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Engineers, Planners & Landscape Architects

Engineering

- Land/Site Development
- Municipal Infrastructure
- Environmental/ Water Resources
- Traffic/ Transportation
- Recreational

Planning

- Land/Site Development
- Planning Application Management
- Municipal Planning
- Urban Design
- Expert Witness (LPAT)
- Wireless Industry

Landscape Architecture

- Streetscapes & Public Amenities
- Open Space, Parks & Recreation
- Community & Residential
- Commercial & Institutional
- Environmental Restoration

910 March Road

Serviceability Report

910 MARCH ROAD
OTTAWA, ONTARIO

SERVICEABILITY REPORT

Prepared by:

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

January 26, 2023

Ref: R-2022-212
Novatech File: 121186

NOVATECH
Engineers, Planners & Landscape Architects

January 26, 2023

City of Ottawa
Planning and Growth Management Department
110 Laurier Avenue West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: Alison Hamlin – Manager, Development Review West

Re: 910 March Road
Serviceability Report
Our File No.: 121186

Please find enclosed the complete pdf copy of the above noted report dated January 26, 2023. This report is submitted in support of the Zoning Amendment Application.

If you have any questions, please contact the undersigned.

Yours truly,

NOVATECH

Cara Ruddle, P.Eng.
Senior Project Manager, Land Development Engineering

cc: Pascale Lépine, Lépine Corporation

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List of Appendices

1.0. INTRODUCTION

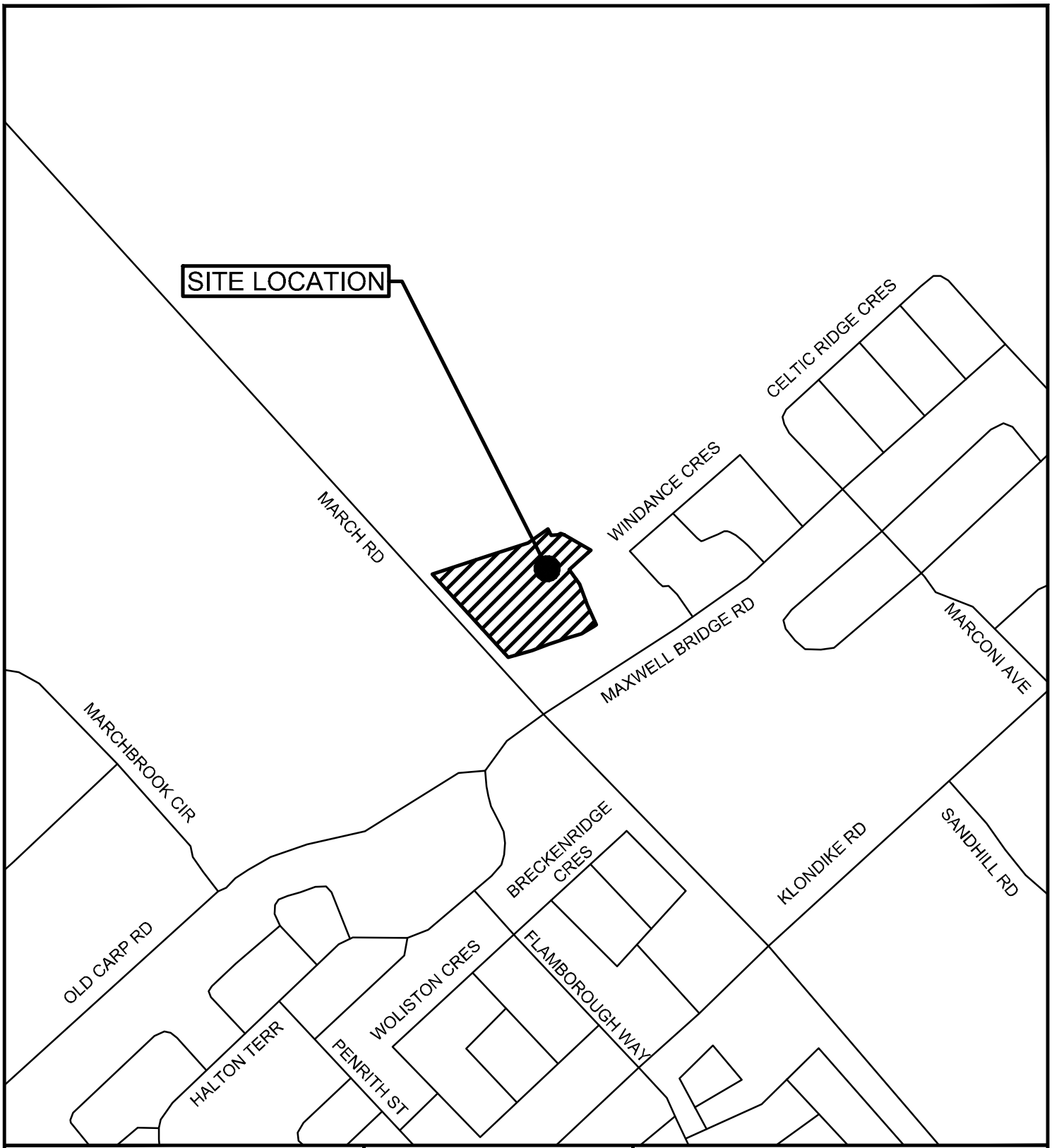
Novatech has been retained by Lépine Corporation to review the servicing for a proposed development at 910 March Road within the City of Ottawa to support a Zoning By-Law Amendment Application. ***Figure 1*** is a Key Plan showing the site location. The purpose of this report is to demonstrate that the proposed development can be serviced with the existing municipal infrastructure surrounding the property.

2.0. EXISTING DEVELOPMENT

The property is approximately 2.72 hectares in size and there are currently 4 storage buildings and several sea containers within the site area. It is our understanding that previously the site included two residences with multiple barns and sheds which are now abandoned. The site is bound by March Road to the west, farmland to the north, an existing residential subdivision to the east, and a commercial property to the south. The topography of the site is relatively flat however it generally slopes to the existing Shirley's Brook tributaries along the north (Tributary 3), south (Tributary 4), and east (Tributary 2) property lines. ***Figure 2*** shows the existing site conditions and topography.

3.0. PROPOSED DEVELOPMENT

It is proposed to construct an apartment complex with commercial spaces on the ground level. The development will include 391 residential housing units and 521 m^2 of commercial space. The development will have two direct pedestrian accesses, a primary entrance along March Road and a secondary entrance leading from the central landscaped courtyard. Vehicular access to the site is provided with an entrance from March Road to a small surface parking lot, an entrance to underground parking and a roundabout drop off area by the central courtyard area. The proposed development has a multi-level building layout with a maximum height of 9 stories above grade level. **Figure 3** shows the proposed site plan.



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

910 MARCH RD

KEY PLAN

SCALE		
N.T.S		
DATE	JOB	FIGURE
JAN 2023	121186	1

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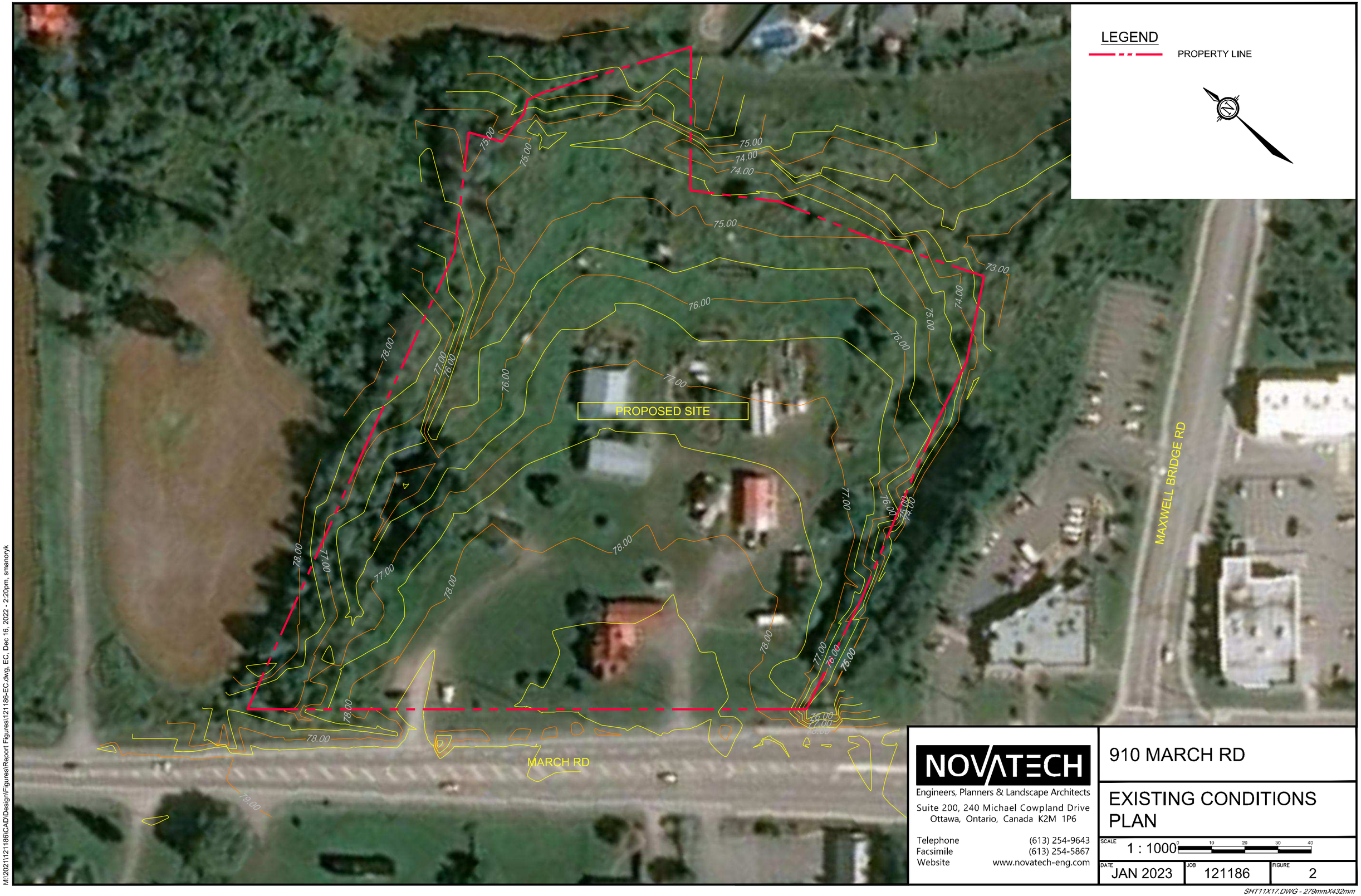

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Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

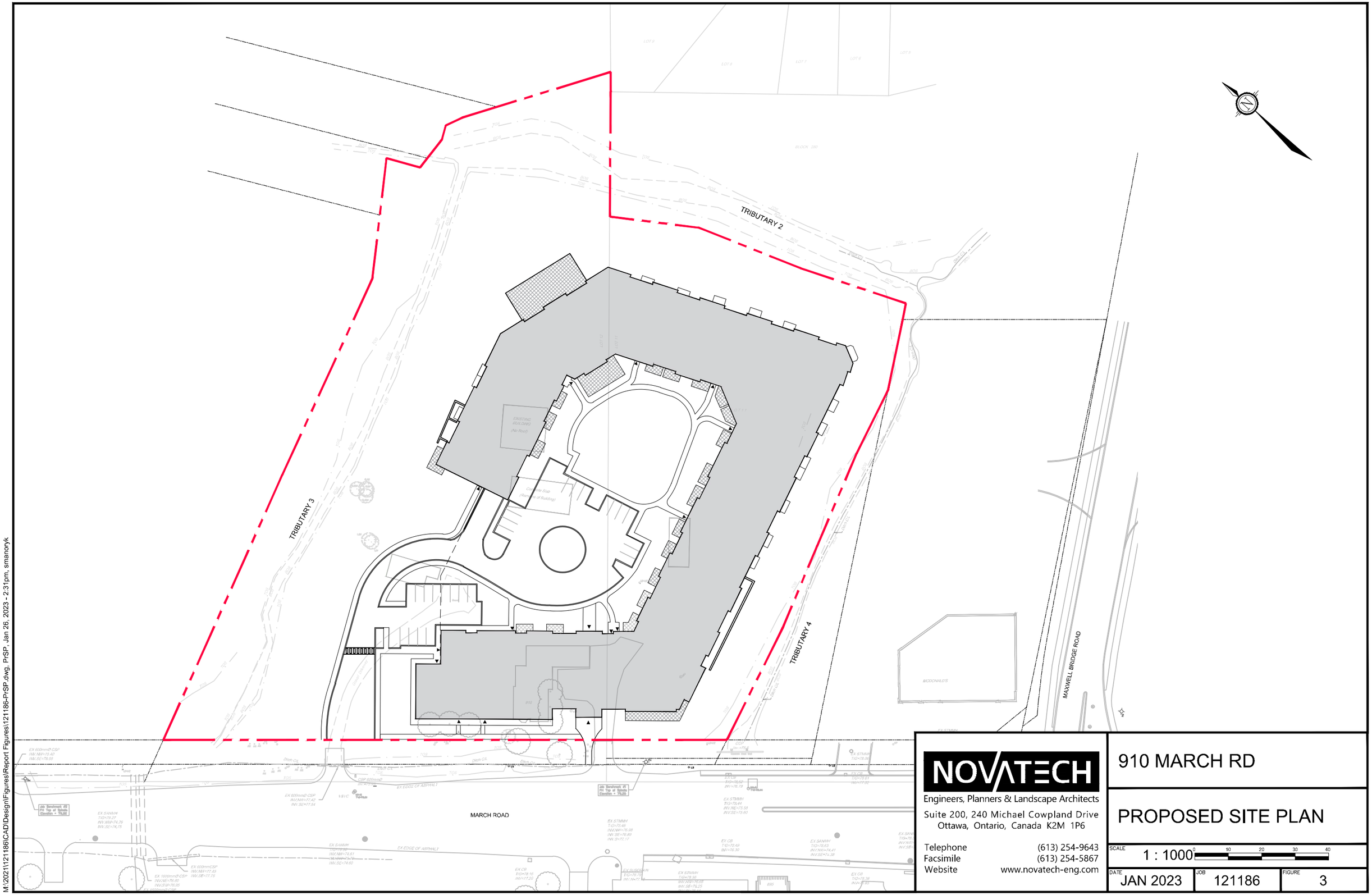
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

910 MARCH RD

EXISTING CONDITIONS PLAN

SCALE 1 : 1000 (0 10 20 30 40)

DATE JAN 2023 | JOB 121186 | FIGURE 2



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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

910 MARCH RD

PROPOSED SITE PLAN

SCALE 1 : 1000 (0, 10, 20, 30, 40)

DATE	JOB	FIGURE
JAN 2023	121186	3

SHT11X17.DWG - 279mmX432mm

4.0. SITE CONSTRAINTS

There are numerous site constraints noted in various reports that may affect the development and engineering design of the subject development. These constraints are shown on **Figure 4 – Preliminary Constraints Plan**. This drawing also shows a preliminary developable area which is the combination of all constraints present on the site. It is understood that this developable area requires approval by the MECP, City of Ottawa, and MVCA. The site constraints are as follows:

A geotechnical investigation was completed by Paterson Group Inc. and a report prepared entitled 'Geotechnical Investigation, Proposed Mixed Use Development, 910 March Road, Ontario' dated November 30, 2021. The report included the following recommendations.

- Bedrock was encountered between 2 and 10m below existing grade.

- During construction, groundwater volumes pumped could be between 50,000 to 400,000 L/day or greater. Therefore, it may be required to register on the Environmental Activity and Sector Registry (EASR) or obtain a Permit To Take Water. However, the construction will be managed such that groundwater pumping will be minimized to be maintained under the 50,000L/day threshold.

- A stable slope allowance is not required for the Subject Site as the slopes were determined to be stable under static and seismic conditions. Also, a Toe Erosion and Erosion Access Allowance is not required for the watercourses as there were no signs of active erosion and flow from the creek was observed to be minimal.

An 'Environmental Impact Statement, Zoning By-Law Amendment, 910 March Road, Ottawa, Ontario' was prepared by Gemtec dated December 2022 (Gemtec EIS Report). This report supersedes a 'Combined Environmental Impact Statement & Tree Conservation Report' prepared by McKinley Environmental Solutions dated June 2020. The Gemtec EIS Report identifies a number of constraints that may impact development. The constraints are described briefly below.

- Watercourse Tributaries – The subject site is bounded on three sides by watercourse tributaries to Shirley's Brook, Tributary 2 to the east, Tributary 3 to the north and Tributary 4 to the south and a setback is required along each tributary. The Gemtec EIS Report recommends a minimum setbacks of 20m measured from the centreline of the watercourse for Tributaries 2 and 3 and a setback of 10m from top of slope for Tributary 4. The setback area shall remain undisturbed and is to be left in a natural state.

- Turtle Habitat – Tributary corridors 2 and 3 are considered by the MECP to be Category 2 Blanding's Turtle Habitat with the full site area considered by the MECP to be Category 3 Blanding's Turtle habitat. Field studies conducted by Gemtec identified that Tributary 4 does not contain suitable Blanding's turtle habitat. A 20m setback from the centreline of the watercourse along Tributary 2 and 3 are recommended so that an overall 40m corridor is provided along the tributaries for turtle habitat. Additional on-site environmental enhancements and compensation measures will be determined in consultation with the MECP through the Overall Benefit Permit process.

LEGEND

- Site Boundary (AOV Survey, Dated January 17, 2022)
- Water Course Centreline (AOV Survey, Dated January 17, 2022)
- Bottom of Slope / Top of Bank (AOV Survey, Dated January 17, 2022)
- Top of Slope (AOV Survey, Dated January 17, 2022)
- 20m from Centreline of Watercourse (AOV Survey, Dated January 17, 2022)
- 10m from Top of Slope (AOV Survey, Dated January 17, 2022)
- ANTICIPATED Floodplain - NOVATECH (Interpolated from KANATA NORTH COMMUNITY DESIGN PLAN dated May 2016)
- 1:100 Floodplain - MVCA (Interpolated from MVCA Mapping dated December 6, 2017)
- 15m from Top of Slope
- MEANDER BELT LIMIT (Approximated from Shirley's Brook and Watts Creek Subwatershed Study, Dillon 1999)
- 30m from Top of Bank - Assumed Normal High Water (AOV Survey, Dated January 17, 2022 - Bottom of Slope)
- CATEGORY 2 BLANDING'S TURTLE HABITAT (WITHIN WITH PROPERTY BOUNDARY, 30m radius)
- CATEGORY 3 BLANDING'S TURTLE HABITAT (WITHIN WITH PROPERTY BOUNDARY, 250m radius)
- PRELIMINARY DEVELOPABLE AREA

NOTE:
DEVELOPABLE AREA IS THE COMBINATION OF ALL CONSTRAINTS. ANY DEVIATION TO INCREASE THE DEVELOPABLE AREA MUST BE APPROVED BY MECP, CITY OF OTTAWA AND MVCA.

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

910 MARCH ROAD

PRELIMINARY CONSTRAINTS PLAN

SCALE 1 : 1000 (0, 10, 20, 30, 40)
DATE JAN 2023
JOB 121186
FIGURE 4

SHT11X17.DWG - 279mmX432mm

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Additional site constraints are noted as follows:

- Floodplain – The 100-year floodplain for tributaries 2 and 3, obtained from MVCA mapping, is another site constraint. Note all floodplain areas associated with the tributaries are captured within the recommended setbacks. Development is to occur outside the floodplain area and any storage of stormwater needs to be above the 100-year floodplain elevation. However, as indicated in the Kanata North Community Design Plan (KNCDP) prepared by Novatech dated June 2016, the floodplain is anticipated to change due the overall stormwater management design and multiple stormwater management ponds proposed as part of the Kanata North Urban Expansion Area (KNUEA) development. Both floodplain lines are shown on **Figure 4**. No development is proposed in either the existing or anticipated floodplain.

- Meander Belt - The Environmental Management Plan (EMP) of KNCDP completed a fluvial geomorphological analysis of Shirley's Brook and its tributaries with respect to the KNUEA development to determine appropriate meander belt widths along the Tributaries 2 and 3. The meander belt limits are shown on **Figure 4**. Tributary 4 does not require a meander belt limit since it is considered an open drain or ditch lacking in natural geomorphic features (as noted in the KNCDP EMP).

5.0. WATER SERVICING

The existing development was previously serviced by a private well and septic systems. However, the subject property is within the City of Ottawa 2W pressure Zone. It is proposed that this development connect to the existing 400mm diameter watermain in the March Road right-of-way that was installed as part of the Kanata North Urban Expansion development.

Water demand and fire flow calculations have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines. The required fire demand was calculated using the Fire Underwriters Survey (FUS) Guidelines using assumptions on building construction and setback requirements. The water demands were calculated for a population of 700 from a total of 390 units based on the following criteria:

Water Demands:

- Average Daily Demand = 280 L/capita/day
- Average Apartment Population = 1.8 Person/Unit
- Maximum Daily Demand = 2.5 x Average Daily Demand
- Peak Hour Demand = 2.2 x Maximum Daily Demand
- Fire Flow = Fire Underwriters Survey (FUS)

Preliminary water demand and fire flows are summarized in ***Table 5.1*** below and supporting calculations are provided in ***Appendix B***. Refer to **Figure 5** which shows the existing and proposed servicing for the subject development.

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

910 MARCH ROAD

CONCEPTUAL GRADING AND SERVICING PLAN

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

DATE JAN 2023 | JOB 121186 | FIGURE 5

SHT11X17.DWG - 279mmX432mm

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Table 5.1 Water Demand Summary

Use	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
Mixed Use	2.27	5.67	12.48	150

The above water demand information was submitted to the City of Ottawa for boundary conditions provided from the City's water model. The boundary conditions will determine whether the existing watermain infrastructure surrounding the development has capacity for the proposed development. The boundary conditions are provided in **Table 5.2**.

Table 5.2 Water Boundary Conditions

Criteria	Head (m)	Pressure (psi)
Connection #1 to Existing 406mm Watermain March Road (Ground Elevation = 78.9m)		
Maximum HGL	131.0	74.0
Peak Hour	125.9	66.8
Max Day + Fire Flow	123.9	64.0
Connection #2 to Existing 406mm Watermain March Road (Ground Elevation = 78.9m)		
Maximum HGL	131.0	74.0
Peak Hour	125.9	66.8
Max Day + Fire Flow	123.9	64.0

These boundary conditions were used to analyze the performance of the watermain for three theoretical conditions: 1) High Pressure check under Average Day conditions, 2) Peak Hour demand, and 3) Maximum Day + Fire Flow demand. The following **Table 5.3** summarizes the results from the hydraulic water analysis.

Table 5.3 Water Analysis Results Summary

Condition	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)[1]
Connection #1 to Existing 406mm Watermain March Road (Ground Elevation = 78.9m)			
High Pressure	2.27	80psi (Max)	78.2
Peak Hour	12.48	40psi (Min)	71.0
Max Day + Fire Flow	155.67	20psi (Min)	68.1
Connection #2 to Existing 406mm Watermain March Road (Ground Elevation = 78.9m)			
High Pressure	2.27	80psi (Max)	78.2
Peak Hour	12.48	40psi (Min)	71.0
Max Day + Fire Flow	155.67	20psi (Min)	68.1

[1]Pressures based on a P1 FFE of 76.00m

Based on the proceeding analysis it can be concluded that the watermain, as designed, will provide adequate flow and pressures for the fire flow + maximum day demand and peak hour demand. There are existing fire hydrants along March Road that will provide fire protection for the proposed development. Refer to **Appendix B** for hydraulic calculations, a sketch showing existing hydrant locations and City of Ottawa boundary conditions.

As per the City of Ottawa Technical Bulletin ISDTB-2014-02, the proposed development will require two service connections since the average day demand for the proposed development is greater than 50 cubic meters of water. Therefore, two 150mm diameter water services are proposed to service the building and will connect to the existing 406mm diameter watermain within the March Road right-of-way. The two services will be separated by an isolation valve within the existing watermain system in the event that maintenance is required on the City's system. In the average day (high pressure) condition, water pressures approach the 80psi threshold, therefore pressure reducing valves will be required on both service connections. Refer to **Figure 5** Conceptual Grading and Servicing Plan for the water servicing information.

6.0. SANITARY SERVICING

As indicated previously, the existing development was serviced by an existing septic system. There is an existing 600mm diameter sanitary trunk sewer along March Road fronting the proposed development which was constructed as part of the Kanata North Urban Expansion Area (KNUAE). It is proposed to service the development by connecting a 200mm diameter service to this existing sanitary trunk sewer within the March Road right-of-way.

A Master Servicing Study for the Kanata North Community Design Plan (KNCDP) was developed by Novatech in 2016. Excerpts from this report can be found within **Appendix C**. This specific site area is not included in the sanitary drainage area, however the site is tributary to Drainage Area MR-3. The KNCDP sanitary design sheets indicate that the 600mm diameter trunk sewer that is fronting the proposed development has a residual capacity of 92 L/s.

Sanitary flows for the proposed development are calculated from criteria in Section 4 of the City of Ottawa Sewer Design Guidelines. The sanitary flow demands were calculated for a population of 700 and a total commercial space of 521 m² using the following criteria:

- Average Daily Flow = 280 L/capita/day
- Residential Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Commercial/ Institutional Peaking Factor = 1.5
- Peak Extraneous Flows (Infiltration) = 0.33 L/s/ha

The peak sanitary design flow including infiltration was calculated to be **8.04 L/s**. Detailed sanitary flow calculations are provided in **Appendix C** for reference.

As indicated previously, given that this is a new sanitary trunk sewer along March Road, with a residual capacity of 92 L/s, it is anticipated that there will be no capacity concerns by connecting to this sewer.

7.0. STORM SERVICING & STORMWATER MANAGEMENT

The topography of the site is relatively flat with a general slope to Tributary 2 at the eastern property boundary. Stormwater currently sheet flows to the Shirley's Brook tributaries along the property boundaries. There are currently no storm sewers or structures within the March Road ROW servicing the site. Refer to **Appendix D** for a portion of the existing City Sewer Mapping included as reference.

It is proposed to service the proposed development with a private storm sewer system that will outlet to Tributary 2. Where possible, storm water will also sheet drain to the surrounding tributaries similar to existing conditions. Refer to **Figure 5** for the Conceptual Servicing and Grading Plan.

Stormwater management criteria for the subject development was provided by the City as part of the August 18th, 2021 Pre-Consultation Meeting (meeting notes provided in **Appendix A**), and is as follows:

- Onsite storm runoff, in excess of the allowable release rate, must be detained on site up the 100-yr storm.
- The pre-development runoff coefficient or a maximum 'C' of 0.5, whichever is less is to be used to calculate an allowable release rate for the site.
- A calculated time of concentration or 10 minutes, whichever is greater is to be used in calculating the allowable release rate for the site.
- IDF curves derived from MacDonald Cartier Airport are to be used in calculations.

Preliminary stormwater management calculations were completed for the proposed development and the 2-yr, 5-yr, and 100-yr storm event release rates for the site were calculated to be **97.8, 132.7, 227.3 L/s** respectively. Quantity control of stormwater will be required for the proposed development. Based on preliminary grading the site has been divided into stormwater drainage areas and the stormwater conceptual design is described for the various drainage areas subsequently. Refer to **Appendix D** which includes a Post-Development Drainage Area Plan.

Along the perimeter of the property (areas B1, B2 and B3), between the proposed building and existing tributaries, stormwater will sheet drain away from the edge of building to the existing tributary. Similarly, along the frontage adjacent to March Road, stormwater sheet drains away from the building and will be collected in a swale and outlet to Tributary 4. There is minimal change to the runoff coefficient in these areas and the stormwater will sheet drain and/or travel along a grassed swale, therefore, quality control of stormwater is not required for these drainage areas.

Stormwater from the remainder of the site will be over-controlled to account for the uncontrolled release of stormwater along the site perimeter areas. Stormwater from the building roof will be collected in roof drains and stored within an underground storage tank located at the rear of the building. Similarly, stormwater from the internal courtyard area will be collected and directed to the rear underground storage tank with an orifice control device to control the release rate. Stormwater from roof areas is deemed as clean and therefore does not require quality control. Stormwater from the courtyard area will sheet drain across grassed areas to the deck drains, and therefore also does not require quality control.

Stormwater from the front entrance road and surface parking area will be collected in catchbasins and deck drains and directed to a second stormwater storage tank adjacent to the parking garage entrance ramp. The release of stormwater will be controlled by weir/orifice control devices and will outlet from the storage tank and into an Oil Grit Separator unit for quality control.

During storms in excess of the 100-year storm event, site grading will provide an overland flow route to Tributary 3 for the internal courtyard area and surface parking areas. **Figure 5** Conceptual Grading and Servicing Plan shows the preliminary conceptual grading design including major overland flow route.

In summary, the proposed storm sewer infrastructure can service the proposed development and appropriate stormwater management methods can be used to meet the allowable release rate. Refer to **Table 7.2** below for the post-development stormwater management summary, and **Appendix D** for preliminary stormwater management calculations and pre and post development drainage area figures.

Table 7.2 Post-Development Stormwater Management Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Outlet Location		2 Year Storm Event			5 Year Storm Event			100 Year Storm Event		
					Orifice	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)
A1	0.400	0.90	1.00	Tributary 2	N/A	7.7	N/A	61.0	10.5	N/A	81.6	13.8	N/A	174.8
A2	0.910	0.90	1.00	Tributary 2	N/A	27.7	N/A	114.3	37.4	N/A	153.7	40.6	N/A	363.9
B1	0.260	0.35	0.41	Sheet Flow	N/A	19.4	N/A	0.0	26.4	N/A	0.0	53.1	N/A	0.0
B2	0.250	0.28	0.34	Sheet Flow	N/A	14.9	N/A	0.0	20.3	N/A	0.0	42.2	N/A	0.0
B3	0.470	0.28	0.33	Sheet Flow	N/A	28.1	N/A	0.0	38.1	N/A	0.0	77.7	N/A	0.0
Total						**97.8**			**132.7**			**227.3**		**538.7**
Allowable						**97.8**			**132.7**			**227.3**		

8.0. EROSION AND SEDIMENT CONTROL MEASURES

Temporary erosion and sediment control measures will be required on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks will be placed in existing catchbasins and manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
- Mud mats will be installed at the site entrances;
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

The erosion and sediment control measures will be required prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be undertaken

9.0. CONCLUSIONS AND RECOMMENDATIONS

The conclusions of this report are as follows:

- Water servicing, including both domestic and fire protection, can be provided by connection to the existing 400mm diameter watermain within the March Road right-of-way.
- Sanitary servicing can be provided from the existing 600mm diameter sanitary trunk sewer within the March Road right-of-way. This sewer has excess capacity to accommodate flows from the proposed development.
- Storm servicing can be provided for the proposed development. Quantity control of stormwater is provided within underground storage tanks with orifice control devices controlling the release of stormwater to the allowable release rates.
- Quality control of stormwater will be provided for the proposed site though the installation of an oil grit separator unit. Quality control is not provided for developed areas where the drainage is limited to roof and landscape drainage.
- An overland flow route will be provided to from the proposed site to Tributary 3.
- Erosion and sediment control measures will be required during construction.

The preceding report is respectfully submitted for review and approval. Please contact the undersigned should you have any questions or require additional information.

NOVATECH

Prepared by:

Spencer Manoryk
Project Engineer
Land Development Engineering

Reviewed by:

Cara Ruddle, P.Eng.
Senior Project Manager
Land Development Engineering

APPENDIX A
City Correspondence

File Number: PC2021-0280
August 18, 2021

Pre-Consultation Meeting Notes

Site Address: 910 March Road
Location: Virtual - Microsoft Teams
Meeting Date: August 18, 2021

Attendees: Colette Gorni – Planner, City of Ottawa
Molly Smith – Planner, City of Ottawa
Santosh Kuruvilla – Project Manager (Infrastructure), City of Ottawa
Josiane Gervais – Project Manager (Transportation), City of Ottawa
Mark Young – Planner (Urban Design), City of Ottawa
Jeff Goettling – Planner (Parks), City of Ottawa
Matthew Hayley – Planner (Environmental), City of Ottawa
Jeffrey Ren – Co-op Student, City of Ottawa
Erica Ogden – MVCA
Francis Lepine – Lepine Corporation
Pascale Lepine – Lepine Corporation
Bruno St. Jean – Neuf Architects
Jack Stirling – The Stirling Group
Greg Winters – Novatech
Kayla Blakely – Novatech
Cara Ruddle – Novatech
Robin Marinac – CGH Transportation
Christopher Gordon – CGH Transportation

Regrets: Mark Richardson – Planning Forester, City of Ottawa
Mike Russett – Planner (Parks), City of Ottawa
Sami Rehman – Planner (Environmental), City of Ottawa
Mike Giampa – Project Manager (Transportation), City of Ottawa

Applicant Comments:

1. The commercial development that was previously proposed is no longer being considered; Lepine has purchased the site and is now proposing a mixed-use development
2. The March Road corridor is expected to support higher building heights and the draft new Official Plan designates the site as ‘Mainstreet Corridor’
3. Lepine is proposing a mid-rise mixed-use building that is stepped from two to seven storeys; commercial space on the ground floor will be oriented along March Road; parking for the development will be predominantly underground

4. Tributaries of Shirley's Brook are found along the perimeter of the site; 20m setbacks are proposed for Tributary 2 and 3 with a smaller setback proposed for Tributary 4 to the south; the setback will be buffered by a natural zone
5. Existing residential neighbourhoods are located a significant distance away from the development given the proposed setbacks
6. Two new accesses, a new right-in access and a new full movement access, are proposed to be obtained off of March Road
7. A GM Zone, consistent with what adjacent properties along March Road, will be sought to permit the proposed development
8. The applicants have reached out to Councillor Sudds and Councillor El-Chantiry

Planning

1. Major Zoning By-law Amendment and Site Plan Control (Complex) applications are required to permit the proposed development. As there have already been applications submitted for the previous proposal, the owner has the following options for moving forward:
    a. Withdraw existing applications and resubmit new applications. The applicant would be entitled to a refund of 33.3% of the planning component of the application fee and 100% of the legal component of the application fee. Fees and forms for new applications can be found here. Please note that each planning application fee will be reduced by 10 per cent if two or more applications are submitted at the same time and for the same lands.
    b. Continue with existing applications and pay a re-circulation fee of $4,070.00 for each application. Due to the scope of changes to the proposal, the application would need to be re-circulated to surrounding property owners and new signs posted on site. Please note that the site plan recirculation fee can be paid at the time of registration, but the rezoning recirculation fee will need to be paid at the time of resubmission (instructions for payment to be provided following resubmission).
        - Please note that new affidavits will be required with the resubmission, as there has been a change in ownership on the site.
        - As required, all required plans and studies need be updated to reflect the new proposal.
2. Please ensure that the submission considers appropriate Official Plan policies that are applicable at the time of the submission of the application:

a. If a complete application is received by no later than the day before the new Official Plan is adopted (October 2021), it will be processed on the basis of existing Official Plan policy provided it is consistent with the 2020 Provincial Policy Statement.

b. Applications received after the day before the new Official Plan is adopted (October 2021), will be reviewed and evaluated on the basis of the policies of the new Official Plan, which is consistent with the 2020 Provincial Policy Statement.

3. Please consider opportunities for connections to existing path networks.
4. Cash-in-lieu of parkland and associated appraisal fee will be required as a condition of approval as per the Parkland Dedication By-law.
5. You are encouraged to contact Councillor Eli El-Chantiry, at Eli.El-Chantiry@ottawa.ca, and Councillor Jenna Sudds at Jenna.Sudds@ottawa.ca to discuss the revised proposal.

Please contact Colette Gorni, Planner, at Colette.Gorni@ottawa.ca if you have any questions or require additional information relating to the comments above.

Urban Design

1. A design brief is required. Please see attached terms of reference.
2. The introduction of a mix of uses, and the provision of commercial use at grade is appreciated as it is not required in this location.
3. Efforts to eliminate the front yard parking abutting March Road should be utilized. This may require parking in support of the commercial uses on the east side of this building wing. This will also address the lack of an adequate throat length for the access point to March Road.
4. Consider breaking the building into two. If a link is required, this should be glazed and allow for visibility and connectivity from the inner courtyard to the open space beyond.
5. Consideration should be given to massing options which minimize the impact of the four-storey component on the low-rise residential to the east. Consideration should be given to switching the location of the four-storey wing with the one-storey link.
6. The Lobby space for Building B should be a through Lobby configuration with direct frontage on March Road.
7. Consider a private pedestrian loop for residents along the perimeter of the site abutting the open space lands/feature. This pathway could include connections to outdoor residential terraces.

8. The architectural treatment of the buildings should include a clearly defined podium or base of 2-3 storeys. The materiality should include the use of noble materials for the base of the building such as masonry.

9. Is outdoor at-grade amenity space proposed at grade? It is recommended that this be provided, and the area should serve as a link between the indoor amenity and open space beyond.

Please contact Mark Young, Planner (Urban Design), at Mark.Young@ottawa.ca if you have any questions or require additional information relating to the comments above.

Engineering

1. The Servicing Study Guidelines for Development Applications are available at the following link: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

2. Record drawings and utility plans are available for purchase from the City's Information Centre. Contact the City's Information Centre by email at informationcentre@ottawa.ca or by phone at (613) 580-2424 x44455.

3. Stormwater quantity control criteria – The post-development release rate is to be controlled to the pre-development release rate for all storms (2-yr up to 100-yr). The release rate is to be computed using the lesser of C=0.5 or existing and the Tc computed but no less than 10 minutes.

4. The subject property has been included in the overall sanitary sewer drainage area plan associated with the 600mm diameter trunk sanitary sewer to be constructed on March Road from Shirley's Brook Drive north to the future Street to service the Kanata North Urban Expansion Area. The sanitary sewer release rate shall be restricted to the allocations set in the above noted sanitary sewer drainage area plan and associated sanitary sewer design sheet. Construction of the 600mm diameter trunk sanitary sewer is anticipated to be complete at the end of the 2021 construction season. It is encouraged to combine construction efforts when developing the subject site to limit road cuts on March Road.

5. To service the Kanata North Urban Expansion area, a 400mm diameter watermain will also be extended up March Road from Maxwell Bridge Road to future Street 1. The subject site can connect to this future watermain. Construction of the 400mm watermain is anticipated to be complete at the end of the 2021 construction season. It is encouraged to combine construction efforts when developing the subject site to limit road cuts on March Road.

6. When basic water demand is greater than 50 cu. m. per day (about 50 homes), the site shall be connected with a minimum of two feeder mains to avoid the

creation of a vulnerable service area (see section 4.3 of the latest City of Ottawa Water Distribution Guideline).

7. Stormwater quality control criteria– Consult with the Conservation Authority (MVCA) for their requirements. Include the correspondence with MVCA in the stormwater/site servicing report.
8. As per the City of Ottawa Slope Stability Guidelines for Development Applications an engineering report is required for any retaining walls proposed 1.0 m or greater in height within the subject site that addresses the global stability of the wall and provides structural details. A Retaining Wall Stability Analysis Report and Retaining Wall Structural Details are required to be provided from a Professional Engineer licensed in the Province of Ontario that demonstrates the proposed retaining wall structure has been assessed for global instability as per City standards. Please ensure the analysis and required documentation are provided as part of the submission to address this comment.
9. Emergency routes will need to be satisfactory to Fire Services. Please show fire routes on the site plan. For information regarding fire route provisions, please consult with Kevin Heiss at kevin.heiss@ottawa.ca.
10. Clearly show and label the property lines on all sides of the property.
11. Clearly show and label all the easements (if any) on the property, on all plans.
12. When calculating the post development composite runoff coefficient (C), please provide a drawing showing the individual drainage area and its runoff coefficient.
13. When using the modified rational method to calculate the storage requirements for the site, the underground storage should not be included in the overall available storage. The modified rational method assumes that the restricted flow rate is constant throughout the storm which, in this case, underestimates the storage requirement prior to the 1:100-year head elevation being reached. Alternately, if you wish to include the underground storage, you may use an assumed average release rate equal to 50% of the peak allowable rate. Otherwise, disregard the underground storage as available storage or provide modeling to support the design.
14. Engineering plans are to be submitted on standard A1 size (594mm x 841mm) sheets.
15. Phase 1 ESA and Phase 2 ESA must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
16. Provide the following information for water main boundary conditions:
    a. Location map with water service connection location(s).

b. Average daily demand (l/s).

c. Maximum daily demand (l/s).

d. Maximum hourly demand (l/s).

e. Fire flow demand (provide detailed fire flow calculations based on Fire Underwriters survey (FUS) Water Supply for Public Fire Protection). Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF).

f. Hydrant capacity shall be assessed to demonstrate the RFF can be achieved. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

17. If you are proposing any exterior light fixtures, all must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a table showing the fixture types (including make, model, part number), and the mounting heights must be included on a plan.

18. As per Ottawa Sewer Design Guideline section 4.4.4.7, a monitoring maintenance hole shall be required just inside the property line for all non-residential and multi residential buildings connections from a private sewer to a public sewer. See the sewer use By-law 2003-514(14) monitoring devices for details.

19. Please contact Santosh Kuruvilla, Infrastructure Project Manager, at Santosh.Kuruvilla@ottawa.ca if you have any questions or require additional information relating to the comments above.

Environmental Planning

1. Please be aware that all of the Shirley's Brook (including both the branch and tributary) is identified as banding's turtle habitat and that habitat by definition is 30 m from edge of wetland/watercoures and an additional 240 m of what is called category 3 habitat. However, the Kanata North CDP is proposing a reduced habitat protection area of 20 metres based on a proposed Endangered Species Act approval from MNRF/MECP. Similarly, for the subject site at 910 March, it may be possible to receive a reduced habitat protection area from MECP but that

will require an application under the ESA and compensation as per MECP requirements. MECP approval will be required prior to approval of development.

2. The site is subject to the Shirley's Brook & Watt's Creek Sub-watershed Study (1999) and Kanata North EMP (2001), both require 15 m setback from the top of bank for the Shirley's Brook branch and the tributary. It is adjacent to the KNUEA but not part of it, so any compensation for habitat needs to be worked out with MECP.

3. EIS – An Environmental Impact Statement is required, which shall comply with the Environmental Impact Statement Guidelines. The EIS will need to identify the limit of development based on the environmental attributes of the watercourses. The watercourse to the south will require a minimum 15 m setback from top of bank, the watercourse to the east and north will require a 30 m setback from normal highwater mark, floodplain or geotechnical limit which ever is greater. The northern watercourse is not located along the property line, the setback is to the watercourse highwater mark and not the property boundary and the watercourse cannot be moved.

4. Bird-safe development – Given the height of the proposal (mid to high rise) the proposal will need to review and incorporate bird safe design elements. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans .

Please contact Matthew Hayley, Environmental Planner, at Matthew.Hayley@ottawa.ca if you have any questions or require additional information relating to the comments above.

Transportation

1. Follow Traffic Impact Assessment Guidelines

    a. A full TIA is required. Please submit a Scoping report at your earliest convenience.

    b. Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package and/or monitoring report (if applicable).

    c. The proposed traffic signal on March Road will trigger an RMA. Request base mapping asap. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)

d. An update to the *TRANS Trip Generation Manual* has been completed (October 2020). This manual is to be utilized for this TIA. A copy of this document can be provided upon request.

2. Signalized intersection:

    a. The City has concerns with signalizing this access and operations along March Road. Specifically, queuing and blocking of existing intersections along March Road. The TIA needs to address these concerns.

    b. Should the applicant wish to pursue a proposed signal, the developer will be responsible for the construction and maintenance cost of the intersection.

    c. The applicant must be aware that although the BRT on March Road is not listed on the Affordable Network of the TMP, when and if this infrastructure is constructed, the full movement access to the site will not be supported. As such, this signalized intersection is considered throw-away.

    d. The intersection may need to be fully protected, the specifics of the design will be reviewed as part of the RMA process.

    e. A signalized intersection in this location will impact the proposed subdivision to the west at 927 March Road (Application # D07-16-20-0034) as a right-in/right-out access was proposed at this location. Please coordinate with this applicant, a singe RMA for the intersection would be preferred.

3. ROW protection on March Rd between urban area limit and Terry Fox is 44.5m (Note: Subject to unequal widenings outlined in March Road ESR). Confirm this ROW protection is provided.

4. Clear throat requirements for >200 apartments on an arterial is 40m.

5. Corner clearances should follow minimum distances set out within TAC Figure 8.8.2.

6. 936 March Road and Street 1 is a nearby DC intersection.

7. TMP includes:

    a. Transit Priority Measures (Isolated) along March Road (2031 Affordable Concept)

    b. BRT (at-grade crossings) along March Road (2031 Network Concept)

    c. March Road widening (2031 Network Concept)

    d. Spine Route along March Road (Cycling Network)

8. Consider providing a connection to the cycling path at the rear of the site (this would require a crossing of the watercourse, therefore environmental constraints would need to be considered).

9. On site plan:

    a. Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.

    b. Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.

    c. Turning movement diagrams required for internal movements (loading areas, garbage).

    d. Show all curb radii measurements; ensure that all curb radii are reduced as much as possible

    e. Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)

    f. Sidewalk is to be provided along property frontage.

    g. Sidewalk is not to be continuous across controlled intersection (if signalized) as per City Specification 7.4.

    h. Show slope of garage ramp on site plan. Note that underground ramps should be limited to a 12% grade and must contain a subsurface melting device when exceeding 6%. Ramp grades greater than 15% can be psychological barriers to some drivers.

    i. Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.

    j. Parking stalls at the end of dead-end parking aisles require adequate turning around space. Ensure this is provided.

    k. Grey out any area that will not be impacted by this application.

10. As the proposed site is mixed-use and accessible to the general public, AODA legislation applies. Consider using the City's Accessibility Design Standards as a reference for AODA requirements.

11. Noise Impact Studies required for the following:

    a. Road

b. Stationary, due to the proximity to neighboring exposed mechanical equipment and/or if there will be any exposed mechanical equipment due to the proximity to neighboring noise sensitive land uses.

Please contact Josiane Gervais, Transportation Project Manager (TPM), at Josiane.Gervais@ottawa.ca if you have any questions or require additional information relating to the comments above.

Forestry

TCR Requirements

1. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City

    a. An approved TCR is a requirement of Site Plan approval.

    b. The TCR may be combined with eh LP provided all information is supplied

2. As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (City) owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.

3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR

    a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester

    b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit

4. The TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition

5. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)

6. The TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site

7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained

8. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca

a. The location of tree protection fencing must be shown on a plan

b. Show the critical root zone of the retained trees

c. If excavation will occur within the critical root zone, please show the limits of excavation

9. The City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.

For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

MVCA

1. The subject property is regulated by MVCA under Ontario Regulation 153/06 and is surrounded by the tributaries of Shirley's Brook. Attached is a map of the regulated area on the subject property including the 1:100 year floodplain and the meander belt erosion hazard. Development is not permitted within the flood plain or erosion hazard. To the north is tributary 3, east is tributary 2 and south is tributary 4.
2. The Official Plan policy 4.7.3 requires a minimum watercourse setback which is the greater of the flood line, geotechnical limit, 30 metres from the normal high water or 15 metres from the existing top of bank, unless additional study to refine the setback and site-specific measures are implemented.
3. The subject property was not within Kanata North Urban Expansion Area Environmental Management Plan boundary which established only a 40 meter corridor for the tributaries based on enhancements and compensation provided in order to reduce the setback, as approved the by the City, MVCA and MECP.
4. The watercourse setbacks in the development proposal should be revised or a site specific assessment should be provided to ensure the proposed development is not located within the erosion hazard and will not impact water quality.
5. For tributary 4 a setback of 15 metres from top of bank should be provided to match the setback provided on the adjacent property.
6. As the stormwater for the proposed development will outlet directly to Shirley's Brook, an enhanced level of water quality treatment (80% long-term TSS removal) is required.

Please contact the MVCA's Planner, Erica Ogden, at EOgden@mvc.on.ca if you have any questions or require additional information relating to the comments above.

Next Steps

Please refer to the links to Guide to preparing studies and plans and fees for further information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please do not hesitate to Colette Gorni, at Colette.Gorni@ottawa.ca, if you have any questions.

APPENDIX B
Watermain Information

FUS - Fire Flow Calculations

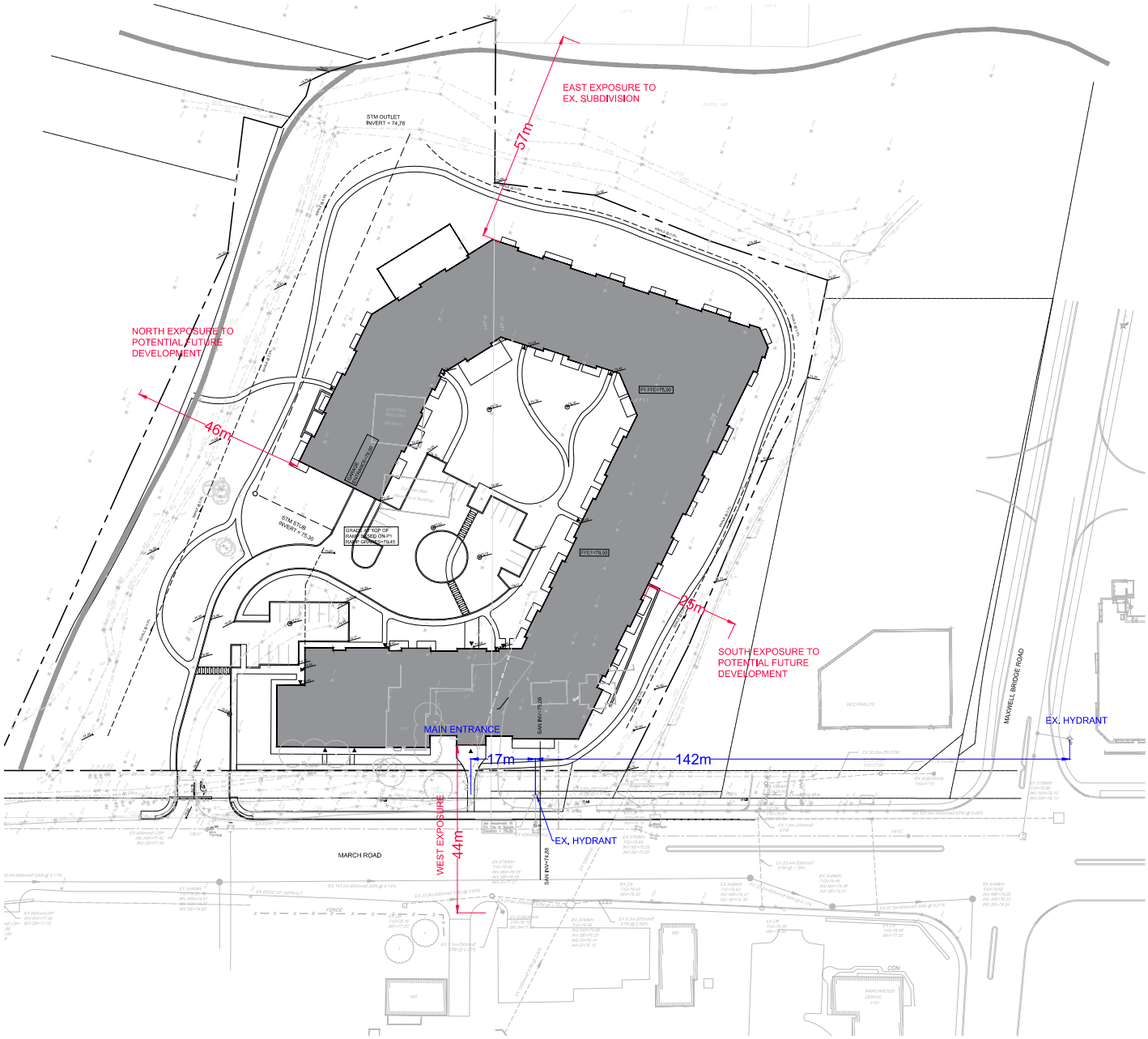
As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121186
Project Name: 910 March Road
Date: 1/26/2023
Input By: Zarak Ali
Reviewed By: Matt Hrehoriak
Revised By:
Building Description: 9-Storey Apartment Building

Legend: Input by User; No Information or Input Required

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)	7303			
		Number of Floors/Storeys	9			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**10,955**	
	F	**Base fire flow without reductions**				**14,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**11,900**
		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%	**-4,760**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	No	-10%		
				Cumulative Total	**-40%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**1,785**
		East Side	> 45.1m		0%	
		South Side	20.1 - 30 m		10%	
		West Side	30.1- 45 m		5%	
				Cumulative Total	**15%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**9,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**150**
				or	USGPM	2,378
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	1080


EAST EXPOSURE TO
EX. SUBDIVISION
57m
NORTH EXPOSURE TO
POTENTIAL FUTURE
DEVELOPMENT
46m
25m
SOUTH EXPOSURE TO
POTENTIAL FUTURE
DEVELOPMENT
MAIN ENTRANCE
17m
142m
EX. HYDRANT
EX. HYDRANT
WEST EXPOSURE
44m
MARCH ROAD
MAXWELL BRIDGE ROAD
STM OUTLET
INVERT = 74,78
STM STUB
INVERT = 75,30
SAN INV=75,06
SAN INV=74,91
FFE=75,00
FFE=75,00

NOVATECH
Engineers, Planners & Landscape Architects

910 MARCH ROAD
Lépine Corporation
HYDRAULIC ANALYSIS

JOB NO. 121186
DATE PREPARED: JANUARY 2023

Table 1
Water Demand

	Unit Type						Total Demand (L/s)		
	1 Bed Apartment	2 Bed Apartment	3 Bed Apartment	3 Bed+ Office Apartment	Commercial	Total	Avg Day	Max. Daily	Peak Hour
Unit Count	225	127	38		n/a	390	2.27	5.67	12.48
Area (m^2)					521	521	0.05	0.07	0.13
Population	315	267	118		-	700	**2.32**	**5.74**	**12.61**

Design Parameters:

- Avg Apartment	1.8	persons/unit
- 1 Bed Apartment	1.4	persons/unit
- 2 Bed/ 1 Bed + Office Apartment	2.1	persons/unit
- 3 Bed/ 2 Bed + Office Apartment	3.1	persons/unit
-3 Bed + Office Apartment	3.4	persons/unit

Section 4.0 Ottawa Sewer Design Guidelines

- Average Domestic Flow	280	L/person/day

Ontario Building Code Table 8.2.1.3

- Office Area Flows	75	l/9.3m² /day

Peaking Factors: Table 4.2 Ottawa Design Guidelines - Water Distribution

Max. Daily Demand:

- Residential	2.5	x Avg Day
- Commercial	1.5	x Avg Day

Peak Hourly Demand:

- Residential	2.2	x Max Day
- Commercial	1.8	x Max Day

CALCULATED WATER DEMANDS:

Proposed Development (9 Storey Building)

Average Day (Maximum HGL)=	2.27	L/s
Maximum Day =	5.67	L/s
Peak Hour (Minimum HGL) =	12.48	L/s
Max Day + Fire =	155.67	L/s

City of Ottawa Boundary Conditions:

Bounday conditions based on (Zone 2W pressure zone) connection to 406mm dia. Watermain on March Road

Peak Hour (Minimum HGL) =	125.9	m
Average Day (Maximum HGL)=	131	m
Max Day + Fire =	123.9	m

Watermain Analysis:

Water Service Elevation = 76.00 m

High Pressure Test = Max. HGL - Water Service Elevation x 1.42197 PSI/m < 80 PSI

High Pressure = 78.2 PSI

Low Pressure Test = Min. HGL - Water Service Elevation x 1.42197 PSI/m > 40 PSI

Low Pressure = 71.0 PSI

Max Day + Fire Test = Max Day + Fire Flow - Water Service Elevation x 1.42197 PSI/m > 20 PSI

Max Day + Fire = 68.1 PSI

Spencer Manoryk

From: Cara Ruddle
Sent: Monday, September 26, 2022 12:47 PM
To: Spencer Manoryk
Subject: FW: 910 March Road - water boundary conditions request
Attachments: 910 March Road_26Sept2022.docx

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: Monday, September 26, 2022 12:43 PM
To: Cara Ruddle <c.ruddle@novatech-eng.com>
Subject: RE: 910 March Road - water boundary conditions request

Hi Cara,

Please find attached the Boundary conditions for the subject application.

Thanks,

Santhosh Kuruvilla
Project Manager, Infrastructure Approvals
City of Ottawa
mailto:santhosh.kuruvilla@ottawa.ca

From: Cara Ruddle <c.ruddle@novatech-eng.com>
Sent: September 15, 2022 3:08 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Subject: RE: 910 March Road - water boundary conditions request

for the update.

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: Thursday, September 15, 2022 2:55 PM
To: Cara Ruddle <c.ruddle@novatech-eng.com>
Cc: Spencer Manoryk <s.manoryk@novatech-eng.com>
Subject: RE: 910 March Road - water boundary conditions request

Hi Cara,

I already made the request for the boundary conditions but haven't received it yet. It takes about 3 weeks nowadays to receive boundary conditions. As soon as I get it, I will send it to you.

Thanks,

Santhosh Kuruvilla
Project Manager, Infrastructure Approvals
City of Ottawa
mailto:santhosh.kuruvilla@ottawa.ca

From: Cara Ruddle <c.ruddle@novatech-eng.com>
Sent: September 15, 2022 2:37 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Spencer Manoryk <s.manoryk@novatech-eng.com>
Subject: FW: 910 March Road - water boundary conditions request

Any update to my email below? Do you know when we can expect boundary conditions? I would like to provide an update to my client.

Thanks.

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

From: Cara Ruddle
Sent: Monday, August 29, 2022 3:00 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Spencer Manoryk <s.manoryk@novatech-eng.com>
Subject: RE: 910 March Road - water boundary conditions request

Santhosh:
Please find below responses to your comments as well as supporting figures attached.

1. Location map with water service connection location(s).
    - See attached Boundary Conditions Sketch

2. Average daily demand (l/s).
    - Average Day = 2.38 L/s
3. Maximum daily demand (l/s).
    - Maximum Day = 5.91 L/s
4. Maximum hourly demand (l/s).
    - Peak Hour = 12.96 L/s
5. Fire flow demand (provide detailed fire flow calculations based on Fire Underwriters survey (FUS) Water Supply for Public Fire Protection). Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF).
    - Fire Flow = 150 L/s
    - See attached Fire Flow Calculations
    - See attached figure for exposure separation distances
6. Hydrant capacity shall be assessed to demonstrate the RFF can be achieved. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.
    - See attached figure for fire hydrants considered

Please confirm the information provided is satisfactory to obtain boundary conditions. Thanks.

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: Thursday, August 18, 2022 11:27 AM
To: Cara Ruddle <c.ruddle@novatech-eng.com>
Subject: FW: 910 March Road - water boundary conditions request

Hi Cara,

Thanks for your request for the boundary condition for the subject application.

Please provide the following information (detailed) for the boundary condition request in one email:

1. Location map with water service connection location(s).
2. Average daily demand (l/s).
3. Maximum daily demand (l/s).
4. Maximum hourly demand (l/s).
5. Fire flow demand (provide detailed fire flow calculations based on Fire Underwriters survey (FUS) Water Supply for Public Fire Protection). Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF).
6. Hydrant capacity shall be assessed to demonstrate the RFF can be achieved. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

Note: The fire flow requirements for a private property in an existing development area where no watermain sizing is required, the OBC method can be used if the fire demand for the private property is less than 9,000 L/min. If the OBC fire demand reaches 9000 L/min, then the FUS method is to be used.

Thanks,
Santhosh

From: Cara Ruddle <c.ruddle@novatech-eng.com>
Sent: August 15, 2022 1:09 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Subject: 910 March Road - water boundary conditions request

We are looking for boundary conditions for the existing watermain infrastructure to complete a water servicing analysis for the 910 March Road development. Attached is a geomap image showing the existing water infrastructure and our proposed connection location. Water Demands for the proposed development are provided below:

910 March Road

- Average Day = 2.38 L/s
- Maximum Day = 5.91 L/s
- Peak Hour = 12.96 L/s
- Maximum Day + Fire Flow = 172.91 L/s

Please provide boundary conditions at your earliest convenience. Please let me know if there are any questions.

Thanks.

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

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This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

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'

Boundary Conditions
910 March Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	143	2.38
Maximum Daily Demand	355	5.91
Peak Hour	778	12.96
Fire Flow Demand #1	9,000	150.00

Location

Results

Connection 1 – March Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.0	74.0
Peak Hour	125.9	66.8
Max Day plus Fire 1	123.9	64.0

Ground Elevation = 78.9 m

Notes

1. A second connection to the watermain, separated by an isolation valve, is required to decrease vulnerability of the water system in case of breaks.

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.

APPENDIX C
Sanitary Sewer Information

PROJECT #: 121186
PROJECT NAME: 910 MARCH ROAD
LOCATION: OTTAWA

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: JANUARY 2022

910 MARCH ROAD SANITARY FLOWS

LOCATION		Wastewater Flow Q(w)									EXTRANEOUS FLOW Q(i)			DESIGN FLOW Q(d)	PIPE					
		Apartment Units			Residential				Commercial											
FROM	TO	1 Bed Apartment	2 Bed Apartment	3 Bed Apartment	Pop.	Accum. Pop.	Peak Factor	Peak Flow (l/s)	Area	Peak Flow (l/s)	Total Area (ha)	Accum. Area (ha)	Infilt. Flow (l/s)	Total Flow (l/s)	Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q_{full} (%)
910	**EX**	225	127	38	700	700	3.1	7.07	521	0.07	2.72	2.72	0.90	8.04	200	0.50	36.7	23.2	0.74	34.7%

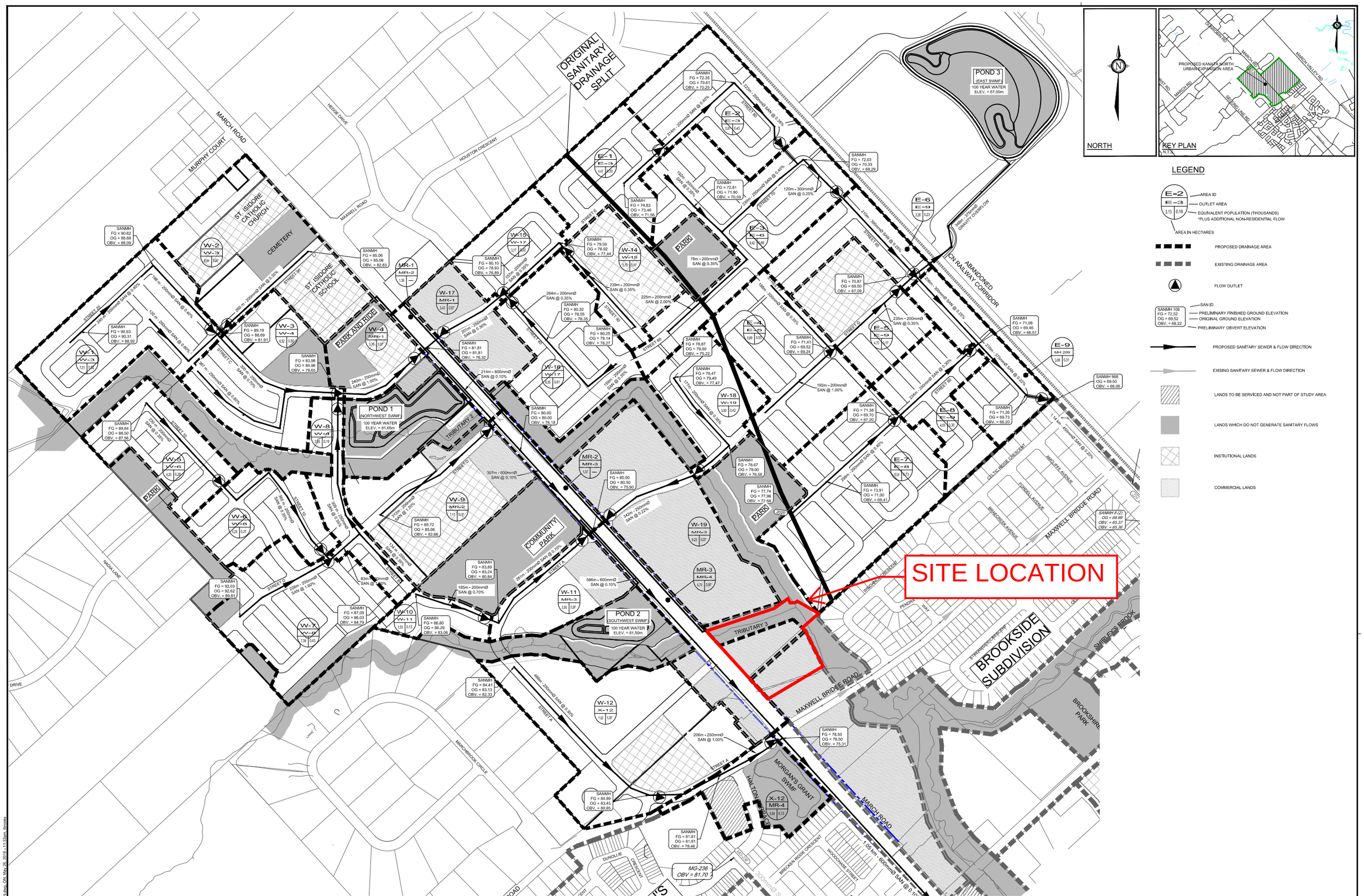
Design Parameters:

- Avg Apartment	1.8
- 1 Bed Apartment	1.4
- 2 Bed/ 1 Bed + Office Apartment	2.1
- 3 Bed/ 2 Bed + Office Apartment	3.1
-3 Bed + Office Apartment	3.4

Ontario Building Code Table 8.2.1.3
- Office Area Flows 75 l/9.3m² /day

Section 4.0 Ottawa Sewer Design Guidelines
- Average Domestic Flow 280 L/person/day
- Extraneous Flows 0.33 L/s/ha

1. Q(d) = Q(w) + Q(i) , where
2. Q(i) = 0.28 L/s/ha
3. Residential Peaking Facor = Harmon's
4. Commercial Peaking Factor = 1.5



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

No.	REVISION	DATE	BY
3.	ISSUED WITH DRAFT MASTER SERVICING STUDY	MAY 20/16	JLS
2.	ISSUED WITH DRAFT MASTER SERVICING STUDY	APR 4/16	JLS
1.	ISSUED WITH DRAFT MASTER SERVICING STUDY	FEB 26/16	JLS

SCALE 1:3000
1:3000
0 30 60 90 120

DESIGN ARM / TB
CHECKED ARM
DRAWN TB
CHECKED CJR
APPROVED JLS

FOR REVIEW ONLY

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
KANATA NORTH URBAN EXPANSION AREA
COMMUNITY DESIGN PLAN

DRAWING NAME
ONSITE SANITARY DRAINAGE AREA PLAN

PROJECT No. 112117-04
REV REV # 3
DRAWING No. 112117-SAN1

M:\2012\112117\CAD\Design\...\SSS112117-SAN.dwg, ON, May 29, 2018 - 11:57am, tbrooks

TABLE C-6b:
SANITARY SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION				RESIDENTIAL AREA AND POPULATION										ICI							INFILTRATION				FLOW	PIPE					
									Cumulative					IND			COMM		INST													
Street	From	To	Total	Dwellings		Density (Net ha)		Pop.	Residential			Peak	Peak	Area	Accu.	Peak	Area	Accu.	Area	Accu.	Peak	Total	Accu. Area		Infiltration	Total	Dia	Dia	Slope	Velocity	Capacity	Ratio
	Node	Node	Area	SFH	SD/TH	Low[3]	High[4]		Area	Pop.		Factor	Flow		Area	Factor		Area		Area	Flow	Area	New	Exist	Flow	Flow	Act	Nom		(Full)	(Full)	Q/Qfull
			(ha)	3.4	2.7	101	161		(ha)	New	Exist		(l/s)	(ha)	(ha)		(ha)	(ha)	(ha)	(ha)	(l/s)	(ha)	(ha)		(l/s)	(l/s)	(mm)	(mm)	(%)	(m/s)	(l/s)	(%)
W-16	W-16	W-17	6.55			3.17	1.78	606.8	4.95	**607**		3.93	9.7								0.0	6.55	6.55		1.8	11.5	203	200	0.35	0.62	20.2	57%
W-17	W-17	MR-1	3.43					0.0	7.51	**865**		3.84	13.5				**3.05**	3.05		8.04	9.6	6.48	19.99		5.6	28.7	254	250	0.30	0.67	33.9	84%
MR-1 (MARCH ROAD)	MR-1	MR-2	1.36					0.0	30.73	**3373**		3.40	46.4					3.40		8.04	9.9	1.36	47.42		13.3	69.6	610	600	0.10	0.69	202.4	34%
W-9	W-9	MR-2	7.17				1.13	181.9	1.13	**182**		4.00	2.9				**1.38**	1.38	**3.77**	3.77	4.5	7.17	25.90		7.3	14.7	203	200	1.20	1.15	37.4	39%
MR-2 (MARCH ROAD)	MR-2	MR-3	1.37					0.0	33.23	**3555**		3.38	48.7					4.78		11.81	14.4	1.37	74.69		20.9	84.0	610	600	0.10	0.69	202.4	41%
W-10	W-10	W-11	1.53				0.78	125.6	0.78	**126**		4.00	2.0								0.0	1.53	1.53		0.4	2.5	203	200	0.70	0.88	28.6	9%
W-11	W-11	MR-3	3.55				1.64	264.0	2.42	**390**		4.00	6.3				**1.08**	1.08			0.9	3.55	5.08		1.4	8.7	203	200	0.70	0.88	28.6	30%
W-18	W-18	W-19	3.90			1.21	1.82	415.2	3.03	**415**		4.00	6.7								0.0	3.90	3.90		1.1	7.8	203	200	0.35	0.62	20.2	39%
W-19	W-19	MR-3	9.23					0.0	3.03	**415**		4.00	6.7				**8.83**	8.83			7.7	9.23	13.13		3.7	18.1	254	250	0.25	0.61	31.0	58%
MR-3 (MARCH ROAD)	MR-3	MR-4	4.74					0.0	38.68	**4360**		3.30	58.3				2.06	16.75		11.81	24.8	4.74	97.64		27.3	110.4	610	600	0.10	0.69	202.4	55%
W-12	W-12	X-12	11.62			2.24	6.98	1350.0	9.22	**1350**		3.71	20.3						**2.01**	2.01	1.7	11.62	11.62		3.3	25.3	254	250	0.30	0.67	33.9	75%
X-12 (BIDGOOD / HALTON TERRACE)	X-12	MR-4	3.54				0.79	127.2	10.01	**1477**		3.68	22.0								0.0	3.54	15.16		4.2	26.3	254	250	1.00	1.22	62.0	42%
X-5 (760 & 788 March Road)	X-5	MR-4	1.76				1.76	283.4	1.76	**283**		4.00	4.6								0.0	1.76	1.76		0.5	5.1						
MR-4 (MARCH ROAD)	MR-4	*MH 186*	4.71					0.0	50.45	**6120**		3.16	78.4					16.75		13.82	26.5	4.71	119.27		33.4	138.3	610	600	0.10	0.69	202.4	68%
*X-6 (750 March Road, Blue Heron Co-op Homes)*****	*X-6*	*X-8*	*1.29*		*83*			*224.1*	*1.29*		*224*	*4.00*	*2.1*								*0.0*	*1.29*		*1.29*	*0.5*	*2.5*						
			**** 83 units obtained from Co-op website (http://www.chaseo.ca/member/blue-heron-co-op/)																													
*X-7 (Morgans Grant) ******	*X-7*	*X-8*	*48.45*					*3188.0*	*49.74*		*3188*	*3.42*	*25.2*								*0.0*	*48.45*		*49.74*	*17.4*	*42.6*						
			***** Information obtained from JL Richards #24566, Sanitary Design Sheet, July 2012																													
X-8 (Inverary Drive)	*X-8*	*MH 186*	*4.31*	*39*	*49*			*264.9*	*54.05*		*3677*	*3.37*	*28.6*								*0.0*	*4.31*		*54.05*	*18.9*	*47.6*						
Shirley's Brooke Drive	*MH 186*	*MH 184*	*0.00*					*0.0*	*104.50*	**6120**	*3677*	*2.96*	*98.7*					*16.75*		*13.82*	*26.5*	*0.00*	*119.27*	*54.05*	*52.3*	*177.5*	610	600	0.10	0.69	202.4	88%
X-9 (Mckinley Drive)	*X-9*	*MH 184*	*7.84*		*117*			*315.9*			*316*	*4.00*	*2.9*				*2.73*	*2.73*			*2.4*	*7.84*		*7.84*	*2.7*	*8.0*						
Shirleys Brooke Drive	*MH 184*	*MH 182*	*0.00*					*0.0*	*104.50*	**6120**	*3993*	*2.95*	*100.4*					*19.48*		*13.82*	*28.9*	*0.00*	*119.27*	*61.89*	*55.1*	*184.4*	610	600	0.10	0.69	202.4	91%
Shirleys Brooke Drive	*MH 182*	*MH 1*	*0.00*					*0.0*	*104.50*	**6120**	*3993*	*2.95*	*100.4*					*19.48*		*13.82*	*28.9*	*0.00*	*119.27*	*61.89*	*55.1*	*184.4*	610	600	0.10	0.69	202.4	91%
X-10 (Sandhill Road)		*MH 1*	*11.62*	*9*	*60*		*5.32*	*1049.1*	*11.62*		*1049*	*3.79*	*9.2*						*2.11*	*2.11*	*1.8*	*11.62*		*11.62*	*4.1*	*15.1*						
X-11		*MH 1*	*0.87*				*0.87*	*140.1*	*0.87*		*140*	*4.00*	*1.3*								*0.0*	*0.87*		*0.87*	*0.3*	*1.6*						
Briar Ridge Pump Station	*PS*	*MH 1*							72.88	**3644**	6094	2.97	85.623	0	35.08	3.1	0.00	6.76	0.00	5.25	35.6	0.00	92.96	88.15	56.9	178.1						
EAST MARCH TRUNK	*MH 1*	*EMT*	0.00					0.0	189.87	**9764**	11276	2.63	172.7		35.08	3.1		26.24		21.18	66.3	0.00	212.23	162.53	116.3	355.3	762	750	0.10	0.80	367.1	97%

DESIGN PARAMETERS

Average Daily Flow (Future)=	350	L/cap/day	Industrial Peak Factor=	per MOE graph	
Average Daily Flow (Existing)=	200	L/cap/day	Extraneous Flow (Future)=	0.28	L/s/ha
Indust/Comm/Inst Flow (Future)=	50000	L/ha/day	Extraneous Flow (Existing)=	0.35	L/s/ha (Jan 2008 monitored event)
Indust/Comm/Inst Flow (Existing)=	20000	L/ha/day	Minimum Velocity=	0.60	m/s
Max Res Peak Factor=	4.00		Manning's n=	0.013	
Comm/Inst Peak Factor=	1.50				

Designed: Alex McAuley
Checked: CJR
Dwg. Reference: 112117-SAN1
112117-SAN2

PROJECT:
Kanata North Community Design Plan

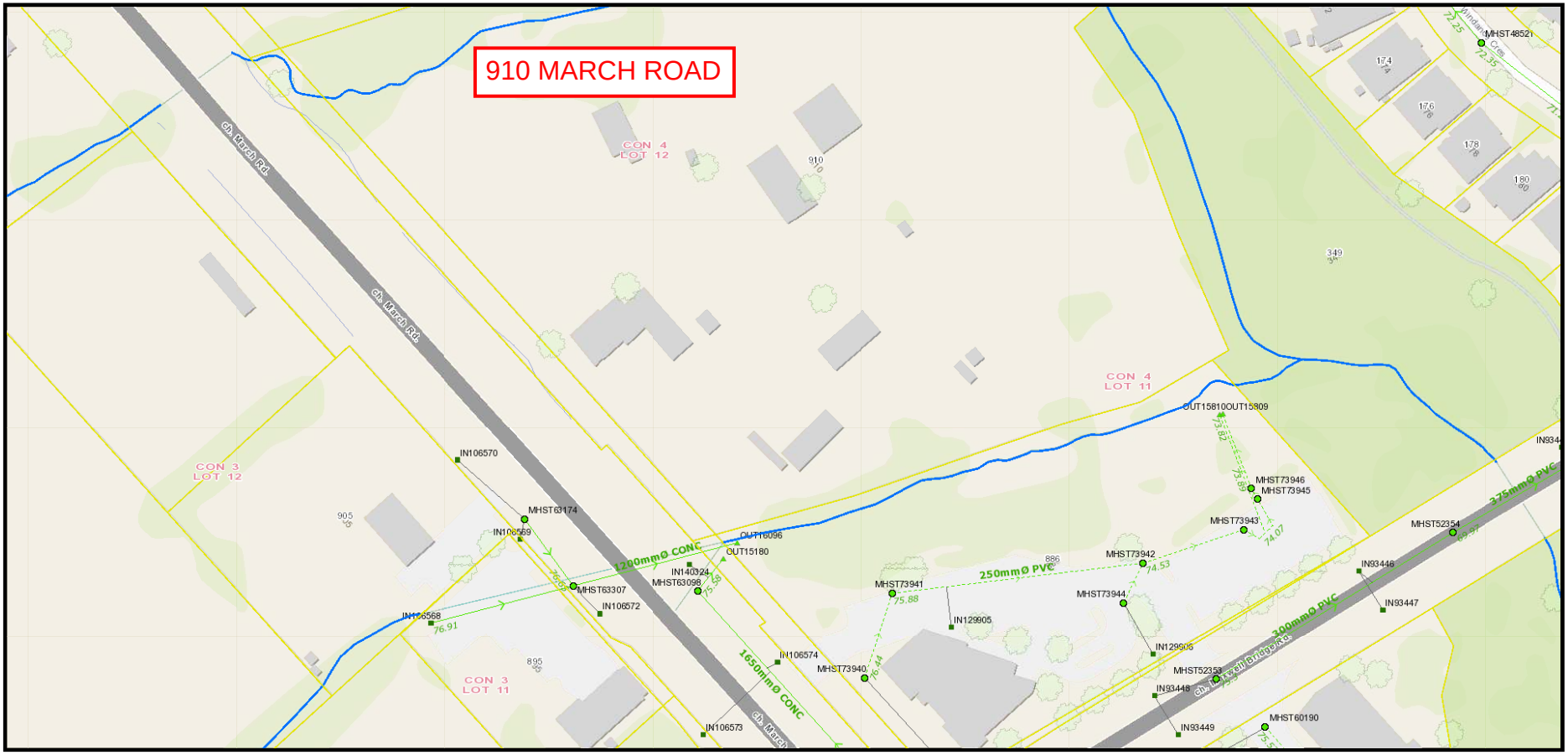
CLIENT:
Kanata North Land Owners

Date: May, 2016

Notes:
1. Existing sanitary sewers tributary to, and not receiving flow from the KNUEA Trunk sewer have not been analysed for capacity
2. Existing unit counts obtained from City of Ottawa geoOttawa (2014) parcel counts, unless otherwise indicated
3. Low Density based on (16.6 Singles/net ha * 3.4pers/unit) + (16.5 Towns/net ha * 2.7pers/unit)
4. High Density based on (35.8 Towns/net ha * 2.7pers/unit) + (35.8 Apartments/net ha * 1.8pers/unit)
5. Overall unit counts for the KNCDP are based on Demonstration Plan "A-24", plus 10% to allow for flexibility in unit type distribution

Upgraded Existing Sanitary Sewers

APPENDIX D
Stormwater Management Information


910 MARCH ROAD
Glx. March Rd.
CON 4
LOT 12
CON 4
LOT 11
CON 3
LOT 12
CON 3
LOT 11
910
905
895
886
349
174
176
178
180
MHST48521
OUT15810
OUT15809
IN106570
MHST63174
IN106569
OUT16096
OUT15180
1200mmØ CONC
IN140324
MHST63098
MHST63307
IN106572
IN106568
76.91
76.69
75.58
MHST73946
MHST73945
MHST73943
74.07
MHST73942
74.53
250mmØ PVC
MHST73941
75.88
MHST73944
IN129905
IN129906
MHST52354
375mmØ PVC
IN93446
IN93447
100mmØ PVC
MHST52353
IN93448
IN93449
MHST60190
IN106574
MHST73940
76.44
1650mmØ CONC
IN106573
Glx. Marc
Glx. Hazeldean Bridge Rd.

LEGEND

PROPERTY LINE

PRE DEVELOPMENT DRAINAGE AREA

2.29
EX-1
0.2

DRAINAGE AREA ha
DRAINAGE AREA IDENTIFIER
RUNOFF COEFFICIENT

2.29
EX-1
0.2

MARCH ROAD

MAXWELL BRIDGE ROAD

EXISTING BUILDING (No Roof)

Concrete Slab (Remains of Building)

MCDONALD'S

FENCE

M:\2021\121186\CAD\Design\Figures\Report Figures\121186-SWM.dwg, EX SWM, Jan 25, 2023 - 10:35am, smanoryk

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

910 MARCH ROAD

PRE DEVELOPMENT DRAINAGE AREA PLAN

SCALE 1 : 1000 (0, 10, 20, 30, 40)

DATE JAN 2023 | JOB 121186 | FIGURE 6

SHT11X17.DWG - 279mmX432mm

LEGEND

PROPERTY LINE

POST DEVELOPMENT DRAINAGE AREA

0.40 / A1 / 0.9

DRAINAGE AREA ha
DRAINAGE AREA IDENTIFIER
RUNOFF COEFFICIENT

0.25 / B2 / 0.28

0.91 / A2 / 0.90

0.40 / A1 / 0.90

0.47 / B3 / 0.28

0.26 / B1 / 0.35

EXISTING BUILDING (No Roof)

MARCH ROAD

MAXWELL BRIDGE ROAD

MCDONALD'S

FENCE

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

910 MARCH ROAD

POST DEVELOPMENT DRAINAGE AREA PLAN

SCALE 1 : 1000 (0 10 20 30 40)

DATE JAN 2023 | JOB 121186 | FIGURE 7

SHT11X17.DWG - 279mmX432mm

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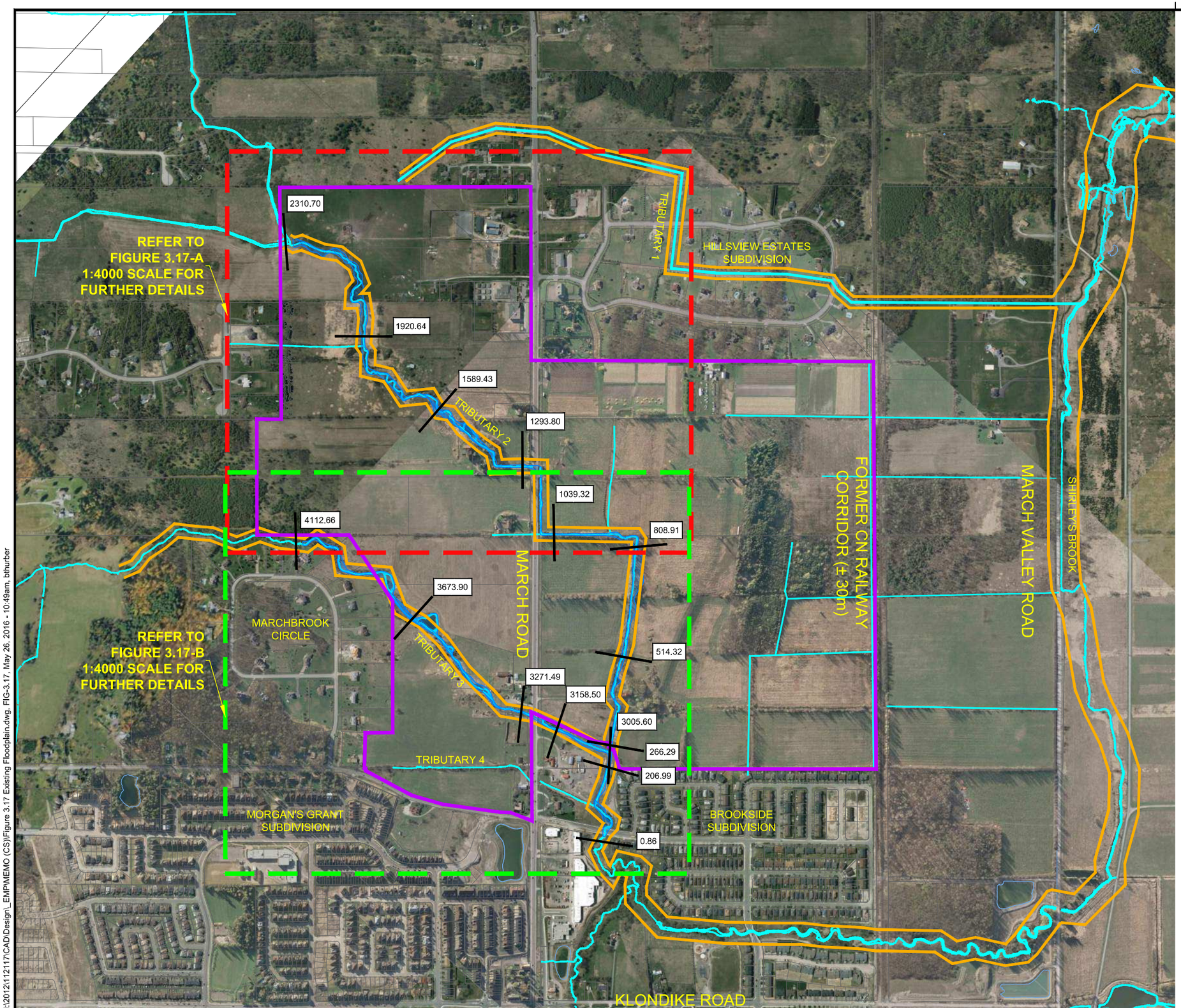

LEGEND

- KNUEA
- MEANDER BELT WIDTH
- DRAINAGE CHANNEL
- 2310.70 HEC-RAS STATION
- FLOODPLAIN EXTENTS

TRIBUTARY 2			
STATION	2-YEAR WL	5-YEAR WL	100-YEAR WL
2310.70	89.03	89.05	89.10
1920.64	86.00	86.11	86.25
1589.43	83.35	83.39	83.43
1293.80	79.86	80.12	80.51
1039.32	78.77	78.87	79.10
808.91	77.91	77.94	78.02
514.32	76.67	76.76	76.92
266.29	74.83	74.93	75.14
TRIBUTARY 3			
STATION	**2-YEAR WL**	**5-YEAR WL**	**100-YEAR WL**
4112.66	89.34	89.37	89.45
3673.90	81.34	81.36	81.43
3271.49	77.81	77.89	78.00
3158.50	76.66	76.72	76.87
3005.60	74.54	74.63	74.84
NORTHWEST BRANCH (CONFLUENCE OF TRIBUTARIES 2 & 3)			
STATION	**2-YEAR WL**	**5-YEAR WL**	**100-YEAR WL**
206.99	74.41	74.47	74.60
0.86	71.92	72.02	72.23

KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 3.17
EXISTING FLOODPLAIN LIMITS

DATE MAY 2016
JOB 112117
SCALE 1:10,000 (0, 50, 100m, 200m)

NOVATECH
Engineers, Planners & Landscape Architects

M:\2012\112117\CAD\Design_EMP\MEMO (CS)\Figure 3.17 Existing Floodplain.dwg, FIG-3.17, May 26, 2016 - 10:49am, bthurber

SHT11x17.DWG - 279mmx432mm

Time to Peak Calculations - Existing Conditions

Time of Concentration (Uplands Overland Flow Method)

Area ID	Overland Flow						Channel Flow			Overall	
	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (Uplands) (m/s)	Travel Time (min)	Length (m)	Velocity * (m/s)	Travel Time (min)	Time of Concentration (min)	Time to Peak (min)
EX-1	140	78.5	73	3.9%	0.3	8	N/A	N/A	N/A	8	5

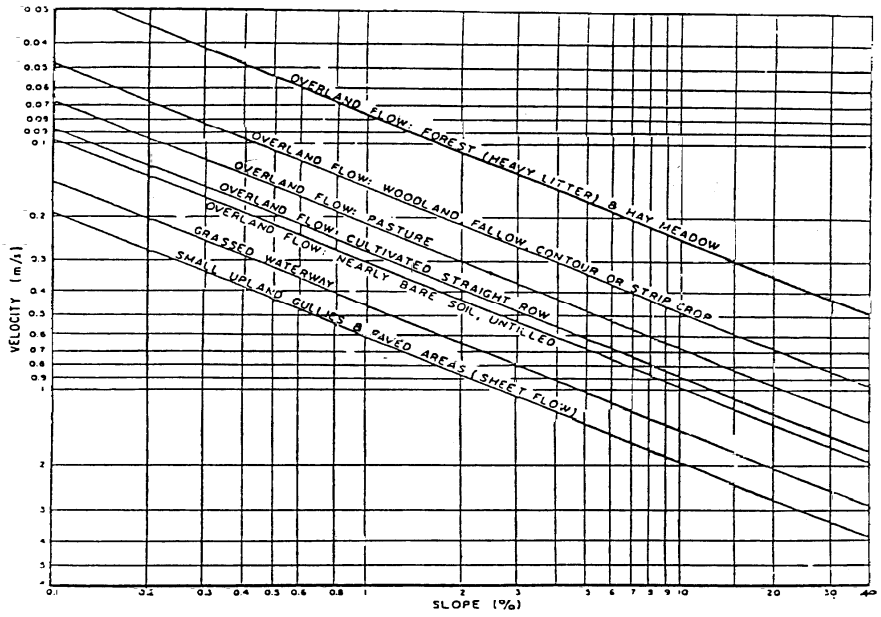

Figure A.5.2: Upland Method for Estimating Time of Concentration
(SCS National Engineering Handbook, 1971)

PROJECT #: 121186
PROJECT NAME: 910 MARCH ROAD
LOCATION: OTTAWA, ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: JANUARY 2023

TABLE 1A: Pre-Development Runoff Coefficient "C"

Area	"C"
Total	0.20
2.290	

TABLE 1B: Allowable Flows

CATCHMENT	Area (ha)	"C"	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
EX-1	2.290	0.20	10	**97.8**	**132.7**	**227.30**

Time of Concentration	Tc=	10.0	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014)$^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053)$^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199)$^{0.810}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

TABLE 2A: Post-Development Runoff Coefficient "C" - POST CATCHMENT A1

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.400	0.90	0.90	1.00	1.00
0.400	Roof					
	Soft					

TABLE 2B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT A1

0.400 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	40	32.86	32.89	7.7	25.15	60.36
	45	30.24	30.26	7.7	22.52	60.81
	50	**28.04**	**28.06**	**7.7**	**20.32**	**60.97**
	55	26.17	26.19	7.7	18.45	60.89
	60	24.56	24.58	7.7	16.84	60.61

TABLE 2C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT A1

0.400 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	40	44.18	44.22	10.5	33.74	80.98
	45	40.63	40.66	10.5	30.18	81.49
	50	**37.65**	**37.68**	**10.5**	**27.20**	**81.61**
	55	35.12	35.15	10.5	24.67	81.42
	60	32.94	32.97	10.5	22.49	80.96

TABLE 2D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT A1

0.4 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	60	55.89	62.15	13.8	48.40	174.26
	65	52.65	58.54	13.8	44.79	174.69
	70	**49.79**	**55.37**	**13.8**	**41.62**	**174.79**
	75	47.26	52.55	13.8	38.80	174.59
	80	44.99	50.03	13.8	36.28	174.14

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_s = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

TABLE 3A: Post-Development Runoff Coefficient "C" - POST CATCHMENT A2

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.190	0.90	0.90	1.00	1.00
0.910	Roof	0.720	0.90		1.00	
	Soft					

TABLE 3B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT A2

0.910 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	20	52.03	118.47	27.7	90.81	108.97
	25	45.17	102.84	27.7	75.18	112.77
	30	**40.04**	**91.17**	**27.7**	**63.51**	**114.32**
	35	36.06	82.10	27.7	54.44	114.32
	40	32.86	74.83	27.7	47.17	113.20

TABLE 3C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT A2

0.910 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	20	70.25	159.95	37.4	122.53	147.03
	25	60.90	138.65	37.4	101.23	151.84
	30	**53.93**	**122.78**	**37.4**	**85.36**	**153.65**
	35	48.52	110.47	37.4	73.05	153.40
	40	44.18	100.60	37.4	63.18	151.63

TABLE 3D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT A2

0.91 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	45	69.05	174.68	40.6	134.13	362.16
	50	63.95	161.79	40.6	121.24	363.72
	55	**59.62**	**150.84**	**40.6**	**110.29**	**363.94**
	60	55.89	141.40	40.6	100.85	363.07
	65	52.65	133.19	40.6	92.64	361.28

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

TABLE 4A: Post-Development Runoff Coefficient "C" - POST CATCHMENT B1

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.056	0.90	0.35	1.00	0.41
0.260	Roof	0.000				
	Soft	0.204	0.20		0.25	

TABLE 4B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT B1

0.260 =Area (ha)
0.35 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Storage Req'd (m^3)
2 YEAR	0	167.22	42.40	19.4	0.00
	5	103.57	26.26	19.4	0.00
	10	76.81	**19.47**	**19.4**	**0.00**
	15	61.77	15.66	19.4	0.00
	20	52.03	13.19	19.4	0.00

TABLE 4C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT B1

0.260 =Area (ha)
0.35 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Storage Req'd (m^3)
5 YEAR	0	230.48	58.44	26.4	0.00
	5	141.18	35.79	26.4	0.00
	10	104.19	**26.42**	**26.4**	**0.00**
	15	83.56	21.18	26.4	0.00
	20	70.25	17.81	26.4	0.00

TABLE 4D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT B1

0.26 =Area (ha)
0.41 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Storage Req'd (m^3)
100 YEAR	5	242.70	72.19	53.1	0.00
	10	178.56	53.11	53.1	0.00
	15	**142.89**	**42.51**	**53.1**	**0.00**
	20	119.95	35.68	53.1	0.00
	25	103.85	30.89	53.1	0.00

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_s = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

TABLE 5A: Post-Development Runoff Coefficient "C" - POST CATCHMENT B2

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.030	0.90	0.28	1.00	0.34
0.250	Roof					
	Soft	0.220	0.20		0.25	

TABLE 5B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT B2

0.250 =Area (ha)
0.28 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Storage Req'd (m^3)
2 YEAR	0	167.22	33.01	14.9	0.00
	5	103.57	20.44	14.9	0.00
	10	76.81	**15.16**	**14.9**	**0.00**
	15	61.77	12.19	14.9	0.00
	20	52.03	10.27	14.9	0.00

TABLE 5C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT B2

0.250 =Area (ha)
0.28 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Storage Req'd (m^3)
5 YEAR	0	230.48	45.49	20.3	0.00
	5	141.18	27.87	20.3	0.00
	10	**104.19**	**20.57**	**20.3**	**0.00**
	15	83.56	16.49	20.3	0.00
	20	70.25	13.87	20.3	0.00

TABLE 5D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT B2

0.25 =Area (ha)
0.34 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Storage Req'd (m^3)
100 YEAR	5	242.70	57.35	42.2	0.00
	10	178.56	42.19	42.2	0.00
	15	**142.89**	**33.77**	**42.2**	**0.00**
	20	119.95	28.34	42.2	0.00
	25	103.85	24.54	42.2	0.00

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_s = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

TABLE 6A: Post-Development Runoff Coefficient "C" - POST CATCHMENT B3

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.052	0.90	0.28	1.00	0.33
0.470	Roof					
	Soft	0.418	0.20		0.25	

TABLE 6B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT B3

0.470 =Area (ha)
0.28 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Storage Req'd (m^3)
2 YEAR	0	167.22	60.62	28.1	0.00
	5	103.57	37.55	28.1	0.00
	10	76.81	**27.84**	**28.1**	**0.00**
	15	61.77	22.39	28.1	0.00
	20	52.03	18.86	28.1	0.00

TABLE 6C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT B3

0.470 =Area (ha)
0.28 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Storage Req'd (m^3)
5 YEAR	0	230.48	83.55	38.1	0.00
	5	141.18	51.18	38.1	0.00
	10	**104.19**	**37.77**	**38.1**	**0.00**
	15	83.56	30.29	38.1	0.00
	20	70.25	25.47	38.1	0.00

TABLE 6D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - POST CATCHMENT B3

0.47 =Area (ha)
0.33 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Storage Req'd (m^3)
100 YEAR	5	242.70	105.59	77.7	0.00
	10	178.56	77.69	77.7	0.00
	15	**142.89**	**62.17**	**77.7**	**0.00**
	20	119.95	52.19	77.7	0.00
	25	103.85	45.18	77.7	0.00

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

PROJECT #: 121186
PROJECT NAME: 910 MARCH ROAD
LOCATION: OTTAWA, ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: JANUARY 2023

Table 7: Post-Development Stormwater Mangement Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Outlet Location	Orifice	2 Year Storm Event			5 Year Storm Event			100 Year Storm Event		
						Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)
A1	0.400	0.90	1.00	Tributary 2	N/A	7.7	N/A	61.0	10.5	N/A	81.6	13.8	N/A	174.8
A2	0.910	0.90	1.00	Tributary 2	N/A	27.7	N/A	114.3	37.4	N/A	153.7	40.6	N/A	363.9
B1	0.260	0.35	0.41	Sheet Flow	N/A	19.4	N/A	0.0	26.4	N/A	0.0	53.1	N/A	0.0
B2	0.250	0.28	0.34	Sheet Flow	N/A	14.9	N/A	0.0	20.3	N/A	0.0	42.2	N/A	0.0
B3	0.470	0.28	0.33	Sheet Flow	N/A	28.1	N/A	0.0	38.1	N/A	0.0	77.7	N/A	0.0
Total						**97.8**			**132.7**			**227.3**		**538.7**
Allowable						**97.8**			**132.7**			**227.3**		