

**PROPOSED RESIDENTIAL DEVELOPMENT
1900 & 2000 City Park Drive**

**ASSESSMENT OF ADEQUACY OF
PUBLIC SERVICES REPORT**

Prepared by:

NOVATECH

Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

April 21, 2023

Ref: R-2023-030
Novatech File No. 123006

April 21, 2022

Colonnade BridgePort
100 Argyle Avenue, Suite 200
Ottawa, Ontario
K2P 1B6

**Attention: Bonnie Martell, MCIP, RPP
Development Manager**

Dear Ms. Martell:

**Re: Assessment of Adequacy of Public Services Report
Proposed Residential Development
1900 & 2000 City Park Road, Ottawa, ON
Novatech File No.: 123006**

Enclosed is a copy of the 'Assessment of Adequacy of Public Services Report' for the proposed residential development located at 1900 & 2000 City Park Drive, in the City of Ottawa. The purpose of this report is to demonstrate that the proposed development can be serviced by the existing municipal infrastructure fronting the subject site. This report is being submitted in support of Official Plan Amendment and Zoning By-law Amendment applications.

Please contact the undersigned, should you have any questions or require additional information.

Yours truly,

NOVATECH



Miroslav Savic, P. Eng.
Senior Project Manager

cc: Kelsey Charie (City of Ottawa)

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Location and Site Description	1
1.2	Pre-Consultation Information	2
1.3	Proposed Development.....	2
2.0	SITE SERVICING	3
2.1	Sanitary Servicing	3
2.2	Water Supply for Domestic Use and Firefighting.....	4
2.3	Storm Drainage and Stormwater Management.....	7
3.0	CONCLUSION	9

LIST OF FIGURES

- Figure 1: Aerial View of the Subject Site
- Figure 2: Aerial View of the Subject Site
- Figure 3: Conceptual Sanitary Servicing Layout
- Figure 4: Conceptual Water Servicing Layout
- Figure 5: Conceptual Storm Servicing Layout
- Figure 6: Conceptual Stormwater Management Plan

LIST OF APPENDICES

- Appendix A: Correspondence
- Appendix B: Sanitary Sewer Calculations, E-Mail from the City of Ottawa
- Appendix C: Water Analysis, FUS Calculations, and Watermain Boundary Conditions
- Appendix D: IDF Curves and Preliminary SWM Calculations

1.0 INTRODUCTION

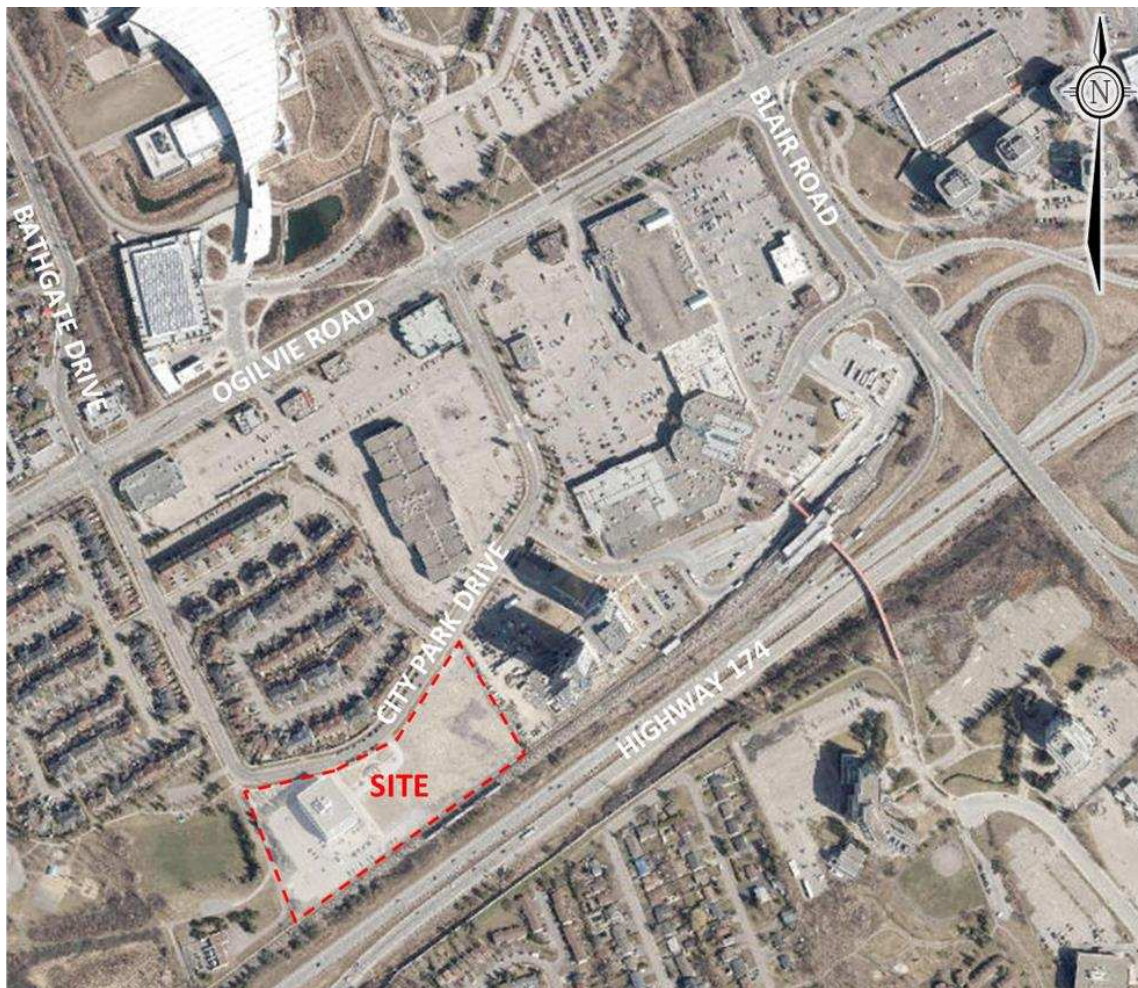
Novatech has been retained by Colonnade BridgePort to assess adequacy of the existing public services related to the proposed development at 1900 & 2000 City Park Drive. The purpose of this report is to demonstrate that the proposed development can be serviced by the existing municipal infrastructure surrounding the subject site. This report is being submitted in support of Official Plan Amendment and Zoning By-law Amendment applications.

1.1 Location and Site Description

The subject site is located at 1900 & 2000 City Park Drive, in the City of Ottawa. The 1.21 ha site is currently occupied by two commercial/industrial buildings and associated parking lots. The subject site is located on the south side of City Park Drive and north of Highway 174. The site is bordered by City Centre Park to the west and a high-rise residential development to the east. The legal description of the is designated as Part of Block 2, Registered Plan 4M-649, City of Ottawa.

There is an existing office building on site with surface parking lot at 1900 City Park Drive. The 2000 City Park Drive site is currently vacant.

Figure 1: Aerial View of the Subject Site



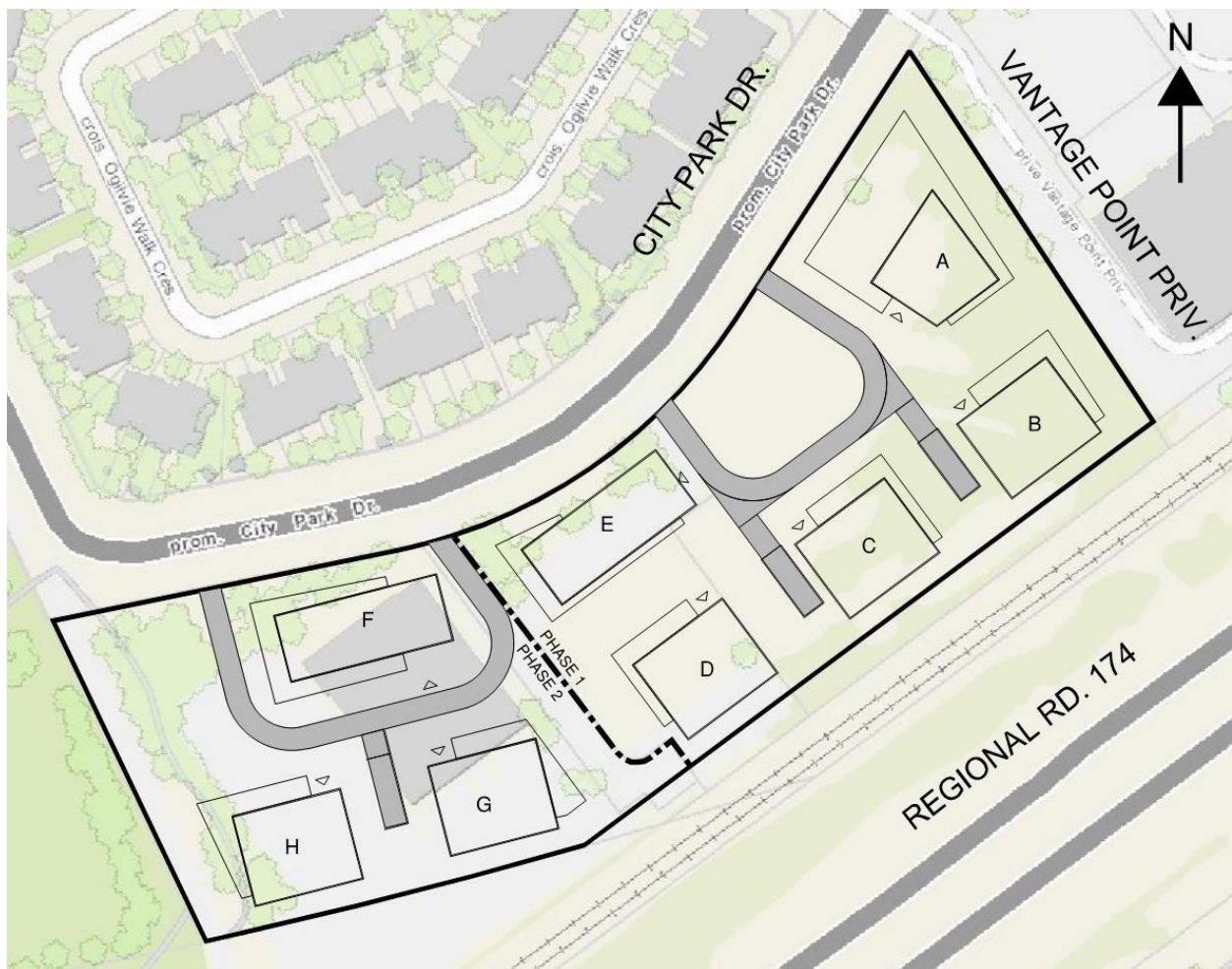
1.2 Pre-Consultation Information

A pre-consultation meeting was held with the City of Ottawa on January 19, 2023, at which time the client was advised of the general submission requirements. Further consultations were held with City staff and the Rideau Valley Conservation Authority (RVCA). Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

1.3 Proposed Development

The proposed development will be developed in phases and is expected to include a total of 8 (eight) residential towers with podiums: five (5) towers in Phase 1 and three (3) towers Phase 2. The parking will be provided underground with site entrances off City Park Drive. Refer to **Figure 2** for conceptual site plan.

Figure 2: Conceptual Site Plan



The subject site is located within an LRT Transit Oriented Development (TOD) Area. A report entitled 'LRT Transit Oriented Development Study Areas Servicing Overview, TOD Study Areas: Lees, Hurdman, Train, St. Laurent, Cyrville and Blair, Final Report' (TOD Report) dated January 22, 2014 prepared by Stantec Consulting Ltd. provides a high level assessment of the servicing of the listed TOD stations. The subject site is within the Blair TOD Study Area of the TOD Report which assisted in preparation of this report.

2.0 SITE SERVICING

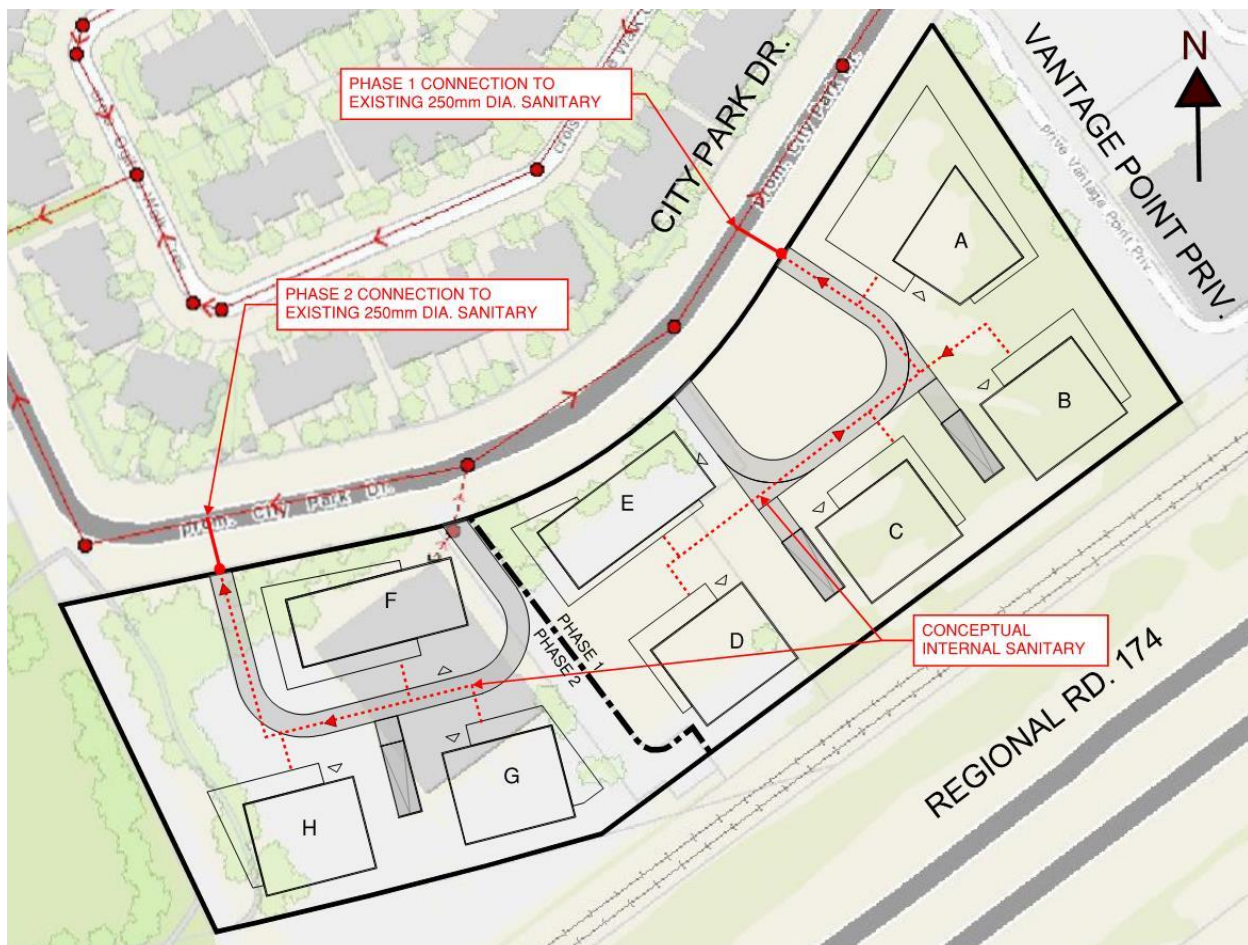
The objective of this report is to demonstrate that proper sewage outlets (sanitary and storm) as well as a suitable domestic water supply and appropriate fire protection are available for the proposed development. The servicing criteria, the expected sewage flows and water demands are to conform to the requirements of the City of Ottawa municipal design guidelines for sewer and water distribution systems. On-site stormwater management will be implemented to meet the requirements of the City of Ottawa.

2.1 Sanitary Servicing

The existing office building is currently serviced by 250mm diameter sanitary sewer in City Park Drive.

The Phase 1 sanitary service will be connected to the 250mm sanitary sewer that flows east along City Park Drive and discharges into 1050mm diameter Maxime Relief Trunk sewer that drains into the 1200mm diameter pipe crossing under the highway and eventually discharges into the 1650mm diameter Greens Creek Collector. The Phase 2 sanitary service is proposed to be connected to 250mm sanitary sewer that flows west than turns north along City Park Drive and outlets into the 1050mm diameter Maxime Relief Trunk sewer. Refer to **Figure 3** showing the existing sanitary sewer infrastructure and conceptual servicing layout.

Figure 3: Conceptual Sanitary Servicing Layout



Based on criteria in Section 4 of the City of Ottawa Sewer Design Guidelines, the total theoretical peak sanitary flow, including infiltration, from the proposed development will be approximately 23.4 L/s in Phase 1 and 14.9 L/s in Phase 2. Refer to the table below for a summary of the preliminary sanitary sewage flows and to **Appendix B** for detailed calculations.

Proposed Residential Development	Unit Count	Design Population	Peak Residential Flow (L/s)	Infiltration Allowance (L/s)	Peak Sewage Flow (L/s)
Phase 1 (Buildings A, B, C, D, and E)	1400	2520	22.90	0.51	23.4
Phase 2 (Buildings F, G, and H)	850	1530	14.57	0.36	14.9

Based on review of the City record drawings, the existing 250mm sanitary sewer flowing east at 0.45% slope (Phase 1 service connection) has a full flow capacity of 41.6 L/s. The existing 250mm sanitary sewer flowing west at 0.3% slope (Phase 2 service connection) has a full flow capacity of 34 L/s.

The sanitary flow calculations were provided to the City of Ottawa for the purpose of capacity analysis of downstream sanitary sewer system. The City asset management flagged some concerns related to the downstream sewer system and will review in further detail when Official Plan Amendment and Zoning By-law Amendment applications are submitted. Refer to **Appendix B** for email correspondence with the City of Ottawa.

According to the TOD report, there is ample capacity in Maxime Relief Trunk Sewer for the ultimate TOD conditions. The Green Creek Collector the Maxime Relief Trunk outlets to does have a history of surcharging, but it is unknown how much spare capacity may exist.

The sanitary servicing will be re-evaluated once the downstream sanitary sewer capacity information is received from the City of Ottawa.

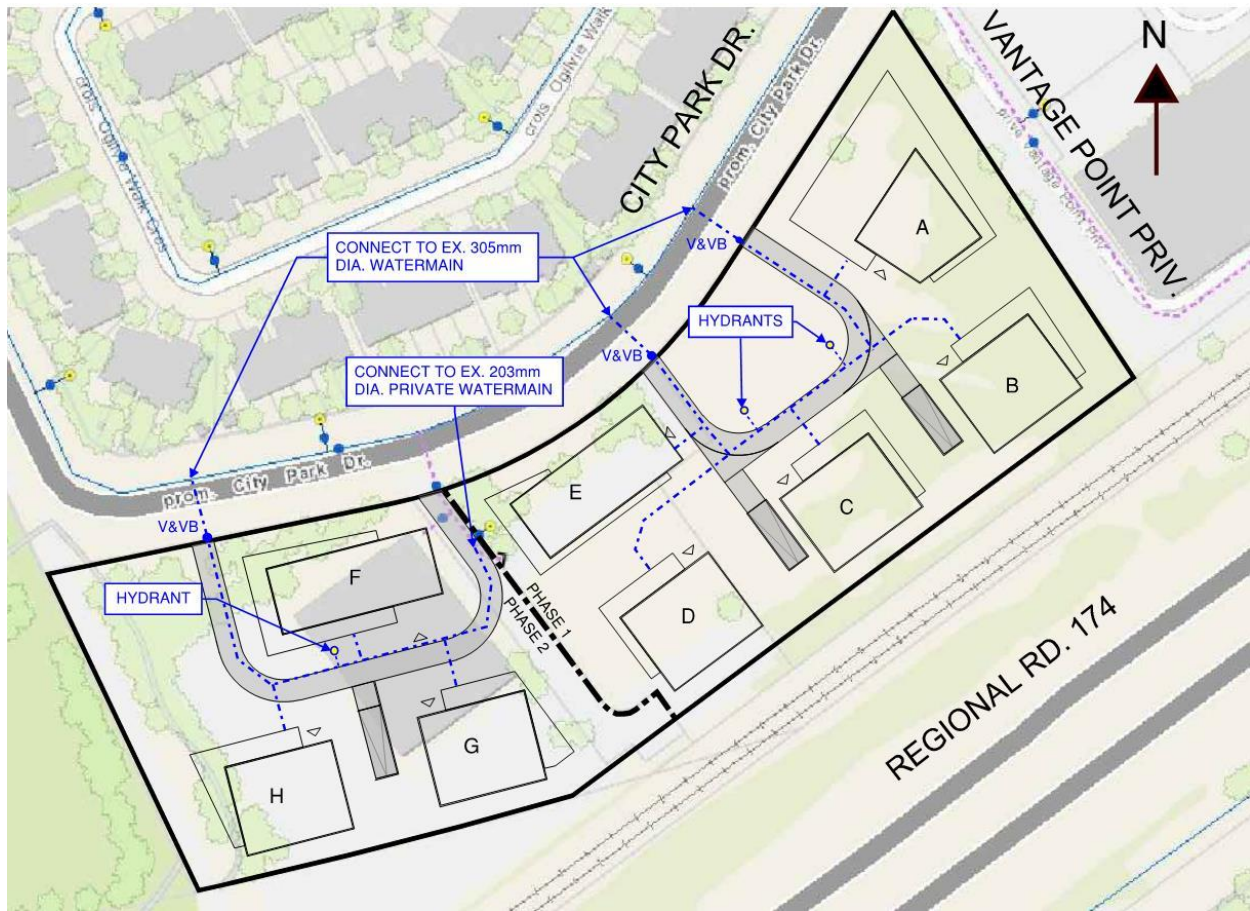
2.2 Water Supply for Domestic Use and Firefighting

The existing office building is serviced by 305mm diameter watermain in City Park Drive. The City Park Drive watermain is connected to the 610mm diameter watermain in Ogilvie Avenue.

The TOD report indicated that the Blair TOD study area is located within Pressure Zone 1E of the City's central water distribution system. The existing 1220mm diameter watermain parallel and south of Highway 174 represents a major feed to this area. A 610mm diameter watermain running north/south along Blair Road connects the 610mm Ogilvie watermain to the 1220mm diameter feedermain.

Under post-development conditions, the proposed site will continue to be serviced by the 305mm diameter municipal watermain in City Park Drive. The anticipated daily water demands for both phases of the proposed development will be greater than 50m³/day. Therefore, each phase of the proposed development will require two (2) water service connections to the 305m diameter City Park Drive watermain. New watermain valves on the existing 305m diameter watermain will be required between the proposed service connections to provide redundancy. Refer to **Figure 4** showing the existing watermain infrastructure and conceptual servicing layout.

Figure 4: Conceptual Water Servicing Layout



Preliminary water demand and fire flow calculations have been prepared for the proposed development based on criteria in Section 4 of the City of Ottawa Design Guidelines for Water Distribution Systems. The fire flows are calculated using the Fire Underwriters Survey (FUS) method, based on general building assumptions, including building footprint, construction materials and fully sprinklered buildings. Refer to the table below for a summary of the water demands and fire flows and to **Appendix C** for detailed calculations.

Proposed Residential Development	Unit Count	Design Population	Avg. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Max. FUS Fire Flow (L/s)
Phase 1 (Buildings A, B, C, D, and E)	1400	2520	8.2	20.4	44.9	133
Phase 2 (Building F, G, and H)	850	1530	5.0	12.4	27.3	133

The following design criteria were taken from Section 4.2.2 – ‘Watermain Pressure and Demand Objectives’ of the City of Ottawa Design Guidelines for Water Distribution:

- Normal operating pressures are to range between 345 kPa (50 psi) and 483 kPa (70 psi)
- Minimum system pressures are to be 276 kPa (40 psi) under Peak Hour Demand.
- Minimum system pressures are to be 140 kPa (20 psi) under Max Day + Fire Flow demands.

The following table summarizes preliminary hydraulic analysis results based on municipal watermain boundary conditions provided by the City.

Municipal Watermain Boundary Condition	Boundary Condition HGL (m)	Normal Operating Pressure Range (psi)	Anticipated WM Pressure (psi)*
Phase 1 (305mm diameter WM in City Park Drive)			
Minimum HGL (Peak Hour Demand)	109.3 m	40 psi (min.)	~ 49 psi
Maximum HGL (Max Day Demand)	117.3 m	50-70 psi	~ 61 psi
HGL Max Day + Fire Flow (133 L/s)	112.0 m	20 psi (min.)	~ 53 psi
Phase 2 2 (305mm diameter WM in City Pard Drive)			
Minimum HGL (Peak Hour Demand)	109.3 m	40 psi (min.)	~ 51 psi
Maximum HGL (Max Day Demand)	117.3 m	50-70 psi	~ 62 psi
HGL Max Day + Fire Flow (133 L/s)	112.2 m	20 psi (min.)	~ 55 psi

*Based on an approximate ground elevation of 74.5m at Phase 1 WM connection and 73.5m at Phase 2 WM connection.

Based on preliminary calculations, it is anticipated that the watermain pressure within the municipal watermain network will be within the normal operation pressure range, while satisfying minimum pressure requirements under Peak Hour demand and Max Day + Fire flow Demand conditions. Given the height of the proposed buildings, the booster pumps will be required to provide adequate water pressure to the upper floors.

A multi-hydrant approach to firefighting is anticipated to be required to supply the maximum FUS fire flow calculated above. Based on a review of the geoOttawa website, there are two (2) Class AA (blue bonnet) municipal fire hydrants within 75m of the subject site, one (1) in front of the Phase 1 development and one (1) in front of the Phase 2 development. As per the City of Ottawa Technical Bulletin ISTB-2018-02, Class AA (blue bonnet) hydrants within 75m of a building should provide a minimum flow of 95 L/s (at a pressure of 20 PSI). New private hydrants will be provided on site within 45m unobstructed path from the fire department siamese connection location at each building as required by the Ontario Building Code. The combined flow from the existing municipal fire hydrants and the new private hydrants is expected to exceed the maximum Fire Flow requirements (133 L/s) for the proposed development.

Refer to **Appendix C** for preliminary watermain analysis, FUS fire flow calculations and

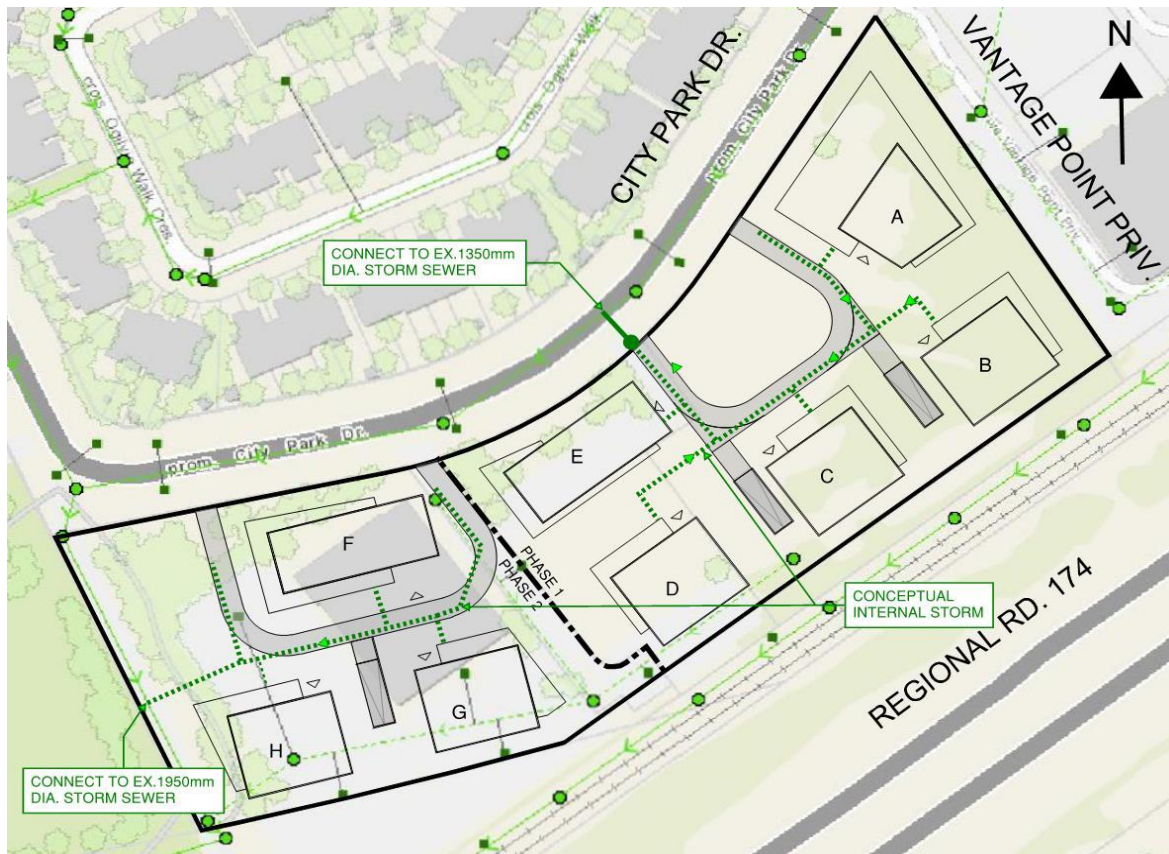
correspondence with the City of Ottawa related to the municipal watermain boundary conditions.

2.3 Storm Drainage and Stormwater Management

Under current conditions, drainage from the existing office building site is collected with an on-site stormwater system that outlets the existing 1950mm diameter storm sewer located within the sewer easement along the west property line. The topography of the undeveloped portion of the site gradually slopes from north to south towards the south property line. Drainage from this portion of the site is being collected with the two on-site existing catch basins that are connected to the existing office building stormwater system.

Under post-development conditions, storm flows from Phase 1 development are proposed to be directed to the existing 1350mm diameter storm sewer in City Park Drive that outlet to the 1950mm storm sewer running within the sewer easement along the west property line. The storm flows from Phase 2 development are proposed to be directly connected to the 1950mm diameter storm sewer. Refer to **Figure 5** showing the existing storm sewer infrastructure and conceptual servicing layout.

Figure 5: Conceptual Storm Servicing Layout



On-site stormwater management (SWM), including both quantity and quality control measures, will be required. A detailed SWM design and report will be prepared as part of the Site Plan Control application. The stormwater quantity control criteria have been provided at pre-consultation meetings with the City of Ottawa. Follow up discussions were held with the City of Ottawa and the Rideau Valley Conservation Authority (RVCA) with respect to the stormwater

quality control requirements. Refer to **Appendix A** for notes from the pre-consultation meeting and the email correspondence with the City of Ottawa and RVCA.

Based on SWM criteria provided by the City of Ottawa, the allowable release rate from the site is calculated using the Rational Method, with a maximum allowable runoff coefficient equivalent to existing conditions, but in no case greater than $C=0.5$, a time of concentration of 10 minutes and a 5-year rainfall intensity from City of Ottawa IDF curves. The Phase 1 allowable release rate was calculated to be 115.3 L/s. The calculation is based on a pre-development runoff coefficient of 0.26. The Phase 2 allowable release rate was calculated to be 157.7 L/s. Since the Phase 2 pre-development runoff coefficient exceeds 0.50, the calculation is based on a maximum allowable runoff coefficient of $C=0.50$.

For the purpose of this report, a high level stormwater management calculations are provided to estimate preliminary stormwater storage volumes requirements. The storage volumes are calculated using the Modified Rational Method and are summarized in the following table.

Preliminary Stormwater Storage Requirements Table

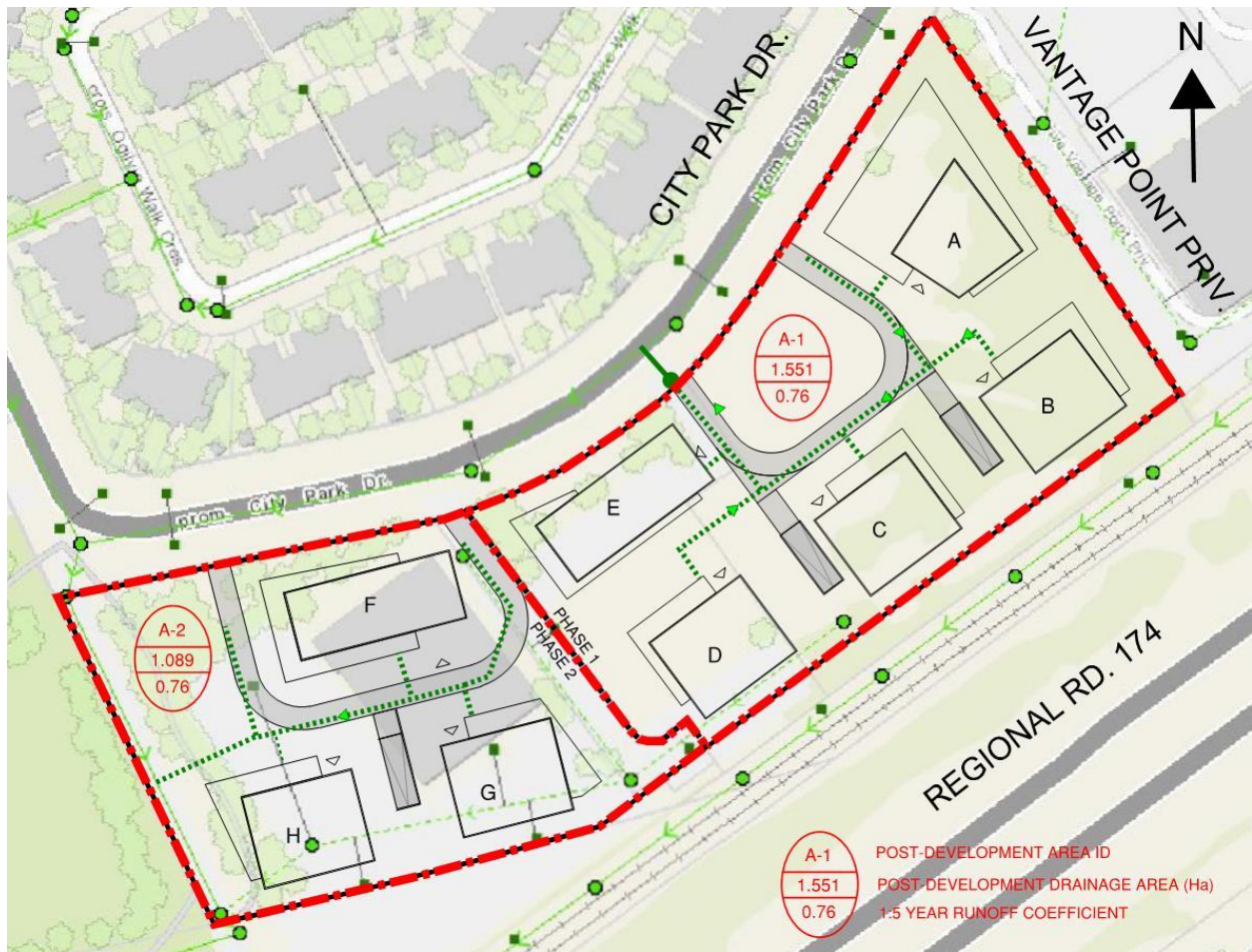
Design Event	Post-Development Storage Volume Requirements		
	Area A-1 (Phase 1) (m ³)	Area A-2 (Phase 2) (m ³)	Total Site (m ³)
5-Year	~143	~50	~193
100-Year	~399	~189	~588

The following table compares the post-development flows from the proposed development to both the uncontrolled pre-development flows and to the allowable release rate specified by the City of Ottawa, for the 5-year and the 100-year design events.

Preliminary Stormwater Flow Comparison Table

Design Event	Pre-development Conditions					Post Development Conditions		
	Uncontrolled Flow (L/s)			Allowable Release Rate (L/s)		Phase 1 Flow (L/s)	Phase 2 Flow (L/s)	Total Flow (L/s)
	Phase 1	Phase 2	Total	Phase 1	Phase 2			
5-Year	115.3	235.4	350.8	115.3	157.7	115.3	157.7	273.0
10-Year	217.7	451.7	669.4			115.3	157.7	273.0

Refer to **Appendix D** for preliminary SWM calculations and **Figure 6** showing the conceptual stormwater management plan.

Figure 6: Conceptual Stormwater Management Plan

It is anticipated that required storage will be provided on the proposed building roofs and in internal stormwater management tanks. The use of control flow roof drains and inlet control devices (ICD) or stormwater pumps will be required.

The subject site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA) and is tributary to the Rideau River. As per the information provided by the City of Ottawa, an 'Enhanced' Level of Protection, equivalent to a long-term average removal of 80% Total Suspended Solids (TSS), with at least 90% of the total rainfall being captured and treated, will be required for the site. This can be achieved by installation of oil-grit separator (OGS) units on the storm outlets from the site.

A complete stormwater management (SWM) analysis will be included as part of the Site Plan Control submission to the City of Ottawa.

3.0 CONCLUSION

Conclusions of this report are as follows.

The existing municipal watermain network along with internal private watermains will provide adequate water supply and redundancy for the subject site.

Storm servicing can be provided by connecting to the existing municipal storm sewer system. On-sit stormwater management will be implemented to meet the requirements of the City of Ottawa.

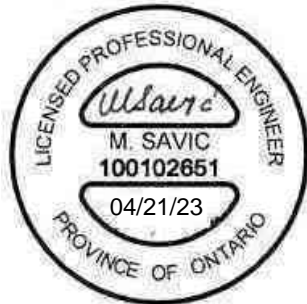
Sanitary servicing can be provided by connecting to the existing sanitary sewers in City Park Drive. The sanitary servicing will be re-evaluated once the capacity analysis of the downstream sewer system is completed by the City of Ottawa.

A complete servicing, grading and stormwater management design will be included as part of the Site Plan Control submission to the City of Ottawa.

NOVATECH

Prepared by:

Reviewed by:



Miroslav Savic, P. Eng.
Senior Project Manager

A handwritten signature in black ink, appearing to read 'Lee Sheets'.

Lee Sheets, C.E.T.
Director

APPENDIX A
Correspondence

1900 – 2000 City Park (Ward 11) – Pre-application Consultation Notes

Meeting Date: Thursday, January 19, 2023, from 2:15 pm to 3 pm

Attendees	Antoine Cousineau, Architect, NEUF architectes Bonnie Martell, Development Manager, Colonnade BridgePort Carol Bandar, Architect, NEUF architectes Frank Puentes, Architect, NEUF architectes Greg Winters, Planner, Novatech James Ireland, Planner, Novatech Jennifer Luong, Transportation Engineer, Novatech Kelsey Charie, Project Manager (Development Review), City of Ottawa Lee Sheets, Senior Project Manager, Novatech Lucy Ramirez, Planner (Development Review), City of Ottawa Patrick McMahon, Project Manager (Transportation), City of Ottawa Phil Castro, Planner (Parks), City of Ottawa Randolph Wang, Planner (Urban Design), City of Ottawa
Regrets	Hayley Murray, Forester – PRED, City of Ottawa

Contents

1900 – 2000 City Park (Ward 11) – Pre-application Consultation Notes	1
Proposal Summary	2
City Surveyor	4
Engineering	4
Forestry	6
Planning.....	6
Official Plan.....	6
Secondary Plan.....	7
Community Design Plan.....	7
Consent Application	8

Zoning By-law Amendment 9

Guidelines 9

Planning Application Fees..... 9

Submission Requirements 10

Community Benefits Charge 10

High Performance Development Standards..... 11

Urban Design..... 11

Transportation 13

Waste Services..... 13

Parks 14

 Section 4.4 – Parks and Recreation Facilities of the Official Plan (2021)..... 14

 Parkland Dedication By-law Rates 14

 Parks & Facilities Planning (PFP) comments on the proposed concept:..... 15

Next Steps 15

Bill 109..... 15

 March 7 – Public Open House 16

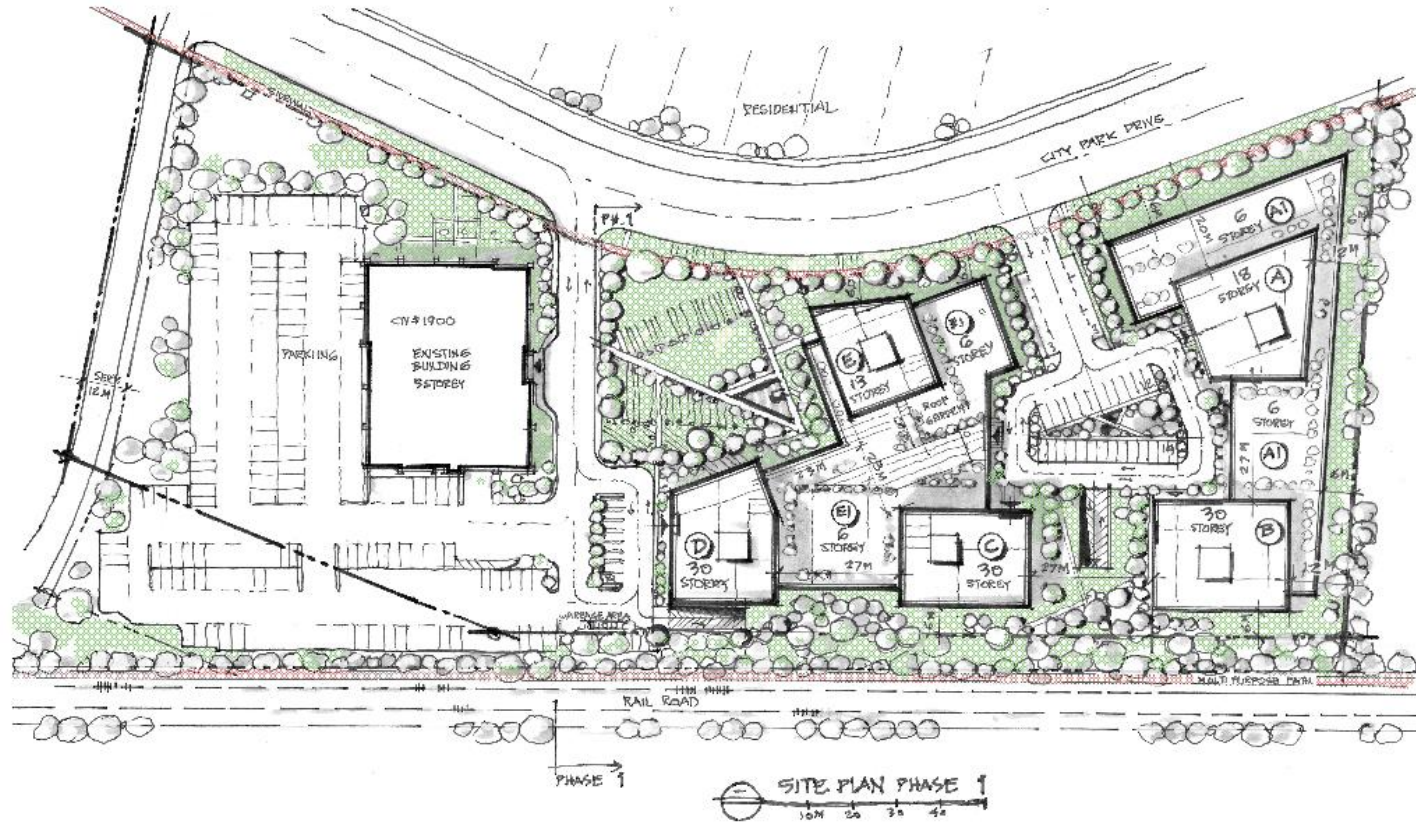
Attachments..... 16

Proposal Summary

There is an existing office building on site and parking at 1900 City Park Drive. The office building was built circa 1991. The property known municipally as 2000 City Park Drive is vacant. The Applicant is proposing a two-phase project – the first being 2000 City Park which is the vacant parcel. The second being “future development”, which is the demolition and re-development of 1900 City Park Drive. Projected timing of construction being 2024.

The pre-application consultation is for an Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBLA). Site Plan Applications will follow later. The proposal is to rezone the lands to TD3 which permits 30 storeys. Each individual building will do their own Site Plan Control process with associated studies.

PROPOSED SITE PLAN - PHASE 1



Plans and Sections

Figure 1: Concept Plan for 2000 City Park

City Surveyor

Bill Harper, City's Surveyor | Bill.Harper@ottawa.ca

The determination of property boundaries, minimum setbacks and other regulatory constraints are a critical component of development. An Ontario Land Surveyor (O.L.S.) needs to be consulted at the outset of a project to ensure properties are properly defined and can be used as the geospatial framework for the development.

Topographic details may also be required for a project and should be either carried out by the O.L.S. that has provided the Legal Survey or done in consultation with the O.L.S. to ensure that the project is integrated to the appropriate control network.

Engineering

Kelsey Charie, Project Manager Infrastructure Approvals | kelsey.charie@ottawa.ca

Please note the following information regarding the engineering reports for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address:

<https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans>

2. Servicing and site works shall be in accordance with the following documents:
 - Ottawa Sewer Design Guidelines, Second Edition, (October 2012), including Technical Bulletins, ISDTB-2014-01, PIEDTB-2016-01, ISTB 2018-01, ISTB-2018-04, and ISTB-2019-02
 - Ottawa Design Guidelines – Water Distribution, First Edition, (July 2010), including Technical Bulletins ISD-2010-2, ISDTB-2014-02, ISTB-2018-02, and ISTB-2021-03
 - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (Revised 2008)
 - City of Ottawa Slope Stability Guidelines for Development Applications (Revised 2012)
 - Ottawa Standard Tender Documents (latest version)

- Ontario Provincial Standards for Roads & Public Works (2013)
3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x 44455
 4. The Stormwater Management Criteria for the subject site is to be based on the following:
 - The pre-development condition of the site including the pre-development runoff coefficient or a maximum equivalent value of 0.5, whichever is less.
 - Flows to the storm sewer in excess of the 5-year pre-development storm release rate, up to and including the 100-year storm event, must be detained on site.
 - Ensure no overland flow for all storms up to and including the 100-year event. Provide adequate emergency overflow conveyance off-site
 5. Services:
 - i. Provide existing servicing information and the proposed servicing information for the sanitary, water, and storm services.
 - ii. Provide FUS method calculations for anticipated Fire Flow Demand
 - iii. Provide calculations for anticipated post-development 100 year storm flows and the required release pre-development release rate that is to be met.
 - iv. Provide storage volume calculations if required and discuss how onsite storage will be achieved
 - v. Provide estimated sanitary flows to allow the City to confirm whether there are any downstream capacity constraints
 - vi. Provide any quality control criteria for the proposed site as outlined by the RVCA and provide methodology to achieve quality control standards
 6. Civil consultant must request boundary conditions from the City's assigned Project Manager. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:
 - i. Location of service(s)
 - ii. Type of development and the amount of fire flow required (as per FUS, 2020).
 - iii. Average daily demand: ____ l/s.

- iv. Maximum daily demand: ___ l/s.
- v. Maximum hourly daily demand: ___ l/s.
- vi. Hydrant location and spacing to meet City's Water Design guidelines.
- vii. Water supply redundancy will be required for more than 50 m³/day water demand.

7. General Engineering Submission requirements:

- a. As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
- b. All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)

Forestry

Hayley Murray, Forester – PRED | hayley.murray@ottawa.ca

There are well established protected trees on this property. Please submit a Tree Conservation Report TCR that shows the footprint of the buildings with the proposed setbacks to understand the impacts of the Zoning By-law Amendment on tree retention. Include the current zoning setbacks and what is proposed.

Planning

Lucy Ramirez, Planner – Development Review | lucy.ramirez@ottawa.ca

Official Plan

Per the New Official Plan (2022) the subject property is designated Outer Urban Hub, (Schedule A and B3).

The New OP does have a policy to permit a high-rise where the parcel is of sufficient size to allow for a transition in built form massing. There is an existing stable residential neighbourhood across the street and any proposal will need to include a transition to this area.



March 27, 2023

Novatech
Suite 200, 240 Michael Cowpland Drive
Ontario, ON K2M 1P6

Attention: James Ireland, Project Planner – Planning and Development

Subject: 1900-2000 City Park Drive
Clarification of Notes, Study and Plan Identification List

Contents

Clarification of the notes	2
Engineering	2
Consent Application	2
Urban Design	3
Transportation	4
Parks	6
Next Steps	6
Clarification on the Study and Plan Identification List	7
Initial list	7
Applicant's response	8
City's response.....	9
Attachments:.....	12

Clarification of the notes

Engineering

Initial Engineering Comment

4. The Stormwater Management Criteria for the subject site is to be based on the following:
- The pre-development condition of the site including the pre-development runoff coefficient or a maximum equivalent value of 0.5, whichever is less.
 - Flows to the storm sewer in excess of the 5-year pre-development storm release rate, up to and including the 100-year storm event, must be detained on site.
 - Ensure no overland flow for all storms up to and including the 100-year event. Provide adequate emergency overflow conveyance off-site

Applicant's response

Engineering

In relation to note 4) Stormwater Management Criteria, the City requires post-development flows be controlled to the pre-development runoff coefficient, which in this case is 0.2. We should be controlling the post-development flows to an allowable runoff coefficient that the existing storm sewer system is sized (designed) for. Emergency overland flow details cannot be provided for rezoning as the plans are still conceptual and the design is still evolving. Details will be provided at the site plan stage when the grading plan will be prepared. The Stormwater management report will be provided as a part of the Adequacy of Public Services Report.

Engineering's Response

- I understand that per our notes the post-development runoff coefficient needs to be 0.2; however, you want a larger post-development coefficient. **What is the post-development coefficient you are seeking?**
- Regarding the emergency overland flow details, we do not want the details, it's something we want you to start thinking about now.

Consent Application

I've attached a copy of the Decision (D08-01-21/B-00378) dated February 11, 2022. I followed up with Davette Nyota, CofA Documents Approval Clerk at davette.nyota@ottawa.ca regarding the outstanding conditions. Conditions 1,2,3,4 and 6 are outstanding. The lapse date of the provisional consent decision is February 11, 2024. **Do you intend to finalize the consent?**

Revised APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.

A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer [here](#):

S/A	ENGINEERING		S/A
■	1. Site Servicing Plan	2. Site Servicing Study / Assessment of Adequacy of Public Services (with a conceptual site servicing figure)	S
■	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S
■	5. Composite Utility Plan	6. Groundwater Impact Study	■
■	7. Servicing Options Report	8. Wellhead Protection Study	■
S	9. Transportation Impact Assessment (TIA)	10. Erosion and Sediment Control Plan / Brief	■
S	11. Storm water Management Report / Brief	12. Hydro geological and Terrain Analysis	■
■	13. Hydraulic Water main Analysis	14. Noise / Vibration Study	■
■	15. Roadway Modification Functional Design	16. Confederation Line Proximity Study	■

S/A	PLANNING / DESIGN / SURVEY		S/A
■	17. Draft Plan of Subdivision	18. Concept Plan Showing Layout of Parking Garage	S
■	19. Draft Plan of Condominium	20. Planning Rationale	S
S	21. Conceptual Site Plan (required for design brief)	22. Minimum Distance Separation (MDS)	■
■	23. Concept Plan Showing Proposed Land Uses and Landscaping	24. Agrology and Soil Capability Study	■
S	25. Concept Plan Showing Ultimate Use of Land	26. Cultural Heritage Impact Statement	■
S	27. Conceptual Landscape Plan (required for design brief)	28. Archaeological Resource Assessment Requirements: S (site plan) A (subdivision, condo)	■
S	29. Survey Plan	30. Shadow Analysis	S
S	31. Conceptual Architectural Building Elevation Drawings (required for design brief)	32. Design Brief (includes the Design Review Panel Submission Requirements)	S
S	33. Wind Analysis		■

S/A	ENVIRONMENTAL		S/A
S	34. Phase 1 Environmental Site Assessment	35. Impact Assessment of Adjacent Waste Disposal/Former Landfill Site	■
A	36. Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37. Assessment of Landform Features	■
A	38. Record of Site Condition	39. Mineral Resource Impact Assessment	■
S	40. Tree Conservation Report (high level)	41. Environmental Impact Statement / Impact Assessment of Endangered Species	■
■	42. Mine Hazard Study / Abandoned Pit or Quarry Study	43. Integrated Environmental Review (Draft, as part of Planning Rationale)	■

S/A	ADDITIONAL REQUIREMENTS		S/A
S	44. Applicant's Public Consultation Strategy (may be provided as part of the Planning Rationale)	45. Site Lighting Plan	■
A	46. Site Lighting Certification Letter	47. Street Level Visualization of the proposed development (.jpg or pdf. Format)	S

Meeting Date: Thursday, January 19, 2023,

Application Type: OPA and ZBLA

File Lead (Assigned Planner): Lucy Ramirez

Infrastructure Approvals Project Manager: Kelsey Charie

Site Address (Municipal Address): 1900 and 2000 City Park Drive

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the Planning, Real Estate and Economic Development Department will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning, Real Estate and Economic Development Department.

Miro Savic

From: Charie, Kelsey <kelsey.charie@ottawa.ca>
Sent: Wednesday, April 12, 2023 1:23 PM
To: Miro Savic
Cc: Lee Sheets; Baird, Natasha
Subject: RE: 1900 & 2000 City Park Drive - RVCA Pre-Consultation

Hi Miro,

80% TSS removal please.

Regards,
Kelsey

From: Miro Savic <m.savic@novatech-eng.com>
Sent: April 12, 2023 10:38 AM
To: Charie, Kelsey <kelsey.charie@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>; Baird, Natasha <Natasha.Baird@ottawa.ca>
Subject: RE: 1900 & 2000 City Park Drive - RVCA Pre-Consultation

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi Kelsey,

I'm following up on the stormwater quality control requirements for the proposed development.

I need this information for inclusion in the Adequacy of Public Services report for re-zoning as per the City request at the pre-consultation meeting.

Thank you,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Miro Savic
Sent: Wednesday, April 5, 2023 12:34 PM
To: Charie, Kelsey <kelsey.charie@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: FW: 1900 & 2000 City Park Drive - RVCA Pre-Consultation

Hi Kelsey,

Can you please provide comments on stormwater quality control requirements. See email from RVCA below.

Thank you,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Eric Lalande <eric.lalande@rvca.ca>

Sent: Wednesday, April 5, 2023 11:22 AM

To: Miro Savic <m.savic@novatech-eng.com>

Subject: Re: 1900 & 2000 City Park Drive - RVCA Pre-Consultation

Hi Miro,

I would like to direct you to the City of Ottawa Infrastructure group as they are now handling water quality comments as a result of changes through Bill 23.

Thank you,

Eric Lalande, MCIP, RPP

Planner, RVCA

Get [Outlook for Android](#)

From: Miro Savic <m.savic@novatech-eng.com>

Sent: Wednesday, April 5, 2023 11:14:03 AM

To: Eric Lalande <eric.lalande@rvca.ca>

Subject: FW: 1900 & 2000 City Park Drive - RVCA Pre-Consultation

Hi Eric,

Please see email below as discuss.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Miro Savic

Sent: Wednesday, March 15, 2023 3:34 PM

To: 'Jamie Batchelor' <jamie.batchelor@rvca.ca>

Cc: Lee Sheets <l.sheets@novatech-eng.com>

Subject: 1900 & 2000 City Park Drive - RVCA Pre-Consultation

Hello Jamie,

We are working on a proposed multi-tower residential located at 1900 & 2000 City Park Drive. The proposed development will be phased and will consist of a total of eight (8) residential towers with podiums and underground parking. Attached is a conceptual site plan to better understand the proposed development.

The storm drainage from the site will be connected to the existing municipal storm sewers in City Park Drive. Currently, we are preparing an Assessment of Adequacy of Public Services Report to support a re-zoning application. The detailed SWM design will be part of the Site Plan Control submission to the City following the re-zoning application.

Please review and confirm the stormwater quality control requirements for the proposed development project.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265

The information contained in this email message is confidential and is for exclusive use of the addressee.

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.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

APPENDIX B

**Sanitary Sewer Calculations,
E-mail from the City of Ottawa**

Miro Savic

From: Charie, Kelsey <kelsey.charie@ottawa.ca>
Sent: Tuesday, April 11, 2023 8:18 AM
To: Miro Savic
Cc: Lee Sheets
Subject: RE: 1900 & 2000 City Park Drive - Watermain Boundary Conditions Request

Hi Miro,

I have followed up with water resources twice with no response. I have no control over when they will get to your water boundary request.

For sewer capacity, asset management flagged some concerns but will review in further detail when the zoning application is submitted.

For your reference, Jeff is the senior engineer for the South Branch, would you like me to include Natasha who is the senior engineer for the East Branch on future emails?

Kelsey

From: Miro Savic <m.savic@novatech-eng.com>
Sent: April 10, 2023 11:09 AM
To: Charie, Kelsey <kelsey.charie@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>; Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Subject: RE: 1900 & 2000 City Park Drive - Watermain Boundary Conditions Request

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi Kelsey,

Following up on my voicemail, I really need to know when we can expect to receive boundary conditions and sanitary analysis information for 1900 & 2000 City Park Drive.

It's been three and a half weeks since we ordered boundary conditions, and we cannot advance Adequacy of Public Services report without this information.

Thank you,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265

The information contained in this email message is confidential and is for exclusive use of the addressee.

APPENDIX C

Water Analysis, FUS Calculations, Watermain Boundary Conditions

1900 & 2000 CITY PARK WATER ANALYSIS

PHASE 1 BUILDINGS (A, B, C, D, and E)

Number of Units	
Building A	250
Building B	300
Building C	300
Building D	300
Building E	250
Total Number of Units	1400
Persons per Unit	1.8
Total Population	2,520
Average Day Demand per Person	280 L/c/day

Average Day Demand	8.2 L/s
Maximum Day Demand (2.5 x avg. day)	20.4 L/s
Peak Hour Demand (2.2 x avg. day)	44.9 L/s

PHASE 1 BOUNDARY CONDITIONS

Maximum HGL =	117.3 m
Minimum HGL =	109.3 m
Max Day + Fire Flow (133 l/s) =	112.0 m

PHASE1 PRESSURE TESTS

AVERAGE GROUND ELEVATION 74.5 m

HIGH PRESSURE TEST = MAX HGL - AVG GROUND ELEV x 1.42197 PSI/m < 80 PSI

HIGH PRESSURE = **61 PSI**

LOW PRESSURE TEST = MIN HGL - AVG GROUND ELEV x 1.42197 PSI/m > 40 PSI

LOW PRESSURE = **49 PSI**

MAX DAY + FIRE FLOW TEST = MAX DAY + FIRE - AVG GROUND ELEV x 1.42197 PSI/m > 20 PSI

MAX DAY + FIRE PRESSURE = **53 PSI**

1900 & 2000 CITY PARK WATER ANALYSIS

PHASE 2 (BUILDINGS F, G, and H)

Number of Units	
Building F	250
Building G	300
Building H	300
Total Number of Units	850
Persons per Unit	1.8
Total Population	1,530
Average Day Demand per Person	280 L/c/day

Average Day Demand	5.0 L/s
Maximum Day Demand (2.5 x avg. day)	12.4 L/s
Peak Hour Demand (2.2 x max. day)	27.3 L/s

PHASE 2 BOUNDARY CONDITIONS

Maximum HGL =	117.3 m
Minimum HGL =	109.3 m
Max Day + Fire Flow (133 l/s) =	112.2 m

PHASE 2 PRESSURE TESTS

AVERAGE GROUND ELEVATION 73.5 m

HIGH PRESSURE TEST = MAX HGL - AVG GROUND ELEV x 1.42197 PSI/m < 80 PSI

HIGH PRESSURE = **62 PSI**

LOW PRESSURE TEST = MIN HGL - AVG GROUND ELEV x 1.42197 PSI/m > 40 PSI

LOW PRESSURE = **51 PSI**

MAX DAY + FIRE FLOW TEST = MAX DAY + FIRE - AVG GROUND ELEV x 1.42197 PSI/m > 20 PSI

MAX DAY + FIRE PRESSURE = **55 PSI**

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 123006
 Project Name: 1900 & 2000 City Park Drive
 Date: 3/9/2023
 Input By: M. Savic
 Reviewed By:

Legend

Input by User
 No Information or Input Required

Building Description: Building A 14 Storey Tower with 6 Storey Podium
 Type I - Fire resistive construction (2 hrs)

Step		Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow					
1	Construction Material		Multiplier		0.6
	Coefficient related to type of construction C	Type V - Wood frame		1.5	
		Type IV - Mass Timber		Varies	
		Type III - Ordinary construction		1	
		Type II - Non-combustible construction		0.8	
Type I - Fire resistive construction (2 hrs)		Yes	0.6		
2	Floor Area				12,000
	A	Podium Level Footprint (m ²)	1690		
		Total Floors/Storeys (Podium)	6		
		Tower Footprint (m ²)	635		
		Total Floors/Storeys (Tower)	14		
		Protected Openings (1 hr)	No		
		A, Total Effective Floor Area (m ²)		8,030	
F	Base fire flow without reductions				
	F = 220 C (A)^{0.5}				
Reductions or Surcharges					
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge	10,200
	(1)	Non-combustible		-25%	
		Limited combustible	Yes	-15%	
		Combustible		0%	
		Free burning		15%	
	Rapid burning		25%		
4	Sprinkler Reduction		FUS Table 4	Reduction	-4,080
	(2)	Adequately Designed System (NFPA 13)	Yes	-30% -30%	
		Standard Water Supply	Yes	-10% -10%	
		Fully Supervised System	No	-10%	
		Cumulative Sub-Total			
	Area of Sprinklered Coverage (m²)	19030	100%		
	Cumulative Total		-40%		
5	Exposure Surcharge per		FUS Table 5	Surcharge	1,530
	(3)	North Side	>30m	0%	
		East Side	>30m	0%	
		South Side	10.1 - 20 m	15%	
		West Side	>30m	0%	
	Cumulative Total		15%		
Results					
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min		L/min	8,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	133
				or	2,114
7	Storage Volume	Required Duration of Fire Flow (hours)		Hours	2
		Required Volume of Fire Flow (m ³)		m ³	960

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 123006
 Project Name: 1900 & 2000 City Park Drive
 Date: 3/9/2023
 Input By: M. Savic
 Reviewed By:

Legend

Input by User
 No Information or Input Required

Building Description: Building B: 24 Storey Tower with 6 Storey Podium
 Type I - Fire resistive construction (2 hrs)

Step		Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow					
1	Construction Material		Multiplier		0.6
	Coefficient related to type of construction C	Type V - Wood frame		1.5	
		Type IV - Mass Timber		Varies	
		Type III - Ordinary construction		1	
		Type II - Non-combustible construction		0.8	
Type I - Fire resistive construction (2 hrs)		Yes	0.6		
2	Floor Area				10,000
	A	Podium Level Footprint (m ²)	978		
		Total Floors/Storeys (Podium)	6		
		Tower Footprint (m ²)	750		
		Total Floors/Storeys (Tower)	24		
		Protected Openings (1 hr)	No		
		A, Total Effective Floor Area (m ²)		5,412	
F	Base fire flow without reductions				
	F = 220 C (A)^{0.5}				
Reductions or Surcharges					
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge	8,500
	(1)	Non-combustible		-25%	
		Limited combustible	Yes	-15%	
		Combustible		0%	
		Free burning		15%	
	Rapid burning		25%		
4	Sprinkler Reduction		FUS Table 4	Reduction	-3,400
	(2)	Adequately Designed System (NFPA 13)	Yes	-30% -30%	
		Standard Water Supply	Yes	-10% -10%	
		Fully Supervised System	No	-10%	
		Cumulative Sub-Total			
	Area of Sprinklered Coverage (m²)	23868	100%		
	Cumulative Total		-40%		
5	Exposure Surcharge per		FUS Table 5	Surcharge	2,125
	(3)	North Side	10.1 - 20 m	15%	
		East Side	>30m	0%	
		South Side	>30m	0%	
		West Side	20.1 - 30 m	10%	
	Cumulative Total		25%		
Results					
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min		L/min	7,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s
				or	USGPM
7	Storage Volume	Required Duration of Fire Flow (hours)		Hours	2
		Required Volume of Fire Flow (m ³)		m ³	840

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 123006
 Project Name: 1900 & 2000 City Park Drive
 Date: 3/9/2023
 Input By: M. Savic
 Reviewed By:

Legend

Input by User
 No Information or Input Required

Building Description: Building C: 24 Storey Tower with 6 Storey Podium
 Type I - Fire resistive construction (2 hrs)

Step		Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow					
1	Construction Material		Multiplier		0.6
	Coefficient related to type of construction C	Type V - Wood frame		1.5	
		Type IV - Mass Timber		Varies	
		Type III - Ordinary construction		1	
		Type II - Non-combustible construction		0.8	
Type I - Fire resistive construction (2 hrs)		Yes	0.6		
2	Floor Area				10,000
	A	Podium Level Footprint (m ²)	954		
		Total Floors/Storeys (Podium)	6		
		Tower Footprint (m ²)	750		
		Total Floors/Storeys (Tower)	24		
		Protected Openings (1 hr)	No		
		A, Total Effective Floor Area (m ²)		5,316	
F	Base fire flow without reductions				
	F = 220 C (A)^{0.5}				
Reductions or Surcharges					
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge	8,500
	(1)	Non-combustible		-25%	
		Limited combustible	Yes	-15%	
		Combustible		0%	
		Free burning		15%	
	Rapid burning		25%		
4	Sprinkler Reduction		FUS Table 4	Reduction	-3,400
	(2)	Adequately Designed System (NFPA 13)	Yes	-30% -30%	
		Standard Water Supply	Yes	-10% -10%	
		Fully Supervised System	No	-10%	
		Cumulative Sub-Total			
	Area of Sprinklered Coverage (m²)	23724	100%		
	Cumulative Total		-40%		
5	Exposure Surcharge per		FUS Table 5	Surcharge	1,700
	(3)	North Side	>30m	0%	
		East Side	20.1 - 30 m	10%	
		South Side	>30m	0%	
		West Side	20.1 - 30 m	10%	
	Cumulative Total		20%		
Results					
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min		L/min	7,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s
				or	USGPM
7	Storage Volume	Required Duration of Fire Flow (hours)		Hours	2
		Required Volume of Fire Flow (m ³)		m ³	840

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 123006
 Project Name: 1900 & 2000 City Park Drive
 Date: 3/9/2023
 Input By: M. Savic
 Reviewed By:

Legend

Input by User
 No Information or Input Required

Building Description: Building D: 24 Storey Tower with 6 Storey Podium
 Type I - Fire resistive construction (2 hrs)

Step		Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow					
1	Construction Material		Multiplier		0.6
	Coefficient related to type of construction C	Type V - Wood frame		1.5	
		Type IV - Mass Timber		Varies	
		Type III - Ordinary construction		1	
		Type II - Non-combustible construction		0.8	
Type I - Fire resistive construction (2 hrs)		Yes	0.6		
2	Floor Area				10,000
	A	Podium Level Footprint (m ²)	942		
		Total Floors/Storeys (Podium)	6		
		Tower Footprint (m ²)	750		
		Total Floors/Storeys (Tower)	24		
		Protected Openings (1 hr)	No		
		A, Total Effective Floor Area (m ²)		5,268	
F	Base fire flow without reductions				
	F = 220 C (A)^{0.5}				
Reductions or Surcharges					
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge	8,500
	(1)	Non-combustible		-25%	
		Limited combustible	Yes	-15%	
		Combustible		0%	
		Free burning		15%	
	Rapid burning		25%		
4	Sprinkler Reduction		FUS Table 4	Reduction	-3,400
	(2)	Adequately Designed System (NFPA 13)	Yes	-30% -30%	
		Standard Water Supply	Yes	-10% -10%	
		Fully Supervised System	No	-10%	
		Cumulative Sub-Total			
		Area of Sprinklered Coverage (m²)	23652	100%	
	Cumulative Total		-40%		
5	Exposure Surcharge per		FUS Table 5	Surcharge	2,975
	(3)	North Side	10.1 - 20 m	15%	
		East Side	20.1 - 30 m	10%	
		South Side	>30m	0%	
		West Side	20.1 - 30 m	10%	
	Cumulative Total		35%		
Results					
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min		L/min	8,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s
				or	USGPM
					2,114
7	Storage Volume	Required Duration of Fire Flow (hours)		Hours	2
		Required Volume of Fire Flow (m ³)		m ³	960

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 123006
 Project Name: 1900 & 2000 City Park Drive
 Date: 3/9/2023
 Input By: M. Savic
 Reviewed By:

Legend

Input by User
 No Information or Input Required

Building Description: Building E: 14 Storey Tower with 6 Storey Podium
 Type I - Fire resistive construction (2 hrs)

Step		Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow					
1	Construction Material		Multiplier		0.6
	C Coefficient related to type of construction	Type V - Wood frame		1.5	
		Type IV - Mass Timber		Varies	
		Type III - Ordinary construction		1	
		Type II - Non-combustible construction		0.8	
Type I - Fire resistive construction (2 hrs)		Yes	0.6		
2	Floor Area				10,000
	A	Podium Level Footprint (m ²)	985		
		Total Floors/Storeys (Podium)	6		
		Tower Footprint (m ²)	832		
		Total Floors/Storeys (Tower)	14		
		Protected Openings (1 hr)	No		
		A, Total Effective Floor Area (m ²)		5,604	
F	Base fire flow without reductions				
	$F = 220 C (A)^{0.5}$				
Reductions or Surcharges					
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge	8,500
	(1)	Non-combustible		-25%	
		Limited combustible	Yes	-15%	
		Combustible		0%	
		Free burning		15%	
	Rapid burning		25%		
4	Sprinkler Reduction		FUS Table 4	Reduction	-3,400
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	
		Standard Water Supply	Yes	-10%	
		Fully Supervised System	No	-10%	
		Cumulative Sub-Total			
	Area of Sprinklered Coverage (m ²)	17558	100%		
	Cumulative Total		-40%		
5	Exposure Surcharge per		FUS Table 5	Surcharge	2,550
	(3)	North Side	>30m	0%	
		East Side	>30m	0%	
		South Side	10.1 - 20 m	15%	
		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	8,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s
				or	USGPM
7	Storage Volume	Required Duration of Fire Flow (hours)		Hours	2
		Required Volume of Fire Flow (m ³)		m ³	960

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 123006
 Project Name: 1900 & 2000 City Park Drive
 Date: 3/9/2023
 Input By: M. Savic
 Reviewed By:

Legend

Input by User
 No Information or Input Required

Building Description: Building F: 14 Storey Tower with 6 Storey Podium
 Type I - Fire resistive construction (2 hrs)

Step		Choose		Value Used	Total Fire Flow (L/min)	
Base Fire Flow						
1	Construction Material		Multiplier		0.6	
	Coefficient related to type of construction C	Type V - Wood frame		1.5		
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
Type I - Fire resistive construction (2 hrs)		Yes	0.6			
2	Floor Area				10,000	
	A	Podium Level Footprint (m ²)	965			
		Total Floors/Storeys (Podium)	6			
		Tower Footprint (m ²)	832			
		Total Floors/Storeys (Tower)	14			
		Protected Openings (1 hr)	No			
	A, Total Effective Floor Area (m ²)			5,524		
F	Base fire flow without reductions					
F = 220 C (A)^{0.5}						
Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge	8,500	
	(1)	Non-combustible		-25%		
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
			25%	-15%		
4	Sprinkler Reduction		FUS Table 4	Reduction	-3,400	
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%		-30%
		Standard Water Supply	Yes	-10%		-10%
		Fully Supervised System	No	-10%		-10%
		Cumulative Sub-Total				-40%
	Area of Sprinklered Coverage (m²)		17438	100%		
		Cumulative Total	-40%			
5	Exposure Surcharge per		FUS Table 5	Surcharge	2,125	
	(3)	North Side	>30m	0%		
		East Side	10.1 - 20 m	15%		
		South Side	20.1 - 30 m	10%		
		West Side	>30m	0%		
		Cumulative Total	25%			
Results						
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min		L/min	7,000	
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	117
				or	USGPM	1,849
7	Storage Volume	Required Duration of Fire Flow (hours)		Hours	2	
		Required Volume of Fire Flow (m ³)		m ³	840	

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 123006
 Project Name: 1900 & 2000 City Park Drive
 Date: 3/9/2023
 Input By: M. Savic
 Reviewed By:

Legend

Input by User
 No Information or Input Required

Building Description: Building G: 24 Storey Tower with 6 Storey Podium
 Type I - Fire resistive construction (2 hrs)

Step		Choose		Value Used	Total Fire Flow (L/min)	
Base Fire Flow						
1	Construction Material		Multiplier			
	Coefficient related to type of construction C	Type V - Wood frame		1.5		0.6
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
Type I - Fire resistive construction (2 hrs)		Yes	0.6			
2	Floor Area					
	A	Podium Level Footprint (m ²)	981			
		Total Floors/Storeys (Podium)	6			
		Tower Footprint (m ²)	750			
		Total Floors/Storeys (Tower)	24			
		Protected Openings (1 hr)	No			
		A, Total Effective Floor Area (m ²)		5,424		
F	Base fire flow without reductions				10,000	
		F = 220 C (A)^{0.5}				
Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge	8,500	
	(1)	Non-combustible		-25%		
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
	Rapid burning		25%	-15%		
4	Sprinkler Reduction		FUS Table 4	Reduction	-3,400	
	(2)	Adequately Designed System (NFPA 13)	Yes	-30% -30%		
		Standard Water Supply	Yes	-10% -10%		
		Fully Supervised System	No	-10%		
		Cumulative Sub-Total				-40%
	Area of Sprinklered Coverage (m²)	23886	100%			
		Cumulative Total		-40%		
5	Exposure Surcharge per		FUS Table 5	Surcharge	2,550	
	(3)	North Side	20.1 - 30 m	10%		
		East Side	20.1 - 30 m	10%		
		South Side	>30m	0%		
		West Side	20.1 - 30 m	10%		
		Cumulative Total		30%		
Results						
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min		L/min	8,000	
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	133
				or	USGPM	2,114
7	Storage Volume	Required Duration of Fire Flow (hours)		Hours	2	
		Required Volume of Fire Flow (m ³)		m ³	960	

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 123006
 Project Name: 1900 & 2000 City Park Drive
 Date: 3/9/2023
 Input By: M. Savic
 Reviewed By:

Legend

Input by User
 No Information or Input Required

Building Description: Building H: 24 Storey Tower with 6 Storey Podium
 Type I - Fire resistive construction (2 hrs)

Step		Choose		Value Used	Total Fire Flow (L/min)	
Base Fire Flow						
1	Construction Material		Multiplier			
	Coefficient related to type of construction C	Type V - Wood frame		1.5		0.6
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
Type I - Fire resistive construction (2 hrs)		Yes	0.6			
2	Floor Area					
	A	Podium Level Footprint (m ²)	1028			
		Total Floors/Storeys (Podium)	6			
		Tower Footprint (m ²)	750			
		Total Floors/Storeys (Tower)	24			
		Protected Openings (1 hr)	No			
	A, Total Effective Floor Area (m ²)			5,612		
F	Base fire flow without reductions				10,000	
		F = 220 C (A)^{0.5}				
Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge	8,500	
	(1)	Non-combustible		-25%		
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
			25%	-15%		
4	Sprinkler Reduction		FUS Table 4	Reduction	-3,400	
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%		-30%
		Standard Water Supply	Yes	-10%		-10%
		Fully Supervised System	No	-10%		-10%
		Cumulative Sub-Total				-40%
	Area of Sprinklered Coverage (m²)		24168	100%		
		Cumulative Total	-40%			
5	Exposure Surcharge per		FUS Table 5	Surcharge	850	
	(3)	North Side	>30m	0%		
		East Side	20.1 - 30 m	10%		
		South Side	>30m	0%		
		West Side	>30m	0%		
		Cumulative Total	10%			
Results						
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min		L/min	6,000	
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	100
				or	USGPM	1,585
7	Storage Volume	Required Duration of Fire Flow (hours)		Hours	2	
		Required Volume of Fire Flow (m ³)		m ³	720	

Miro Savic

From: Charie, Kelsey <kelsey.charie@ottawa.ca>
Sent: Tuesday, April 11, 2023 9:10 AM
To: Miro Savic
Cc: Lee Sheets
Subject: RE: 1900 & 2000 City Park Drive - Watermain Boundary Conditions Request
Attachments: 1900-2000 City Park Drive March 2023.pdf

Speak of the devil, they just responded.

Here is the information they have provided:

The following are boundary conditions, HGL, for hydraulic analysis at 1900-2000 City Park Drive (zone 1E) assumed to be connected to the 305 mm watermain on City Park Drive (see attached PDF for location).

Both Connections:

Min HGL: 109.3 m

Max HGL: 117.3 m

Max Day + Fire Flow (183.3 L/s): 112.0 m (Phase 1)

Max Day + Fire Flow (183.3 L/s): 112.2 m (Phase 2)

These are for current conditions and are based on computer model simulation.

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.

Regards,
Kelsey

From: Charie, Kelsey
Sent: April 11, 2023 8:18 AM
To: Miro Savic <m.savic@novatech-eng.com>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1900 & 2000 City Park Drive - Watermain Boundary Conditions Request

Hi Miro,

I have followed up with water resources twice with no response. I have no control over when they will get to your water boundary request.

For sewer capacity, asset management flagged some concerns but will review in further detail when the zoning application is submitted.

For your reference, Jeff is the senior engineer for the South Branch, would you like me to include Natasha who is the senior engineer for the East Branch on future emails?

Kelsey

From: Miro Savic <m.savic@novatech-eng.com>

Sent: April 10, 2023 11:09 AM

To: Charie, Kelsey <kelsey.charie@ottawa.ca>

Cc: Lee Sheets <l.sheets@novatech-eng.com>; Shillington, Jeffrey <jeff.shillington@ottawa.ca>

Subject: RE: 1900 & 2000 City Park Drive - Watermain Boundary Conditions Request

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi Kelsey,

Following up on my voicemail, I really need to know when we can expect to receive boundary conditions and sanitary analysis information for 1900 & 2000 City Park Drive.

It's been three and a half weeks since we ordered boundary conditions, and we cannot advance Adequacy of Public Services report without this information.

Thank you,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Miro Savic

Sent: Tuesday, April 4, 2023 1:08 PM

To: Charie, Kelsey <kelsey.charie@ottawa.ca>

Cc: Lee Sheets <l.sheets@novatech-eng.com>

Subject: RE: 1900 & 2000 City Park Drive - Watermain Boundary Conditions Request

Hi Kelsey,

Could you please follow up with water resources and assess management. We are planning to submit the servicing report next week and would like to get the boundary conditions and the sanitary information this week if possible.

Thanks,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Charie, Kelsey <kelsey.charie@ottawa.ca>

Sent: Thursday, March 23, 2023 4:22 PM

To: Miro Savic <m.savic@novatech-eng.com>

Cc: Lee Sheets <l.sheets@novatech-eng.com>

Subject: RE: 1900 & 2000 City Park Drive - Watermain Boundary Conditions Request

Hi Miro,

I have requested the water boundary conditions and the sanitary capacity information from our water resources and asset management departments. I will update you with their responses as soon as I hear back from them.

Kelsey

From: Miro Savic <m.savic@novatech-eng.com>

Sent: March 20, 2023 11:25 AM

To: Charie, Kelsey <kelsey.charie@ottawa.ca>

Cc: Lee Sheets <l.sheets@novatech-eng.com>

Subject: RE: 1900 & 2000 City Park Drive - Watermain Boundary Conditions Request

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hello Kelsey,

Would you be able to confirm when we can expect to receive boundary conditions?

Thank you,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Miro Savic

Sent: Tuesday, March 14, 2023 4:02 PM

To: kelsey.charie@ottawa.ca

Cc: Lee Sheets <l.sheets@novatech-eng.com>

Subject: 1900 & 2000 City Park Drive - Watermain Boundary Conditions Request

Hello Kelsey,

I'm writing to request watermain boundary conditions for the proposed development located at 1900 & 2000 City Park Drive. The proposed development will be phased and is expected to include eight residential towers: five towers in Phase 1 (Buildings A, B, C, D, and E) and three towers in Phase 2 (Buildings F, G, and H).

The anticipated domestic and fire water demands for the proposed development are noted below. The domestic water demands are calculated based on 1400 units in Phase 1 and 850 units in Phase 2. This is considered the maximum density for the site. The fire flows are calculated using the FUS method, based on a typical high-rise building, including fire resistive building construction and fully sprinklered building. The domestic water demands and the FUS fire flow demands calculations are attached for reference.

PHASE 1

Average Day Demand = 8.17 L/s

Maximum Day Demand = 20.42 L/s

Peak Hour Demand = 44.92 L/s

Maximum Fire Flow Demand (Building A) = 133 L/s (8,000 L/min)

PHASE 2

Average Day Demand = 4.96 L/s

Maximum Day Demand = 12.4 L/s

Peak Hour Demand = 27.27 L/s

Maximum Fire Flow Demand (Building G) = 133 L/s (8,000 L/min)

The water services for both phases of the proposed development will be connected to the existing 305mm diameter watermain in City Park Drive. Refer to the attached sketch for the approximate service connection locations. The exact configuration and locations of the water services will be determined in the site plan development stage when the detailed site servicing plans will be developed.

Please contact me should you have any questions or require additional information.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265

The information contained in this email message is confidential and is for exclusive use of the addressee.

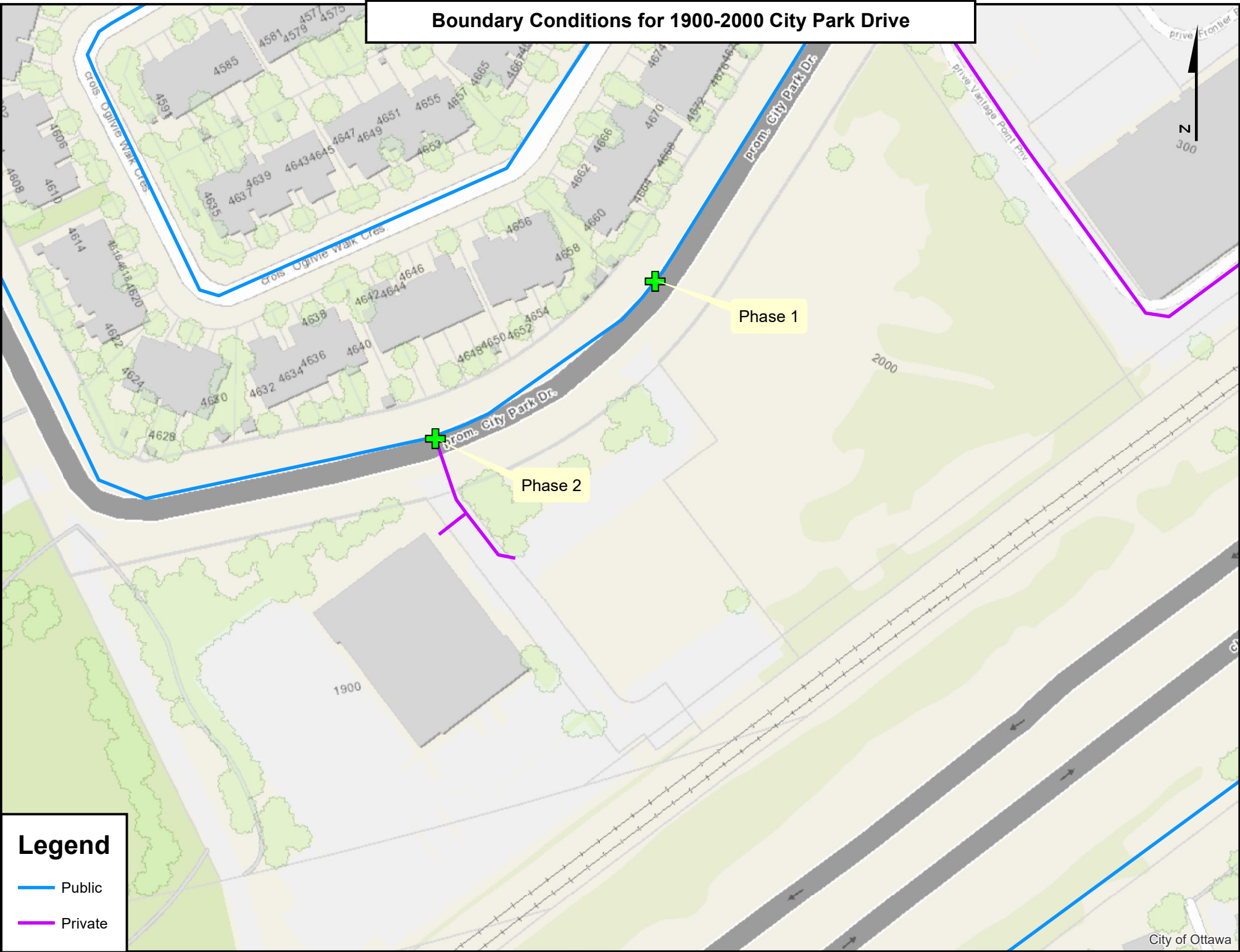
This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

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.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

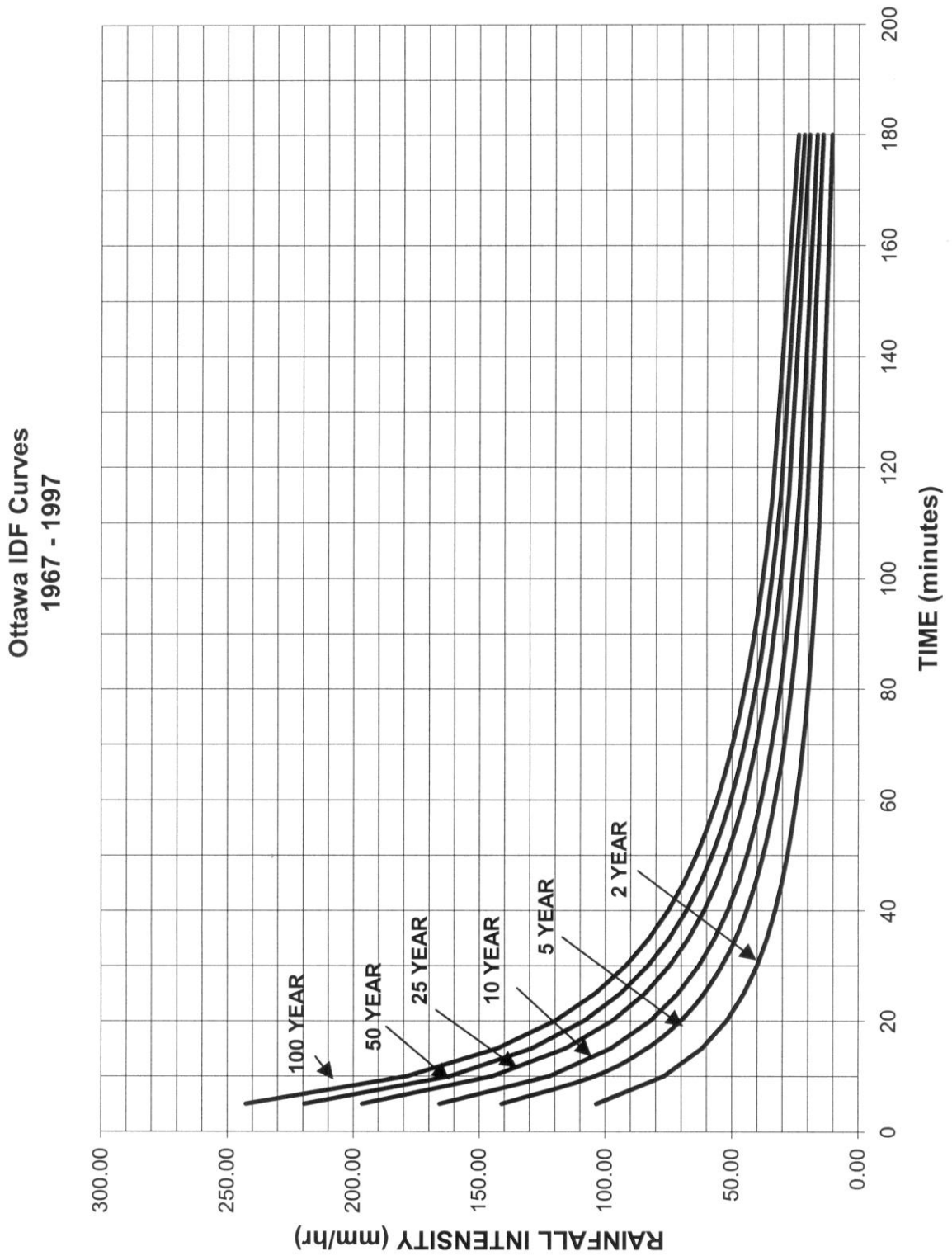
Boundary Conditions for 1900-2000 City Park Drive



Legend

- Public
- Private

APPENDIX D
IDF Curves and Preliminary SWM Calculations



Proposed Residential Development 1900 & 2000 City Park Drive

Pre - Development Site Flows										
Description	Area (ha)	$A_{impervious} (ha)$ C=0.9	$A_{pervious} (ha)$ C=0.2	Agravel (ha) C=0.6	Weighted C_{w5}	Weighted C_{w100}	1:5 Year Flow (L/s)	1:100 Year Flow (L/s)	Allowable C_{value}	Allowable Flow
										5 year (L/s)
Phase 1 (1900 City Park Drive)	1.551	0.089	1.398	0.064	0.26	0.28	115.3	217.7	0.26	115.3
Phase 2 (2000 City Park Drive)	1.089	0.850	0.239	0.000	0.75	0.84	235.4	451.7	0.50	157.7

$T_c = 10mins$

Post - Development Site Flows												
Area	Description	Area (ha)	$A_{imp} (ha)$ C=0.9	$A_{perv} (ha)$ C=0.2	C_5	C_{100}	Uncontrolled Flow (L/s)		Controlled Flow (L/s)		Storage Required (m ³)	
							5 year	100 year	5 year	100 year	5 year	100 year
A-1	Phase 1 Development	1.551	1.241	0.310	0.76	0.85	341.5	654.6	115.3	115.3	142.7	398.6
A-2	Phase 2 Development	1.089	0.871	0.218	0.76	0.85	239.7	459.6	157.7	157.7	50.1	189.0

1900 & 2000 City Park Drive				
Novatech Project No. 123006				
REQUIRED STORAGE - 1:5 YEAR EVENT				
AREA A-1 Phase 1 Development				
OTTAWA IDF CURVE				
Area =	1.551	ha	Qallow =	115.3 L/s
C =	0.76		Vol(max) =	142.7 m ³
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	141.18	462.69	347.39	104.22
10	104.19	341.48	226.18	135.71
15	83.56	273.85	158.55	142.69
20	70.25	230.24	114.94	137.92
25	60.90	199.58	84.28	126.42
30	53.93	176.74	61.44	110.59
35	48.52	159.01	43.71	91.79
40	44.18	144.81	29.51	70.82
45	40.63	133.15	17.85	48.21
50	37.65	123.40	8.10	24.31
55	35.12	115.11	-0.19	-0.62
60	32.94	107.97	-7.33	-26.40
65	31.04	101.74	-13.56	-52.88
70	29.37	96.26	-19.04	-79.96
75	27.89	91.40	-23.90	-107.55
80	26.56	87.05	-28.25	-135.59
85	25.37	83.14	-32.16	-164.01
90	24.29	79.60	-35.70	-192.77

1900 & 2000 City Park Drive				
Novatech Project No. 123006				
REQUIRED STORAGE - 1:100 YEAR EVENT				
AREA A-1 Phase 1 Development				
OTTAWA IDF CURVE				
Area =	1.551	ha	Qallow =	115.3 L/s
C =	0.85		Vol(max) =	398.6 m ³
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	242.70	889.61	774.31	232.29
10	178.56	654.50	539.20	323.52
15	142.89	523.77	408.47	367.62
20	119.95	439.67	324.37	389.24
25	103.85	380.64	265.34	398.02
30	91.87	336.74	221.44	398.59
35	82.58	302.69	187.39	393.51
40	75.15	275.44	160.14	384.34
45	69.05	253.10	137.80	372.06
50	63.95	234.42	119.12	357.36
55	59.62	218.55	103.25	340.71
60	55.89	204.88	89.58	322.48
65	52.65	192.97	77.67	302.92
70	49.79	182.50	67.20	282.24
75	47.26	173.21	57.91	260.60
80	44.99	164.91	49.61	238.13
85	42.95	157.44	42.14	214.94
90	41.11	150.69	35.39	191.10

1900 & 2000 City Park Drive				
Novatech Project No. 123006				
REQUIRED STORAGE - 1:5 YEAR EVENT				
AREA A-2 Phase 2 Development				
OTTAWA IDF CURVE				
Area =	1.089	ha	Qallow =	157.7 L/s
C =	0.76		Vol(max) =	50.1 m ³
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	141.18	324.83	167.13	50.14
10	104.19	239.73	82.03	49.22
15	83.56	192.25	34.55	31.10
20	70.25	161.64	3.94	4.72
25	60.90	140.11	-17.59	-26.38
30	53.93	124.08	-33.62	-60.52
35	48.52	111.63	-46.07	-96.74
40	44.18	101.66	-56.04	-134.49
45	40.63	93.48	-64.22	-173.39
50	37.65	86.63	-71.07	-213.20
55	35.12	80.81	-76.89	-253.73
60	32.94	75.80	-81.90	-294.85
65	31.04	71.43	-86.27	-336.47
70	29.37	67.58	-90.12	-378.50
75	27.89	64.17	-93.53	-420.90
80	26.56	61.12	-96.58	-463.61
85	25.37	58.37	-99.33	-506.59
90	24.29	55.88	-101.82	-549.81

1900 & 2000 City Park Drive				
Novatech Project No. 123006				
REQUIRED STORAGE - 1:100 YEAR EVENT				
AREA A-2 Phase 2 Development				
OTTAWA IDF CURVE				
Area =	1.089	ha	Qallow =	157.7 L/s
C =	0.85		Vol(max) =	189.0 m ³
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)
5	242.70	624.55	466.85	140.06
10	178.56	459.49	301.79	181.07
15	142.89	367.71	210.01	189.01
20	119.95	308.67	150.97	181.16
25	103.85	267.23	109.53	164.30
30	91.87	236.41	78.71	141.67
35	82.58	212.50	54.80	115.08
40	75.15	193.37	35.67	85.61
45	69.05	177.69	19.99	53.97
50	63.95	164.57	6.87	20.62
55	59.62	153.43	-4.27	-14.09
60	55.89	143.83	-13.87	-49.92
65	52.65	135.48	-22.22	-86.68
70	49.79	128.12	-29.58	-124.22
75	47.26	121.60	-36.10	-162.44
80	44.99	115.78	-41.92	-201.24
85	42.95	110.53	-47.17	-240.55
90	41.11	105.79	-51.91	-280.31