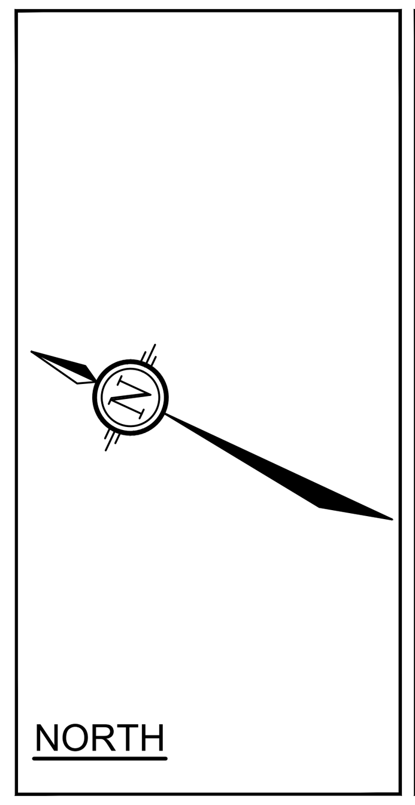
5-Year

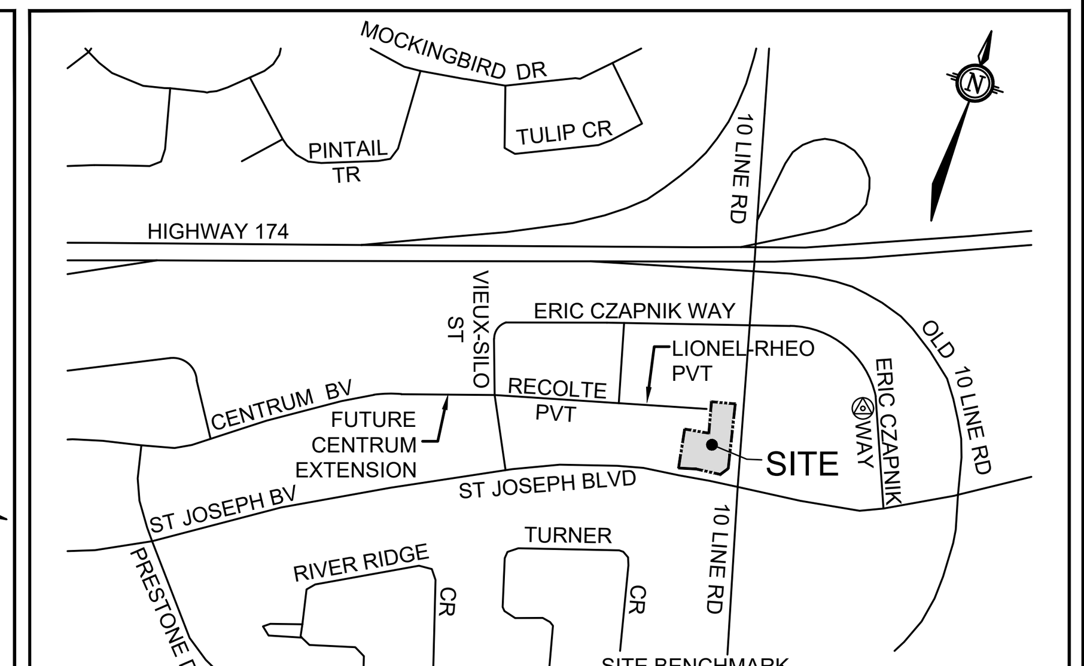
Area ID	Static Ponding Area (m^2)	Drainage Area (ha)	Runoff Coef. (5-year)	Time-of-Conc. (min)	Rainfall Intensity mm/hr	Uncontrolled Peak Flow (L/s)	Roof Drain Flow Control System	Setting	Controlled Peak Flow (L/s)	Flow Depth (m)	Storage Required (m^3)	Storage Available (m^3)
R-B1	271.3	0.027	0.90	10.00	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







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
- 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
- 1:100yr PONDING AREA AND ELEVATION
- 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) 63.94
		5yr	(0.00) 64.12
		100yr	(0.10) 64.75
		Static	(0.10) 64.75
		100yr + 20%	(0.12) 64.77
CB2	64.65	2yr	(0.00) 63.78
		5yr	(0.00) 63.90
		100yr	(0.06) 64.71
		Static	(0.10) 64.75
		100yr + 20%	(0.12) 64.77
CB3	65.00	2yr	(0.00) 64.61
		5yr	(0.09) 65.09
		100yr	(0.31) 65.31
		Static	(0.30) 65.30
		100yr + 20%	(0.31) 65.31
CBMH1	66.70	2yr	(0.00) 63.89
		5yr	(0.00) 64.23
		100yr	(0.00) 66.10
		Static	(0.30) 67.00
		100yr + 20%	(0.01) 66.71
RYE1	69.50	2yr	(0.00) 63.94
		5yr	(0.00) 64.12
		100yr	(0.00) 64.76
		Static	(0.30) 69.80
		100yr + 20%	(0.00) 64.79
RYT1	65.00	2yr	(0.00) 63.94
		5yr	(0.00) 64.12
		100yr	(0.00) 64.76
		Static	(0.00) 65.00
		100yr + 20%	(0.00) 64.79
TRENCH DRAIN	63.70	2yr	(0.00) 64.61
		5yr	(0.00) 65.09
		100yr	(0.00) 65.34
		Static	(0.00) 67.30
		100yr + 20%	(0.00) 65.36

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

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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 # 1
DRAWING No. 120237-STM