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- Environmental Restoration

Claridge Homes Inc.
141 George Street

Servicing and Stormwater Management Report

141 George Street

City of Ottawa

Servicing and Stormwater Management Report

Prepared By:

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

September 24th, 2024
Revised: January 23rd, 2025

Novatech File: 112142
Ref: R-2023-103

NOVATECH
Engineers, Planners & Landscape Architects

January 23,2025

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

Attention: **Vincent Duquette, Infrastructure Project Manager**

Reference: **141 George Street**
Servicing and Stormwater Management Report
Our File No.: 112142

Please find enclosed the 'Servicing and Stormwater Management Report' for the above noted development located in the City of Ottawa. This report is being submitted in support of a revised site plan application for 141 George to include the complete underground parking structure between York Street and George Street. The above grade building for 110 York and 116 York will be submitted under separate applications (OPA, Zoning and Site Plan).

Should you have any questions or require additional information, please contact the undersigned.

Yours truly,

NOVATECH

Greg MacDonald, P. Eng.
Director, Land Development and Public Sector Infrastructure

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Appendices

Figures

1.0 INTRODUCTION

Novatech has been retained to prepare a Servicing and Stormwater Management Report for the proposed site plan located at 141 George Street within the City of Ottawa. The purpose of this report is to support a revised site plan application for 141 George to include the complete underground parking structure between York Street and George Street. The above grade building for 110-116 York will be submitted under separate applications (OPA, Zoning and Site Plan). **Figure 1** Key Plan shows the site location.

1.1 Existing Conditions

The subject site is generally bound by York Street to the north, George Street to the south, the Andaz Hotel to the west and 118 York Street to the east. The total area comprises of approximately 0.44 hectares.

Presently the site contains the existing Whiskey Bar, addressed 112 York Street, along the York Street frontage. The remainder of the site presently consists of an aboveground asphalt parking area, with access to Dalhousie and George Street.

The site primarily drains from the south to the north with a +/- 1.56m grade differential across the site. **Figure 2** shows the existing site conditions.

Previous and relevant reports pertaining to the development of this site include:

110 York and 141 George Street Serviceability Memo, by Novatech dated March 12, 2024

This memo assessed the serviceability of the development based on a concept which included the following:

- 141 George with 296 residential units and 679 m^2 of commercial area
- 110 York Street with 106 hotel rooms and 793 m^2 of commercial space

Residential / Hotel Development 141 George Street/ 325 Dalhousie Street/110 York Street, Ottawa, Ontario, Servicing Design Brief', by Novatech Engineering dated April 12, 2018

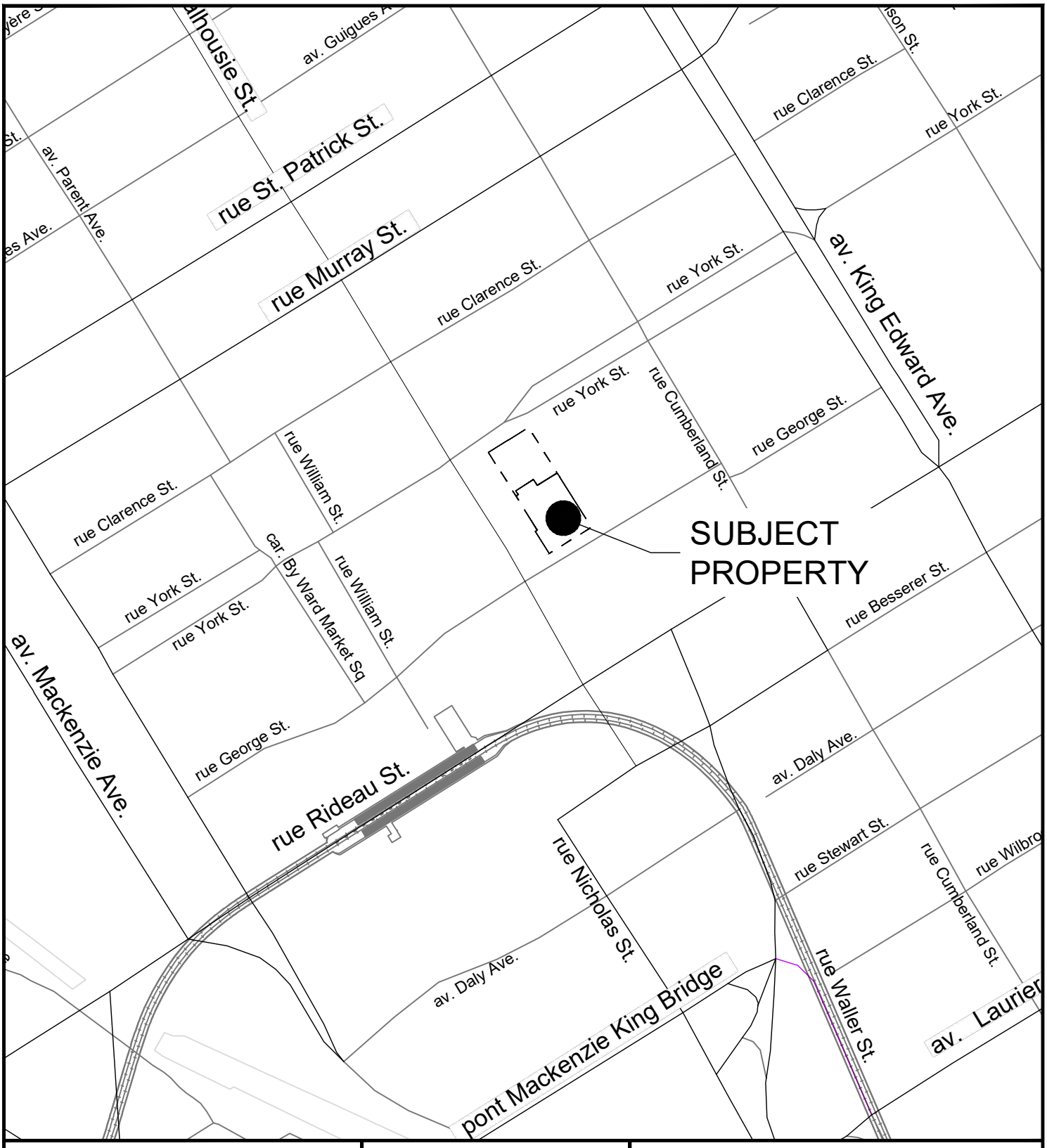
This memo assessed the serviceability of the development based on a concept which included the following:

- 141 George with 282 residential units and 1097 m^2 of commercial area
- 110 York Street with 128 hotel rooms with connection to the existing Andaz Hotel

Residential / Hotel Development 141 George Street/ 325 Dalhousie Street/, Ottawa, Ontario, Servicing Design Brief (Incl. Interim Condition) by Novatech dated February 14, 2014

This memo assessed the serviceability of the development based on a concept which included the following:

- 141 George with 282 residential units and 1079 m^2 of commercial area



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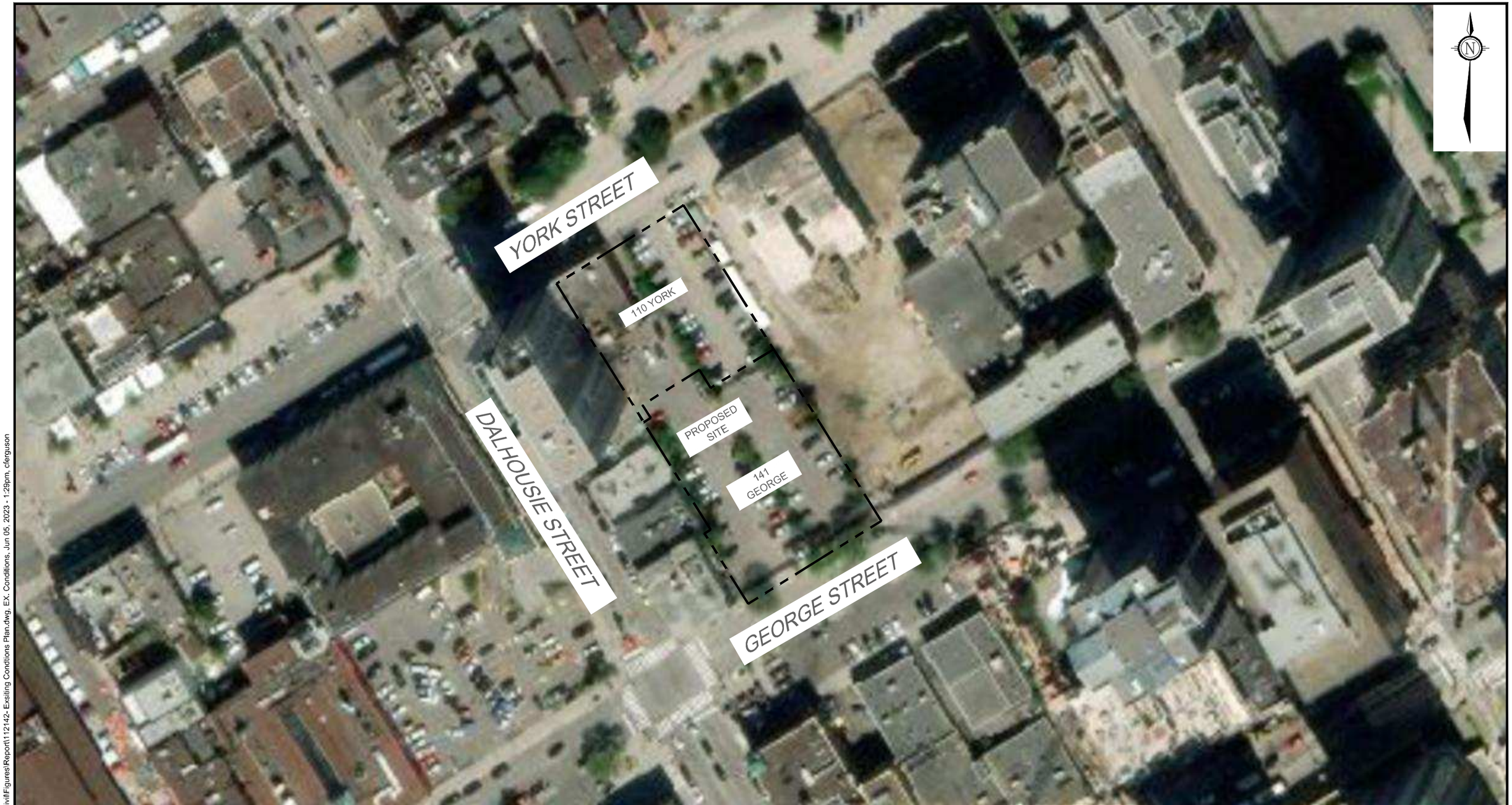
CITY OF OTTAWA

141 GEORGE STREET

KEY PLAN

SCALE: N.T.S

DATE: SEPT 2024 | JOB: 112142 | FIGURE: FIGURE 1



LEGEND

SITE BOUNDARY

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CITY OF OTTAWA
141 GEORGE STREET

EXISTING CONDITIONS

SCALE 1 : 1000 (0 10 20 30 40)

DATE SEPT 2024 | JOB 112142 | FIGURE FIGURE 2

SHT11X17.DWG - 279mmX432mm

M:\2012\112142_141 GEORGE-110 YORK\CAD\CivilFigures\Report\112142- Exsiting Conditions Plan.dwg, EX. Conditions, Jun 05, 2023 - 1:29pm, cferguson

- 325 Dalhousie Street (current Andaz Hotel) with 187 hotel rooms and 292m^2 of commercial space

Site plan approval for the 141 George Street was received based on a 22-storey building with 296 residential units, 679m^2 of commercial area and 288 underground parking spaces on 4 levels of parking within the 141 George Street property.

1.2 Proposed Development

This report is submitted in support of a revised site plan application for the approved 141 George Street project. Plans are to build-out the complete underground parking for both 141 George Street and 110 – 116 York Street. The above grade building at 110-116 York Street will be subject to future development applications (OPA, Zoning and Site Plan) and will not be built at this time. However, proposed services for the building will be assessed and extended to the building and capped for future connection.

The proposed development at 141 George Street will change slightly as follows;

- 297 residential units, an office area (72.70m^2), and Commercial area (453.00m^2)

The proposed future 110-116 York Building will consist of 154 hotel rooms and a Banquet Hall with a maximum capacity of 615 persons and a Bar/Cocktail lounge with a maximum capacity of 235 persons

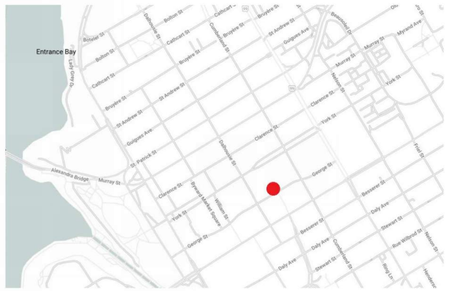
Access to the proposed underground parking structure will be provided from George Street and Dalhousie Street. The proposed parking structure will have four (4) levels of parking beneath the development of 141 George and 110-116 York.

Figure 3 shows the site plan for the proposed development.

2.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation was completed for the development, and a report prepared entitled 'Geotechnical Investigation', Proposed High-Rise Building, 137/141 George Street & 110/116 York Street, Ottawa, Ontario prepared by Paterson Group Inc. dated October 29, 2024 (PG2733-3, Rev 5). The following is a summary of the findings of the report:

- The long-term groundwater table can be expected at a depth of approximately 2.5 to 4.5 m throughout the subject site. It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.
- Practical auger refusal was encountered on the bedrock surface at approximate depths ranging from 3.5 to 5.6 m. Based on the recovered rock core samples, the bedrock was observed to consist of grey limestone, which is poor to good in quality in the upper 1 to 1.5 m, generally becoming excellent in quality with depth.
- Existing foundation walls and other construction debris should be entirely removed from within the building perimeter and within the lateral support zones of the foundation. Under paved areas, existing construction remnants, such as foundation walls, should be excavated to a minimum of 1 m below final grade.
    - The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation

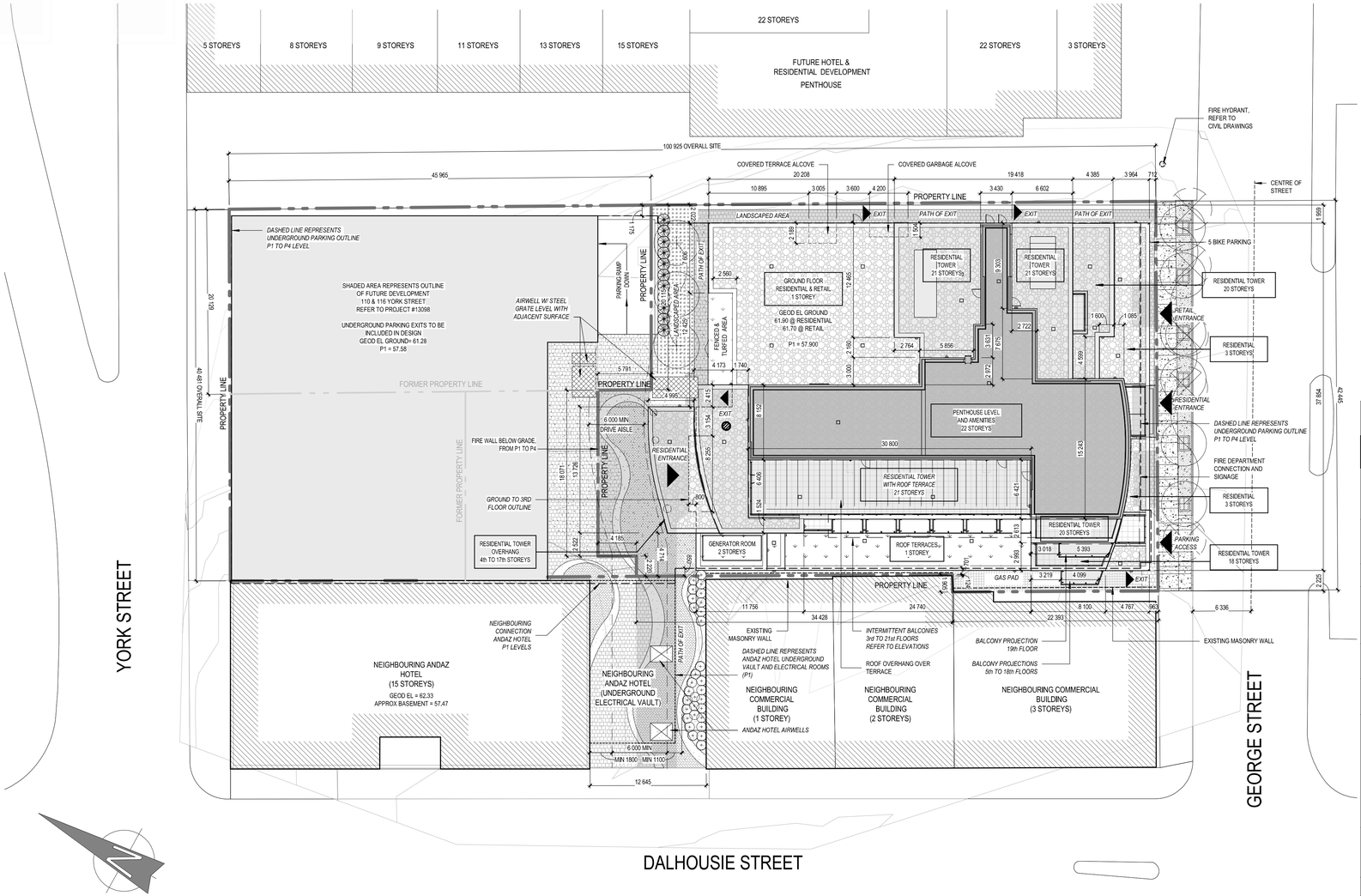


NOTES
• FOR EXISTING SITE CONDITIONS, SEE SURVEY PLAN BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD., SUBMITTED SEPERATELY. • FOR NEW GRADES AND SITE SERVICES, SEE CIVIL ENGINEERING PLANS BY NOVATECH ENGINEERING CONSULTANTS, SUBMITTED SEPERATELY. • ZONING GFA INCLUDES AREA MEASURED FROM THE INTERIOR FACE OF EXTERIOR WALLS TO THE EXTERIOR FACE OF PARTY WALLS SEPARATING DIFFERENT USES, AS DEFINED IN CITY OF OTTAWA ZONING BY-LAW DEFINITION (2008-250).

SOLID WASTE COLLECTION REQUIREMENTS		
ZONING MECHANISM	REGULATION	PROPOSED
Residential Waste	**Garbage (Compacted)** = 0.053y³/unit Require 16y³ **Recycling (GMP)** = 0.018y³/unit Require 6y³ **Recycling (Fibres)** = 0.038y³/unit Require 12y³ **Organics** = 240L container/50 units Require 6 containers	**Garbage (Compacted)** = 6 x 3y³ containers Total = 18y³ **Recycling (GMP)** = 2 x 3y³ containers Total = 6y³ **Recycling (Fibres)** = 4 x 3y³ containers Total = 12y³ **Organics** = 7 x 240L containers Total = 1680L

OCCUPANCY	UNITS / STOREYS	PROPOSED ZONING GFA
Residential (Rental)	297 units / Ground to 21st floors	Ground = 1 caretaker unit = 93.9m² (excluded) 2ND = 16 units = 939m² 3rd = 16 unit = 946m² 4th - 11th = 15 units/floor = 934m²/ floor 12th = 15 units = 932m² 13th - 17th = 15 units/floor = 934m²/ floor 18th = 14 units = 876m² 19th & 20th = 14 units = 851m² 21st = 12 units = 772m² TOTAL = 18,309m² (without Ground)
	Minimum 15% (44 units) required to be Barrier-Free (BF) to be distributed throughout residential storeys.	8 x Studios (1BF units = 15%)) 191 x 1 Bedroom (31BF units = 16%) 98 x 2 Bedroom (15BF units = 15%) 47BF units = 15%
Commercial	Ground	Commercial = 453m² Office = 72m²
	TOTAL	**18,834m²**

MIXED-USE WITH GROUND FLOOR COMMERCIAL - ZONING - MD2 (2031) S307		
ZONING RULE	REQUIREMENT	PROVIDED
Minimum lot area	No minimum	3,109.10m²
Minimum lot width	No minimum	42.45m on George Street. 40.40 on back portion.
Minimum front yard	No minimum, 1m maximum.	0.72m on George Street
Minimum interior side yard	No minimum	0.70m on West side of building. 1.94m on East side of building.
Minimum rear yard	No minimum	6.29m to one storey volume. 5.47m to 4th to 17th floor overhang.
Maximum building height	70m as per Schedule 307. No projections permitted beyond building height.	70m all inclusive.
Maximum floor space index	Not applicable	Not applicable
Minimum width of landscape area	No minimum except that where a yard is provided and not used for required driveways, aisles, parking, loading spaces, or outdoor commercial patio, the whole yard must be landscaped	Whole yard to be landscaped.
Provisions for buildings 10 storeys and higher (By-law 2019-353)	Minimum lot area for an interior lot: 1350m². Minimum interior side and rear yard setback for a tower: 7.5m Minimum separation distance between towers on the same lot: 15m.	Minimum lot area met. Site Plan Approval received. Not applicable.
Parking Garage permission	100% of ground floor fronting a street (excluding mechanical room, pedestrian and vehicular access) for a minimumm depth of 3m, must be occupied by permitted use..	100% of ground fronting George Street for a minimumm depth of 3m, is occupied by permitted Commercial use and Office use.
Ground floor use	100% of ground floor fronting a street (excluding lobby area, mechanical room and access to other floors) for a minimumm depth of 3m, must be occupied by select uses. Total gross area of lobbies, mechanical rooms and access to other floors must not exceed 50% of ground floor gross area. Min. 50% of ground floor to be occupied by permitted use subject to a separate and direct access to abutting street.	100% of ground fronting George Street for a minimumm depth of 3m, is occupied by permitted Commercial use, Total gross area of lobbies, mechanical rooms and access to other floors does not exceed 50% of ground floor gross area. Area of permitted Commercial use exceeds 50% of gross floor area and has separate direct access to George Street.



SITE PLAN
1 : 250

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AMENITY AND PARKING REQUIREMENTS ZONING - MD2 (2031) S307 **(PARKING COMBINED WITH FUTURE 110 & 116 YORK STREET DEVELOPMENT)**				
ZONING MECHANISM	REGULATION	ORIGINAL PROPOSAL 1 STOREY PARKING (DEC 7, 2012)	PROPOSED 5 STOREY PARKING (JUN 6, 2023)	NEWLY PROPOSED 4 STOREY PARKING (NOV 2024)
Residential Parking **141 GEORGE** **110 & 116 YORK**	None Required 6m drive aisle required.	Hotel & Condos 5 exterior 225 interior	P2 26 spaces P3 51 spaces P4 52 spaces P5 52 spaces	P3 44 spaces P4 22 spaces 6.0m drive aisle provided. P3 41 spaces P4 41 spaces
Visitor Parking **141 GEORGE**	Residential Area Z (By-law 2016-249): no more than 30 visitor spaces are required per building, Exception #2031: 0.083 spaces x 297 units = 25 visitor parking spaces 6m drive aisle required.		P1 2 spaces P2 23 spaces	P4 25 spaces 6.0m drive aisle provided,
Commercial Parking **141 GEORGE**	None Required 6.7m drive aisle required.		P1 5 spaces.	None Required,
Hotel Parking **141 GEORGE** **110 & 116 YORK**	None Required 6m drive aisle required.		P1 25 spaces	P1 30 spaces P2 44 spaces 6.0m drive aisle provided. P1 22 spaces P2 41 spaces
		Total: 230 spaces	**Total: 245 spaces**	**Total: 310 spaces** 141 George 165 spaces 110 York 145 spaces
Barrier-Free Parking **141 GEORGE** **110 & 116 YORK**	Requires 4 barrier-free spaces (Traffic and Parking By-Law 2017-301)		P1 to P5 2 spaces per floor **Total 10 spaces**	P1 to P4 1 space per floor **Total: 4 spaces**
Minimum Bicycle Parking **141 GEORGE** **110 & 116 YORK**	Residential: 0.5 spaces x 297 units = 149 bicycle parking spaces Retail: 1 space per 250m² of GFA 468m² GFA / 250m² = 2 bicycle parking spaces Hotel: 1 per 1000m² of GFA +/-6,800m² GFA/1,000m² = 7 bicycle parking spaces Minimum 50% to be horizontal racks.	Condo 141 interior Hotel 7 exterior **Total: 148 spaces**	Residential: 16 (P1) (Indoor) 64 (P2) 66 (P3) Retail : 5 (Exterior) **Total: 151 spaces**	Residential: 65 (P1) 63 (P2) 31 (P3) Retail : 5 (Exterior) **Total 164 spaces** Hotel 9 (Interior) **Total: 173 spaces** 76 (44%) vertical mount.
Maximum parking	1.5 per dwelling unit Limited to 446 space for 297 units. (combined with visitor) 1 per 100m² of Commercial gross area. Limited to 5 spaces.		Total parking spaces is under the limit.	Total parking spaces is under the limit.
Minimum driveway width	6m		6m	6m
Minimum aisle width	6m		6m	6m
Loading	Exception #2031; None Required.		NA	NA
Amenities Areas	Amenity Area - 6m² per unit = 297 units x 6m² = 1,782m² Communal Amenity Area : Exception #2031; minimum 40% off the required total Amenity Area = 1,782m² x 0.4 = minimum 713m² Layout of Communal Amenity Area - aggregated into areas up to 54m²		Total Balconies = 1,555m² Ground = 35m² 2nd = 59m² 3rd = 89m² 4th to 17th = 75m²/ floor 18th = 77m² 19th = 85m² 20th = 75m² 21st = 85m² Total Communal = 729m² Ground floor = 220m² 2nd = 195m² 21st = 341m² Total = 2,284m²	Total Balconies = 1,727m² 2nd = 110m² 3rd = 113m² 4th = 95m² 5th to 17th = 82m²/ floor 18th = 80m² 19th = 97m² 20th = 84m² 21st = 82m² Total Communal = 773m² Ground floor = 432m² 22nd = 341m² Total = 2,500m²

GENERAL NOTES

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2. The contractor is responsible for checking and verifying all dimensions with respect to the project. Any discrepancy shall be reported to the architect.
3. The architect must be notified of all errors, omissions, and discrepancies between these documents and those of the other professionals.
4. Do not scale drawings. The dimensions on these documents must be read and not measured.
5. These drawings are to be read in conjuction with all material relevant to the project.

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8288

NEUF
ARCHITECT(E)S

Client

CLARIDGE HOMES

Project

141 GEORGE STREET

Location: OTTAWA
No.: 12810

NO	REVISION	DATE (yyyy.mm.dd)
KK	FOR COORDINATION	2023.12.04
LL	FOR COORDINATION	2023.12.15
MM	FOR PERMIT	2023.12.21
OO	FOR COORDINATION	2024.01.23
RR	FOR COORDINATION	2024.02.26
VV	RE-ISSUED FOR PERMIT	2024.04.16
WW	FOR COORDINATION	2024.05.02
XX	FOR COORDINATION	2024.05.09
YY	FOR COORDINATION	2024.05.14
ZZ	RE-ISSUED FOR SITE PLAN APPROVAL	2024.05.16
CCC	FOR TENDER	2024.05.23
FFF	FOR REVISED FOUNDATION PERMIT	2024.07.03
III	SITE PLAN REVISION RESPONSE	2024.08.26
LLL	FOR COORDINATION	2024.10.23
MMM	SITE PLAN REVISION	2024.11.07
NNN	ISSUED FOR CONSTRUCTION	

Drawn by: SJ
Checked by: LH
DATE (aa.mm.jj): FEB 2023
Scale: As indicated

Drawing Title

SITE PLAN

Revision: NNN
Dwg Number: A100

PC2024-0200
D070-12-12-0199
16814

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below groundwater level. The subsurface soil is considered to be mainly a Type 2 and Type 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects. Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant.

- A temporary Ministry of Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required if more than 400,000 L/day of ground and/or surface water are to be pumped during the construction phase.
- For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR).

3.0 WATER SERVICING

There are existing City watermains in all rights-of-way fronting the proposed site. There is an existing 200mm diameter (dia.) watermain within York Street, a 300mm (dia.) watermain in Dalhousie Street, and a 300mm (dia.) watermain within George Street.

Each building will have its own individual water entry, and servicing. It is proposed to service 141 George Street with two (2) individual 150mm diameter services. Two (2) services will connect to the existing 300mm diameter watermain within the George Street right-of-way. Additionally, two (2) 150mm diameter services will connect to the existing 200mm diameter watermain within the York Street right-of-way which will service the future 110-116 York Building. The proposed services will be separated by the existing isolation valves within the rights-of-way providing redundancy, as per the City of Ottawa standards.

The buildings will be sprinkled and equipped with a siamese connections located near the main entrance within 45m of a fire hydrant. Refer to the General Plan of Services drawing (112142-GP) for servicing details.

Water demand calculations have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines and the Ontario Building Code as follows:

- Average Day Demand (Residential) = 280L/cap/day
- Average Day Demand (Hotel) = 225L/cap/day
- 1 Bedroom Apartment = 1.4 Persons/unit
- 2 Bedroom Apartment = 2.1 Persons/unit
- 3 Bedroom Apartment = 3.1 Persons/unit
- Office = 75L/person/day
- Bar/Cocktail Lounge = 70 L/seat/day
- Banquet Hall = 30L/seat/day
- Restaurant = 125 L/seat/day
- Residential Peaking Factors
  - Maximum Day = 2.5 x Avg Day
  - Peak Hour = 2.2 x Max Day
- Commercial Peaking Factors
  - Maximum Day = 1.5
- Peak Hour = 1.8

The required fire demand was calculated using the OBC and compared to Fire Underwriters Survey 2020 (FUS) Guidelines. Through correspondence with the architect, it is understood that the proposed buildings are residential occupancy (Limited Combustible), composed of fire resistive construction (2 hrs.), and will contain a fully supervised sprinkler system designed as per NFPA 13.

The water demand calculations, fire flow calculations and correspondence are provided in **Appendix B** for reference. A summary of the water demand and fire flows for both 141 George Street and 110-116 York Street is provided in **Table 3.1 and Table 3.2**.

Table 3.1: Water Demand Summary (141 George Street)

Population	Commercial Area (m^2)	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)	Fire Flow (L/s) - OBC
502	525.70	2.17	4.83	10.26	100	150

Table 3.2: Water Demand Summary (110-116 York Street)

Hotel Population	Banquet Hall (Seats)	Bar/ Cocktail Lounge (Seats)	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s) - FUS	Fire Flow (L/s) - OBC
227.20	615	235	1.13	1.69	3.04	100	150

Note as per ITSB 2018-02 the fire flow was distributed among several surrounding hydrants during modelling as outlined in **Table 3.3**.

Table 3.3: Maximum Flow to be considered from a given hydrant.

Hydrant Class	Distance to building (m)	Contribution to Fire Flow	
		(L/min)	(L/s)
AA	≤75	5700	95
	>75and ≥150	3800	63.33
A	≤75	3800	63.33
	>75and ≥150	2850	47.50
B	≤75	1900	31.67
	>75and ≥150	1500	25.00
C	≤75	800	13.33
	>75and ≥150	800	13.33

For the purpose of the analysis, and in light of the available pressures, it was assumed off-site hydrants would be rated as Class AA. As the fire flow is calculated as 100 L/s, two (2) hydrants will be required to achieve the required flow. There are presently 2 existing class AA hydrants

within the boulevards of George Street within 75m of the proposed building capable of providing a maximum flow of 190L/s as per **Table 3.3**. Both hydrants are within 45m of the proposed Siamese connection. Refer to **Appendix B** for calculations and the hydrant coverage figure.

Fire hydrant coverage for the proposed 110-116 York Building is shown in **Appendix B** as well.

Water demand information for 141 George Street was submitted to the City for boundary conditions from the City's water model for a previous design iteration. The building demands at the time of the request were as noted in **Table 3.4** below

Table 3.4: Water Demand Summary (141 George Street)

Population	Commercial Area (m^2)	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)	Fire Flow (L/s) - OBC
502	670	2.03	4.68	10.04	100	150

As depicted above the demands previously circulated were slightly lower than the present design. The slight increase will have a negligible impact on the system pressures due to the robust nature of the City of Ottawa water system.

The boundary conditions were used for analyzing the performance of the proposed and existing watermain systems for three theoretical conditions:

1) High Pressure check under Average Day conditions
2) Peak Hour demand
3) Maximum Day + Fire Flow demand.

Refer to **Table 3.4,** for a summary of the boundary conditions and hydraulic analysis.

Table 3.4: Water Boundary Conditions Response (141 George Street)

Criteria	Head (m)	Pressure[1] (m)	Pressure (PSI)	Pressure Requirements
Connection (George Street)				
Min HGL	106.3	44.4	63.08	> 40psi
Max HGL	115.4	53.5	76.01	< 80psi
Max Day + Fire Flow	109.0	47.1	66.91	> 20psi

[1]Pressure based on a Finished Floor elevation of 61.90m

Boundary conditions have been requested for the 110-116 York Street project, and we are presently awaiting response from the City. Based on our knowledge of the water system in the area it is expected that adequate pressures and flows are available in York Street for this development.

The hydraulic analysis indicates that the system can provide adequate pressures and flow to meet the domestic and fire flow requirements for the site. Refer to **Appendix B** for detailed water demand calculations, and City of Ottawa boundary conditions.

4.0 SANITARY SERVICING

There are existing City sanitary sewers in all rights-of-way fronting the proposed site. There is an existing 1200mm sanitary sewer within York Street right-of-way, a 250mm sanitary sewer within Dalhousie Street right-of-way, and a 1980x1500 brick sanitary sewer (horseshoe shape) within George Street right-of-way.

It is proposed to service the George Building with a 200mm sanitary service connection to the existing 1980x1500 brick sanitary within the George Street right-of-way.

Additionally, it is proposed to service the future 110-116 York Building with a 200mm sanitary service connection to the existing 1200mm sanitary within the York Street right-of-way.

Sanitary flows for the proposed developments were calculated using criteria from Section 4 of the City of Ottawa Sewer Design Guidelines and the Ontario Building Code as follows:

- Residential Average Flow = 280 L/capita/day
- Hotel Average Flow = 225L/cap/day
- 1 Bed apartment = 1.4 Person/unit
- 2 Bed apartment = 2.1 Person/unit
- 3 Bed apartment = 3.1 Person/unit
- Professional Office flow = 75 L/9.3m^3/day
- Retail Restaurant flow = 125 L/seat/day
- Bar / Cocktail Lounge flow = 70 L/seat/day
- Banquet Hall= 30L/seat/day
- Residential Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Commercial Peaking Factor = 1.5
- Peak Extraneous Flows (Infiltration) = 0.33L/s/ha

The peak sanitary flow including infiltration for 141 George Street was calculated to be **6.30 L/s**. Detailed sanitary flow calculations are provided in **Appendix C** for reference.

The anticipated peak sanitary flow including infiltration for 110-116 York Street was calculated to be **3.05 L/s**. Detailed sanitary flow calculations are provided in **Appendix C** for reference.

5.0 STORM SERVICING

There is a 675m storm sewer located within the York Street right-of-way, a 450mm storm sewer located in Dalhousie Street right of-way and a 900mm storm sewer within the George Street right-of-way fronting the proposed development.

It is proposed to service the proposed 141 George development with one (1) 250mm storm service connections to the existing 900m storm sewer within the George Street right-of-way. The storm service will convey the uncontrolled foundation drain and the controlled flows from the internal stormwater cistern within the parking garage. Through correspondence with the city, it is understood that the existing 100-year HGL within George Street is at an elevation of 60.6m during the 100-yr storm event. The proposed services will be installed complete with backflow prevention as the 100-year HGL is higher than the proposed service inverts. Additionally, a test port will be

provided to give access to City personnel. Refer to the General Plan of Services drawing (112142 - GP) for details.

Additionally, as part of this application it is proposed to service the York development with one (1) 250mm storm service connection to the existing 675m storm sewer within the York Street right-of-way. The storm service will convey the uncontrolled foundation drain, trench drain and the controlled flows from the roof drains. Through correspondence with the City it is understood that the existing 100-year HGL within York Street is at an elevation of approximately 60.1m during the 100-yr storm event. The proposed storm services are set to be above the frequent storm event. The proposed service will be installed complete with backflow prevention as the 100-year HGL is higher than the proposed service invert. Additionally, a test port will be provided to give access to City personnel. Refer to the General Plan of Services drawing (112142 - GP) for details.

The design criteria used in sizing the storm sewers are summarized below in **Table 5.1.**

Table 5.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	2 Year Return Period
Storm Sewer Design	Rational Method
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	20 min
Allowable Runoff Coefficient (C)	0.5
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

Refer to **Appendix D** for detailed storm drainage area plans and storm sewer design sheets.

6.0 STORM DRAINAGE AND STORMWATER MANAGEMENT (141 GEORGE, 110-116 YORK)

6.1 Design Criteria

Through correspondence with the City of Ottawa, and our knowledge of development requirements in the area, the following criteria have been adopted to control post-development stormwater discharge from the site:

- Control proposed development flows, up to and including the 100-year storm event, to a 5 year allowable release rate calculated using a runoff coefficient (C) of 0.50 and a time of concentration (Tc) of 20 minutes;
- Provide source controls which are in conformity with the City of Ottawa requirements, where possible;

- Limit ponding to 0.15 m for all rooftop storage areas and 0.30 m for all parking storage areas; and

- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

The approach to the stormwater management design is to determine the allowable release rate for the site, calculate the uncontrolled flow, and ensure that the remaining flow, in combination with the uncontrolled flow, does not exceed the allowable release rate. All proposed development runoff in excess of the allowable release rate, will be attenuated on-site prior to being released into the storm sewers within George Street and York Street.

6.2 Quantity Control

The allowable release rate for the 0.438 ha site was calculated to be 42.8 L/s based on the SWM criteria provided by the City of Ottawa.

Design Storms

The design storms are based on City of Ottawa design storms. Design storms were used for the 5-year and 100-year return periods (i.e. storm events).

Model Parameters

Post-development catchments were modelled based on the proposed site plan and grading as shown on **Drawing 112142-SWM** within **Appendix D**. The building roofs were assumed to have no depression storage.

The site has been divided into sixteen (16) areas for the post development condition. The drainage areas are as follows:

Area R-01 to R-10:

- Stormwater from the roof of the York building will be captured and controlled by flow control roof drains prior to releasing to the existing storm sewer servicing the development. The ponding will be limited to 0.15m in depth with overflow scuppers provided for emergencies. Storage of stormwater will be provided for storms up to and including the 100-year event. Further detailed calculations will be provided once a roof plan has been established for the 110 York development. Assumptions; 10 drains and 1.5 L/s of flow per drain.

Area D-01:

- Stormwater from the small area fronting George Street will flow uncontrolled to the George Street right-of-way.

Area D-02:

- Stormwater from the area North-East of the proposed building will flow uncontrolled to the George Street right-of-way.

Area A-01:

- Stormwater from the area north-west of the proposed George building to the property line fronting Dalhousie Street will be captured by an area drain. These flows will be conveyed

through the underground parking garage by the internal mechanical plumbing to the proposed George cistern.

Area A-02:

- Stormwater from the area north of the proposed George building, outside of the ground floor units with private access will be captured by an area drain. These flows will be conveyed through the underground parking garage by the internal mechanical plumbing to the proposed George cistern.

Area A-03:

- Stormwater from the area above parking structure within the York building ramp will be captured with a trench drain. These flows will be conveyed uncontrolled through the underground parking garage to the York Street STM service.

Area R-00:

- Stormwater from George Building roof will be captured by uncontrolled roof drains and routed to the proposed cistern by the internal mechanical system.

6.2.1 Cistern Design

Due to the high hydraulic grade lines (HGL) in the neighboring city infrastructure the cistern is proposed to be controlled through the means of pumps to mitigate potential backflow. The pumps will be designed by the mechanical consultant to convey the flows as noted in **Table 6.1**. The Cistern will be complete with internal back-up power in the event of power loss and will have an internal overflow above the required 100-year storage elevation for emergencies.

Table **6.1 below** summarizes the flow, storage required, and storage provided for each of the site drainage areas.

Table 6.1: Post-Development Stormwater Management Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Control Device	Outlet Location	2 Year Storm Event				5 Year Storm Event				100 Year Storm Event			
						Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided
D-01	0.011	0.90	1.00	N/A	George Street	2.20	N/A	N/A	N/A	2.90	N/A	N/A	N/A	5.60	N/A	N/A	N/A
D-02	0.011	0.90	1.00	N/A	George Street	2.00	N/A	N/A	N/A	2.80	N/A	N/A	N/A	5.30	N/A	N/A	N/A
A-03	0.012	0.90	1.00	N/A	York Street	2.20	N/A	N/A	N/A	3.00	N/A	N/A	N/A	5.70	N/A	N/A	N/A
R-01	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-02	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-03	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-04	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-05	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-06	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-07	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-08	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-09	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-10	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-00 / AD-02 (A-02)	0.257	0.90	1.00	Pump	George Street	11.20	0.670	26.71	115.07	11.20	1.060	42.18	115.07	11.20	2.600	103.45	115.07
Post-Development Flow						**27.6**	-	**26.7**	**115.1**	**32.9**	-	**42.2**	**115.1**	**42.8**	-	**103.5**	**115.1**
Total Allowable Release Rate						**42.8**				**42.8**				**42.8**			

Notes:
D-01 and D-02 are uncontrolled flows from 141 George to George Street
AD-01 (A-01) ,AD-02 (A-02) and R-00 are flows to Geroge Cistern
A-03 - Flows to the York service uncontrolled
R-01 to R-10 are controlled flows to service the future building at 110-116 York which will discharge directly to storm sewer on York

Interim Conditon 110-116 York
In the interim , e.g. pending the construction of 110-116 York and the roof top controls, it is proposed to sheet drain the area to a catch basin which will connect to the York Street Sewer through the proposed STM service. As the exisiting area is hard surface and curently drains to York post-development will not exceed predevelopment, per below.
Qpre (Asphalt Current); 2.78 x 0.223 x 104.16 x 0.90 = 58.1 L/sec (5-Year). 2.78 x 0.223 x 178.56 x 1.0 =110.70 L/sec (100-Year)
Qpost (Hardscape Interim); 2.78 x 0.223 x 104.16 x 0.90 = 58.1 L/sec (5-Year), 2.78 x 0.223 x 178.56 x 0.75 = 110.70 L/sec (100-Year)

Refer to **Appendix D** for Rational Method calculations and **Drawing SWM**-Stormwater Management Plan.

6.3 Major Overland Flow Route

A major overland flow route will be provided for storms greater than the 100-year storm event. Stormwater will be directed to the surrounding rights-of-way. The major overland system is shown on the Grading Plan (drawing 112142-GR).

7.0 EROSION AND SEDIMENT CONTROL

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

- Filter socks (catchbasin inserts) will be placed in existing and proposed catchbasins and catchbasin 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;
- Strawbale or rock check dams will be installed in swales and ditches;
- 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;

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Erosion and Sediment Control Plan (drawing 112142-ESC) for additional information.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Watermain

The analysis of the existing and proposed watermain network confirms the following:

- The proposed dual 150mm dia. watermain service which connects to the existing 300mm in George Street can service the proposed development.
- The proposed dual 150mm dia. watermain service which connects to the existing 200mm in York Street can service the proposed development.
- There are adequate pressures in the existing watermain infrastructure to meet the required domestic demands for the development.
- There is adequate flow to service the proposed fire protections system.

Sanitary Servicing

The analysis of the existing and proposed sanitary system confirms the following:

- It is proposed to service the development with a proposed 200mm Sanitary service which will connect to existing sewers within the George Street Avenue right-of-way.
- Additionally, it is proposed to service the development with a proposed 200mm Sanitary service which will connect to existing sewers within the York Street Avenue right-of-way.
- It is anticipated there is adequate capacity within the existing sanitary infrastructure to service.

Stormwater Management

The following provides a summary of the storm sewer and stormwater management system:

- The proposed storm sewer system is to connect to the storm sewers within in the George Street and York Street right-of-way.
- Stormwater control is to be provided by a Cistern within the George Street development and future rooftop controls for the York Street Development.
- Storm flows will be attenuated through the implementation of a pump.
- As per existing conditions a major overland flow routes have been provided to the surrounding rights-of-way.

Erosion and Sediment control

- Erosion and sediment control measures (i.e. filter fabric, catch basin inserts, silt fences, etc.) will be implemented prior to construction and are to remain in place until vegetation is established.

9.0 CLOSURE

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

NOVATECH

Prepared by:

Curtis Ferguson, E.I.T.
Land Development Engineering

Reviewed by:

Greg MacDonald, P.Eng
Director, Land Development and Public Sector Infrastructure

Appendix A
Pre-Consultation

File No.: PC2024-0200

June 5, 2024

Vincent Denomme
Claridge Homes(George St) Inc.
Via email: vincent.denomme@claridgehomes.com

Subject: **Pre-Consultation: Meeting Feedback**
Proposed Site Plan Control Revision Application – 137, 141 George Street and 110-116 York Street

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on May 28, 2024.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☒	**4** ☐	**5** ☐

One (1) indicates that considerable major revisions are required while five (5) suggests that the proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Please proceed to complete a Phase 3 Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

2. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density before the Phase 3 pre-consultation, you may be required to complete or repeat the Phase 2 pre-consultation process.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

1. From a construction and efficiency perspective, we agree that building this garage all together at once is logical; however, we will want some protections in place because it is premature to what is happening above-grade. We have some concerns with permitting this high volume of parking on such a downtown site in advance of the redevelopment approval at 110 and 116 York Street; and therefore, any approved drawings should essentially close-off the section of parking on 110 and 116 York Street. Punch-out walls can effectively temporarily close off this section of the parking garage as an interim measure. We do not want any functioning parking taking place on 110 and 116 York Street in advance of the Site Plan Approval for that property.

2. We wish to flag the risk to the Owner/applicant that constructing the footings (during the parking garage construction) in advance of the SPC approval for 110 and 116 York Street. The risk is that through the OPA/ZBLA/SPC process, the proposed building is still subject to change throughout the application processes. Should a change be required that affects the footings, it will be the Owner's responsibility to adjust or potentially rebuild accordingly.

3. Please ensure clear communication and the same floor plans are shared between City of Ottawa departments working on this project; namely, Building Permit Office (attn: Terri Hunt) and Right-Of-Way Approvals Office (attn: Tyler McQuillen).

4. In the Scoped Planning Rationale/Planning Cover Letter, clarify the Ownership, easements, and intended users

    a. Clarify the intent of ownership over the parking garage. There is a Part Lot Control application (D07-08-23-0036) to adjust lot line adjustments between 137, 141 George St and 110 York St that is currently on hold. This application does not need to be re-initiated in tandem with this application, but please provide an explanation outlining the general intent

in terms of who will own and operate this shared parking garage and clarify if any easements are anticipated to allow for this shared ownership.

b. It is understood from the pre-con meeting that the garage is intended to be used by visitors to the hotel Andaz (existing and future addition) as well as the people renting within the 137, 141 George St building. It is understood that the first level of underground parking will be for the hotel use and level 2 and 3 will be gated to allow the renters of 137, 141 George St to use their fobs through this restricted access to park. It is also understood there is commercial at grade at 137, 141 George. Please confirm this understanding is correct and outline how this parking garage will function and address any requirements of each use within the Scoped Planning Rationale.

5. Parking calculations:

   a. It is understood that the same number of parking spaces are being proposed through this application as was previously approved through the SPC application at 137, 141 George St (D07-12-12-0199). In the Scoped Planning Rationale, please outline the numbers and layout of what was previously approved (X number of spaces, 6 levels?) compared to what it is now (X number of spaces, 3 levels?).

   b. Provide a chart that has a breakdown of the required and proposed vehicular and bike parking and accessible spaces provided for all developments sharing this underground parking garage. The chart should:

      i. Provide a total for the entire garage of vehicular spaces, bike parking spaces, accessible spaces

      ii. Breakdown the total under associated address and also use within that address.

   c. It is understood that the redevelopment proposal and it's associated unit count at 110 and 116 York St is still subject to change through the future OPA/ZBLA/SPC applications.

6. Illustrate and label on submitted floor plans:

   a. Clearly show and label all property lines on the floor plans

   b. Identify municipal addresses of applicable areas of the plan (understanding the property boundaries may be subject to change through the associated Part Lot Control application)

   c. Punch-out walls. The City wants a punch-out wall on the property line for 110 and 16 York Street. This needs to be built alongside the parking garage to ensure the portion located on 110 and 116 York Street is not

accessible/used in advance of a redevelopment approval (associated OPA, ZBLA, and SPC approval).

d. Dimension parking spaces, drive aisle widths, turning radius', access etc. to ensure compliance with the Zoning By-law Part 4

7. Clarify if any above-grade soft landscaping will be impacted by the location/height of the underground parking garage at specifically 110 and 116 York Street.

8. Speak to any changes (or whether there are no changes) to the vehicular access or underground vehicular circulation.

9. Provide a Zoning Confirmation Report citing the underground parking garage is in compliance with Part 4 – Parking, Queuing and Loading Provisions of the Zoning By-law.

10. For Phase 3 Pre-con and application, in addition to any other staff requirements outlined in the SPIL, please provide the following:

    a. Floor Plans for each level of underground parking (addressing comments above)

    b. Scoped Planning Rationale / Planning Cover letter (addressing comments above)

    c. Zoning Confirmation Report (only for the underground parking garage)

    d. Plan of Survey (if easily available for all properties in question)

Engineering

Comments:

11. The Stormwater Management Criteria, for the subject site, is to be based on the following:

    a. Please update the SWM calculations to account for the added parcel at 116 York.

    b. Demonstrate the servicing strategy is consistent with the studies and plans previously approved under the existing SPC agreement.

    c. Please provide a Pre-Development Drainage Area Plan to define the pre-development drainage areas/patterns. Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution.

12. General Servicing

    a. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.

    b. Where servicing involves three or more service trenches, either a full road width or full lane width 40 mm asphalt overlay will be required, as per amended Road Activity By-Law 2003-445 and City Standard Detail Drawing R10. The extent of the overlay must be shown on the grading plan or a road reinstatement plan.

    c. CCTV sewer inspection of city infrastructure is required to record pre and post construction conditions and ensure there is no damage to City

13. Storm Sewer

    a. A 675mm dia. concrete storm sewer (1991) is available within York Street.

    b. A storm sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices. If there is no space to accommodate a monitoring maintenance hole, a test port giving access to the city personnel shall be provided.

14. Sanitary Sewer

    a. A 1200 mm dia. concrete Sanitary sewer (1934) is available within York Street.

    b. Please provide the estimated new Sanitary sewer discharge and we will confirm if sanitary sewer main has the capacity.

    c. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

    d. Sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices. If there is no space to accommodate a monitoring maintenance hole, a test port giving access to the city personnel shall be provided.

    e. A backwater valve is required on the sanitary service for protection.

15. Water:

    a. A 200 mm dia. Ductile Iron watermain (1989) is available within York Street.

b. The pre-installation of water service laterals for future use is not typically permitted. For this specific situation we will allow the installation of the pre-installation of the water services, however the connection to the main and commissioning will not be permitted until SPC approval for the hotel addition is obtained.

c. Existing water services are to be blanked at the watermain.

d. Water Supply Redundancy: As per ISTB-2021-03, Industrial, commercial, institutional service areas with a basic day demand greater than 50 m^3/day and residential areas serving 50 or more dwellings shall be connected with a minimum of two watermains, separated by an isolation valve, to avoid the creation of a vulnerable service area. Individual residential facilities with a basic day demand greater than 50 m3/day shall be connected with a minimum of two water services, each their own meter and separated by an isolation valve, to avoid the creation of a vulnerable service area.

e. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:

    i. Plan showing the proposed location of service(s).

    ii. Type of development and the amount of fire flow required (L/min). Note: 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. Fire flow demand requirements are to be based on ISTB-2021-03. Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF).

    iii. Average daily demand: __L/s.

    iv. Maximum daily demand: __L/s.

    v. Maximum hourly daily demand: __L/s.

    vi. Note: Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons.

f. Please review Technical Bulletin ISTB-2018-02, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A hydrant coverage figure shall be provided and demonstrate there is adequate fire

protection for the proposal. Two or more public hydrants are anticipated to be required to handle fire flow.

g. A Water Data Card will have to be submitted to size the water meter.

16. Grading and Erosion

a. Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A topographical plan of survey shall be provided as part of the submission and a note provided on the plans.

b. Erosion and sediment control plan must be provided.

17. Environmental

a. A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 to determine the potential for site contamination of the added parcel at 116 York St. Depending on the Phase I recommendations a Phase II ESA may be required.

b. The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.

c. Official Plan: Section 10. Protection of Health and Safety (ottawa.ca)

18. Environmental Compliance Approval

a. An Environmental Compliance Approval (ECA) for Private Sewage Works is not required at this stage. However, consideration shall be taken to evaluate the proposed SWM works with respect to the future severance of the site as Stormwater management works servicing more than one parcel of land requires an ECA from the Ministry of the Environment, Conservation and Parks.

b. Environmental Compliance Approval | Ontario.ca

19. Geotechnical

a. A Geotechnical Study/Investigation shall be prepared in support of this development proposal for the added parcel at 116 York St. The geotechnical study shall also be updated to address the proposed changes regarding the depth of excavation and founding depth.

b. Geotechnical Study shall be consistent with the Geotechnical Investigation and Reporting Guidelines for Development Applications. Geotechnical Investigation and Reporting (ottawa.ca)

20. Pre-Construction Survey

a. Pre-Construction (Piling/Hoe Ramming or close proximity to City Assets) and/or Pre-Blasting (if applicable) Survey required for any buildings/dwellings in proximity of 75m of site and circulation of notice of vibration/noise to residents within 150 m of site. Conditions for Pre-Construction/ Pre-Blast Survey & Use of Explosives will be applied to agreements. Refer to City's Standard S.P. No. F-1201 entitled Use of Explosives, as amended.

Please refer to the City of Ottawa Guide to Preparing Studies and Plans [Engineering]: Planning application submission information and materials. The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from

Feel free to contact Vincent Duquette, Infrastructure Project Manager, for follow-up questions.

Noise

Comments:

21. Noise requirements

a. A Transportation Noise Assessment is not required at this stage. It will be requested during SPC/ZBLA application for the hotel addition seeing as the subject development is located within 100m proximity of Dalhousie Street.

Feel free to contact Vincent Duquette, Infrastructure Project Manager, for follow-up questions.

Transportation

Comments:

22. Right-of-way protection.

a. See Schedule C16 of the Official Plan.

b. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

23. The Screening Form has indicated that TIA Triggers have been met. Please proceed with the TIA Step 3– Forecasting Report. The consultant is to address how they plan to enable and encourage travel by sustainable modes (i.e., to make walking, cycling, transit, carpooling and telework more convenient, accessible, safe, and comfortable). Please complete the City of Ottawa's TDM Measures Checklist.

24. Please provide your response to the previous Transportation comments submitted under PC2024-0101 (Ph1 precon for OPA/ZBLA/SPC for 110, 116 York).

Feel free to contact **Wally Dubyk**, Transportation Project Manager, for follow-up questions.

Submission Requirements and Fees

1. A Site Plan Control Revision Application (to D07-12-12-0199) – Standard is required.
    a. Additional information regarding fees related to planning applications can be found here.
2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
3. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

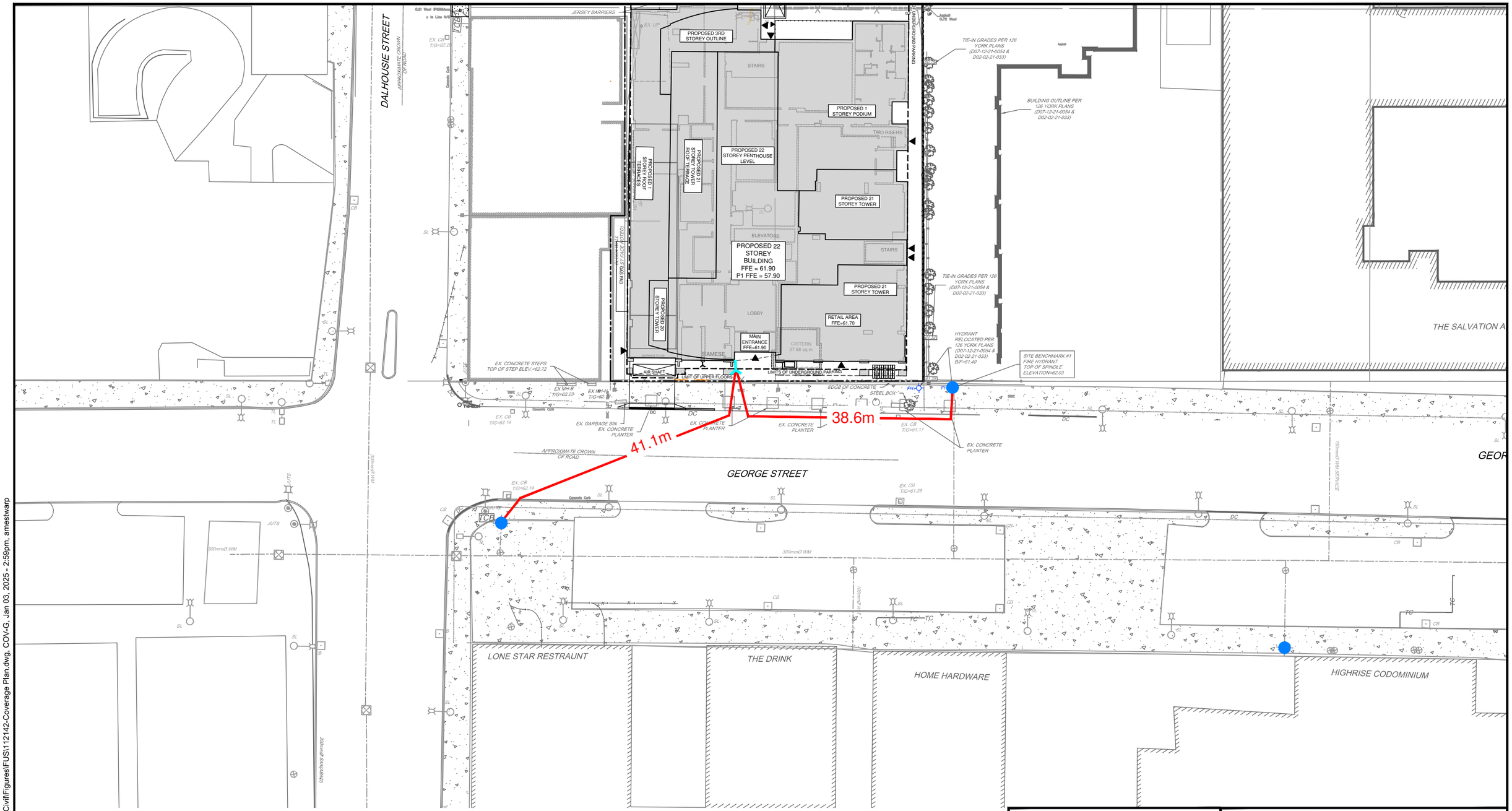
Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,
Ann O'Connor

Encl. Study and Plan Identification List (SPIL)

c.c. Vincent Duquette
John Wu
Wally Dubyk

Appendix B
Water Servicing



LEGEND

- PROPERTY LINE
- PROPOSED SIAMESE CONNECTION
- EXISTING CLASS AA HYDRANT
- DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE

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

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

CITY OF OTTAWA
141 GEORGE STREET

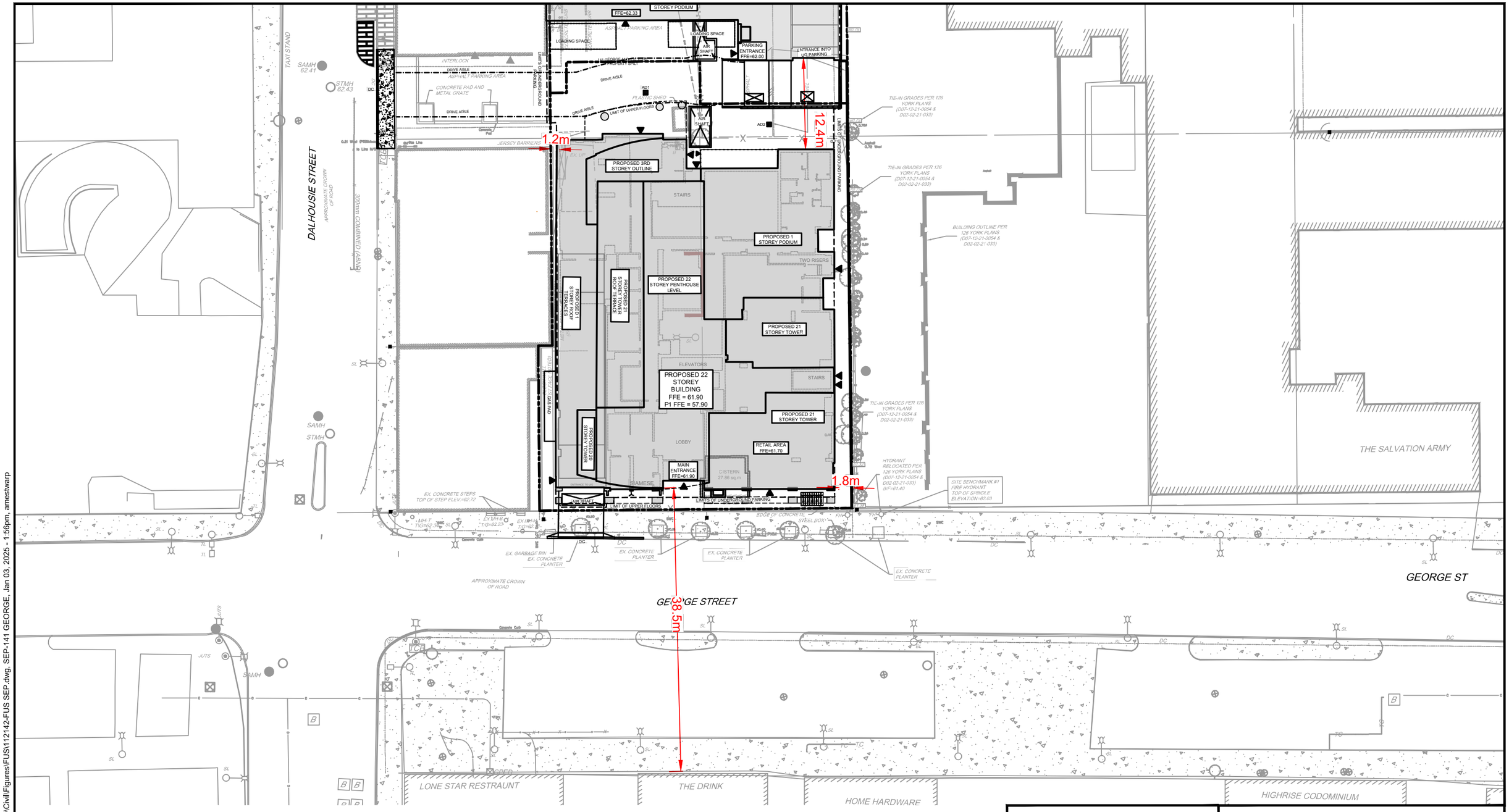
COVERAGE PLAN

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

DATE	JOB	FIGURE
JAN 2025	112142	COV-G

SHT11X17.DWG - 279mmX432mm

M:\2021\112142_141 GEORGE-110 YORK\CAD\Civil\Figures\FUS\112142-Coverage Plan.dwg, COV-G, Jan 03, 2025 - 2:59pm, amestwarp



LEGEND

- PROPERTY LINE
- PROPOSED TACTILE INDICATOR
- PROPOSED ENTRANCE
- DC — PROPOSED DEPRESSED CURB

NOVATECH
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Website www.novatech-eng.com

CITY OF OTTAWA
141 GEORGE STREET

FUS SEPARATION

SCALE 1 : 500 (0, 5m, 10m, 20m)
DATE JAN 2025
JOB 112142
FIGURE FUS-G

M:\2012\112142_141 GEORGE-110 YORK\CAD\Civil\Figures\FUS\112142-FUS SEP.dwg, SEP-141 GEORGE, Jan 03, 2025 - 1:56pm, arnestwarp

SHT11X17.DWG - 279mmX432mm

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 112142
Project Name: 141 George Street
Date: 5/1/2023
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp, P.Eng

Legend: Input by User; No Information or Input Required

Building Description: 21 Storey Mixed-Use with Ground Floor Commercial
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)	1759			
		Total Floors/Storeys (Podium)	1			
		Tower Footprint (m^2)	1220			
		Total Floors/Storeys (Tower)	20			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**2,369**	
	F	**Base fire flow without reductions**				**6,000**
		F = 220 C (A)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,100**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,040**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	20927.2	80%		
				Cumulative Total	**-40%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**3,315**
		East Side	0 - 3 m		25%	
		South Side	>30m		0%	
		West Side	0 - 3 m		25%	
				Cumulative Total	**65%**	
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

OBC Water Supply for Firefighting Calculation

Based on OBC 2012 (Div. B, Article 3.2.5.7)

References: Ontario Fire Marshal - OBC Fire Fighting Water Supply
Ontario Building Code 2012, Appendix A, Vol 2., A-3.2.5.7

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 112142
Project Name: 141 George Street
Date: 9/24/2024
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Greg MacDonald, P.Eng.

Legend
Input by User
No Input Required

Building Description: 17 + Penthouse Storey Mixed-Use Building

Step		Calculation Inputs		Calculation Notes	Value
Minimum Fire Protection Water Supply Volume					
1	**Water Supply Coefficient**				
	Building Classification =	C		From Table 3.1.2.1	
	Water Supply Coefficient - K =			From Table 1 (A3.2.5.7)	**18**
2	**Total Building Volume**				
	Building Width - W	37.70	m		
	Building Length - L	47.18	m	Area (W * L) = 1779 m2	
	Building Height - H	64.5	m		
	Total Building Volume - V =			W * L * H	**114725 m³**
3	**Spatial Coefficient Value**				
	Exposure Distances: (Exterior building face to property/lot line, to street centre, or to mid-point between proposed building and another building on same lot)			**Spatial Coefficients:** From Figure 1 (Spatial Coefficient vs Exposure Distance)	
	North	11.60	m	Sside 1 = **0.00**	
	East	1.80	m	Sside 2 = **0.50**	
	South	38.50	m	Sside 3 = **0.00**	
	West	1.20	m	Sside 4 = **0.50**	
	Total of Spacial Coefficient Values - S-Tot as obtained from the formula =			1.0 + (Sside 1 + Sside 2 + Sside 3 + Sside 4) (Max. value = 2.0)	**2.00**
4	**Minimum Fire Protection Water Supply Volume**				
	Q =			$K * V * S_{Tot}$	**4,130,109 L**
Required Minimum Water Supply Flow Rate					
5	**Minimum Water Supply Flow Rate =**			From Table 2 (For water supply from a municipal or industrial water supply system, min. pressure is 140 kPa)	**9,000 L/min** or **150 L/s**
Minimum Fire Protection Water Supply Volume for 30 minutes					
6	**Q =**			= Minimum Water Supply Flow Rate (L/min) * 30 minutes	**270,000 L**
Required Fire Protection Water Supply Volume					
7	**Q =**			Highest volume out of (4) and (6)	**4,130,109 L**
Notes					

Project No. 112142
Project Name: 141 George Street
Project Location: Ottawa, Ontario

NOVATECH
Engineers, Planners & Landscape Architects

Date: May 17th, 2023
Revised: January 23, 2025

Proposed Development Conditions - 141 George Street

	21-Storey Mixed-Use	
Studio	8	
1 Bed Apartment	191	
2 Bed Apartment/ 1 Bed+ Den	98	
3 Bed Apartment/ 2 Bed + Den	0	
Number of units	297	
Total Residential Population	484	
Total Residential Daily Flow (L/day)	**135632**	
Office Area (m^2)	72.70	* Rental Office
Restaurant Area (m2)	453.00	* Commerial area on 1st floor
Total Commercial Daily Flow (L/day)	**52063.56**	
Avg Day Demand (L/s)	2.17	
Max Day Demand (L/s)	4.83	
Peak Hour Demand (L/s)	10.26	

Design Parameters

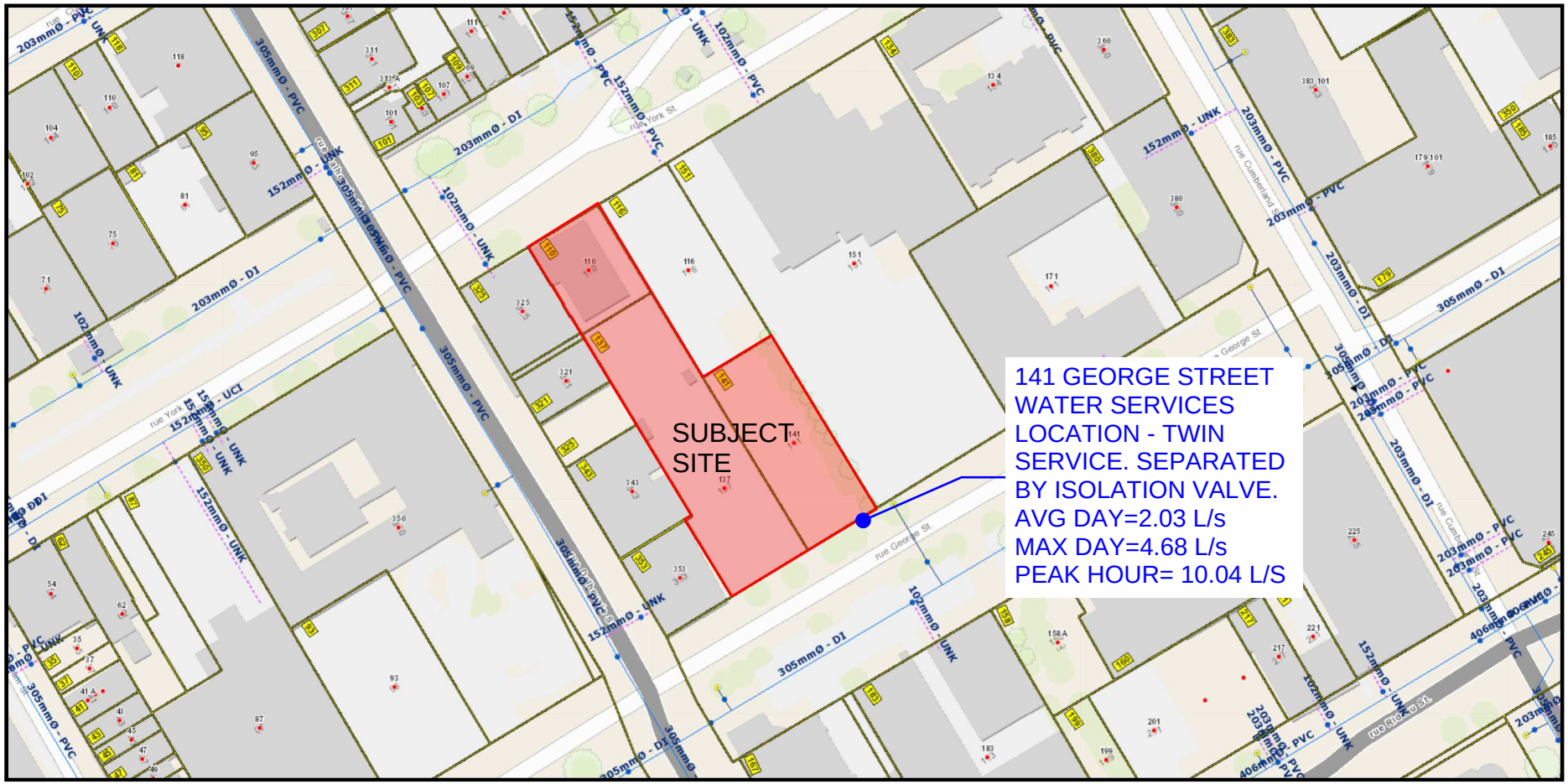
Use	Daily Demand Volume		Source
Studio	1.4	Person/unit	City of Ottawa Sewer Design Guidelines
1 Bed Apartment	1.4	Person/unit	
2 Bed Apartment	2.1	Person/unit	
3 Bed Apartment	3.1	Person/unit	
Average Residential Flow	280	L/c/day	City of Ottawa Water Distribution Guidelines
Professional Office	75	L/9.3m2/day	Daily Demands from OBC Table 8.2.1.3
Retail - Restaurant	125	L/seat/day (1 seat/ 1.1m2, OBC 3.1.17.1)	

Residential Peaking Factors City of Ottawa Water Distrubution Guidelines:

Conditions	Peaking Factor	
Maximum Day	2.5	x avg day
Peak Hour	2.2	x max day

Commercial Peaking Factors City of Ottawa Water Distribution Guidelines

Conditions	Peaking Factor	
Maximum Day	1.5	x avg day
Peak Hour	1.8	x max day

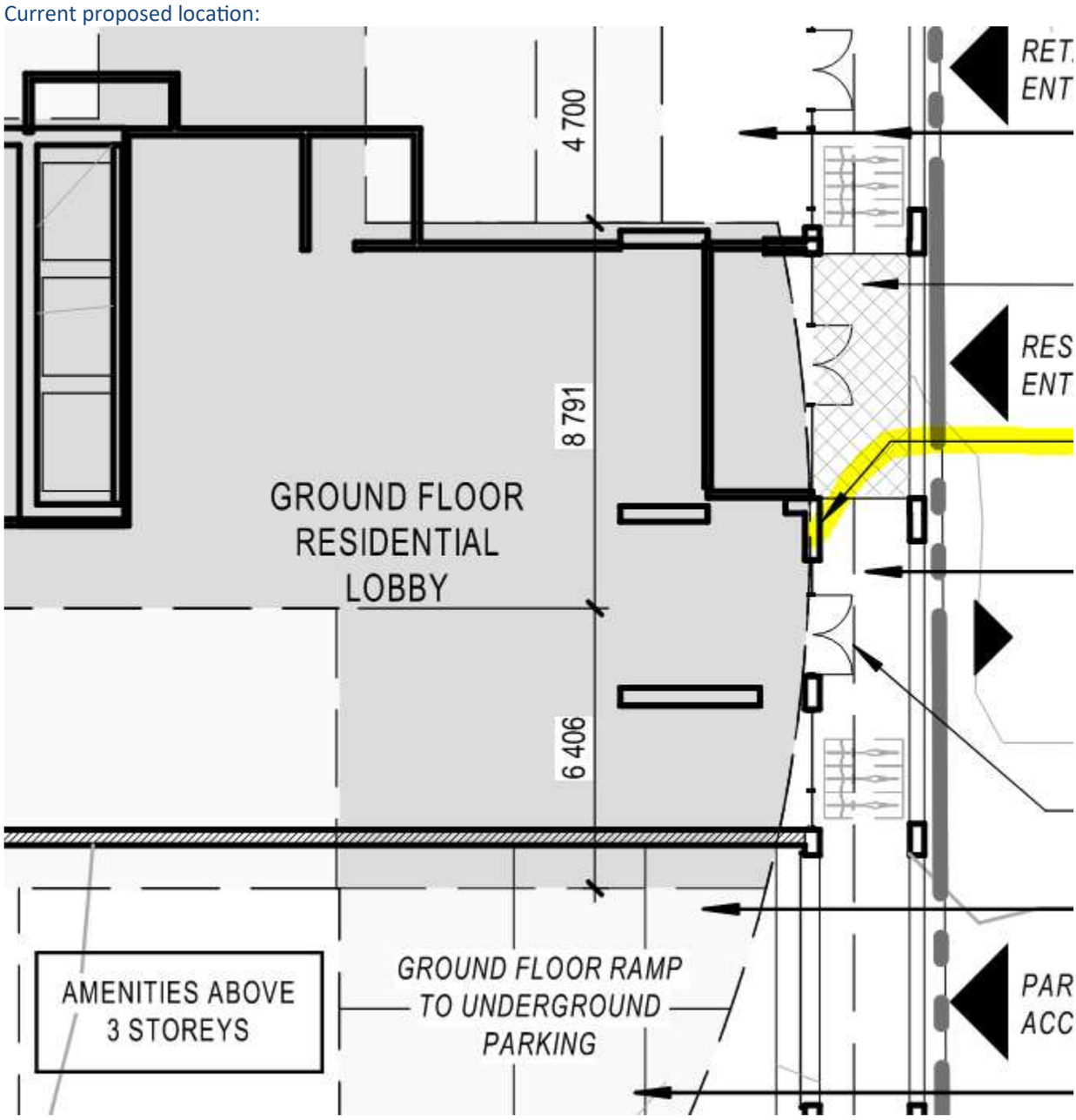

SUBJECT SITE
141 GEORGE STREET
WATER SERVICES
LOCATION - TWIN SERVICE. SEPARATED BY ISOLATION VALVE.
AVG DAY=2.03 L/s
MAX DAY=4.68 L/s
PEAK HOUR= 10.04 L/S

Curtis Ferguson

From: Evelyne Cardinal <ecardinal@neufarchitectes.com>
Sent: Tuesday, April 25, 2023 10:09 AM
To: Curtis Ferguson; Dinesh Jain
Cc: Anthony Mestwarp
Subject: RE: 141 George Street (112142)

Adding Dinesh Jain, mechanical engineer to the email.

1) Type 1: concrete construction = fire resistive construction 2hr
2) Yes to all three, but mechanical to confirm
3) Current proposed location:



EVELYNE CARDINAL, OAA, OAQ
Directrice du bureau d'Ottawa . Ottawa Office Director
T 613 234 2274 #288 F 514 847 2287 C 613 809 3042
47 Clarence Street, suite 406, Ottawa (ON) K1N 9K1
NEUF ARCHITECTES INC. Confidentialité + Transmission
Montréal. Ottawa. Toronto

50 ANS ET TOUJOURS NEUF . 50 YEARS AND STILL NEUF

De : Curtis Ferguson <c.ferguson@novatech-eng.com>
Envoyé : April 25, 2023 9:52 AM
À : Evelyne Cardinal <ecardinal@neufarchitectes.com>

Cc : Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Objet : RE: 141 George Street (112142)

Good Morning Evelyne,

Few more questions pertaining to 141 George and 110 York;

1) **Construction Material (one of the following);**

Type V - Wood frame
Type IV - Mass Timber
Type III - Ordinary construction
Type II - Non-combustible construction
Type I - Fire resistive construction (2 hrs)

2) **Sprinkler Reduction (YES or NO);**
   a. Adequately Designed System (NFPA 13) – **Y OR N**
   b. Standard Water Supply – **Y OR N**
   c. Fully Supervised System – **Y OR N**

3) **Location of Siamese Connections**

Thanks,
Curtis Ferguson, B.A.Sc., E.I.T. | Land Development
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 EXT: 331

From: Curtis Ferguson
Sent: Monday, April 24, 2023 4:31 PM
To: Evelyne Cardinal <ecardinal@neufarchitectes.com>
Cc: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: RE: 141 George Street (112142)

Evelyne,

Perfect, thanks.

Keep me updated on the changes. Will need to include the “Retail Office” space in our Water / Sanitary calculations as well.

In the interment I’ll assume;
- 5000 ft^2 Commercial (use to be determined - conservative assumptions until confirmed use [I.E. Café, Office, Retail etc..]).
- 1000 ft^2 Retail Office Space.

Thanks,
Curtis Ferguson, B.A.Sc., E.I.T. | Land Development
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 EXT: 331

From: Evelyne Cardinal <ecardinal@neufarchitectes.com>
Sent: Monday, April 24, 2023 4:13 PM
To: Pascal Vendette <pascal@neufarchitectes.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Cc: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: RE: 141 George Street (112142)

…. And the CAD.

EVELYNE CARDINAL, OAA, OAQ
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NEUF ARCHITECTES INC. Confidentialité + Transmission
Montréal. Ottawa. Toronto

50 ANS ET TOUJOURS NEUF . 50 YEARS AND STILL NEUF

De : Evelyne Cardinal
Envoyé : April 24, 2023 4:13 PM
À : Pascal Vendette <pascal@neufarchitectes.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Cc : Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Objet : RE: 141 George Street (112142)

Hi Curtis,
We recently got information that the retail space will be cut down to 5000 sq.ft. as shown in this pink area. There's a second 1000sq.ft. pink area at the bottom that will most likely become the retail offices. Shawn is working on this right now, so if there are any changes, I will let you know.

Otherwise, I forgot to include the ground floor roof plan. I've attached the second floor, there's a roof space between grid 8-5 and G-D.

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NEUF ARCHITECTES INC. Confidentialité + Transmission
Montréal. Ottawa. Toronto

50 ANS ET TOUJOURS NEUF . 50 YEARS AND STILL NEUF

De : Pascal Vendette <pascal@neufarchitectes.com>
Envoyé : April 24, 2023 2:46 PM
À : Curtis Ferguson <c.ferguson@novatech-eng.com>
Cc : Anthony Mestwarp <a.mestwarp@novatech-eng.com>; Evelyne Cardinal <ecardinal@neufarchitectes.com>
Objet : RE: 141 George Street (112142)

Hi Curtis.
Evelyne Cardinal is the main contact for 141 George & 110 York.
I cc'ed her to this email … + see below for contact info.

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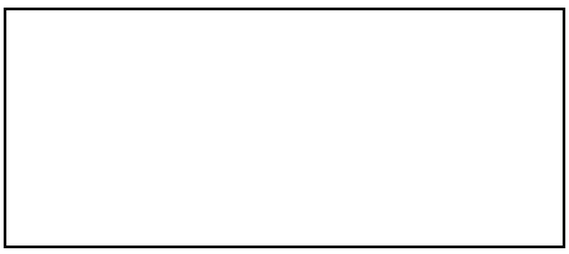

PASCAL VENDETTE
Technologue senior en architecture . Senior architectural technologist
T 514 847 1117 #269 F 514 847 2287 C 514 833 6005
630, boul. René-Lévesque O. 32e étage, Montréal (QC) H3B 1S6
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Montréal. Ottawa. Toronto

50 ANS ET TOUJOURS NEUF . 50 YEARS AND STILL NEUF

De : Curtis Ferguson <c.ferguson@novatech-eng.com>
Envoyé : 24 avril 2023 13:55
À : Pascal Vendette <pascal@neufarchitectes.com>
Cc : Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Objet : 141 George Street (112142)

Good Afternoon Pascal,

Hope you're doing well.

Assuming you're on Claridge - 141 George Street? If not, please forward to correct contact.

Do we have confirmation of retail area size (m2) for 141 George Street? I could take the area from CAD but figured I'd check for true value. Also under the assumption York Street component contains no retail. Please confirm.

Thanks,
Curtis Ferguson, B.A.Sc., E.I.T. | Land Development
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 EXT: 331

From: Wu, John <John.Wu@ottawa.ca>
Sent: Tuesday, August 29, 2023 11:43 AM
To: Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 141 George Street (112142)

Hi, :

Here is the result:

******The following information may be passed on to the consultant, but do NOT forward this e-mail directly.******

The following are boundary conditions, HGL, for hydraulic analysis at 141 George Street (zone 1W) assumed to be a dual connection to the 305 mm watermain on George Street (see attached PDF for location).

Min HGL: 106.3 m

Max HGL: 115.4 m

Max Day + Fire Flow (100 L/s): 109.0 m

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.

Thanks.

John

From: Curtis Ferguson <c.ferguson@novatech-eng.com>
Sent: August 17, 2023 1:12 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: RE: 141 George Street (112142)

John,

Circling back on boundary condition request now that you are OK with the design approach (duel watermain).

Thanks,

Curtis Ferguson, B.A.Sc., E.I.T. | Land Development

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 EXT: 331

From: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Sent: Thursday, May 25, 2023 4:32 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 141 George Street (112142)

Hi John,

Our apologies as noted on the sheet that should be the daily residential demand L/day, not L/s. The average daily demand was 1.97L/s as noted further below.

Note the architect made a slight revision to the unit count and the demands are now as follows:

i. Required fire flows: 100 L/. Refer to FUS calcs attached.

ii. Average demand: 2.03 L/s.

iii. Maximum demand: 4.68 L/s.

iv. Peak hour demand: 10.04 L/s.

The plans were previously submitted with the Andaz development depicting the future 141 George Street with only one water service. Since then the City has updated servicing requirements to have redundancy on water services. Unfortunately it does not appear that there are any valves readily available within the George street frontage that can be utilized to provide the required redundancy. Would the City be willing to permit a new valve on the 300mm watermain in this instance?

Thanks,

Anthony Mestwarp, P.Eng., Project Engineer | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

From: Wu, John <John.Wu@ottawa.ca>
Sent: Wednesday, May 24, 2023 12:25 PM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: RE: 141 George Street (112142)

Hi, Anthony:

Please fix your water demand in that demand calculation sheet (it can't be 13000 l/s), and it is over 50 cubic meters per day, you need two connections. please submit what you will do with that requirement, we do not want to see a n new valve added on George Street 300 water main.

Thanks.

John

From: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Sent: May 24, 2023 12:18 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Duquette, Vincent <Vincent.Duquette@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 141 George Street (112142)

Hi John,

Can you please provide water boundary conditions for the above noted site based on the info provided below and attached. If you have any questions, or require additional information, let me know.

i. One (1) water connection is proposed. Twined service separated by an isolation valve
ii. Required fire flows: 100 L/. Refer to FUS calcs attached.
iii. Average demand: 1.97 L/s.
iv. Maximum demand: 4.52 L/s.
v. Peak hour demand: 9.69 L/s.

Thanks,

Anthony Mestwarp, P.Eng., Project Engineer | Land Development Engineering

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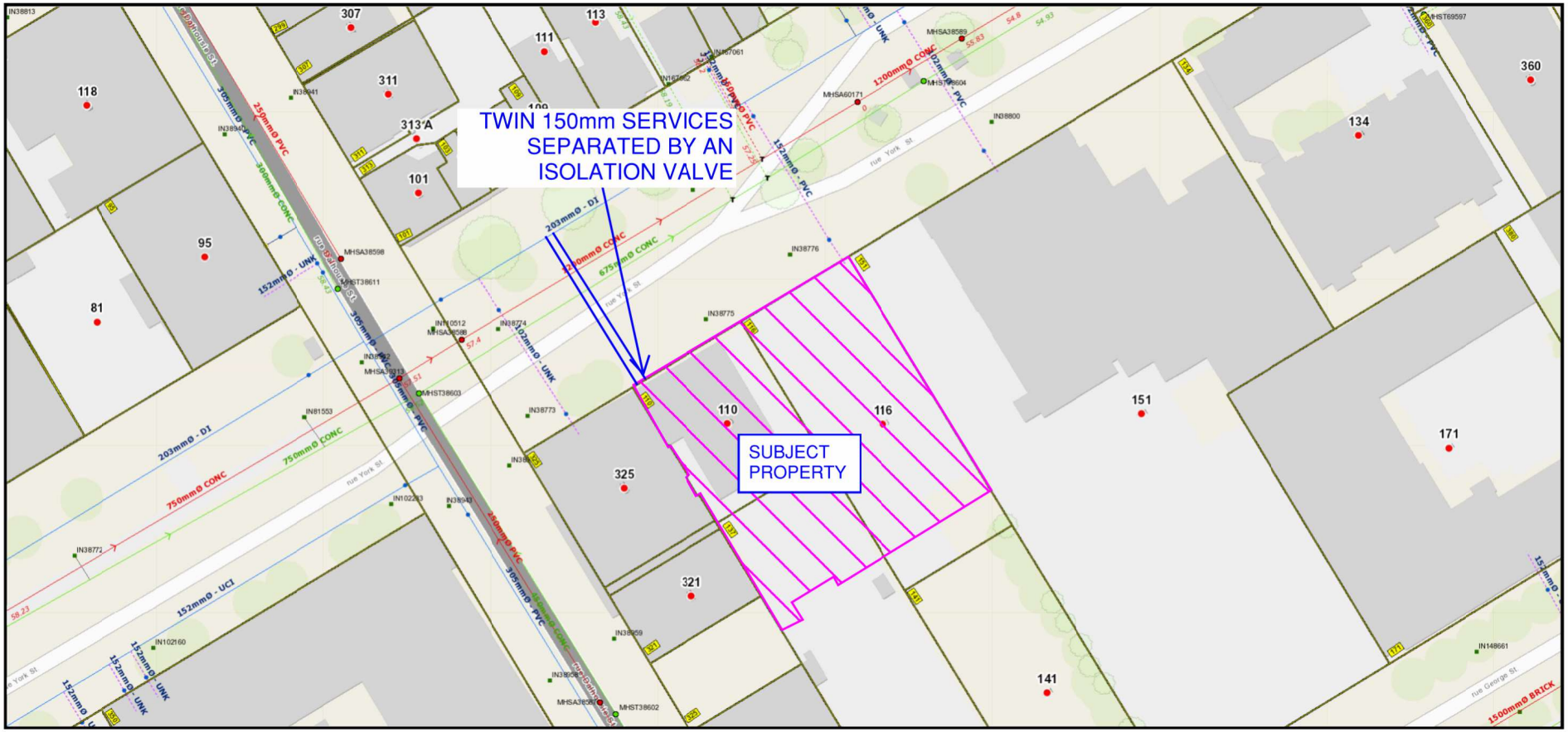
Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216


TWIN 150mm SERVICES SEPARATED BY AN ISOLATION VALVE
SUBJECT PROPERTY
York St
rue York St
rue George St
203mmØ - DI
750mmØ CONC
675mmØ CONC
1200mmØ CONC
152mmØ - UNK
152mmØ - UCI
152mmØ - PVC
305mmØ - PVC
250mmØ PVC
1500mmØ BRICK
307
311
313 A
101
111
113
118
95
81
325
321
110
116
151
171
134
360
141

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Boundary Condition Request

Novatech Project #: 112142
Project Name: 110 York Street
Date: 9/20/2024
Revised: 1/3/2025
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp, P.Eng
Drawing Reference:

Legend: Input by User | No Input Required | Calculated Cells →

Reference: Ottawa Design Guidelines - Water Distribution (2010 and TBs)
MOE Design Guidelines for Drinking-Water Systems (2008)
Fire Underwriter's Survey Guideline (2020)
Ontario Building Code, Part 3 (2012)

Small System = NO

	# of Dwellings	Area (ha.)	Seats	Pop. Equiv.	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)	Basic Day Demand (m^3/day)
Residential Input								
Singles				0.00	0.00	0.00	0.00	0.0
Semis / Townhomes				0.00	0.00	0.00	0.00	0.0
Apartments (2-BR)				0.00	0.00	0.00	0.00	0.0
Apartments (1-BR)				0.00	0.00	0.00	0.00	0.0
Industrial / Commercial / Institutional (ICI) Input								
Hotel Rooms(Avg)	154			277.20	0.72	1.08	1.95	62.4
Industrial Area - Light					0.00	0.00	0.00	0.0
Industrial Area - Heavy					0.00	0.00	0.00	0.0
Commercial Area					0.00	0.00	0.00	0.0
Institutional Area					0.00	0.00	0.00	0.0
Other Area					0.00	0.00	0.00	0.0
Bar/Cocktail Lounge			235.00	235.00	0.19	0.29	0.51	0.0
Banquet Area			615.00	615.00	0.21	0.32	0.58	0.0
Totals	**154**	**0.00**		**1127.20**	**1.13**	**1.69**	**3.04**	**62.4**

Summary

i. Type of Development and Units:	Mixed-Use Hotel, 154 rooms.		
ii. Site Address:	110-116 York Street		
iii. Proposed Water Service Connection Location(s):	York Street		
iv. Average Day Flow Demand:		1.13	L/s
v. Peak Hour Flow Demand:		3.04	L/s
vi. Maximum Day Flow Demand:		1.69	L/s
vii. Required Fire Flow #1:		6000	L/min
viii. Required Fire Flow #2:			L/min
ix. Required Fire Flow #3:			L/min

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Design Parameters

Residential						
Unit Type	**Singles**	**Semis/ Towns**		**Apts (2-BR)**	**Apts (1-BR)**	**Hotel Room (Avg)**
Population Equiv.	3.4	2.7		2.1	1.4	1.8
Dailly Demand	L/per person/day					
Average Demand	280					
Hotel Demand	225					
Basic Demand	225					

Vulnerable Service Area (VSA)
50
< 50 m³/day
> 50 m³/day

Residential Peaking Factors		**Max Day (x Avg Day)**	**Peak Hour (x Avg Day)**
	Pop.		
Small System (If Applicable)	0	9.50	14.30
	30	9.50	14.30
	150	4.90	7.40
Modified	300	3.60	*5.50*
	450	3.00	*5.50*
	500	2.90	*5.50*
Large System (Default)	> 500	2.50	5.50

Institutional / Commercial / Industrial							
Industrial		**Commercial**		**Institutional**	**Other Use**	**Bar/Cocktail Lounge**	**Banquet Hall**
Light	**Heavy**						
L/gross ha/day					L/m²/day	**L/seat/day**	**L/seat/day**
35,000	55,000	28,000		28,000	5	**70.00**	**30.00**
10,000	17,000	17,000		17,000	3		

ICI Peaking Factors	**Max Day (x Avg Day)**		**Peak Hour (x Avg Day)**
	1.50		2.70

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

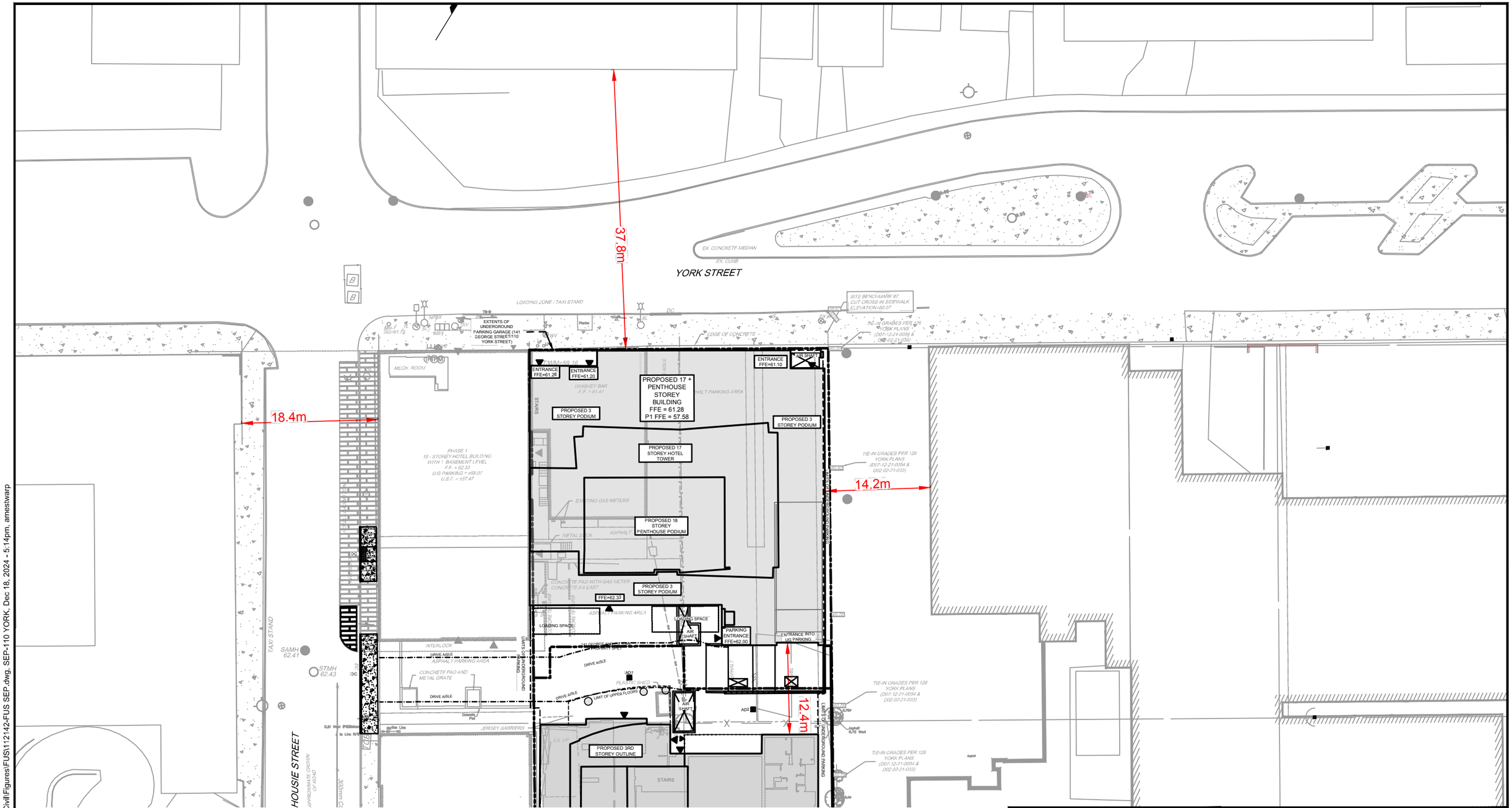
Novatech Project #: 112142
Project Name: 110-116 York
Date: 9/25/2024
Revised 1/3/2025
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Anthony Mestwarp, P.Eng
Drawing Reference: 112142-FUS-Y

Building Description: 17+ Penthouse Storey Hotel
Type I - Fire resistive construction (2 hrs)

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)

Formula Method

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)	2219.61	1410 (110york), 809.6 (Andaz)		
		Total Floors/Storeys (Podium)	3			
		Tower Footprint (m^2)	1364.61	555 (York), 809.6 (Andaz)		
		Total Floors/Storeys (Tower)	15			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**3,329**	
	F	**Base fire flow without reductions**				**8,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**6,800**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,400**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	27128.05	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**3,060**
		East Side	10.1 - 20 m		15%	
		South Side	10.1 - 20 m		15%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**45%**	
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



LEGEND

- PROPERTY LINE
- PROPOSED TACTILE INDICATOR
- PROPOSED ENTRANCE
- DC — PROPOSED DEPRESSED CURB
- 2HR FIREWALL

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Website www.novatech-eng.com

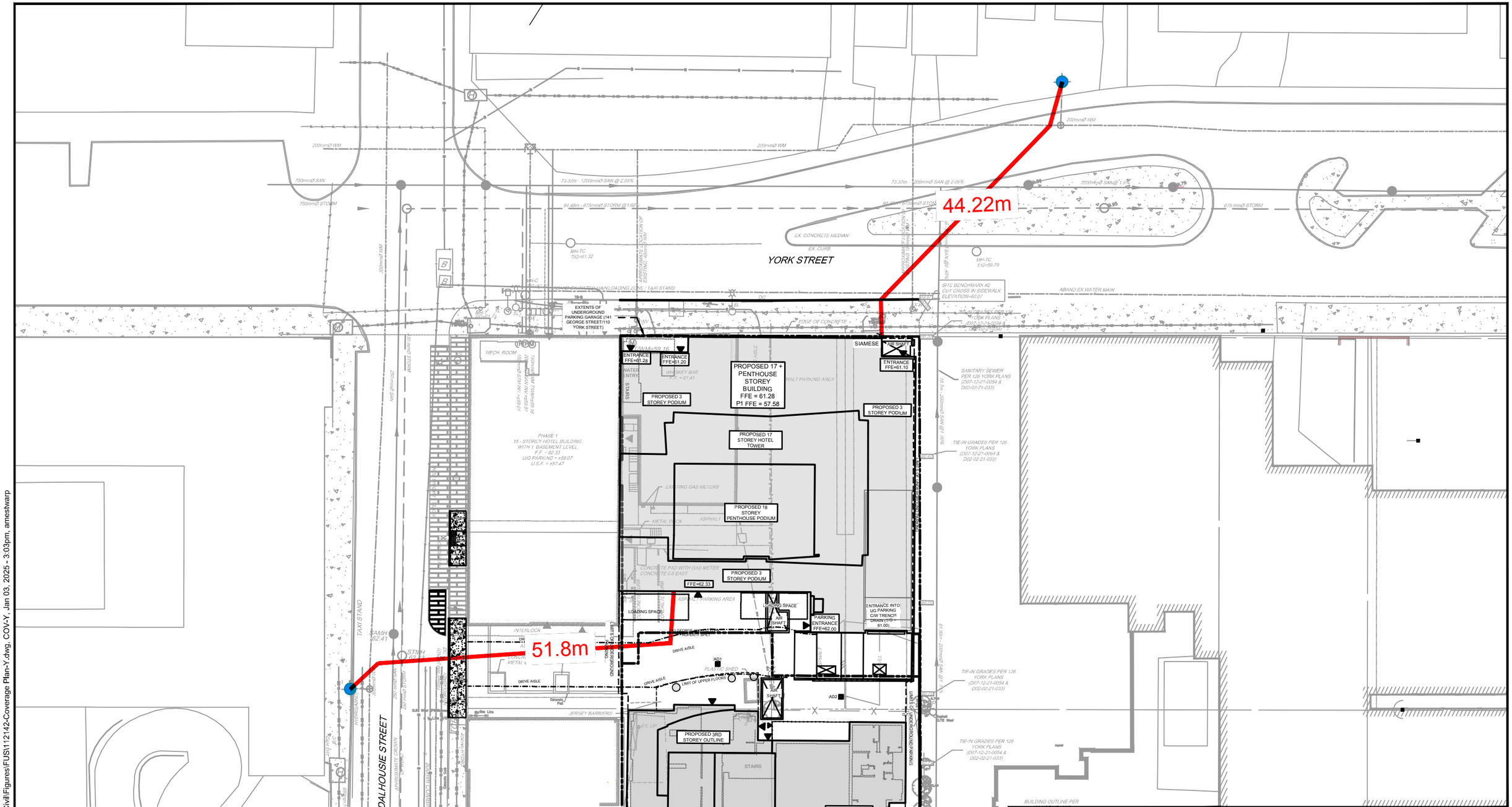
CITY OF OTTAWA
110 YORK STREET

FUS SEPARATION

SCALE 1 : 500 (0, 5m, 10m, 20m)
DATE JAN 2025
JOB 112142
FIGURE FUS-Y

SHT11X17.DWG - 279mmX432mm

M:\2012\112142L_141 GEORGE-110 YORK\CAD\Civil\Figures\FUS\112142-FUS SEP.dwg, SEP-110 YORK, Dec 18, 2024 - 5:14pm, amestwarp



LEGEND

- PROPERTY LINE
- PROPOSED SIAMESE CONNECTION
- EXISTING CLASS AA HYDRANT
- PROPOSED HYDRANT
- DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE

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CITY OF OTTAWA

110 YORK STREET

COVERAGE PLAN

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

DATE JAN 2025 | JOB 112142 | FIGURE COV-Y

SHT11X17.DWG - 279mmX432mm

M:\2012\112142_141 GEORGE-110 YORK\CAD\Civil\Figures\FIJS\112142-Coverage Plan-Y.dwg, COV-Y, Jan 03, 2025 - 3:03pm, amestwarp

OBC Water Supply for Firefighting Calculation

Based on OBC 2012 (Div. B, Article 3.2.5.7)

References: Ontario Fire Marshal - OBC Fire Fighting Water Supply
Ontario Building Code 2012, Appendix A, Vol 2., A-3.2.5.7

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 112142
Project Name: 110-116 York Street
Date: 9/24/2024
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Greg MacDonald, P.Eng.

Legend
Input by User
No Input Required

Building Description: 17 + Penthouse Storey Mixed-Use Building

Step		Calculation Inputs		Calculation Notes	Value
Minimum Fire Protection Water Supply Volume					
1	**Water Supply Coefficient**				
	Building Classification =	C		From Table 3.1.2.1	
	Water Supply Coefficient - K =			From Table 1 (A3.2.5.7)	**18**
2	**Total Building Volume**				
	Building Width - W	39.92	m		
	Building Length - L	39.90	m	Area (W * L) = 1593 m2	
	Building Height - H	52.4	m		
	Total Building Volume - V =			W * L * H	**83463 m³**
3	**Spatial Coefficient Value**				
	Exposure Distances: (Exterior building face to property/lot line, to street centre, or to mid-point between proposed building and another building on same lot)			**Spatial Coefficients:** From Figure 1 (Spatial Coefficient vs Exposure Distance)	
	North	37.80	m	Sside 1 = **0.00**	
	East	14.20	m	Sside 2 = **0.00**	
	South	12.40	m	Sside 3 = **0.00**	
	West	30 (Firewall)	m	Sside 4 = **0.00**	
	Total of Spacial Coefficient Values - S-Tot as obtained from the formula =			1.0 + (Sside 1 + Sside 2 + Sside 3 + Sside 4) (Max. value = 2.0)	**1.00**
4	**Minimum Fire Protection Water Supply Volume**				
	Q =			$K * V * S_{Tot}$	**1,502,337 L**
Required Minimum Water Supply Flow Rate					
5	**Minimum Water Supply Flow Rate =**			From Table 2 (For water supply from a municipal or industrial water supply system, min. pressure is 140 kPa)	**9,000 L/min** or **150 L/s**
Minimum Fire Protection Water Supply Volume for 30 minutes					
6	**Q =**			= Minimum Water Supply Flow Rate (L/min) * 30 minutes	**270,000 L**
Required Fire Protection Water Supply Volume					
7	**Q =**			Highest volume out of (4) and (6)	**1,502,337 L**
Notes					

OBC - Water Supply for Firefighting - User Guide - Unsprinklered

- Please use the notes below as a guide when completing fire flow calculations for buildings using the Ontario Building Code.
- Use FUS where required (e.g. City of Ottawa)
- When in doubt, confirm setbacks, etc. with architect/owner
- When in doubt, err on conservative side

Note: This form only applies for Unsprinklered Buildings

Enter a description of the building or unit being considered, i.e. use/most stringent condition/address

Use average interior height (e.g. approx. 3m)

All spaces below and above grade within a building, measured to the underside of the roof deck, should be included in the volume (cubic metres) for the fire protection water supply formula. An exception may be made to exclude a non-combustible crawl space (with no combustible services) below a non-combustible floor, located under the lowest building floor area, if it will not be developed in the future or used as a storage area.

Exposure distances from a new building are measured from the exterior building faces to the property lines of the building. The distance from the face of the building to the property line shall be determined in accordance with Sentence 3.2.3.1.(3) of the Building Code. When facing a street, the property line shall be deemed to be the centre of the street. When facing an existing building (exceeding 10 m² in building area) on the same property, the exposure distance (for use in Figure 1) shall be the greater of either the "limiting distance" of the new building face as obtained from Sentence 3.2.3.1.(1) of the Building Code, or the mid-point between the two buildings.

Exterior Wall Exposures = Distance between:

(Limiting Distance)		Exterior face and Property Line
OBC 3.2.3.1.(3)	or	Exterior face and Centreline of Street
Exposure Distances:	or	Exterior face and line at mid-distance to another building on same lot

Only applicable for buildings without municipal water supply, otherwise municipal water supply system can be assumed to provide this volume

Except as provided in Section 6.3 (d), the minimum fire protection water supply "Q" required in Section 6.3 (a) shall not be less than what is needed to provide the minimum flow rate specified in Table 2 for a duration of 30 minutes.

From: Sonia Joanis <sjoanis@neuf.ca>
Sent: Monday, January 6, 2025 1:30 PM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Subject: RE: York- statistics - 112142

Hi Anthony,

No specific occupant load was discussed.

Code would suggest an occupant load of 235 people for such a large area.

By design, Hyatt has seen the furniture layout and deemed the 130 seats as satisfactory.

The washroom load is based on the larger occupant load.

Regards,

SONIA JOANIS, OAA

Architect. Architecte

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De : Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Envoyé : 6 janvier 2025 12:50
À : Sonia Joanis <sjoanis@neuf.ca>
Cc : Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Objet : RE: York- statistics - 112142

Hi Sonia,

Thanks for confirming. Was there any talk of an anticipated occupancy? The water flows are based on per seat. If not, we can make an assumption based on the meeting room area.

Thanks,

Anthony Mestwarp, P.Eng., Project Manager | Land Development Engineering

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240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

From: Sonia Joanis <sjoanis@neuf.ca>
Sent: Monday, January 6, 2025 12:29 PM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Subject: RE: York- statistics - 112142

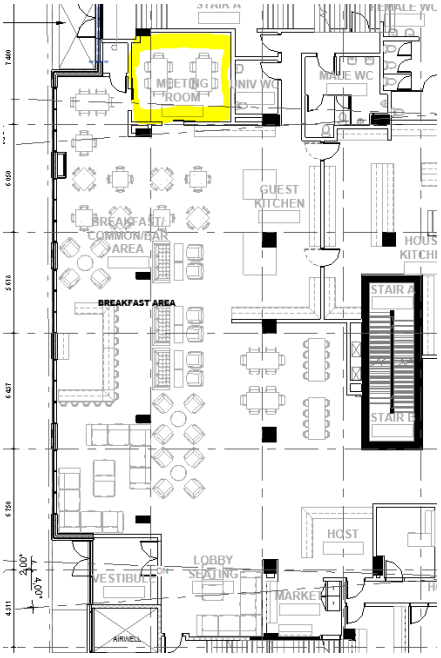
Hi Anthony,

Based on previous discussions with Hyatt, the breakfast/bar area on the ground floor doesn't have a set user group depending on the time of day.

The morning breakfast service will be for the hotel clientel, but the afternoon/evening use of the bar and seating area is not firmly set for client use.

There was talk of potentially having the meeting room on ground floor be a rentable space and potentially having the area act as a restaurant/bar for public use past noon.

I would recommend that your response to the City allows for all of the above, to give Hyatt maximum flexibility of use.



Regards,

SONIA JOANIS, OAA

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De : Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Envoyé : 6 janvier 2025 09:54
À : Sonia Joanis <sjoanis@neuf.ca>
Cc : Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Objet : RE: York- statistics - 112142

Hi Sonia,

Happy new year.

I got a question from the city reviewer when requesting the water boundary conditions. Can you please confirm that the breakfast/bar on the first floor is only to be used by those in the hotel. If the area is to service the general public, we will also need the number of seats/ maximum occupancy to calculate the additional water demand for the area.

Can you please confirm?

Thanks,

Anthony Mestwarp, P.Eng., Project Manager | Land Development Engineering

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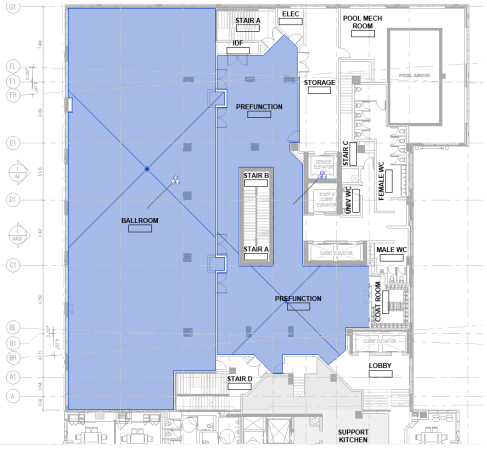
From: Sonia Joanis <sjoanis@neuf.ca>
Sent: Monday, December 16, 2024 3:58 PM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Subject: RE: York- statistics - 112142

Hi Anthony,

The 2nd floor will hold a ballroom of approx. 560m^2 with prefunction areas of approx. 265m^2 if we include the circulation.

Currently the new 2nd floor is designed for a maximum occupancy of 615 people, while the ballroom area itself could hold up to 585 people.

The 3rd floor will have a fitness and pool area, to be determined by the hotel whether access/membership would be provided to the public.



Regards,

SONIA JOANIS, OAA

Architect. Architecte

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De : Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Envoyé : 16 décembre 2024 09:19
À : Sonia Joanis <sjoanis@neuf.ca>
Cc : Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Objet : RE: York- statistics - 112142

Hi Sonia,

Thanks for confirming. One last question will there be any conference/ banquet halls that will be rented by the public. If so what would the area of the conference rooms be?

Thanks,

Anthony Mestwarp, P.Eng., Project Manager | Land Development Engineering

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240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

From: Sonia Joanis <sjoanis@neuf.ca>
Sent: Thursday, December 12, 2024 4:21 PM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Subject: RE: York- statistics - 112142

Hi Anthony,

Here are the approximate areas per floor, taken from the inside face of exterior walls.

Floor areas from 4th floor up are not finalized and likely subject to adjustments as the layouts get finalized for the tower portion of the building.

P2, P3, P4	1,518m² each floor
P1	1,634m²
Ground	1,380m²
2nd, 3rd	1,410m² each floor
4th to 17th	average 555m² each floor
Penthouse	approx. 225m²

Regards,

SONIA JOANIS, OAA

Architect. Architecte

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De : Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Envoyé : 12 décembre 2024 13:42
À : Sonia Joanis <sjoanis@neuf.ca>
Cc : Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Objet : RE: York- statistics - 112142

HI Sonia,

Sorry for the delayed response.

The interior face of the exterior walls will be fine.

Thanks,

Anthony Mestwarp, P.Eng., Project Manager | Land Development Engineering

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From: Sonia Joanis <sjoanis@neuf.ca>
Sent: Thursday, December 12, 2024 9:51 AM
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Cc: Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Subject: RE: York- statistics - 112142

Hi Anthony,

For 110-116 York;

- 154 hotel rooms.
- No commercial area

- Confirm what parameters you require the areas to be calculated; inside face of exterior walls, outside face of exterior walls, any exclusions?

Regards,

SONIA JOANIS, OAA

Architect. Architecte

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De : Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Envoyé : 12 décembre 2024 07:47
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Objet : RE: York- statistics - 112142

Hi Sonia,

For the York building, would you be able to confirm the following as well:

- unit counts,
- commercial areas,
- floor areas of each building level

Thanks,

Anthony Mestwarp, P.Eng., Project Manager | Land Development Engineering

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Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

From: Sonia Joanis <sjoanis@neuf.ca>
Sent: Tuesday, December 10, 2024 10:09 AM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Subject: RE: York- statistics - 112142

Hi Anthony,

If you are referring to mechanical shafts, there will be multiple spaces fitting that description and rating at every level.

Regards,

SONIA JOANIS, OAA

Architect. Architecte

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De : Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Envoyé : 10 décembre 2024 10:06
À : Sonia Joanis <sjoanis@neuf.ca>
Cc : Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Objet : RE: York- statistics - 112142

Hi Sonia,

The 1hr vertical openings refers to internal openings between floors, mechanical works etc. If you can please confirm [yes/no].

Regards,

Anthony Mestwarp, P.Eng., 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. 216

From: Sonia Joanis <sjoanis@neuf.ca>
Sent: Tuesday, December 10, 2024 9:59 AM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>; Evelyne Cardinal <ecardinal@neuf.ca>
Subject: RE: York- statistics - 112142

Good morning Anthony,

1. The project is non-combustible construction.

Floors and load bearing structures shall have a fire resistance rating of 2 hours.

2. Your question is a bit broad. There will be 1h protected window openings on the exterior wall of the East façade.

Elevator hoists and stairwells will have a 1.5h and 2hr fire resistance rating respectively.

3. Mechanical to advise.
4. Not yet discussed. Considering this project is an addition, can the existing firefighter connections on Dalhousie count? Mechanical to advise.

Regards,

SONIA JOANIS, OAA

Architect. Architecte

T 613 234 2274 ext 138 F 613 234 7453 C 613 314 1175

4th - 10 Rideau Street, Ottawa (ON) K1N 9J1

NEUF ARCHITECTES INC. Confidentialité + Transmission

Montréal. Ottawa. Toronto

50 ans et toujours NEUF . 50 Years and Still NEUF

De : Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Envoyé : 10 décembre 2024 08:13
À : Sonia Joanis <sjoanis@neuf.ca>
Cc : Curtis Ferguson <c.ferguson@novatech-eng.com>; Tyler Martin <tm@goodevestructural.ca>; Pranshu Devgan <pdevgan@jainconsultants.com>; Laura Liu <lliu@jainconsultants.com>; bkhuat@jainconsultants.com; djasarevic@jainconsultants.com; ryan.tuttle@claridgehomes.com; Lu Chen <lc@jbla.ca>
Objet : RE: York- statistics - 112142

Hi Sonia,

Can you please confirm the unit counts, commercial areas, and floor areas of the proposed 110 York building, we would like to ensure that we have the most recent information.

Can you also please confirm the building construction/ details as per the below:

1. Construction Material
    a. Type V – Wood Frame
    b. Type IV - Mass Timber
    c. Type III – Ordinary Construction
    d. Type II – Non-combustible construction
    e. Type I – Fire resistive construction (2hrs)
2. Does the building have Protected openings (1hr) [Do vertical openings have minimum 1 hour rating between floors?]
3. Sprinkler system details
    a. Adequately Designed System (NFPA 13) [Yes/No]
    b. Standard Water supply [Yes/No]
    c. Fully Supervised System [Yes/No]
4. Can you confirm the proposed location of the Siamese Connection

Thanks,

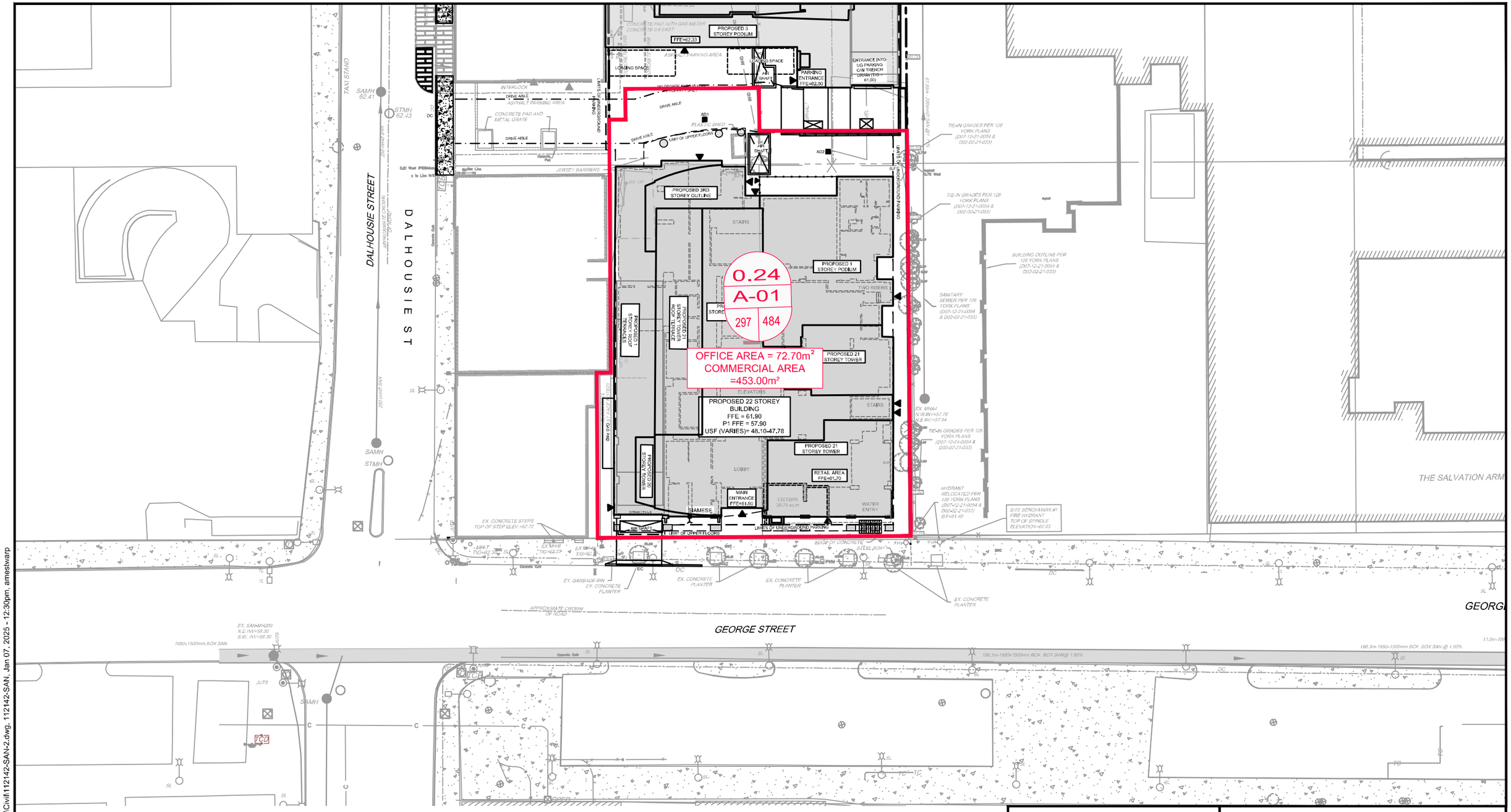
Anthony Mestwarp, P.Eng., Project Manager | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

Appendix C
Sanitary Servicing



LEGEND

- PROPERTY LINE
- PROPOSED SANITARY SEWER AND MANHOLE
- SAN MH — EXISTING SANITARY MANHOLE & SEWER
- SANITARY SEWER DRAINAGE AREA BOUNDARY

0.47
20A-19A
71 | 128

DRAINAGE AREA (ha)
SAN SEWER PIPE RUN
NO. UNITS/POPULATION

NOVATECH
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Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

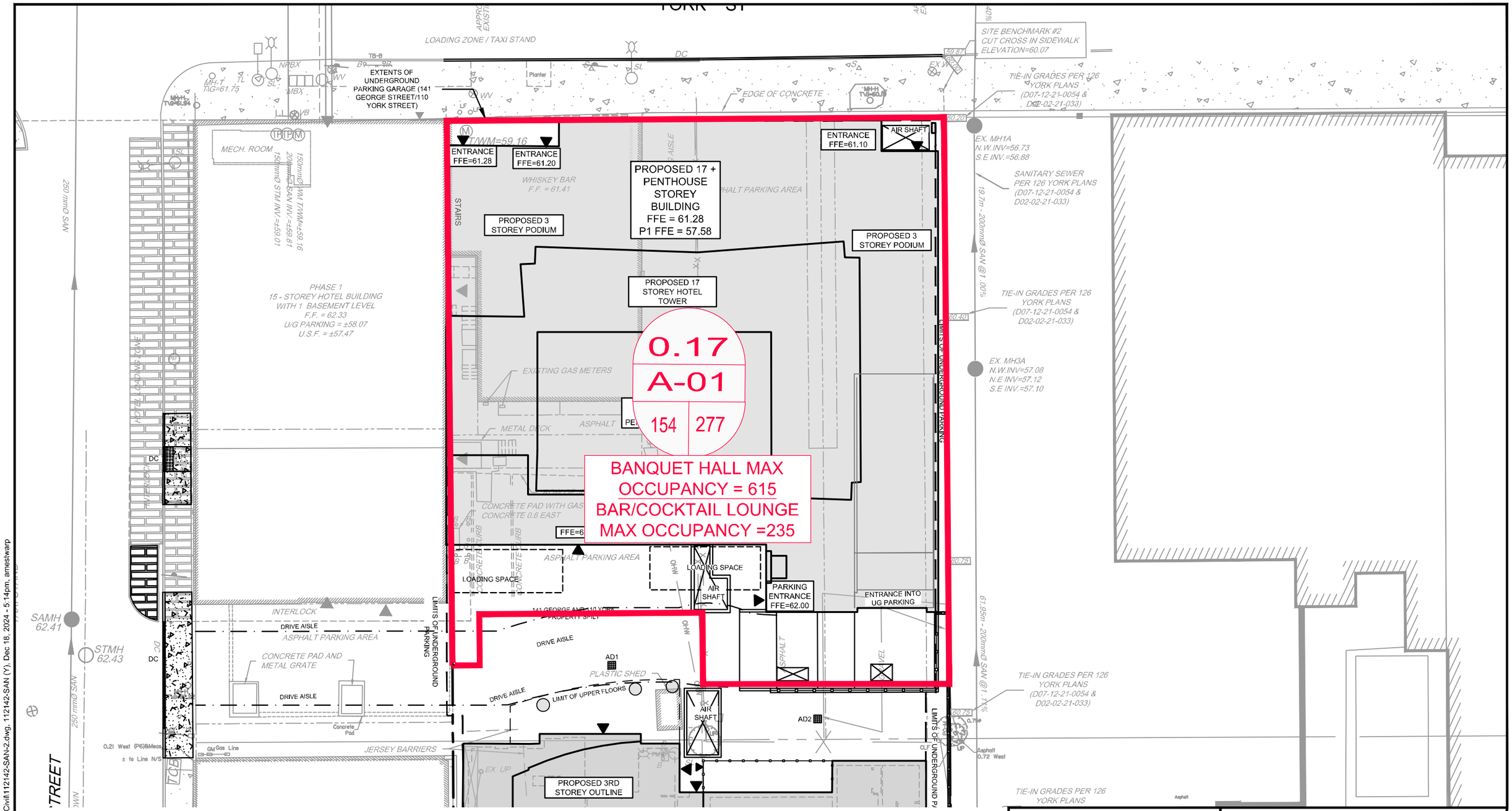
141 GEORGE STREET

SANITARY DRAINAGE AREA PLAN

SCALE 1 : 500 (0, 5m, 10m, 20m)
DATE JAN 2025 | JOB 112142 | FIGURE SAN

SHT11X17.DWG - 279mmX432mm

M:\2012\11\112142_141 GEORGE-110 YORK\CAD\Civil\112142-SAN-2.dwg, 112142-SAN, Jan 07, 2025 - 12:30pm, amestwarp



LEGEND

- PROPERTY LINE
- PROPOSED SANITARY SEWER AND MANHOLE
- SAN MH — EXISTING SANITARY MANHOLE & SEWER
- SANITARY SEWER DRAINAGE AREA BOUNDARY

0.47 / 20A-19A / 71 | 128

DRAINAGE AREA (ha)
SAN SEWER PIPE RUN
NO. UNITS/HOTEL POPULATION

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

110-116 YORK STREET

SANITARY DRAINAGE AREA PLAN

SCALE 1 : 300 (0 3 6 9 12)
DATE JAN 2025 | JOB 112142 | FIGURE SAN

SANITARY SEWER DESIGN SHEET

Project Name: 141 George Street
Date Prepared: 5/25/2023
Date Revised: 9/24/2024
Date Revised 01/23/2025 (Anthony Mestwarp)
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Greg MacDonald, P.Eng
Drawing Reference: 112142 - SAN 141 George Street

USER DESIGN INPUT
CUMULATIVE CELL
CALCULATED DESIGN CELL OUTPUT

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			DEMAND																	DESIGN CAPACITY							
			RESIDENTIAL FLOW									COMMERCIAL FLOW					EXTRANEOUS FLOW				PROPOSED SEWER PIPE SIZING / DESIGN							
AREA	FROM MH	TO MH	Studio	1 Bed Apartment	2 Bed / 1 Bed + Den Apartment	3 Bed / 2 Bed + Den Apartment	POPULATION (in 1000's)	CUMULATIVE POPULATION (in 1000's)	PEAK FACTOR M	AVG POPULATION FLOW (L/s)	PEAKED DESIGN POP FLOW (L/s)	COMMERICAL Area	CUMULATIVE COMMERICAL Area	DESIGN COMMERICAL FLOW (L/s)	COMMERICAL PEAK FACTOR	PEAKED COMMERICAL FLOW	Total Area (ha.)	Accum. Area (ha.)	DESIGN EXTRAN. FLOW (L/s)	TOTAL DESIGN FLOW (L/s)	PIPE LENGTH (m)	PIPE SIZE (mm) AND MATERIAL	PIPE ID ACTUAL (m)	ROUGH. (n)	DESIGN GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak Design / Qcap
George Street																												
A-02	Stub	EX. 1980mm x 1500mm SAN	8	191	98	0	0.484	0.484	3.39	1.57	5.31	525.700	525.700	0.60	1.50	0.90	0.24	0.24	0.08	6.30	6.4	250 PVC	0.254	0.013	2.00	87.7	1.73	7.2%
TOTAL			8	191	98	0	0.484	0.484				525.700	525.700				0.24											

7. Commercial Flow

141 George

Use	Area (m2)
Office Area	72.70
Commercial/Restaurant Area	453.00
Total Com Area	525.70
Total Com Daily Volume (L/s)	52063.56

Use	Daily Demand Volume		Source
Professional Office	75	L/9.3m2/day	Daily Demands from OBC Table 8.2.1.3
Retail Restaurant	125	L/seat/day (1 seat/ 1.1m2, OBC 3.1.17.1)	

Design Parameters:			
1. Residential Flows			
-1 Bed Apartment / Studio	1.4	Person/ Unit	
-2 Bed Apartment	2.1	Person/ Unit	
-3 Bed Apartment	3.1	Person/ Unit	
2. Commercial Flow			
-Restaurant/Lounge	125	L/day/seat	
3. q Avg capita flow	280	L/per/day	
4. M = Harmon Formula (maximum of 4.0)			
5. K =	0.8		
6. Commercial Peak Factor			
-area > 20% of development	1.5		
-area < 20% of development	1.0		
7. Extraneous Flows =	0.33	L/sec/ha	

CAPACITY EQUATION

Q full= (1/n) A R^(2/3)So^(1/2)

Where : Q full = Capacity (L/s)

n = Manning coefficient of roughness (0.013)

A = Flow area (m^2)

R = Wetter perimenter (m)

So = Pipe Slope/gradient

SANITARY SEWER DESIGN SHEET

Engineers, Planners & Landscape Architects

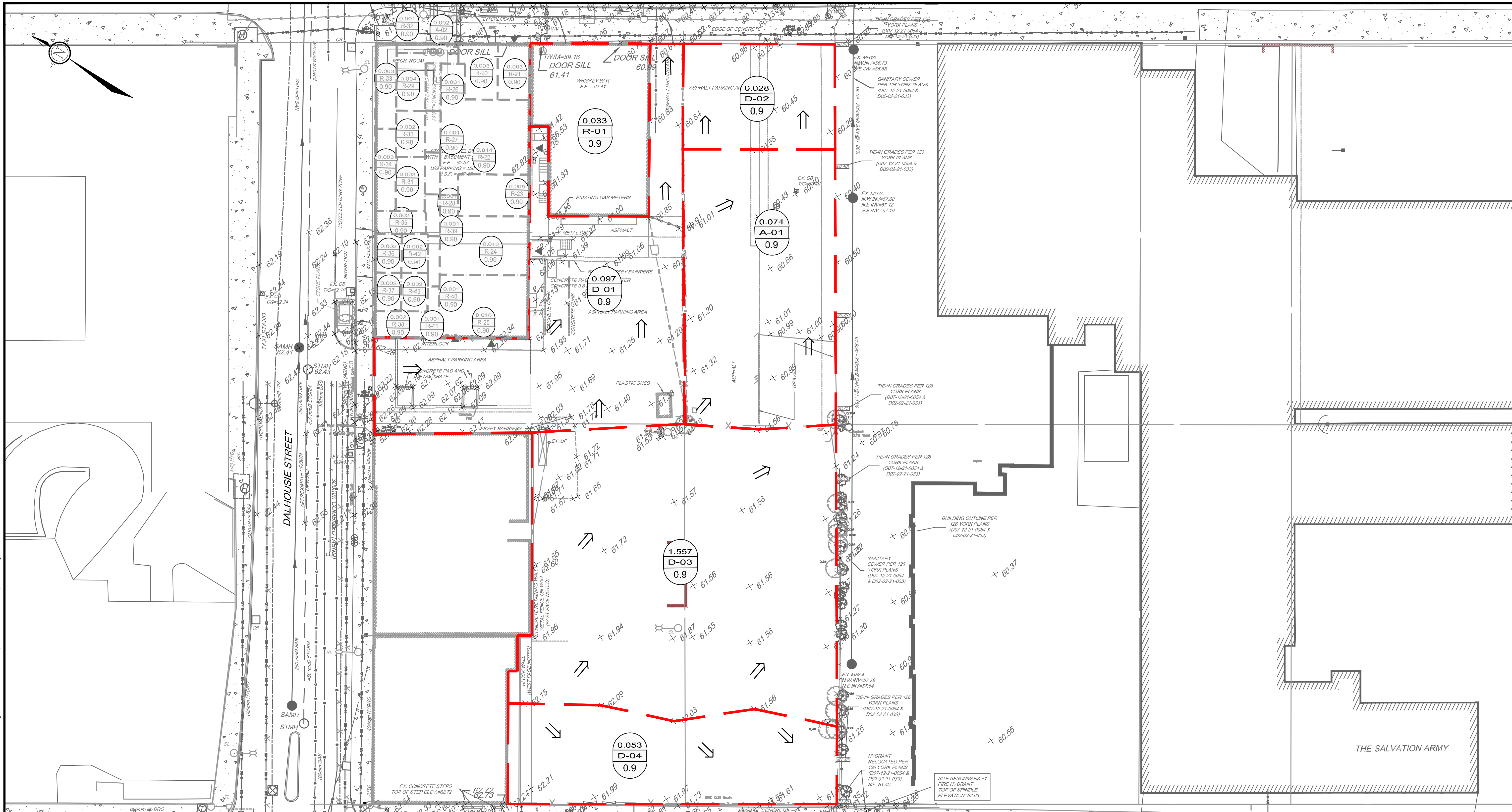
Project Name: 110 York Street
Date Prepared: 10/13/2023
Date Revised: 9/25/2024
Revised: 01/06/2025 (By Anthony Mestwarp)
Input By: Curtis Ferguson, E.I.T.
Reviewed By: Greg MacDonald, P.Eng
Drawing Reference: 112142 - SAN - York Street

USER DESIGN INPUT
CUMULATIVE CELL
CALCULATED DESIGN CELL OUTPUT

LOCATION			DEMAND													DESIGN CAPACITY							
			RESIDENTIAL FLOW						COMMERCIAL FLOW					EXTRANEOUS FLOW				PROPOSED SEWER PIPE SIZING / DESIGN							
AREA	FROM MH	TO MH	HOTEL ROOMS	POPULATION (in 1000's)	CUMULATIVE POPULATION (in 1000's)	Average Pop. Flow Q(q) (L/s)	Design Peaking Factor M	Peak Design Pop. Flow Q(p) (L/s)	Banquet Hall (Seats)	Bar/Cocktail Lounge (Seats)	DESIGN COMMERICAL FLOW (L/s)	COMMERICAL PEAK FACTOR	PEAKED COMMERCIAL FLOW	Total Area (ha.)	Accum. Area (ha.)	DESIGN EXTRAN. FLOW (L/s)	TOTAL DESIGN FLOW (L/s)	PIPE LENGTH (m)	PIPE SIZE (mm) AND MATERIAL	PIPE ID ACTUAL (m)	ROUGH. (n)	DESIGN GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak Design / Qcap
York Street																								
A-01	Stub	EX. 1200mm SAN	154	0.277	0.277	0.72	3.31	2.39	615.000	235	0.40	1.50	0.61	0.17	0.17	0.06	3.05	19.3	200 PVC	0.203	0.013	1.00	34.2	1.06	8.9%
TOTAL			154	0.277	0.277				615.000	615				0.17											

Design Parameters:								
1. Commercial Flow				CAPACITY EQUATION				
-Hotel Room	1.8	Person/ Unit		Q full= (1/n) A R^(2/3)So^(1/2)				
Banquet Hall	30	L/seat/day		Where :	Q full = Capacity (L/s)			
Bar/Cocktail Lounge	70	L/seat/day						
2. q Avg Hotel flow (With Full Housekeeping facilities	225	L/per/day						
3. M = Harmon Formula (maximum of 4.0)								
4. K =	0.8							
5. Commercial Peak Factor					n = Manning coefficient of roughness (0.013)			
-area > 20% of development	1.5				A = Flow area (m^2)			
-area < 20% of development	1.0				R = Wetter perimenter (m)			
6. Extraneous Flows =	0.33	L/sec/ha			So = Pipe Slope/gradient			

Appendix D
Storm Servicing



LEGEND

0.03 / R-01 / 0.9	DRAINAGE AREA AREA ID C VALUE
▬ ▬ ▬	PROPOSED STORM DRAINAGE AREA
CB □	*EXISTING CATCHBASIN*
+61.12	*EXISTING GRADES*

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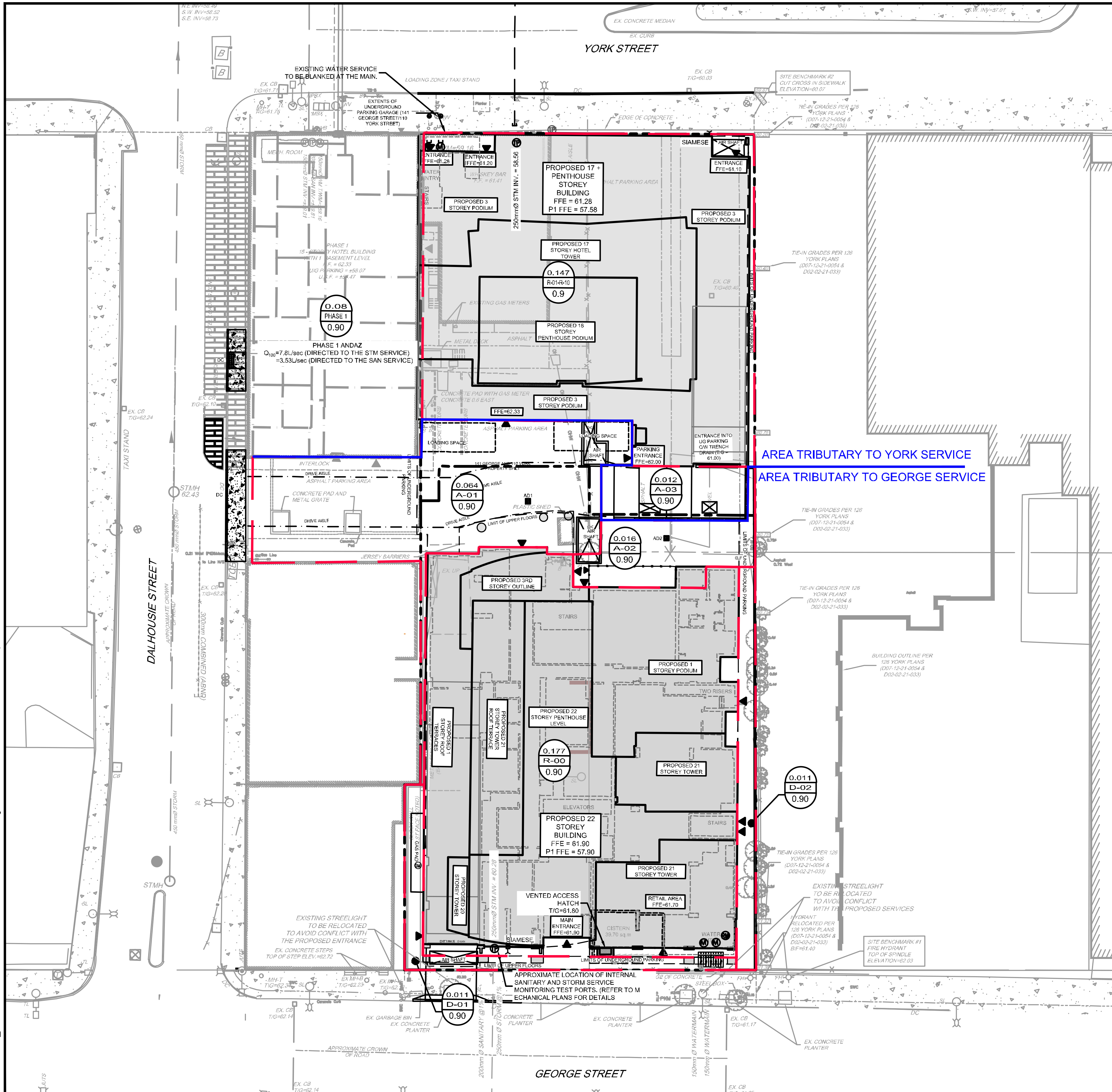
Facsimile (613) 254-5867
Website www.novatech-eng.com

141 GEROGE, 110 & 116 YORK

PRE DEVELOPMENT DRAINAGE FLOWS

SCALE	DATE	JOB	FIGURE
1 : 500	SEP 2024	112142	PRE-STM

M:\2012\112142_141 GEORGE-110 YORK\CAD\Civil\112142-2-PRESTM-Y.dwg, PRE FLOWS, Sep 19, 2024 - 2:35pm, cferguson



LEGEND

	DRAINAGE AREA LIMITS
0.085 / A-16 / 0.78	DRAINAGE AREA (ha) / DRAINAGE AREA ID / RUNOFF COEFFICIENT
	PROPERTY LINE
	PROPOSED CURB
DC	PROPOSED DEPRESSED CURB
	PROPOSED RETAINING WALL C/W GUARD RAIL
	PROPOSED STORM SEWER AND MANHOLE
	PROPOSED AREA DRAIN
	PROPOSED TRENCH DRAIN
	PROPOSED BUILDING ENTRANCE
STM MH	*EXISTING STORM MANHOLE & SEWER*
CB 1	*EXISTING CATCHBASIN*

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Ottawa, Ontario, Canada K2M 1P6

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Website www.novatech-eng.com

CITY OF OTTAWA
141 GEORGE STREET & 110 YORK

POST-DEVELOPMENT STORMWATER MANAGEMENT PLAN

SCALE	DATE	JOB	FIGURE
1 : 500	JAN 2025	112142	SWM

M:\2012\112142_141 GEORGE-110 YORK\CAD\Civil\112142-2-SWM.dwg, SWM, Jan 22, 2025 - 9:04am, amestwarp

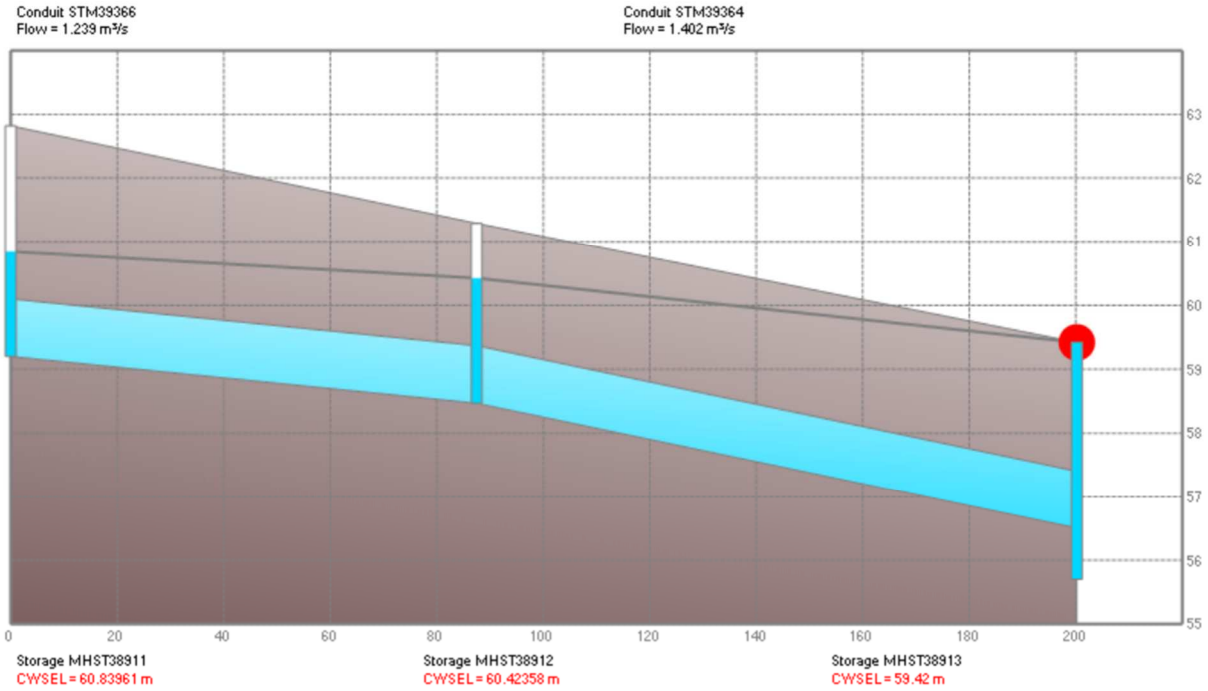
SHT11X17.DWG - 279mmX432mm

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Friday, May 5, 2023 4:51 PM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>; Wu, John <John.Wu@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 141 George Street - Phase 2 (112142)

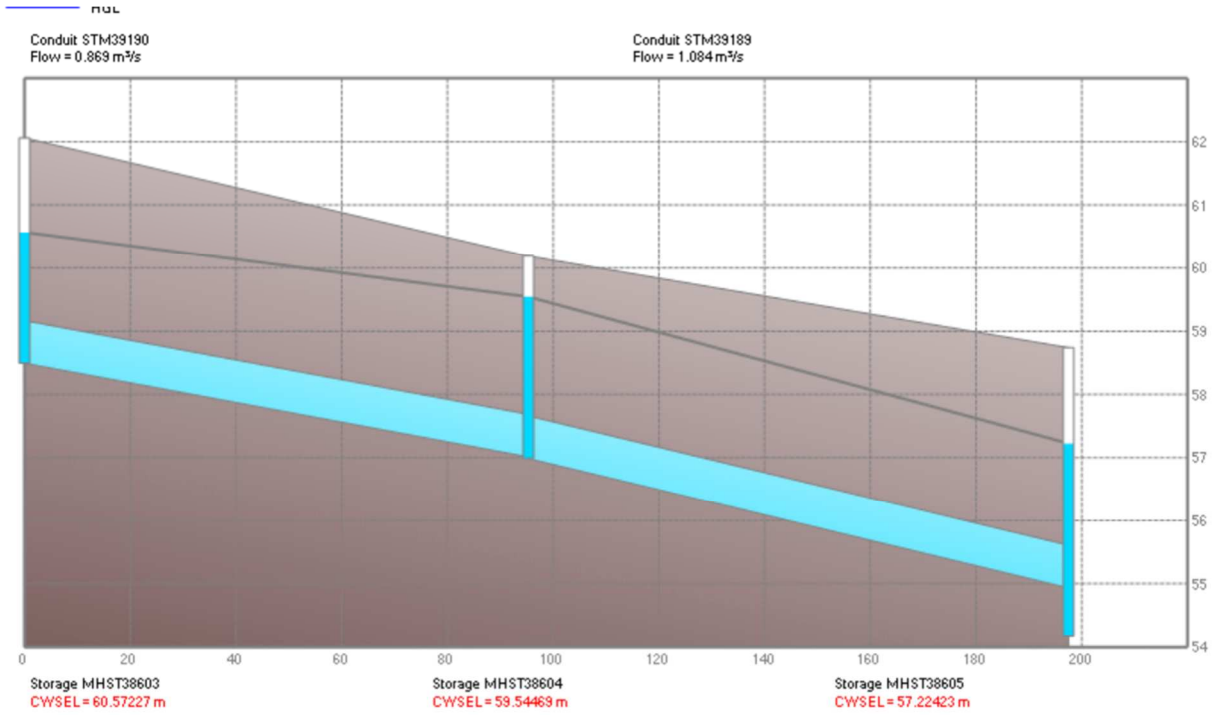
Hi Anthony,

Please see below HGL requested. In these old uncontrolled systems, the 100-year HGL is expected to break out at the surface.

George between Dalhousie and Cumberland



York between Dalhousie and Cumberland



Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department – Direction général de la planification, des biens immobilier et du développement économique
Development Review – Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Sent: April 28, 2023 5:20 PM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>; Wu, John <John.Wu@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 141 George Street - Phase 2 (112142)

Hi Vincent,

The requested PDF is attached.

I hope you have a good weekend.

Regards,

Anthony Mestwarp, P.Eng., Project Engineer | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Friday, April 28, 2023 4:13 PM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>; Wu, John <John.Wu@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 141 George Street - Phase 2 (112142)

Hi Anthony,

I will be reviewing this file in John's absence. Can you please forward me the pdf file highlighting the pipe segments that is mentioned in your previous email. I will then circulate it to asset management to obtain the HGL requested.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department – Direction général de la planification, des biens immobilier et du développement économique
Development Review – Central Branch
City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Sent: April 28, 2023 10:59 AM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Wu, John <John.Wu@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>; Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Subject: RE: 141 George Street - Phase 2 (112142)

Hi Vincent ,

Please review it.

--

Thanks,

Abdul
Mohammad Abdul Mottalib, P. Eng.
Extension: 27798

From: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Sent: April 28, 2023 10:15 AM
To: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Cc: Wu, John <John.Wu@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: FW: 141 George Street - Phase 2 (112142)

Hi Abdul,

I understand that John is currently out of the office.

Can you please review the below?

Thanks,

Anthony Mestwarp, P.Eng., Project Engineer | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

From: Anthony Mestwarp
Sent: Friday, April 28, 2023 10:10 AM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: 141 George Street - Phase 2 (112142)

Hi John,

We are working on the design of 141 George Street Phase 2 and would like to confirm the existing storm sewer HGL within the city infrastructure neighboring the site, to ensure there will not be any backflow issues on the proposed connections.

Can you please confirm who would be the engineering reviewer for this project, and if required forward this email to the appropriate contact.

York Street:

Can you please confirm the existing HGL within the 675mm concrete storm sewer within York street between manholes MHST38603 and MHST38604 as highlighted on the attached PDF.

George Street:

Can you please confirm the existing HGL within the 900mm concrete storm sewer within York street between manholes MHST38911 and MHST38912 as highlighted on the attached PDF.

Thanks,

Anthony Mestwarp, P.Eng., Project Engineer | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

PROJECT #: 112142
PROJECT NAME: 141 George Street/110-116 York Street
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED:June 8, 2023
Revised: Aug 21, 2023
Revised: Sept 12, 2023
Revised: Sept 24, 2024
Revised: Jan 23,2025

TABLE 1A: Allowable Runoff Coefficient "C"

Area*	"C"
Total	0.50
0.438	

TABLE 1B: Allowable Flows

Outlet Options	Area (ha)	"C"	Tc (min)	$Q_{5\ Year}$ (L/s)	Q_{ALLOW} (L/s)
George Street / York Street	0.438	0.50	20	**42.8**	**42.8**

Time of Concentration	Tc=	20	min
Intensity (2 Year Event)	I_2=	52.03	mm/hr
Intensity (5 Year Event)	I_5=	70.25	mm/hr
Intensity (100 Year Event)	I_{100}=	119.95	mm/hr

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

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" - D-01 - Uncontrolled Flow

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	Hard	0.011	0.90	0.90	1.00
0.011	Soft	0.000	0.20		

Runoff Coefficient Equation

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

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 2B: Post-Development D-01 Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
George Street	0.011	0.90	10	**2.2**	**2.9**	**5.6**

Time of Concentration	Tc=	10	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
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

PROJECT #: 112142
PROJECT NAME: 141 George Street / 110 York Street
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED:June 8, 2023
Revised: Aug 21, 2023
Revised: Sept 12, 2023
Revised: Jan 23,2025

TABLE 3A: Post-Development Runoff Coefficient "C" - D-02 - Uncontrolled Flow

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	Hard	0.011	0.90	0.90	1.00
0.011	Soft	0.000	0.20		

Runoff Coefficient Equation

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

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 3B: Post-Development D-01 Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
George Street	0.011	0.90	10	**2.0**	**2.8**	**5.3**

Time of Concentration	Tc=	10	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 4A: Post-Development Runoff Coefficient "C" - D-02 - Uncontrolled Flow

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	Hard	0.012	0.90	0.90	1.00
0.012	Soft	0.000	0.20		

Runoff Coefficient Equation

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

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 4B: Post-Development D-01 Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
George Street	0.012	0.90	10	**2.2**	**3.0**	**5.7**

Time of Concentration	Tc=	10	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

PROJECT #: 112142
PROJECT NAME: 141 George Street
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED:June 8, 2023
Revised: Aug 21, 2023
Revised: Sept 12, 2023
Revised: Sept 23, 2024
Revised: Jan 23,2025

TABLE 5A: Post-Development Runoff Coefficient "C" - A-01, A-02,R-00 - George Cistern

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.079	0.90	0.90	1.00	1.00
0.257	Roof	0.177	0.90		1.00	
	Soft	0.000	0.20		0.25	

TABLE 5B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02,R-01

0.257 =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	15	61.77	39.67	11.2	28.47	25.62
	20	52.03	33.42	11.2	22.22	26.66
	25	45.17	**29.01**	**11.2**	**17.81**	**26.71**
	30	40.04	25.72	11.2	14.52	26.13
	35	36.06	23.16	11.2	11.96	25.11

TABLE 5C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02,R-01

0.257 =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	45.12	11.2	33.92	40.70
	25	60.90	39.11	11.2	27.91	41.87
	30	**53.93**	**34.64**	**11.2**	**23.44**	**42.18**
	35	48.52	31.16	11.2	19.96	41.92
	40	44.18	28.38	11.2	17.18	41.23

TABLE 5D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02,R-01

0.257 =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	49.28	11.2	38.08	102.80
	50	63.95	45.64	11.2	34.44	103.32
	55	**59.62**	**42.55**	**11.2**	**31.35**	**103.45**
	60	55.89	39.89	11.2	28.69	103.28
	65	52.65	37.57	11.2	26.37	102.84

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

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

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

George Street Flow - Reference "Technical Memorandum 110 York Street & 141 George Street Serviceability Memo", Revised: March 12th, 20

Note: Runoff / pump rate was increased by 1.2L/s to accomdate additional stromwater runoff from 116 York.

TABLE 5E: Structure information - A-02,R-01

Structures	Size Dia.(mm)	Area (m^2)	T/G	Bottom of Tank
Tank	-	39.70	61.80	57.90

TABLE 5F: Storage Provided - A-02,R-01

Storage Table			
Elevation (m)	System Depth (m)	Tank Volume (m^3)	
57.90	0.00	0.00	
58.000	0.10	3.97	
58.100	0.20	7.94	
58.200	0.30	11.91	
58.300	0.40	15.88	
58.400	0.50	19.85	
58.500	0.60	23.82	
58.600	0.70	27.79	
58.700	0.80	31.76	
58.800	0.90	35.73	
58.900	1.00	39.70	
59.000	1.10	43.67	
59.100	1.20	47.64	
59.200	1.30	51.61	
59.300	1.40	55.58	
59.400	1.50	59.55	
59.500	1.60	63.52	
59.600	1.70	67.49	
59.700	1.80	71.46	
59.800	1.90	75.43	
59.900	2.00	79.40	
60.000	2.10	83.37	
60.100	2.20	87.34	
60.200	2.30	91.31	
60.300	2.40	95.28	
60.400	2.50	99.25	
60.500	2.60	103.22	
60.600	2.70	107.19	
60.700	2.80	111.16	
60.780	2.88	114.34	**Top of Tank (underside of beam)**
60.800	2.90	114.35	
61.300	3.40	114.71	
61.400	3.50	114.78	
61.500	3.60	114.85	
61.600	3.70	114.93	
61.700	3.80	115.00	
61.800	3.90	115.07	**Vented Tank Lid**

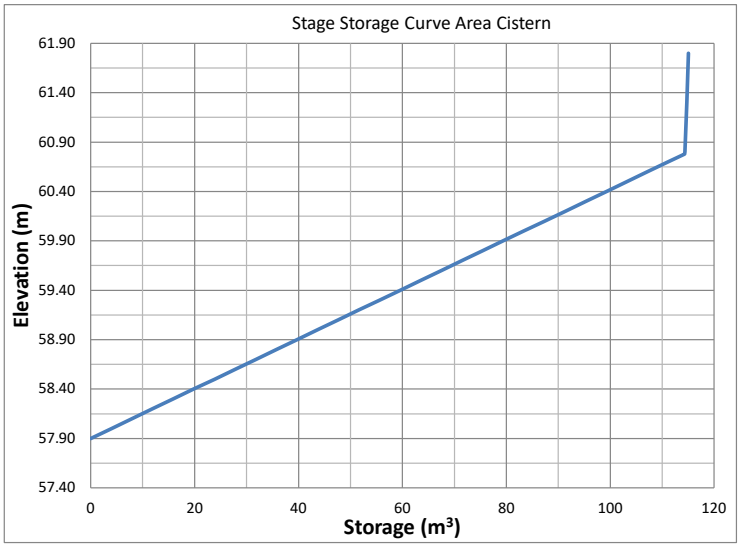


TABLE 5G: Orfice Sizing information - A-02,R-01

Control Device *PUMP*					
Design Event	**Flow (L/S)**	**Head (m)**	**Elev (m)**	**Outlet dia. (mm)**	**Volume (m^3)**
1:2 Year	11.2	0.67	58.57	250.00	26.71
1:5 Year	11.2	1.06	58.96	250.00	42.18
1:100 Year	11.2	2.60	60.50	250.00	103.45

**The design Head is calculated based on the centre of the pipe

George Street Flow - Reference "Technical Memorandum 110 York Street & 141 George Street Serviceability Memo", Revised: March 12th, 2024
Note: Runoff / pump rate was increased by 1.2L/s to accomdate additional stormwater runoff from 116 York.

Table 6.1: Post-Development Stormwater Management Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Control Device	Outlet Location	2 Year Storm Event				5 Year Storm Event				100 Year Storm Event			
						Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)
D-01	0.011	0.90	1.00	N/A	George Street	2.20	N/A	N/A	N/A	2.90	N/A	N/A	N/A	5.60	N/A	N/A	N/A
D-02	0.011	0.90	1.00	N/A	George Street	2.00	N/A	N/A	N/A	2.80	N/A	N/A	N/A	5.30	N/A	N/A	N/A
A-03	0.012	0.90	1.00	N/A	York Street	2.20	N/A	N/A	N/A	3.00	N/A	N/A	N/A	5.70	N/A	N/A	N/A
R-01	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-02	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-03	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-04	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-05	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-06	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-07	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-08	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-09	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-10	0.015	0.90	1.00	Watts Roof Drain	York Street	1.00	TBD	TBD	TBD	1.30	TBD	TBD	TBD	1.50	TBD	TBD	TBD
R-00 / AD-02 (A-02)	0.257	0.90	1.00	Pump	George Street	11.20	0.670	26.71	115.07	11.20	1.060	42.18	115.07	11.20	2.600	103.45	115.07
Post-Development Flow						**27.6**	**-**	**26.7**	**115.1**	**32.9**	**-**	**42.2**	**115.1**	**42.8**	**-**	**103.5**	**115.1**
Total Allowable Release Rate						**42.8**				**42.8**				**42.8**			

Notes:
D-01 and D-02 are uncontrolled flows from 141 George to George Street
AD-01 (A-01) ,AD-02 (A-02) and R-00 are flows to Geroge Cistern
A-03 - Flows to the York service uncontrolled
R-01 to R-10 are controlled flows to service the future building at 110-116 York which will discharge directly to storm sewer on York

Interim Conditon 110-116 York
In the interim , e.g. pending the construction of 110-116 York and the roof top controls, it is proposed to sheet drain the area to a catch basin which will connect to the York Street Sewer through the proposed STM service. As the exisiting area is hard surface and curently drains to York post-development will not exceed predevelopment, per below.
Qpre (Asphalt Current); 2.78 x 0.223 x 104.16 x 0.90 = 58.1 L/sec (5-Year). 2.78 x 0.223 x 178.56 x 1.0 =110.70 L/sec (100-Year)
Qpost (Hardscape Interim); 2.78 x 0.223 x 104.16 x 0.90 = 58.1 L/sec (5-Year), 2.78 x 0.223 x 178.56 x 0.75 = 110.70 L/sec (100-Year)

Appendix E
Recent and Relevant Reports

"110 York Street & 141 George Street Serviceability Memo", by Novatech Engineering, dated March 12th, 2024

“Residential / Hotel Development 141 Geroge Street / 325 Dalhousie Street/110 York Street, Ottawa, Ontario, Servicing Design Brief", by Novatech Engineering, dated April 12th, 2018

“Residential / Hotel Development 141 Geroge Street / 325 Dalhousie Street/110 York Street, Ottawa, Ontario, Servicing Design Brief (Incl. Interim Condition)", by Novatech Engineering, dated February 14th, 2014

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T E C H N I C A L M E M O R A N D U M

DATE: **OCTOBER 16TH, 2023**

REVISED: **MARCH 12TH, 2024**

TO: **MR. JOHN WU**

FROM: **GREG MACDONALD, P.ENG & CURTIS FERGUSON, E.I.T.**

RE: **110 YORK STREET & 141 GEORGE STREET**
SERVICEABILITY MEMO
112142

CC: **VINCENT DENOMME (CLARIDGE HOMES), STEPHEN POON (CLARIDGE HOMES),**

Novatech has been retained by Claridge Homes to prepare a Servicing Memo for the proposed site plan located at 141 George Street & 110 York Street within the City of Ottawa.

The following technical memorandum will review the water, sanitary and storm servicing of the proposed development to determine the serviceability of the development.

141 George Street

Sanitary Sewer

There is an existing 1980x1500mm horseshoe sanitary sewer within the George Street right-of-way.

Design Criteria

Sanitary flows for the proposed development were calculated using criteria from Section 4 of the City of Ottawa Sewer Design Guidelines and the Ontario Building Code as follows:

- Residential Average Flow = 280 L/capita/day
- Studio Apartment = 1.4 Person/unit
- 1 Bed apartment = 1.4 Person/unit
- 2 Bed / 1 Bed + Den apartment = 2.1 Person/unit
- 3 Bed / 2 Bed + Den apartment = 3.1 Person/unit
- Professional Office = 75 L/9.3m^2/day
- Retail / Restaurant = 125 L/2m^2/day
- Bar / Cocktail Lounge = 70 L/day/seat (assumed 1 seat per 2m^2)
- Residential Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Commercial Peaking Factor = 1.0
- Peak Extraneous Flows (Infiltration) = 0.33L/s/ha

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

Sanitary Servicing

The tower is proposed to be serviced by a 200mm dia. sanitary sewer. The proposed service will connect to the existing 1980x1500mm sanitary sewer within the George Street right-of-way. It was confirmed through correspondence with the City that the existing sanitary sewer in George Street has adequate capacity for the development. The peak sanitary flow including infiltration for the site development was calculated to be **6.03 L/s.** Detailed sanitary flow calculations, and correspondence can be found in **Appendix A**.

The detailed design of the Andaz Hotel (Phase 1) was completed by Novatech with details provided within the Andaz Servicing Report. The previous design assumed that the George Building was to consist of a 22-storey condominium with 282 units, and 1097m^2 of commercial. The resultant assumed flow for the site was **9.32L/s**. Additionally, the projected flow from George Street was calculated to be **5.62 L/s**. The assumed design flow was lower than currently proposed, approximately a 7 percent increase in flow from the previous design.

Storm Sewer

There is an existing 900mm dia. concrete sewer within George Street right-of-way.

Design Criteria

Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	2 Year Return Period
Storm Sewer Design	Rational Method
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	20 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

Storm Servicing

It is proposed to service the proposed development with one (1) 250mm storm service connections to the existing 900m storm sewer within the George Street right-of-way. The service will convey the uncontrolled foundation drain and the controlled flows from the internal stormwater cistern within the parking garage. Through correspondence with the City it is understood that the existing 100-year HGL within George Street is at an elevation of 60.6m during the 100-yr storm event. The proposed services will be installed complete with backflow prevention as the 100-year HGL is close to the proposed service inverts (60.28).

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Water

There is an existing 300mm dia. watermain within George Street right-of-way.

Design Criteria

Water demand calculations have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines and the Ontario Building Code as follows:

- Average Domestic Flow = 280L/cap/day
- 1 Bedroom Apartment = 1.4 Persons/unit
- 2 Bedroom Apartment = 2.1 Persons/unit
- 3 Bedroom Apartment = 3.1 Persons/unit
- Office = 75L/9.3m^2/day
- Bar/Cocktail Lounge = 70 L/day/seat
- Restaurant = 125 L/seat/day
- Residential Peaking Factors
  - Maximum Day = 2.5 x Avg Day
  - Peak Hour = 2.2 x Max Day
- Commercial Peaking Factors
  - Maximum Day = 1.5
- Peak Hour= 1.8

The required fire demand was calculated using the Fire Underwriters Survey 2020 (FUS) Guidelines. Through correspondence with the architect, it is understood that the proposed building is residential occupancy (Limited Combustible), composed of fire resistive construction (2 hrs.), and will contain a fully supervised sprinkler system designed as per NFPA 13.

Water Servicing

Domestic Water Demand Summary (George Building)

Population	Commercial Area (m^2)	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
502	670	2.03	4.68	10.04	100

Water Boundary Conditions Response (141 George Street)

Criteria	Head (m)	Pressure[1] (m)	Pressure (PSI)	Pressure Requirements
Connection (George Street)				
Min HGL	106.3	44.4	63.08	> 40psi
Max HGL	115.4	53.5	76.01	< 80psi
Max Day + Fire Flow	109.0	47.1	66.91	> 20psi

[1]Pressure based on a Finished Floor elevation of 61.90m

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The hydraulic analysis indicates that the system can provide adequate pressures and flow to meet the domestic and fire flow requirements for the site.

It is proposed to service the George Building with two (2) individual 200mm diameter services. Two (2) services will connect to the existing 300mm diameter watermain within the George Street right-of-way by way of a TVS connection. A valve will be placed on the 300mm main between the two services for redundancy.

110 York Street

Sanitary Sewer

There is an existing 1200mm dia. sanitary sewer within the York Street right-of-way.

Design Criteria

Sanitary flows for the proposed development were calculated using criteria from Section 4 of the City of Ottawa Sewer Design Guidelines and the Ontario Building Code as follows:

- Average Hotel Flow (full housekeeping facilities) = 225 L/capita/day
- Hotel Room = 1.8 person/unit
- Dance Hall (plus restaurant & bar) = 150 L/day/patron (assumed 1 patron per $2m^2$)
- Residential Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Commercial Peaking Factor = 1.0
- Peak Extraneous Flows (Infiltration) = 0.33L/s/ha

Sanitary Servicing

The building is proposed to be serviced by a 200mm dia. sanitary sewer. The proposed service will connect to the existing 1200mm dia. sanitary sewer within the York Street right-of-way. It was confirmed through correspondence with the City that the existing sanitary sewer in York Street has adequate capacity for the development. The peak sanitary flow including infiltration for the site development was calculated to be **3.13 L/s.** Detailed sanitary flow calculations, and correspondence are attached can be found in **Appendix A**.

Storm Sewer

There is an existing 675mm dia. concrete sewer within George Street right-of-way.

Design Criteria

Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	2 Year Return Period
Storm Sewer Design	Rational Method
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	20 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

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Storm Servicing

It is proposed to service the proposed development with two (2) 250mm storm service connections to the existing 675m storm sewer within the York Street right-of-way. One (1) storm service will convey the uncontrolled foundation drain while the second service will convey the controlled flows from the internal stormwater cistern within the parking garage. Through correspondence with the City it is understood that the existing 100-year HGL within York Street is at an elevation of approximately 60.1m during the 100-yr storm event. The proposed services will be installed complete with backflow prevention as the 100-year HGL is higher than the proposed service inverts.

Water

There is an existing 200mm dia. watermain within York Street right-of-way.

Design Criteria

Water demand calculations have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines and the Ontario Building Code as follows:

- Average Hotel Flow (full housekeeping facilities) = 225 L/capita/day
- Hotel Room = 1.8 Persons/unit
- Dance Hall (plus restaurant & bar) = 150 L/day/patron (assumed 1 patron per 2m^2)
- Residential Peaking Factors
  - Maximum Day = 2.5 x Avg Day
  - Peak Hour = 2.2 x Max Day
- Commercial Peaking Factors
  - Maximum Day = 1.5
- Peak Hour= 1.8

The required fire demand was calculated using the Fire Underwriters Survey 2020 (FUS) Guidelines. Through correspondence with the architect, it is understood that the proposed building is residential occupancy (Limited Combustible), composed of fire resistive construction (2 hrs.), and will contain a fully supervised sprinkler system designed as per NFPA 13.

Domestic Water Demand Summary (York Building)

Population	Commercial Area (m^2)	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
191	793	1.31	2.58	5.26	67

It is proposed to service the York Building with two (2) individual 200mm diameter services. Two (2) services will connect to the existing 200mm diameter watermain within the York Street right-of-way by way of a TVS connection. A valve will be added to the 300mm main between the services to provide redundancy.

Boundary conditions have been requested from the City. We do not anticipate any pressure issues and expect proposed flows to meet the domestic and fire flow requirements for the site.

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Stormwater Management 141 George & 110 York

Design Criteria

Through correspondence with the City of Ottawa, and our knowledge of development requirements in the area, the following criteria have been adopted to control post-development stormwater discharge from the site:

- Control proposed development flows, up to and including the 100-year storm event, to a 5 year allowable release rate calculated using a runoff coefficient (C) of 0.50 and a time of concentration (Tc) of 20 minutes;
- Provide source controls which are in conformity with the City of Ottawa requirements, where possible;
- Limit ponding to 0.15 m for all rooftop storage areas and 0.30 m for all parking storage areas; and
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

The approach to the stormwater management design is to determine the allowable release rate for the site, calculate the uncontrolled flow, and ensure that the remaining flow, in combination with the uncontrolled flow, does not exceed the allowable release rate. All proposed development runoff in excess of the allowable release rate, will be attenuated on-site prior to being released into the storm sewers within George Street and York Street.

Quantity Control

The allowable release rate for the 0.419 ha site was calculated to be 40.9 L/s based on the SWM criteria provided by the City of Ottawa, and the Andaz Servicing Report. The Andaz Hotel (Phase 1) consumed 11.3 L/s which leaves an allowable of 29.6 L/s for the remaining development during the 100-year event.

Design Storms

The design storms are based on City of Ottawa design storms. Design storms were used for the 5, and 100 return periods (i.e. storm events).

Model Parameters

Post-development catchments were modelled based on the proposed site plan and grading as shown on **Drawing 112142-SWM** within **Appendix A**. The building roofs were assumed to have no depression storage.

Post development Stormwater Management Summary can be found below.

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Table 15: Post-Development Stormwater Management Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Control Device	Outlet Location	2 Year Storm Event				5 Year Storm Event				100 Year Storm Event			
						Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)
D-01	0.011	0.90	1.00	N/A	George Street	2.20	N/A	N/A	N/A	2.90	N/A	N/A	N/A	5.60	N/A	N/A	N/A
D-02	0.011	0.90	1.00	N/A	George Street	2.00	N/A	N/A	N/A	2.80	N/A	N/A	N/A	5.30	N/A	N/A	N/A
D-03	0.004	0.90	1.00	N/A	York Street	0.70	N/A	N/A	N/A	1.00	N/A	N/A	N/A	1.90	N/A	N/A	N/A
Cistern (York)	0.125	0.87	0.96	Pump	York Street	6.80	0.240	10.61	75.99	6.80	0.470	17.26	75.99	6.80	1.380	44.00	75.99
Cistern (George)	0.185	0.90	1.00	Pump	George Street	10.00	0.545	16.96	89.11	10.00	0.955	27.36	89.11	10.00	2.615	69.07	89.11
Post-Development Flow						**21.7**	**-**	**27.6**	**165.1**	**23.5**	**-**	**44.6**	**165.1**	**29.6**	**-**	**113.1**	**165.1**
Total Allowable Release Rate						**29.6**				**29.6**				**29.6**			

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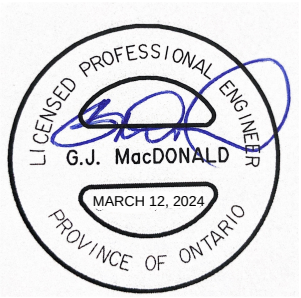
Prepared by:

Curtis Ferguson, E.I.T.
Land Development Engineering

Reviewed by:



Greg MacDonald, P.Eng
Director, Land Development and Public Sector Infrastructure

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

Appendix A

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

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Tuesday, October 10, 2023 2:22 PM
To: Curtis Ferguson
Cc: Wu, John; Anthony Mestwarp; Greg MacDonald
Subject: RE: 141 George Street / 110 York Street - Sanitary HGL (112142)

Hi Curtis,

Asset Management confirmed there is no capacity concerns for the proposed sanitary flows at 110 York St. and 141 George St.
Furthermore, dropping into the 1200mm dia. sanitary sewer on York St. would be acceptable.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department – Direction général de la planification, des biens immobilier et du développement économique
Development Review – Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Curtis Ferguson <c.ferguson@novatech-eng.com>
Sent: October 03, 2023 3:28 PM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Wu, John <John.Wu@ottawa.ca>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>; Greg MacDonald <g.Macdonald@novatech-eng.com>
Subject: RE: 141 George Street / 110 York Street - Sanitary HGL (112142)

Hi Vincent,

141 George Street *Sanitary Design Sheet* is attached.

Anticipated for 110 York (building layout coordination is on-going):

- 84 1 Bed Apartments.
- ~ 200m2 of commercial area anticipated.
- Total Design Flow = 1.79 L/s.

Let me know fi you require anything further.

Curtis Ferguson, B.A.Sc., E.I.T. | Land Development

NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 EXT: 331

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Tuesday, October 3, 2023 2:46 PM
To: Curtis Ferguson <c.ferguson@novatech-eng.com>
Cc: Wu, John <John.Wu@ottawa.ca>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>; Greg MacDonald <g.Macdonald@novatech-eng.com>
Subject: RE: 141 George Street / 110 York Street - Sanitary HGL (112142)

Hi Curtis,

Can you provide calculations showing the anticipated peak sanitary flows going to each sewer and a unit breakdown for the proposed development.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department – Direction général de la planification, des biens immobilier et du développement économique
Development Review – Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Curtis Ferguson <c.ferguson@novatech-eng.com>
Sent: September 28, 2023 2:12 PM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Wu, John <John.Wu@ottawa.ca>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>; Greg MacDonald <g.Macdonald@novatech-eng.com>
Subject: 141 George Street / 110 York Street - Sanitary HGL (112142)

Good Afternoon Vincent,

Inquiring to see if there is capacity issues for the sanitary system fronting both 110 York Street (MHSA38588 to MHSA60171)/ 141 George Street (MHSA38588 to MHSA60171)? Would setting the invert above the obvert of the sanitary in York (1200mm DIA.) function or would there be surcharging issues in the area?

Thanks,
Curtis Ferguson, B.A.Sc., E.I.T. | Land Development
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 EXT: 331

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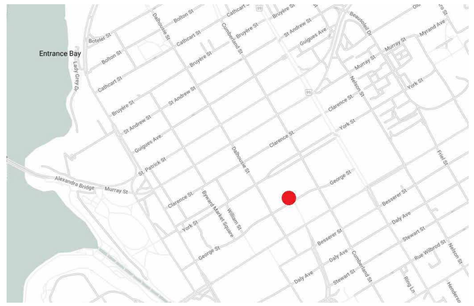
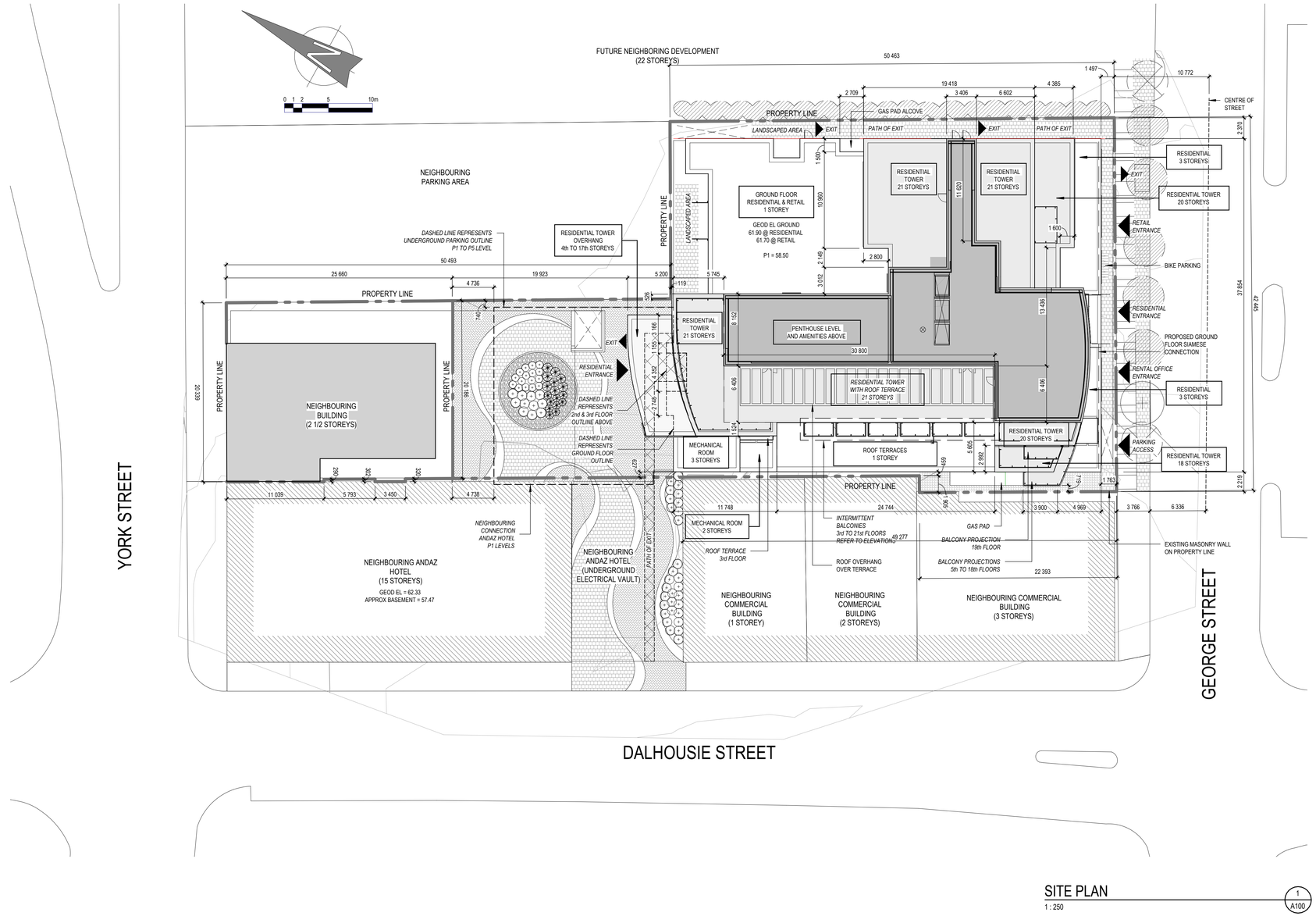


NOTES
• FOR EXISTING SITE CONDITIONS, SEE SURVEY PLAN BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD., SUBMITTED SEPERATELY. • FOR NEW GRADES AND SITE SERVICES, SEE CIVIL ENGINEERING PLANS BY NOVATECH ENGINEERING CONSULTANTS, SUBMITTED SEPERATELY.

OCCUPANCY	UNITS / STOREYS	PROPOSED ZONING GFA
Residential (Rental)	297 units / Ground to 21st floors	Ground = 227m² 2nd = 807m² 3rd = 1,222m² 4th - 17th = 927m²/ floor 12th = 925m² 18th = 869m² 19th & 20th = 849m² 21st = 772m² TOTAL = 18,571m²
	Minimum 15% (44 units) required to be Barrier-Free (BF) to be distributed throughout residential storeys.	7 x Studios (1BF units = 15%)) 193 x 1 Bedroom (31BF units = 16%) 97 x 2 Bedroom (15BF units = 15%) 47BF units = 15%
Commercial	Ground	Commercial = 455m² Office = 73m²
	TOTAL	**19,099m²**



SITE PLAN

1 : 250

1 / A100

MIXED-USE WITH GROUND FLOOR COMMERCIAL - ZONING - MD2 (2031) S307		
ZONING RULE	REQUIREMENT	PROVIDED
Minimum lot area	No minimum	3,109.10m²
Minimum lot width	No minimum	42.45m on George Street. 20.19m on back portion.
Minimum front yard	No minimum	1.51m on George Street
Minimum interior side yard	No minimum	0.45m on West side of building. 0.00m on East side of building.
Minimum rear yard	No minimum	0.15m to one storey volume. 19.92m to 4th to 17th floor overhang.
Maximum building height	70m as per Schedule 307. No projections permitted beyond building height.	70m all inclusive.
Maximum floor space index	Not applicable	Not applicable
Minimum width of landscape area	No minimum except that where a yard is provided and not used for required driveways, aisles, parking, loading spaces, or outdoor commercial patio, the whole yard must be landscaped	Whole yard to be landscaped.
Provisions for buildings 10 storeys and higher (By-law 2019-353)	Minimum lot area for an interior lot: 1350m² Minimum interior side and rear yard setback for a tower: 7.5m Minimum separation distance between towers on the same lot: 15m.	Minimum lot area met. Site Plan Approval received. Not applicable.
Parking Garage permission	100% of ground floor fronting a street (excluding mechanical room, pedestrian and vehicular access) for a minimumm depth of 3m, must be occupied by permitted use..	100% of ground fronting George Street for a minimumm depth of 3m, is occupied by permitted Commercial use and Office use.
Ground floor use	100% of ground floor fronting a street (excluding lobby area, mechanical room and access to other floors) for a minimumm depth of 3m, must be occupied by select uses. Total gross area of lobbies, mechanical rooms and access to other floors must not exceed 50% of ground floor gross area. Min. 50% of ground floor to be occupied by permitted use subject to a separate and direct access to abutting street.	100% of ground fronting George Street for a minimumm depth of 3m, is occupied by permitted Commercial use. Total gross area of lobbies, mechanical rooms and access to other floors does not exceed 50% of ground floor gross area. Area of permitted Commercial use exceeds 50% of gross floor area and has separate direct access to George Street.

AMENITY AND PARKING REQUIREMENTS ZONING - MD2 (2031) S307 (COMBINED WITH 110 YORK STREET)		
ZONING MECHANISM	REGULATION	PROPOSED
Residential Parking	None Required Minimum 50% to be horizontal racks.	P2 19 spaces P3 51 spaces P4 52 spaces P5 51 spaces 84 horizontal & 67 vertical mount.
Visitor Parking	Residential Area Z (By-law 2016-249); no more than 30 visitor spaces are required per building. Exception #2031; 0.083 spaces x 297 units = 25 visitor parking spaces	P2 30 spaces
Commercial Parking	None Required	P1 5 spaces
Hotel Parking	None Required	P1 27 spaces
Barrier-Free Parking	Requires 3 barrier-free spaces (Traffic and Parking By-Law 2017-301)	P1 to P5 2 spaces per floor Total 10 barrier-free spaces
		Total: 245 spaces
Minimum bicycle parking	Residential: 0.5 spaces x 297 units = 149 bicycle parking spaces Retail: 1 space per 250m² of GFA 470m² GFA / 250m² = 2 bicycle parking spaces	Residential: 16 (P1) 64 (P2) 66 (P3) Retail : 5 (Exterior) **Total: 151 bicycle spaces**
Maximum parking	1.5 per dwelling unit Limited to 446 space for 297 units. (combined with visitor) 1 per 100m² of Commercial gross area. Limited to 5 spaces.	Total parking spaces is under the limit. Commercial parking spaces maximized.
Minimum driveway width	6m	6m
Minimum aisle width	6m	6m
Loading	Exception #2031; None Required.	NA
Amenities Areas	Amenity Area - 6m² per unit = 297 units x 6m² = 1,782m² Communal Amenity Area : Exception #2031; minimum 40% off the required total Amenity Area = 1,782m² x 0.4 = minimum 713m² Layout of Communal Amenity Area - aggregated into areas up to 54m²	Combined Balcony Areas = 1,555m² Ground = 35m² 2nd = 59m² 3rd = 89m² 4th to 17th = 75m²/ floor 18th = 77m² 19th = 85m² 20th = 75m² 21st = 85m² Combined Communal Areas = 729m² Ground = 220m² 2nd = 195m² 21st = 314m² Total = 2,284m²

SOLID WASTE COLLECTION REQUIREMENTS		
ZONING MECHANISM	REGULATION	PROPOSED
Residential Waste	**Garbage (Compacted)** = 0.053y³/unit Require 16y³ **Recycling (GMP)** = 0.018y³/unit Require 6y³ **Recycling (Fibres)** = 0.038y³/unit Require 12y³ **Organics** = 240L container/50 units Require 6 containers	**Garbage (Compacted)** = 5 x 4y³ containers Total = 20y³ **Recycling (GMP)** = 2 x 3y³ containers Total = 6y³ **Recycling (Fibres)** = 3 x 4y³ containers Total = 12y³ **Organics** = 7 x 240L containers Total = 1680L

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2. All dimensions which appear on the documents must be verified by the contractor prior to the commencement of work.
3. The architect must be notified of all errors, omissions, and discrepancies between these documents and those of the other professionals.
4. The dimensions on these documents must be read and not measured.

Mechanical - Electrical Engineer
JAIN
7400 East Danbro Crescent, 2nd Floor Mississauga, Ontario, L5N 6P8
T 905 285 9900 jainconsultants.com

Structural Engineer
Goodeve Structural Inc.
18-77 Auriga Drive, Ottawa ON K2E 7Z7
T 613 226 4558 goodevestructural.ca

Landscape Architect
James B. Lennox & Associates
3932, Carling Avenue, Ottawa, ON, K2H 5A8
T 613 722 5168 jbla.ca

Civil
Novatech Eng. Consultants Ltd.
240, Michael Cowpland Drive, Suite 200, Ottawa ON K2M 1P6
T 613 234 9643 novatech-eng.com

Architect
NEUF Architectes INC.
630, boul. René-Lévesque O. 32e étages, Montréal QC H3B 1S6
T 514 847 1117 NEUFarchitectes.com

Seal

NEUF
ARCHITECT(E)S

Client

CLARIDGE HOMES

Project

141 GEORGE STREET

Location
OTTAWA

No.
12810

NO	REVISION	DATE (yyyy.mm.dd)
F	FOR CLIENT COMMENTS	2023.03.03
G	FOR COORDINATION	2023.03.03
H	FOR COORDINATION	2023.04.17
J	FOR COORDINATION	2023.05.17
N	RE-ISSUED FOR SITE PLAN APPROVAL	2023.06.06
O	FOR COORDINATION	2023.06.09
Q	RE-ISSUED FOR SITE PLAN APPROVAL	2023.07.06
R	FOR COORDINATION	2023.07.07
V	FOR COORDINATION	2023.09.11

Drawn by
SJ

Checked by
LH

DATE (aa.mm.jj)
FEB 2023

Scale
As indicated

Drawing Title

SITE PLAN

Revision
V

Dwg Number
A100

From: Vincent Denomme <vincent.denomme@claridgehomes.com>
Sent: Wednesday, October 4, 2023 2:32 PM
To: Curtis Ferguson <c.ferguson@novatech-eng.com>
Cc: Stephen Poon <stephen.poon@claridgehomes.com>
Subject: 110 York

Hi Curtis,

As discussed. Please remove any reference to servicing 110 York on the George Plans.

Also, please prepare a Servicing memo indicating there is sufficient capacity for both projects.

Attached is the site plan prepared for 110 York, there are 106 Hotel rooms. The ground floor has a ball room with back of house/kitchen etc.

SANITARY SEWER DESIGN SHEET

Project Name:	141 George Street
Date Prepared:	5/25/2023
Date Revised:	10/13/2023
Input By:	Curtis Ferguson, E.I.T.
Reviewed By:	Greg MacDonald, P.Eng
Drawing Reference:	112142 - SAN - \141 George Street

USER DESIGN INPUT
CUMULATIVE CELL
CALCULATED DESIGN CELL OUTPUT

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			DEMAND																	DESIGN CAPACITY							
			RESIDENTIAL FLOW									COMMERCIAL FLOW					EXTRANEOUS FLOW				PROPOSED SEWER PIPE SIZING / DESIGN							
AREA	FROM MH	TO MH	Studio	1 Bed Apartment	2 Bed / 1 Bed + Den Apartment	3 Bed / 2 Bed + Den Apartment	POPULATION (in 1000's)	CUMULATIVE POPULATION (in 1000's)	PEAK FACTOR M	AVG POPULATION FLOW (L/s)	PEAKED DESIGN POP FLOW (L/s)	COMMERICAL Area	CUMULATIVE COMMERICAL Area	DESIGN COMMERICAL FLOW (L/s)	COMMERICAL PEAK FACTOR	PEAKED COMMERCIAL FLOW	Total Area (ha.)	Accum. Area (ha.)	DESIGN EXTRAN. FLOW (L/s)	TOTAL DESIGN FLOW (L/s)	PIPE LENGTH (m)	PIPE SIZE (mm) AND MATERIAL	PIPE ID ACTUAL (m)	ROUGH. (n)	DESIGN GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak Design / Qcap
George Street																												
A-02	Stub	EX. 1980mm x 1500mm SAN	25	147	123	1	0.502	0.502	3.38	1.63	5.50	679.700	679.700	0.40	1.00	0.40	0.39	0.39	0.13	6.03	6.4	250 PVC	0.254	0.013	2.00	87.7	1.73	6.9%
TOTAL			25	147	123	1	0.502	0.502				679.700	679.700				0.39											

7. Commercial Flow

141 George

Use	Area (m2)
Office Area	72.70
Restaurant Area	477.00
Bar/Cocktail Lounge	130.00
Total Com Area	679.70
Total Com Daily Volume (L/s)	34948.79

Use	Daily Demand Volume		Source
Professional Office	75	L/9.3m2/day	**Daily Demands from OBC Table 8.2.1.3**
Retail Restaurent	125	L/2m2/day	
Bar/ Cocktail Lounge (meeting/party room)	70	L/day/seat (1 seat/ 2m2)	**City of Ottawa Sewer Design Guidelines**

Design Parameters:			
1. Residential Flows			
-1 Bed Apartment / Studio	1.4	Person/ Unit	
-2 Bed Apartment	2.1	Person/ Unit	
-3 Bed Apartment	3.1	Person/ Unit	
2. Commercial Flow			
-Restaurant/Lounge	125	L/day/seat	
3. q Avg capita flow	280	L/per/day	
4. M = Harmon Formula (maximum of 4.0)			
5. K =	0.8		
6. Commercial Peak Factor			
-area > 20% of development	1.5		
-area < 20% of development	1.0		
7. Extraneous Flows =	0.33	L/sec/ha	

CAPACITY EQUATION

Q full= (1/n) A R^(2/3)So^(1/2)

Where : Q full = Capacity (L/s)

n = Manning coefficient of roughness (0.013)

A = Flow area (m^2)

R = Wetter perimenter (m)

So = Pipe Slope/gradient

SANITARY SEWER DESIGN SHEET

Project Name:	110 York Street
Date Prepared:	10/13/2023
Date Revised:	10/13/2023
Input By:	Curtis Ferguson, E.I.T.
Reviewed By:	Greg MacDonald, P.Eng
Drawing Reference:	112142 - SAN - ' 110 YorK Street

USER DESIGN INPUT
CUMULATIVE CELL
CALCULATED DESIGN CELL OUTPUT

NOVATECH
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LOCATION			DEMAND															DESIGN CAPACITY							
			RESIDENTIAL FLOW						COMMERCIAL FLOW					EXTRANEOUS FLOW				PROPOSED SEWER PIPE SIZING / DESIGN							
AREA	FROM MH	TO MH	HOTEL ROOMS	POPULATION (in 1000's)	CUMULATIVE POPULATION (in 1000's)	PEAK FACTOR M	AVG POPULATION FLOW (L/s)	PEAKED DESIGN POP FLOW (L/s)	COMMERICAL Area	CUMULATIVE COMMERICAL Area	DESIGN COMMERICAL FLOW (L/s)	COMMERICAL PEAK FACTOR	PEAKED COMMERCIAL FLOW	Total Area (ha.)	Accum. Area (ha.)	DESIGN EXTRAN. FLOW (L/s)	TOTAL DESIGN FLOW (L/s)	PIPE LENGTH (m)	PIPE SIZE (mm) AND MATERIAL	PIPE ID ACTUAL (m)	ROUGH. (n)	DESIGN GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak Design / Qcap
York Street																									
A-01	Stub	EX. 1200mm SAN	106	0.191	0.191	3.52	0.50	1.75	793.000	793.000	0.69	1.00	0.69	0.80	0.80	0.26	2.70	6.4	250 PVC	0.254	0.013	2.00	87.7	1.73	3.1%
TOTAL			106	0.191	0.191				793.000	793.000				0.80											

7. Commercial Flow

110 York Street

Use	Area (m2)
Dance Hall (c/w restaurant & bar)	793.00
Total Com Area	793.00
Total Com Daily Volume (L/s)	59475.00

Use	Daily Demand Volume		Source
Dance Hall (c/w restaurant & bar)	150	L/day/patron (1 patron/ 2m2)	City of Ottawa Sewer Design Guidelines

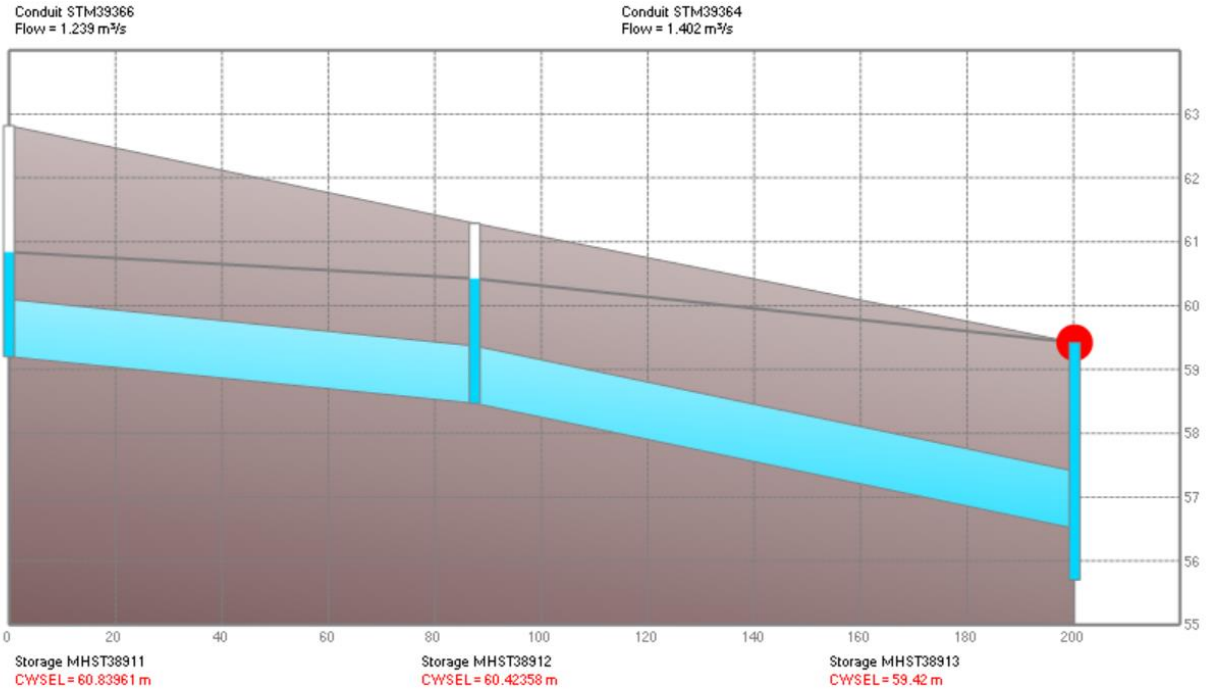
Design Parameters:								
1. Residential Flows				CAPACITY EQUATION				
-Hotel Room	1.8	Person/ Unit		Q full= (1/n) A R^(2/3)So^(1/2)				
2. Commercial Flow				Where :	Q full = Capacity (L/s)			
-Dance hall (c/w restaurant & bar)	150	L/day/patron						
3. q Avg Hotel flow (With Full Housekeeping facilities	225	L/per/day						
4. M = Harmon Formula (maximum of 4.0)					n = Manning coefficient of roughness (0.013)			
5. K =	0.8				A = Flow area (m^2)			
6. Commercial Peak Factor					R = Wetter perimenter (m)			
-area > 20% of development	1.5				So = Pipe Slope/gradient			
-area < 20% of development	1.0							
7. Extraneous Flows =	0.33	L/sec/ha						

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Friday, May 5, 2023 4:51 PM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>; Wu, John <John.Wu@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 141 George Street - Phase 2 (112142)

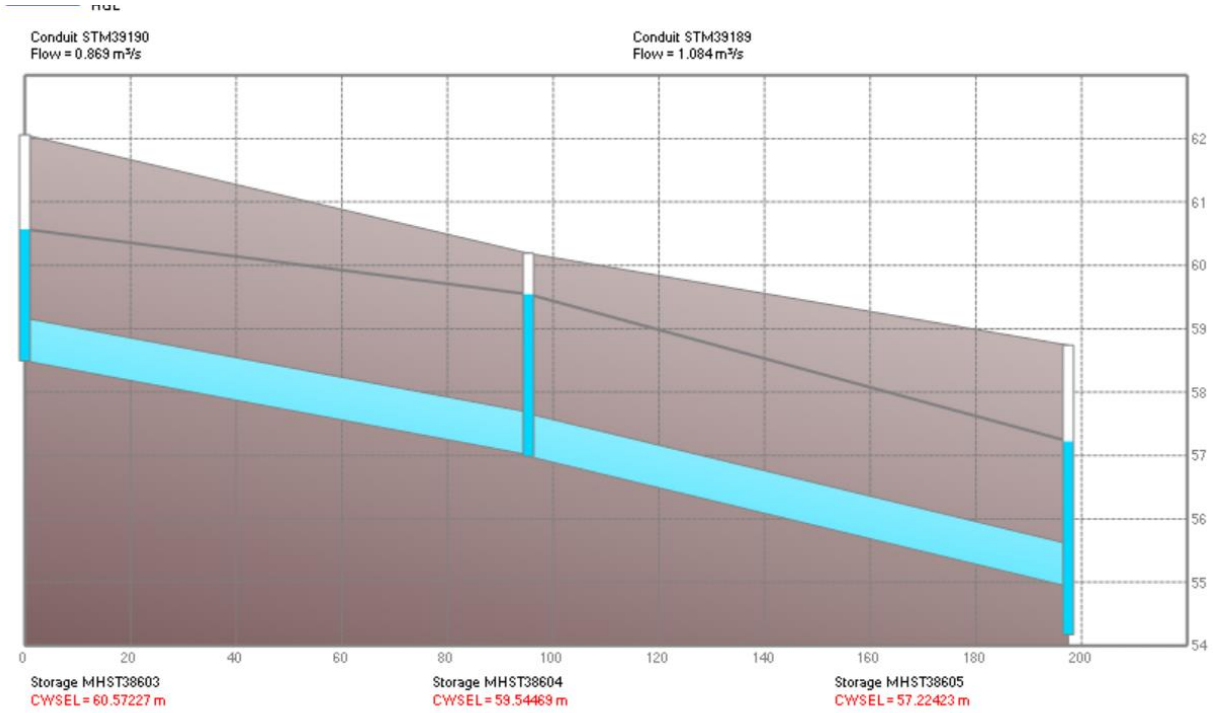
Hi Anthony,

Please see below HGL requested. In these old uncontrolled systems, the 100-year HGL is expected to break out at the surface.

George between Dalhousie and Cumberland



York between Dalhousie and Cumberland



Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department – Direction général de la planification, des biens immobilier et du développement économique
Development Review – Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Sent: April 28, 2023 5:20 PM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>; Wu, John <John.Wu@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 141 George Street - Phase 2 (112142)

Hi Vincent,

The requested PDF is attached.

I hope you have a good weekend.

Regards,

Anthony Mestwarp, P.Eng., Project Engineer | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Friday, April 28, 2023 4:13 PM
To: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Cc: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>; Wu, John <John.Wu@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: RE: 141 George Street - Phase 2 (112142)

Hi Anthony,

I will be reviewing this file in John's absence. Can you please forward me the pdf file highlighting the pipe segments that is mentioned in your previous email. I will then circulate it to asset management to obtain the HGL requested.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department – Direction général de la planification, des biens immobilier et du développement économique
Development Review – Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Sent: April 28, 2023 10:59 AM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Wu, John <John.Wu@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>; Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Subject: RE: 141 George Street - Phase 2 (112142)

Hi Vincent ,

Please review it.

--

Thanks,

Abdul
Mohammad Abdul Mottalib, P. Eng.
Extension: 27798

From: Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Sent: April 28, 2023 10:15 AM
To: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Cc: Wu, John <John.Wu@ottawa.ca>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: FW: 141 George Street - Phase 2 (112142)

Hi Abdul,

I understand that John is currently out of the office.

Can you please review the below?

Thanks,

Anthony Mestwarp, P.Eng., Project Engineer | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

From: Anthony Mestwarp
Sent: Friday, April 28, 2023 10:10 AM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>; Curtis Ferguson <c.ferguson@novatech-eng.com>
Subject: 141 George Street - Phase 2 (112142)

Hi John,

We are working on the design of 141 George Street Phase 2 and would like to confirm the existing storm sewer HGL within the city infrastructure neighboring the site, to ensure there will not be any backflow issues on the proposed connections.

Can you please confirm who would be the engineering reviewer for this project, and if required forward this email to the appropriate contact.

York Street:

Can you please confirm the existing HGL within the 675mm concrete storm sewer within York street between manholes MHST38603 and MHST38604 as highlighted on the attached PDF.

George Street:

Can you please confirm the existing HGL within the 900mm concrete storm sewer within York street between manholes MHST38911 and MHST38912 as highlighted on the attached PDF.

Thanks,

Anthony Mestwarp, P.Eng., Project Engineer | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

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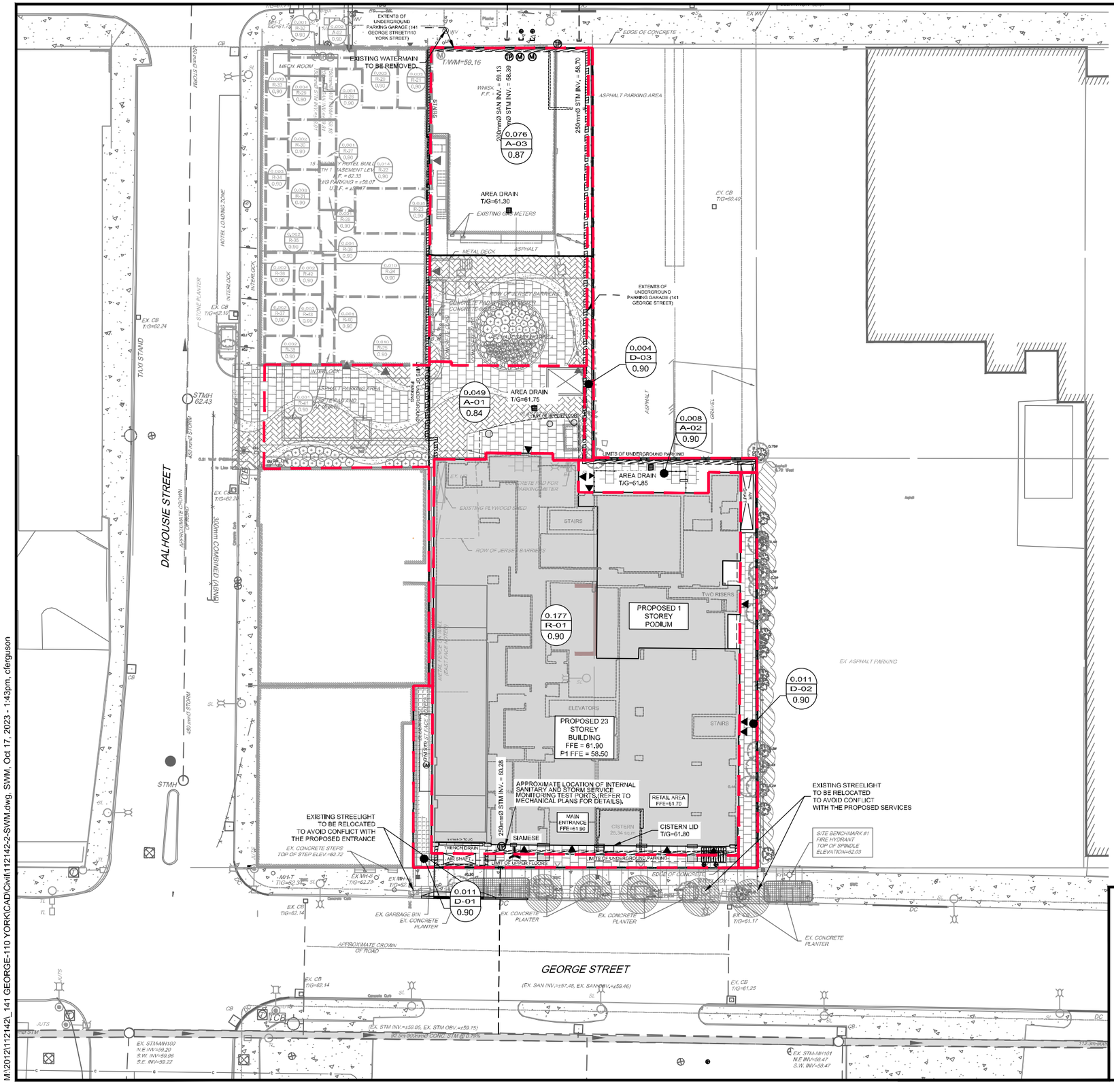

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Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
141 GEORGE STREET

STORMWATER MANAGEMENT PLAN

SCALE 1 : 500 (0, 5m, 10m, 20m)
DATE MARCH 2024
JOB 112142
FIGURE SWM

SHT11X17.DWG - 279mmX432mm

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35 Years

Residential / Hotel Development 141 George Street / 325 Dalhousie Street / 110 York Street Ottawa, Ontario

Servicing Design Brief

RESIDENTIAL / HOTEL DEVELOPMENT
141 GEORGE STREET / 325 DALHOUSIE STREET / 110 YORK STREET
OTTAWA, ONTARIO

SERVICING DESIGN BRIEF

Prepared by:

NOVATECH
240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

December 07, 2012 (R-2012-171)
February 28, 2013 (R-2013-019)
February 14, 2014
Revised April 12, 2018

File No.: 112142
Report Reference No.: R-2014-020

NOVATECH
Engineers, Planners & Landscape Architects

April 12, 2018

City of Ottawa
Planning and Growth Management Department
Development Review (Urban) Services Branch
Infrastructure Approvals Division
110 Laurier Avenue West, 4th Floor
Ottawa ON, K1P 1J1

Attention: Mr. Richard Buchanan

Dear Sir:

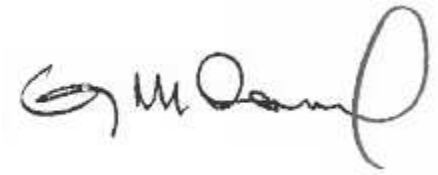
Reference: Residential / Hotel Development
141 George Street / 325 Dalhousie Street
Servicing Design Brief
Our File No.: 112142

Enclosed herein is the revised Servicing Design Brief for the proposed Residential / Hotel development at 141 George Street / 325 Dalhousie Street / 110 York Street, located east of Dalhousie Street between York Street and George Street. This brief is submitted in support of the zoning amendment for the site and outlines how the site will be serviced with sanitary, storm and watermain.

Trusting this report is adequate for your purposes. Should you have any questions, or require additional information, please contact us.

Yours truly,

NOVATECH



Greg MacDonald, P.Eng.
Director | Land Development and Public-Sector Infrastructure

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1.0 INTRODUCTION

This Servicing Design Brief has been prepared in support of a Zoning By-Law Amendment Application of the property located at 110 York Street. A previous Servicing Design Brief was completed on February 14, 2014 in support of a Zoning By-Law Amendment Application for 141 George Street and 325 Dalhousie Street. The proposed development at that time included a 15-storey hotel with 200 rooms and a 22-storey residential condominium with 282 units with approximately 1097 m^2 of commercial floorspace on the ground floor. This report addresses the proposed hotel expansion on 110 York Street, which will add another 128 hotel rooms.

The subject site is located in the Byward Market, east of Dalhousie Street between York Street and George Street in the City of Ottawa. The existing properties are currently occupied by commercial spaces at 110 York Street (The Whiskey Bar), a 15-story hotel building at 325 Dalhousie Street (constructed in 2015), and a privately-owned surface parking lot. Aerial view of the subject is provided in **Figure 1**.

The proposed development of the site will consist of an 18-storey hotel addition at 110 York Street with 128 units and a 22-storey tower at 141 George Street with 282 condominium units. The condominium building will include approximately 1097 m^2 of commercial floor space located on the ground floor. A total of approximately 288 underground parking spaces will be provided on 4 levels of underground parking. Refer to **Figure 2** for details.

As identified in the City of Ottawa's Zoning By-Law, the site is currently designated as Mixed-Use Downtown (MD2). The minor zoning by-law amendment will revise the site's current designation for the proposed development to deal with building height, parking requirements and any applicable zoning provisions that cannot be met. The specific details regarding the changes proposed to the zoning of the subject site are provided in a Planning Rationale submitted as part of the Zoning By-Law Amendment application.

The subject site is approximately 0.42 ha in area. This servicing design brief will outline how the site will be serviced with sanitary, storm and watermain, and will demonstrate that adequate municipal capacity is available within the existing infrastructure to service the development.

2.0 SANITARY SEWER

The existing Dalhousie Street hotel is serviced by a 200 mm dia. sanitary service that connects to the existing 1200 mm dia. sanitary sewer on York Street. The proposed York Street hotel addition will have a separate 200 mm dia. sanitary service that will connect to the existing 1200 mm dia. sanitary sewer on York Street. The existing 200 mm dia. sanitary service for the 110 York Street property will be abandoned. The proposed condominium development will be serviced by a 200 mm dia. sanitary service that will connect to the existing 1980x1500 mm dia. sanitary sewer on George Street. Refer to **Figure 3** for details.

The proposed development flows are based on the City of Ottawa Sewer Design Guidelines. The calculated sanitary flow estimates for existing and proposed buildings on site will be compared to design flows based on current zoning.

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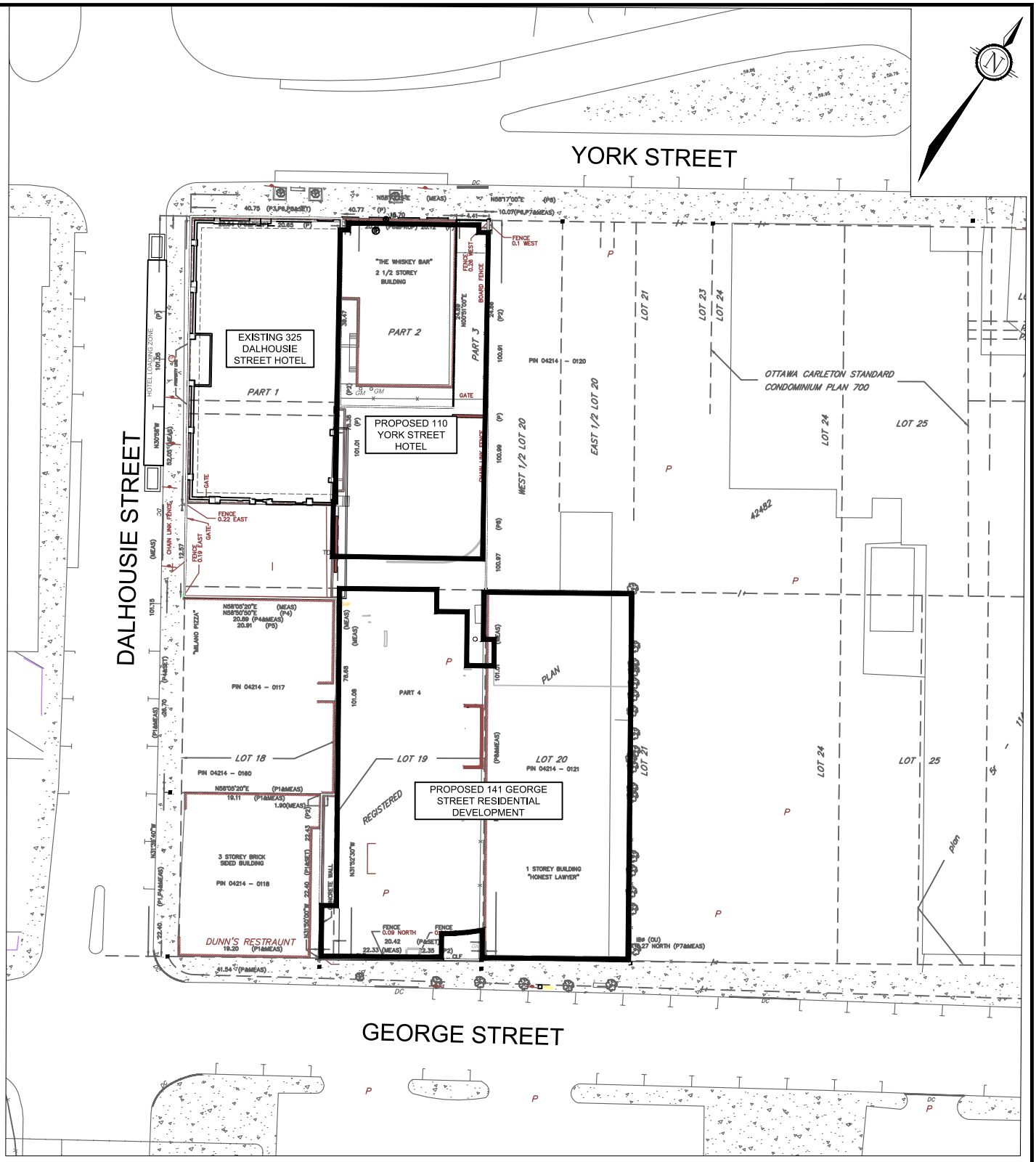
CITY OF OTTAWA
141 GEORGE STREET / 325 DALHOUSIE STREET / 110 YORK STREET

AERIAL PHOTO

SCALE N.T.S

DATE	JOB	FIGURE
APR 2018	112142	FIGURE 1



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CITY OF OTTAWA
141 GEORGE STREET / 325 DALHOUSIE STREET / 110 YORK STREET

CONCEPTUAL SITE PLAN

SCALE N.T.S

DATE APR 2018 | JOB 112142 | FIGURE FIGURE 2

SHT8X11.DWG - 216mmx279mm

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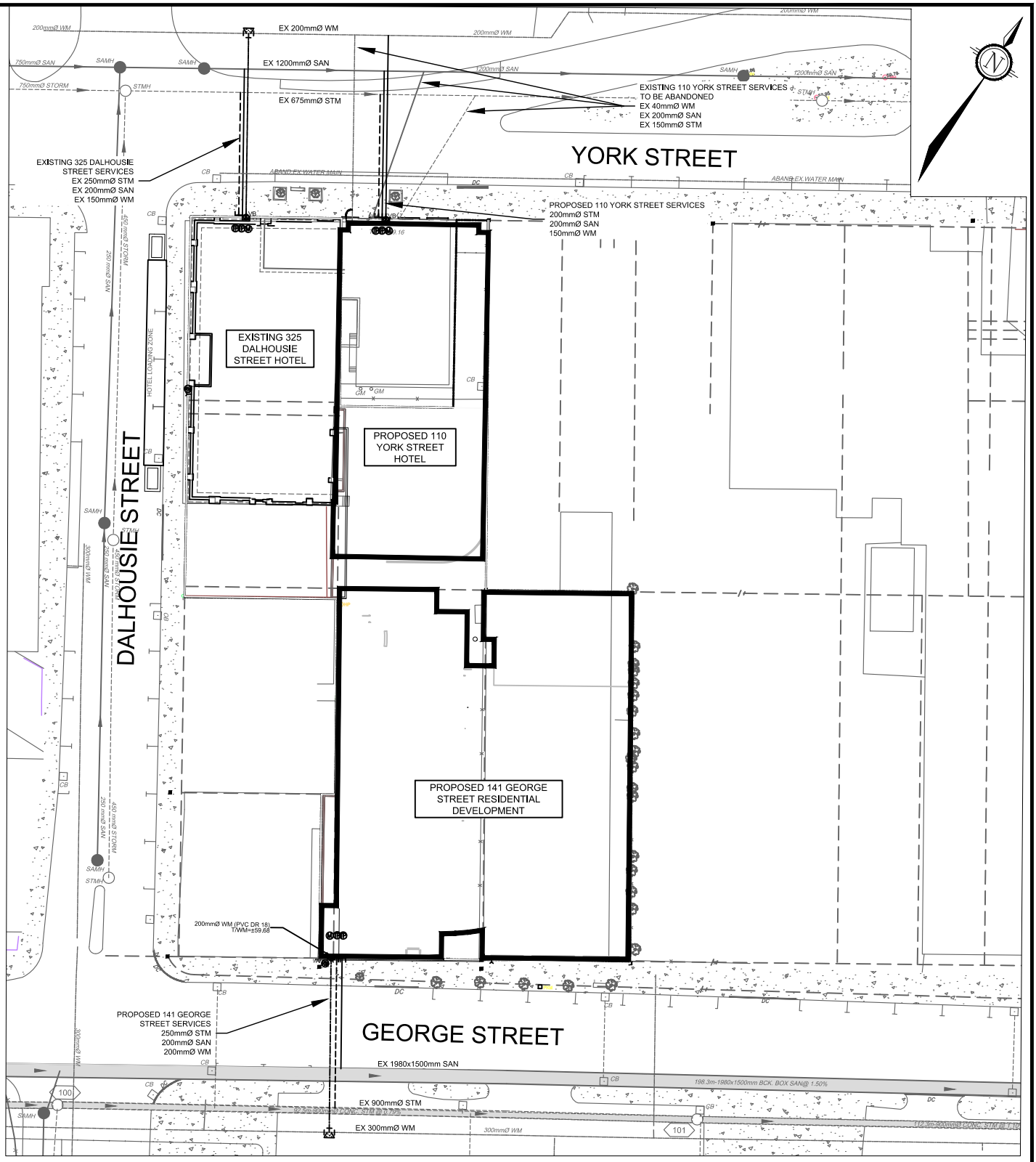

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CITY OF OTTAWA
141 GEORGE STREET / 325 DALHOUSIE STREET / 110 YORK STREET

CONCEPTUAL SITE SERVICING PLAN

SCALE N.T.S

DATE APR 2018 | JOB 112142 | FIGURE FIGURE 3

SHT8X11.DWG - 216mmx279mm

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Sanitary Flows Under Proposed Development

Existing Hotel (Dalhousie Street)

Average Sanitary Flow:

Residential: Q_{SAN} = 200 units x 1.1 persons/unit* x 225 L/cap/day = 49,500 L/day = 0.57 L/s
Restaurant/Bar: Q_{SAN} = 100 seats x 125 L/seat/day = 12,500 L/day = 0.14 L/s
Rooftop Bar: Q_{SAN} = 50 seats x 70 L/seat/day = 3,500 L/day = 0.04 L/s
Staff: Q_{SAN} = 20 staff x 40 L/staff/day = 800 L/day = 0.01 L/s

Total Average Residential Flow = 0.57 L/s
Total Average Commercial Flow = 0.14 L/s + 0.04 L/s + 0.01 L/s = 0.19 L/s
Total Average Sanitary Flow = 0.57 L/s + 0.19 L/s = 0.76 L/s

Peak Sanitary Flow:

Residential Peaking Factor (Harmon Equation) = 3.51
Total Peak Residential Flow = 0.57 L/s x 3.51 = 2.00 L/s
Commercial Peaking Factor = 1.0
Total Peak Commercial Flow = 0.19 L/s x 1.0 = 0.19 L/s

Total Peak Sanitary Flow = 2.00 L/s + 0.19 L/s = 2.19 L/s

** Based on predominantly one person per room (business travel).*

Proposed Hotel (York Street)

Average Sanitary Flow:

Residential: Q_{SAN} = 128 units x 1.1 persons/unit* x 225 L/cap/day = 31,680 L/day = 0.37 L/s
Ballroom/Bar: Q_{SAN} = 50 seats x 70 L/seat/day = 3,500 L/day = 0.04 L/s
Staff: Q_{SAN} = 20 staff x 40 L/staff/day = 800 L/day = 0.01 L/s

Total Average Residential Flow = 0.37 L/s
Total Average Commercial Flow = 0.04 L/s + 0.01 L/s = 0.05 L/s
Total Average Sanitary Flow = 0.37 L/s + 0.05 L/s = 0.42 L/s

Peak Sanitary Flow:

Residential Peaking Factor (Harmon Equation) = 3.56
Total Peak Residential Flow = 0.37 L/s x 3.56 = 1.32 L/s
Commercial Peaking Factor = 1.0
Total Peak Commercial Flow = 0.05 L/s x 1.0 = 0.05 L/s

Total Peak Sanitary Flow = 1.32 L/s + 0.05 L/s = 1.37 L/s

** Based on predominantly one person per room (business travel).*

Proposed Condominium (George Street)

Average Sanitary Flow:

Residential: Q_{SAN} = 282 units x 1.8 persons/unit x 280 L/cap/day = 142,128 L/day = 1.65 L/s
Commercial: Q_{SAN} = 0.1097 ha (1097 m^2) x 28,000 L/ha/d = 3072 L/day = 0.04 L/s

Total Average Sanitary Flow = 1.65 L/s + 0.04 L/s = 1.69 L/s

Peak Sanitary Flow:
Residential Peaking Factor (Harmon Equation) = 3.38
Total Peak Residential Flow = 1.65 L/s x 3.38 = 5.58 L/s
Commercial Peaking Factor = 1.0
Total Peak Commercial Flow = 0.04 L/s x 1.0 = 0.04 L/s

Total Peak Sanitary Flow = 5.58 L/s + 0.04 L/s = 5.62 L/s

Infiltration – Site

Total Site Area = 0.42 ha
Infiltration Flow = 0.33 L/s/ha x 0.42 ha = 0.14 L/s

Site Total

Total Average Sanitary Flow = **2.87 L/s**
Total Peak Sanitary Flow (including infiltration) = **9.32 L/s**

Sanitary Flows Under Current Zoning

Currently, the site is zoned as MD2 – Mixed-Use Downtown. The current zoning by-law permits hotel and a restaurant component as well as residential mid to high use development and a commercial component ancillary to residential. Based on this, sanitary flows are calculated below.

Existing Hotel (Dalhousie Street)

Average Sanitary Flow = 0.76 L/s*
Peak Sanitary Flow = 2.19 L/s*

**See calculations in previous section.*

Existing 110 York Street (The Whiskey Bar)

Average Sanitary Flow:
Bar: Q_{SAN} = 170 seats x 70 L/seat/day = 11,900 L/day = 0.14 L/s
Staff: Q_{SAN} = 6 staff x 40 L/staff/day = 240 L/day = 0.003 L/s

Total Average Sanitary Flow = 0.14 L/s + 0.003 L/s = 0.14 L/s

Total Peak Sanitary Flow:
Commercial Peaking Factor = 1.5

Total Peak Sanitary Flow = 0.14 L/s x 1.5 = 0.21 L/s

Future Residential Development (George Street)

Average Sanitary Flow:
Total Site Area = 0.42 ha
Area Designated for Future Residential Development = 0.21 ha

Population = 0.21 ha x 1800 persons/ha = 378 persons

Total Average Sanitary Flow = 378 persons x 280 L/cap/day = 105,840 L/day = 1.23 L/s

Peak Sanitary Flow:
Residential Peaking Factor (Harmon Equation) = 3.43

Total Peak Residential Flow = 1.23 L/s x 3.43 = 4.22 L/s

Infiltration – Site

Total Site Area = 0.42 ha
Infiltration Flow = 0.33 L/s/ha x 0.42 ha = 0.14 L/s

Site Total

Total Average Sanitary Flow = **2.13 L/s**
Total Peak Sanitary Flow (including infiltration) = **6.76 L/s**

The sanitary flows from the proposed development are in close proximity to the flows calculated under the existing zoning. The existing receiving sewers are a 1200 mm dia. sanitary sewer at ±2.0% slope on York Street with a capacity of approximately 5,750 L/s and a 1500 mm dia. sanitary sewer at ±1.5% slope on George Street with a capacity of approximately 11,650 L/s. Therefore, the proposed development will have negligible impact on the existing municipal sanitary sewer system.

3.0 STORMWATER

Stormwater flows from the site are currently conveyed to the existing storm sewer system via on-site catchbasins and overland flows to York Street, Dalhousie Street, and George Street. The stormwater from the Dalhousie Street hotel as well as the existing building at 110 & 112 York Street is captured by roof drains and outlet through their respective existing service connections. As part of this development, all stormwater will be controlled on site prior to being discharged to the storm system.

The proposed York Street hotel development will be serviced by a new 250 mm dia. storm service that will connect to the existing 675 mm dia. storm sewer on York Street; therefore, the existing 150 mm dia. storm service that is currently connected to the existing 675 mm dia. storm sewer on York Street will need to be abandoned. The new storm service connection to the building will be equipped with a backwater valve.

Furthermore, the proposed condominium development will be serviced by a 250 mm dia. storm service that will connect to the existing 900 mm dia. storm sewer on George Street. The proposed storm service connection to the building will be equipped with a backwater valve. Refer to **Figure 3** for details.

The City will require that on-site stormwater management be implemented to control post-development stormwater discharge for both the 5 & 100 year storm events based on an allowable runoff coefficient (C) of 0.50, a time of concentration (t_c) of 20 minutes, and a 5-year storm control. Stormwater management will be achieved through the use of rooftop controls and surface ponding (as required). Should surplus storage be required, stormwater management

alternatives such as storage tanks or super-pipes will be implemented. Temporary storage will be provided at the surface as required to supply the necessary release rate during all phases until full build out is achieved with underground systems.

The site will be graded such that flows in excess of the 100-year storm event will be conveyed overland to York Street, Dalhousie Street and George Street. Erosion and sediment control measures will be implemented during all phases of construction and inspected regularly.

4.0 WATERMAIN

4.1 Domestic Water Demand

The existing Dalhousie Street hotel is serviced by a 150mm dia. water service that is connected to the existing 200mm dia. watermain in York Street. The proposed York Street hotel development will be serviced by a separate 150 mm dia. water service that will connect to the existing 200 mm dia. watermain on York Street. The existing water service for the 110 York Street property will need to be blanked at the City watermain and abandoned. The proposed condominium development will be serviced by a 200mm dia. water service that will connect to the existing 300 mm dia. watermain on George Street. Refer to **Figure 3** for details.

Estimated domestic daily water demands for the development are roughly the same as the proposed development sanitary flows listed above in Section 2.0:

<u>Existing Hotel (Dalhousie Street)</u>

Residential Average Day Demand = 0.57 L/s
Residential Maximum Day Demand (2.5 x avg. day) = 1.43 L/s
Residential Peak Hour Demand (2.2 x max. day) = 3.15 L/s

Commercial Average Day Demand (Restaurant + Bar + Staff) = 0.19 L/s
Commercial Maximum Day Demand (1.5 x avg. day) = 0.29 L/s
Commercial Peak Hour Demand (1.8 x max. day) = 0.52 L/s

Total Average Day Demand = 0.76 L/s
Total Maximum Day Demand = 1.72 L/s
Total Peak Hour Demand = 3.67 L/s

<u>Proposed Hotel (York Street)</u>

Residential Average Day Demand = 0.37 L/s
Residential Maximum Day Demand (2.5 x avg. day) = 0.93 L/s
Residential Peak Hour Demand (2.2 x max. day) = 2.05 L/s

Commercial Average Day Demand (Ballroom/Bar + Staff) = 0.05 L/s
Commercial Maximum Day Demand (1.5 x avg. day) = 0.08 L/s
Commercial Peak Hour Demand (1.8 x max. day) = 0.14 L/s

Total Average Day Demand = 0.42 L/s
Total Maximum Day Demand = 1.01 L/s
Total Peak Hour Demand = 2.19 L/s

Condominium (George Street)

Residential Average Day Demand = 1.65 L/s
Residential Maximum Day Demand (2.5 x avg. day) = 4.13 L/s
Residential Peak Hour Demand (2.2 x max. day) = 9.09 L/s

Commercial Average Day Demand = 0.04 L/s
Commercial Maximum Day Demand (1.5 x avg. day) = 0.06 L/s
Commercial Peak Hour Demand (1.8 x max. day) = 0.11 L/s

Total Average Day Demand = 1.69 L/s
Total Maximum Day Demand = 4.19 L/s
Total Peak Hour Demand = 9.20 L/s

Based on the data provided by the City, the existing watermains in the area are adequate to service this development. According to hydrant test results, the watermain in the street can deliver in the range of approximately 1000 igpm (±75.8 L/s) at a dynamic pressure greater than 56 psi. A copy of the watermain data is attached in **Appendix A**.

4.2 Fire Demand

Section 4.2.11 of the City of Ottawa Water Design Guidelines reads:

"When calculating the fire flow requirements and affected pipe sizing, designers shall use the method developed by the Fire Underwriters Survey.", and

"The requirements for levels of fire protection on private property are covered in Section 7.2.11 of the Ontario Building Code."

The Fire Underwriters Survey is used to assess the performance of the water distribution system on a "City Block" basis rather than an individual building basis. The Ontario Building Code governs the assessment of fire demand for individual buildings.

Section 7.2.11.1 of the Ontario Building Codes states that the design, construction, installation and testing of fire service mains and water service pipe combined with fire service mains shall be in conformance with NFPA 24.

NFPA 24 is the standard for the "Installation of Private Fire Service Mains and their Appurtenances". Chapter 13 of NFPA 24 discusses sizing the private service fire mains for fire protection systems which shall be approved by the authority having jurisdiction, considering the following factors:

- Construction and Occupancy of the building
- Fire Flow and Pressure of the Water Required
- Adequacy of the Water Supply

Specific to this project the buildings will be sprinklered per Section 3.2.2.45 of the Ontario Building Code (OBC). Section 3.2.5.7 of the OBC requires that an adequate water supply for fire fighting be provided to each building, and references Appendix A of the OBC. Sentence 3 of Section A 3.2.5.7 of the OBC (Appendix A) states that NFPA 13 be used for determining both sprinkler and hose stream demands for a sprinklered building.

The design of the sprinkler system is completed by a Fire Protection Engineer, or typically computed by the sprinkler contractor and approved by the Fire Protection Engineer. The process involves detailed hydraulic calculations based on building layout, pipe runs, head losses, fire pump requirements, etc. At this stage in the development process, these details are not available. However, using Chapter 7 of NFPA 13, it is possible to provide a fairly accurate estimate of the fire demand for the building. This estimate is provided below.

NFPA Chapter 7 Calculation

22 Storey Residential Building – Light Hazard
15 Storey Hotel Building – Light Hazard [incl. restaurant - Ordinary Hazard (Group 1)]
18-Storey Hotel Building – Light Hazard
4 Level Underground Parking (under residential building - serve both) - Ordinary Hazard (Group 1)

Section 7.2.3 of NFPA 13, "Water Demand Requirements – Hydraulic Calculation Methods" is used to estimate the hose stream demand and the sprinkler demand. The water demand for sprinklers is estimated using the most remote area in the building. Figure 7.2.3.1.2 – Area/Density Curves is used for the worst case scenario, which in this case is the Ordinary Hazard Classification in the underground parking garage. For this classification, Figure 7.2.3.1.2 provides a density of 0.15 gpm/ft2 using a coverage of 1500 ft2, or 225 gpm (US).

Table 7.2.3.1.1 is used to determine the hose stream demand. For Ordinary Hazard a total combined inside and outside hose stream demand of 250 gpm is required. Typically, 150 gpm would be drawn off the hydrant and 100 gpm off the hose cabinets.

Therefore, total estimated demand would be 225 gpm + 250 gpm = 475 gpm. Adding an allowance for head losses though out the sprinkler system, an estimated fire demand of between 550 – 600 gpm, or say 600 USgpm (2,270 L/min) would be required. According to the fire hydrant data provided by the City, the 200 mm and 300 mm watermains on York Street and George Street respectively can deliver in the range of 1,000 Igpm (1,200 USgpm) under normal conditions and 2,100 Igpm (2,500 USgpm) at 20 psi residual. The building will also be equipped with a fire pump, if necessary, to provide the minimum residual pressure at the sprinkler heads.

Reference material from NFPA 13 is contained in **Appendix A**.

5.0 CONCLUSIONS

Based on the foregoing, adequate sanitary, storm and water services are available to support this development.

NOVATECH ENGINEERING CONSULTANTS LTD.

Prepared by:

Jeff Marcuccio, EIT
Engineering Intern

Reviewed by:

Miroslav Savic, P.Eng.
Senior Project Manager

Approved By:

Greg MacDonald, P.Eng
Director, Land Development and Public Sector Infrastructure

APPENDIX A
Hydrant Flow Data/Fire Fighting Information

FAX TRANSMISSION FORM - Supply Pressure/Flow Capacity

City of Ottawa
Transportation Utilities and Public Works
Customer Service & Operational Support
951 Clyde Avenue
Ottawa, On, K1Z 5A6
Joseph Hannewyk **email: joseph.hannewyk@ottawa.ca**
Business Consultant/Water Resources Analyst **phone 560-6065 x22617**
fax 728-4183

Date/Time: 12/09/24-10:20:54
Our File: 49-01-2006
1 of 2 Page(s)

To: **Justin Gauthier**
Company: **Novatech Engineering Consultants Ltd.**
Tel: **254-9643x217**
Fax: **254-5867**
Location: **George @ Dalhousie**
Request_dt: 12/09/24-10:14:12
Email: **j.gauthier@novatech-eng.com**

Pressure Only ? (Y):

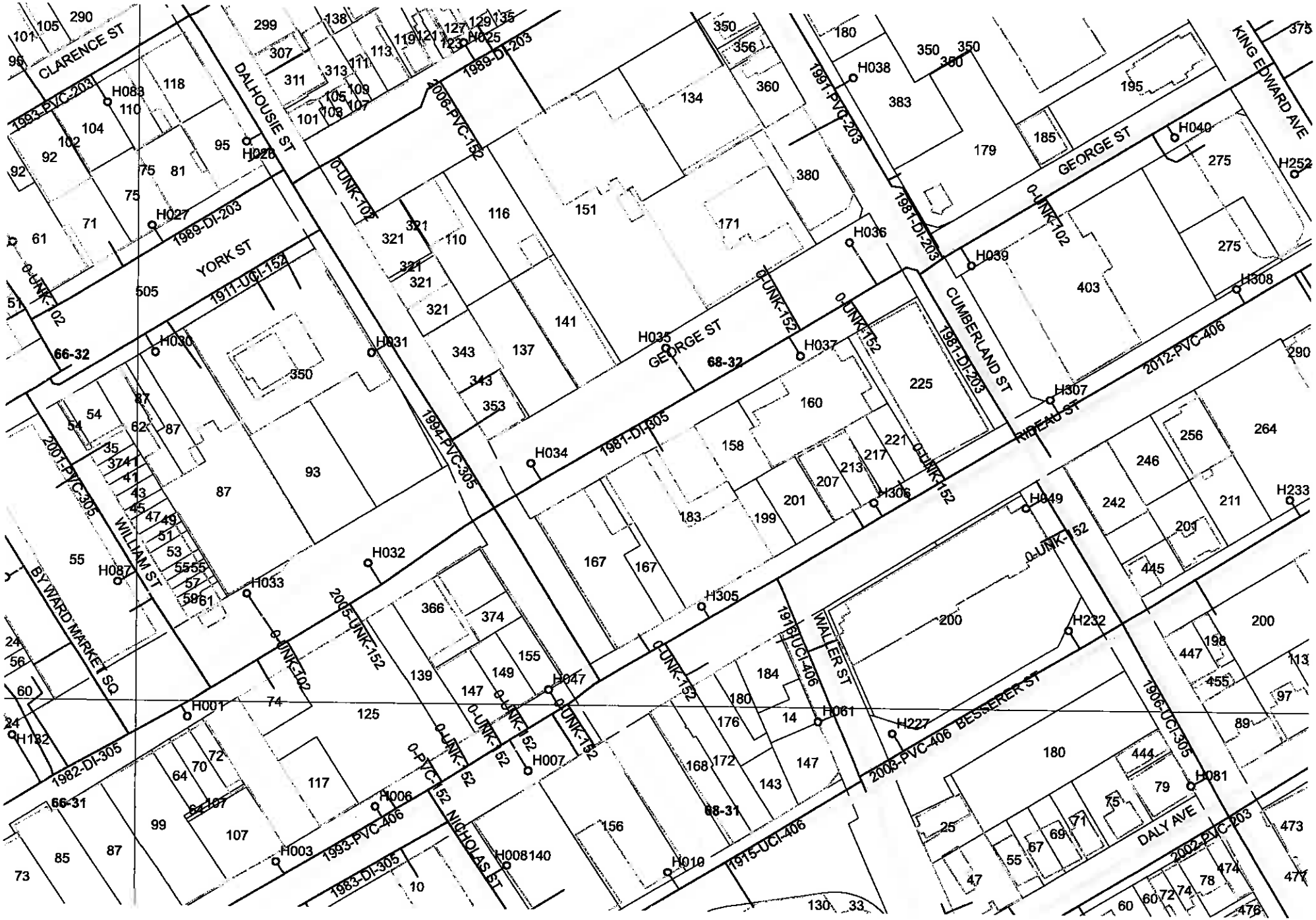
6350

Preferred Response Method:

Inspection Date	Flow Hydrant	Residual Hydrant	Pressure (psi)			Flow (igpm)	
			Static	Dynamic	Pitot	Actual	@ 20 psi
2011/09/26	6832034	6832035	66	>56	46	950	2166
2011/09/26	6832035	6832039	68	>56	52	1010	2135
2011/09/26	6832036	6832039	68	>58	56	1048	2445
2011/09/26	6832037	6832035	66	>56	54	1029	2346
2011/09/27	6832031	6832026	68	>58	56	1048	2445
?	6832029	?	?	?	?	?	?
?	6832215	?	?	?	?	?	?
2011/09/26	6832038	6832039	68	>58	58	1067	2488

Note: the computed flows are approximate and performed for hydrant colour coding purposes, thus these values are not intended for design purposes.

Ref# **6350**


CLARENCE ST
DALHOUSIE ST
YORK ST
GEORGE ST
RIDEAU ST
CUMBERLAND ST
KING EDWARD AVE
BYWARD MARKET SQ
WILLIAM ST
WALLER ST
DALY AVE
NICHOLAS ST
BESSERER ST
1989-DI-203
2006-PVC-152
1991-PVC-203
1911-UCI-152
1994-PVC-305
1981-DI-305
2001-PVC-305
2005-UNK-152
1982-DI-305
1993-PVC-406
1983-DI-305
1915-UCI-406
1976-UCI-406
2003-PVC-406
1906-UCI-305
2002-PVC-203
2012-PVC-406
0-UNK-102
0-UNK-152
0-PVC-152
66-32
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68-31
H088
H026
H027
H030
H031
H032
H033
H087
H001
H132
H006
H003
H008140
H007
H047
H034
H035
H036
H037
H038
H039
H040
H252
H308
H307
H306
H305
H049
H233
H232
H227
H061
H081
H010

6-4.5.9* For individual fasteners, the loads determined in 6-4.5.6 shall not exceed the allowable loads provided in Figure 6-4.5.9.

The type of fasteners used to secure the bracing assembly to the structure shall be limited to those shown in Figure 6-4.5.9. For connections to wood, through bolts with washers on each end shall be used. Holes for through bolts shall be $^1/_{16}$ in. (1.6 mm) greater than the diameter of the bolt.

Exception No. 1: Where it is not practical to install through bolts due to the thickness of the member or inaccessibility, lag screws shall be permitted. Holes shall be pre-drilled $^1/_8$ in. (3.2 mm) smaller than the maximum root diameter of the lag screw.

Exception No. 2: Other fastening methods are acceptable for use if certified by a registered professional engineer to support the loads determined in accordance with the criteria in 6-4.5.9. Calculations shall be permitted where required by the authority having jurisdiction.

6-4.5.10 Sway bracing assemblies shall be listed for a maximum load rating. The loads shall be reduced as shown in Table 6-4.5.10 for loads that are less than 90 degrees from vertical.

Exception: Where sway bracing utilizing pipe, angles, flats, or rods as shown in Table 6-4.5.8 is used, the components do not require listing. Bracing fittings and connections used with those specific materials shall be listed.

Table 6-4.5.10 Allowable Horizontal Load on Brace Assemblies Based on the Weakest Component of the Brace Assembly

Brace Angle	Allowable Horizontal Load
30–40 degrees from vertical	Listed load rating divided by 2.000
45–59 degrees from vertical	Listed load rating divided by 1.414
60–89 degrees from vertical	Listed load rating divided by 1.155
90 degrees from vertical	Listed load rating

6-4.5.11 Bracing shall be attached directly to feed and cross mains. Each run of pipe between changes in direction shall be provided with both lateral and longitudinal bracing.

Exception: Pipe runs less than 12 ft (3.6 m) in length shall be permitted to be supported by the braces on adjacent runs of pipe.

6-4.5.12 A length of pipe shall not be braced to sections of the building that will move differentially.

6-4.6 Restraint of Branch Lines.

6-4.6.1* Restraint is considered a lesser degree of resisting loads than bracing and shall be provided by use of one of the following:

(1) A listed sway brace assembly

(2) A wraparound U-hook satisfying the requirements of 6-4.5.3, Exception No. 3

(3) No. 12, 440-lb (200-kg) wire installed at least 45 degrees from the vertical plane and anchored on both sides of the pipe

(4) Other approved means

Wire used for restraint shall be located within 2 ft (610 mm) of a hanger. The hanger closest to a wire restraint shall be of a type that resists upward movement of a branch line.

6-4.6.2 The end sprinkler on a line shall be restrained against excessive vertical and lateral movement.

6-4.6.3* Where upward or lateral movement would result in an impact against the building structure, equipment, or finish materials, branch lines shall be restrained at intervals not exceeding 30 ft (9 m).

6-4.6.4* Sprig-ups 4 ft (1.2 m) or longer shall be restrained against lateral movement.

6-4.7 Hangers and Fasteners Subject to Earthquakes.

6-4.7.1 C-type clamps (including beam and large flange clamps) used to attach hangers to the building structure in areas subject to earthquakes shall be equipped with a restraining strap. The restraining strap shall be listed for use with a C-type clamp or shall be a steel strap of not less than 16 gauge thickness and not less than 1 in. (25.4 mm) wide for pipe diameters 8 in. (203 mm) or less and 14 gauge thickness and not less than $1^1/_4$ in. (31.7 mm) wide for pipe diameters greater than 8 in. (203 mm). The restraining strap shall wrap around the beam flange not less than 1 in. (25.4 mm). A lock nut on a C-type clamp shall not be used as a method of restraint. A lip on a "C" or "Z" purlin shall not be used as a method of restraint.

Where purlins or beams do not provide an adequate lip to be secured by a restraining strap, the strap shall be through-bolted or secured by a self-tapping screw.

6-4.7.2 C-type clamps (including beam and large flange clamps), with or without restraining straps, shall not be used to attach braces to the building structure.

6-4.7.3 Powder-driven fasteners shall not be used to attach braces to the building structure.

Exception: Powder-driven fasteners shall be permitted where they are specifically listed for service in resisting lateral loads in areas subject to earthquakes.

6-4.7.4 Powder-driven fasteners shall not be used to attach hangers to the building structure where the systems are required to be protected against earthquakes using a horizontal force factor exceeding 0.50 W_p, where W_p is the weight of the water-filled pipe.

Exception: Powder-driven fasteners shall be permitted where they are specifically listed for horizontal force factors in excess of 0.50 W_p.

Chapter 7 Design Approaches

7-1 General.

7-1.1 Water demand requirements shall be determined from the occupancy hazard fire control approach of Section 7-2.

Exception: Special design approaches as permitted in Section 7-9.

7-1.2 For buildings with two or more adjacent occupancies that are not physically separated by a barrier or partition capable of delaying heat from a fire in one area from fusing sprinklers in the adjacent area, the required sprinkler protection for the more demanding occupancy shall extend 15 ft (4.6 m) beyond its perimeter.

7-2 Occupancy Hazard Fire Control Approach.

7-2.1 Occupancy Classifications.

7-2.1.1 Occupancy classifications for this standard relate to sprinkler installations and their water supplies only. They shall not be used as a general classification of occupancy hazards.

7-2.1.2 Occupancies or portions of occupancies shall be classified according to the quantity and combustibility of contents, the expected rates of heat release, the total potential for energy release, the heights of stockpiles, and the presence of flammable and combustible liquids, using the definitions contained in Section 1-4. Classifications are as follows:

Light hazard

Ordinary hazard (Groups 1 and 2)

Extra hazard (Groups 1 and 2)

Special occupancy hazard *(see Section 7-10)*

7-2.2 Water Demand Requirements — Pipe Schedule Method.

7-2.2.1 Table 7-2.2.1 shall be used in determining the minimum water supply requirements for light and ordinary hazard occupancies protected by systems with pipe sized according to the pipe schedules of Section 8-5. Pressure and flow requirements for extra hazard occupancies shall be based on the hydraulic calculation methods of 7-2.3. The pipe schedule method shall be permitted only for new installations of 5000 ft² (465 m²) or less or for additions or modifications to existing pipe schedule systems sized according to the pipe schedules of Section 8-5. Table 7-2.2.1 shall be used in determining the minimum water supply requirements.

Exception No. 1: The pipe schedule method shall be permitted for use in systems exceeding 5000 ft² (465 m²) where the flows required in Table 7-2.2.1 are available at a minimum residual pressure of 50 psi (3.4 bar) at the highest elevation of sprinkler.

Exception No. 2: The pipe schedule method shall be permitted for additions or modifications to existing extra hazard pipe schedule systems.

7-2.2.2 The lower duration value of Table 7-2.2.1 shall be acceptable only where remote station or central station waterflow alarm service is provided.

7-2.2.3* The residual pressure requirement of Table 7-2.2.1 shall be met at the elevation of the highest sprinkler. *(See the Exceptions to 7-2.2.1).*

7-2.2.4 The lower flow figure of Table 7-2.2.1 shall be permitted only where the building is of noncombustible construction or the potential areas of fire are limited by building size or compartmentation such that no open areas exceed 3000 ft² (279 m²) for light hazard or 4000 ft² (372 m²) for ordinary hazard.

Table 7-2.2.1 Water Supply Requirements for Pipe Schedule Sprinkler Systems

Occupancy Classification	Minimum Residual Pressure Required (psi)	Acceptable Flow at Base of Riser (Including Hose Stream Allowance) (gpm)	Duration (minutes)
Light hazard	15	500–750	30–60
Ordinary hazard	20	850–1500	60–90

For SI units, 1 gpm = 3.785 L/min; 1 psi = 0.0689 bar.

7-2.3 Water Demand Requirements — Hydraulic Calculation Methods.

7-2.3.1 General.

7-2.3.1.1* The minimum water supply requirements for a hydraulically designed occupancy hazard fire control sprinkler system shall be determined by adding the hose stream demand from Table 7-2.3.1.1 to the water supply for sprinklers determined in 7-2.3.1.2. This supply shall be available for the minimum duration specified in Table 7-2.3.1.1.

Exception No. 1: An allowance for inside and outside hose shall not be required where tanks supply sprinklers only.

Exception No. 2: Where pumps taking suction from a private fire service main supply sprinklers only, the pump need not be sized to accommodate inside and outside hose. Such hose allowance shall be considered in evaluating the available water supplies.

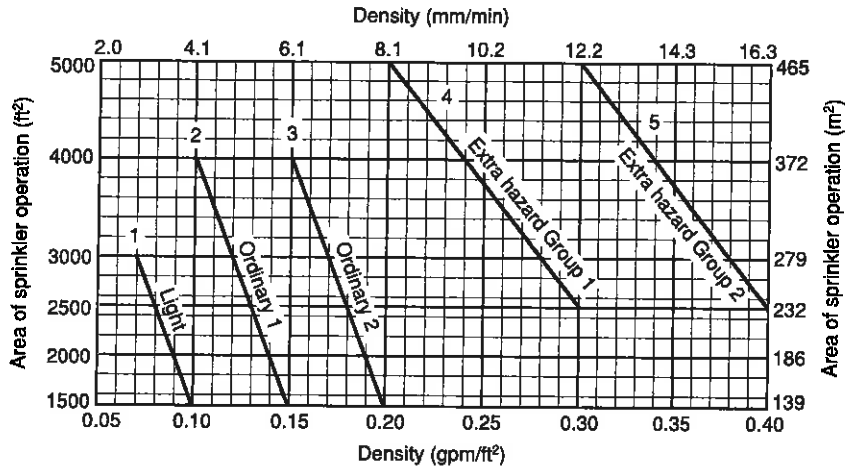
7-2.3.1.2 The water supply for sprinklers only shall be determined either from the area/density curves of Figure 7-2.3.1.2 in accordance with the method of 7-2.3.2 or be based upon the room design method in accordance with 7-2.3.3, at the discretion of the designer. For special areas under consideration, as described in 7-2.3.4, separate hydraulic calculations shall be required in addition to those required by 7-2.3.2 or 7-2.3.3.

Table 7-2.3.1.1† Hose Stream Demand and Water Supply Duration Requirements for Hydraulically Calculated Systems

Occupancy or Commodity Classification	Inside Hose (gpm)	Total Combined Inside and Outside Hose (gpm)	Duration (minutes)
Light hazard	0, 50, or 100	100	30
Ordinary hazard	0, 50, or 100	250	60–90
Extra hazard	0, 50, or 100	500	90–120
Rack storage, Class I, II, and III commodities up to 12 ft (3.7 m) in height	0, 50, or 100	250	90
Rack storage, Class IV commodities up to 10 ft (3.1 m) in height	0, 50, or 100	250	90
Rack storage, Class IV commodities up to 12 ft (3.7 m) in height	0, 50, or 100	500	90
Rack storage, Class I, II, and III commodities over 12 ft (3.7 m) in height	0, 50, or 100	500	90
Rack storage, Class IV commodities over 12 ft (3.7 m) in height and plastic commodities	0, 50, or 100	500	120
General storage, Class I, II, and III commodities over 12 ft (3.7 m) up to 20 ft (6.1 m)	0, 50, or 100	500	90
General storage, Class IV commodities over 12 ft (3.7 m) up to 20 ft (6.1 m)	0, 50, or 100	500	120
General storage, Class I, II, and III commodities over 20 ft (6.1 m) up to 30 ft (9.1 m)	0, 50, or 100	500	120
General storage, Class IV commodities over 20 ft (6.1 m) up to 30 ft (9.1 m)	0, 50, or 100	500	150
General storage, Group A plastics ≤ 5 ft (1.5 m)	0, 50, or 100	250	90
General storage, Group A plastics over 5 ft (1.5 m) up to 20 ft (6.1 m)	0, 50, or 100	500	120
General storage, Group A plastics over 20 ft (6.1 m) up to 25 ft (7.6 m)	0, 50, or 100	500	150

For SI units, 1 gpm = 3.785 L/min.

Figure 7-2.3.1.2 Area/density curves.



7-2.3.1.3 Regardless of which of the two methods is used, the following restrictions shall apply:

(a) For areas of sprinkler operation less than 1500 ft² (139 m²) used for light and ordinary hazard occupancies, the density for 1500 ft² (139 m²) shall be used. For areas of sprinkler operation less than 2500 ft² (232 m²) for extra hazard occupancies, the density for 2500 ft² (232 m²) shall be used.

(b) *For buildings having unsprinklered combustible concealed spaces (as described in 5-13.1.1 and 5-13.7), the minimum area of sprinkler operation shall be 3000 ft² (279 m²).

Exception No. 1: Combustible concealed spaces filled entirely with noncombustible insulation.

*Exception No. 2: *Light or ordinary hazard occupancies where noncombustible or limited combustible ceilings are directly attached to the bottom of solid wood joists so as to create enclosed joist spaces 160 ft³ (4.8 m³) or less in volume.*

*Exception No. 3: *Concealed spaces where the exposed surfaces have a flame spread rating of 25 or less and the materials have been demonstrated to not propagate fire in the form in which they are installed in the space.*

(c) Water demand of sprinklers installed in racks or water curtains shall be added to the ceiling sprinkler water demand at the point of connection. Demands shall be balanced to the higher pressure. *(See Chapter 8.)*

(d) Water demand of sprinklers installed in concealed spaces or under obstructions such as ducts and cutting tables need not be added to ceiling demand.

(e) Where inside hose stations are planned or are required, a total water allowance of 50 gpm (189 L/min) for a single hose station installation or 100 gpm (378 L/min) for a multiple hose station installation shall be added to the sprinkler requirements. The water allowance shall be added in 50-gpm (189-L/min) increments beginning at the most remote hose station, with each increment added at the pressure required by the sprinkler system design at that point.

(f) When hose valves for fire department use are attached to wet pipe sprinkler system risers in accordance with 5-15.5.2, the water supply shall not be required to be added to standpipe demand as determined from NFPA 14, *Standard for the Installation of Standpipe and Hose Systems.*

Exception No. 1: Where the combined sprinkler system demand and hose stream allowance of Table 7-2.3.1.1 exceeds the requirements of NFPA 14, Standard for the Installation of Standpipe and Hose Systems, this higher demand shall be used.

Exception No. 2: For partially sprinklered buildings, the sprinkler demand, not including hose stream allowance, as indicated in Table 7-2.3.1.1 shall be added to the requirements given in NFPA 14, Standard for the Installation of Standpipe and Hose Systems.

(g) Water allowance for outside hose shall be added to the sprinkler and inside hose requirement at the connection to the city water main or a yard hydrant, whichever is closer to the system riser.

(h) The lower duration values in Table 7-2.3.1.1 shall be permitted where remote station or central station waterflow alarm service is provided.

(i) Where pumps, gravity tanks, or pressure tanks supply sprinklers only, requirements for inside and outside hose need not be considered in determining the size of such pumps or tanks.

7-2.3.1.4 Total system water supply requirements shall be determined in accordance with the hydraulic calculation procedures of Section 8-4.

7-2.3.2 Area/Density Method.

7-2.3.2.1 The water supply requirement for sprinklers only shall be calculated from the area/density curves in Figure 7-2.3.1.2 or from Section 7-10 where area/density criteria is specified for special occupancy hazards. When using Figure 7-2.3.1.2, the calculations shall satisfy any single point on the appropriate area/density curve as follows:

(1) Light hazard area/density curve 1
(2) Ordinary hazard (Group 1) area/density curve 2
(3) Ordinary hazard (Group 2) area/density curve 3
(4) Extra hazard (Group 1) area/density curve 4
(5) Extra hazard (Group 2) area/density curve 5

It shall not be necessary to meet all points on the selected curve.

Exception: Sprinkler demand for storage occupancies as determined in Sections 7-3 through 7-8.

7-2.3.2.2 For protection of miscellaneous storage, miscellaneous tire storage, and storage up to 12 ft (3.7 m) in height, the discharge criteria in Table 7-2.3.2.2 shall apply.

Table A-1-4.11 Typical Cotton Bale Types and Approximate Sizes

Bale Type	Dimensions		Average Weight		Volume		Density	
	in.	mm	lb	kg	ft^3	m^3	lb/ft^3	kg/m^3
Gin, flat	55 × 45 × 28	1397 × 1143 × 711	500	226.8	40.1	1.13	12.5	201
Modified gin, flat	55 × 45 × 24	1397 × 1143 × 610	500	226.8	34.4	0.97	14.5	234
Compressed, standard	57 × 29 × 23	1448 × 736 × 584	500	226.8	22.0	0.62	22.7	366
Gin, standard	55 × 31 × 21	1397 × 787 × 533	500	226.9	20.7	0.58	24.2	391
Compressed, universal	58 × 25 × 21	1475 × 635 × 533	500	226.8	17.6	0.50	28.4	454
Gin, universal	55 × 26 × 21	1397 × 660 × 533	500	226.8	17.4	0.49	28.7	463
Compressed, high density	58 × 22 × 21	1473 × 559 × 533	500	226.8	15.5	0.44	32.2	515

A-1-4.11 Baled Cotton. See Table A-1-4.11.

A-1-4.12 Array, Standard (Paper). The occasional presence of partially used rolls on top of columns of otherwise uniform diameter rolls does not appreciably affect the burning characteristics.

A-1-4.12 Roll Paper Storage, Wrapped. Rolls that are completely protected with a heavyweight kraft wrapper on both sides and ends are subject to a reduced degree of fire hazard. Standard methods for wrapping and capping rolls are outlined in Figure A-1-4.12.

In some cases, rolls are protected with laminated wrappers, using two sheets of heavy kraft with a high-temperature wax laminate between the sheets. Where using this method, the overall weight of wax-laminated wrappers should be based on the basis weight per 1000 ft^2 (92.9 m^2) of the outer sheet only, rather than on the combined basis weight of the outer and inner laminated wrapper sheets. A properly applied wrapper can have the effect of changing the class of a given paper to essentially that of the wrapper material. The effect of applying a wrapper to tissue has not been determined by test.

A-1-4.12 Roll Paper Storage Height. The size of rolls and limitations of mechanical handling equipment should be considered in determining maximum storage height.

A-2-1 Occupancy examples in the listings as shown in the various hazard classifications are intended to represent the norm for those occupancy types. Unusual or abnormal fuel loadings or combustible characteristics and susceptibility for changes in these characteristics, for a particular occupancy, are considerations that should be weighed in the selection and classification.

The light hazard classification is intended to encompass residential occupancies; however, this is not intended to preclude the use of listed residential sprinklers in residential occupancies or residential portions of other occupancies.

A-2-1.1 Light hazard occupancies include occupancies having uses and conditions similar to the following:

Churches

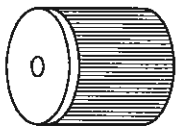
Clubs

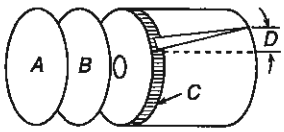
Eaves and overhangs, if of combustible construction with no combustibles beneath

Figure A-1-4.12 Wrapping and capping terms and methods.

Wrapper
Exterior wrapper
Body wrapper — General term for protective wrapping of sides and ends on roll.

Body wrap
Sleeve wrap
Wrap — do not cap — Wrapper placed around circumference of roll. No heads or caps needed.





Heads
Headers — Protection applied to the ends of the rolls (*A* and *B*). Heads do not lap over the end of the roll.

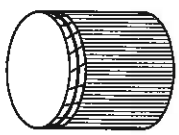
Inside heads — Protection applied to the ends of the rolls next to the roll itself (*B*). The wrapper of the rolls is crimped down over these heads.

Outside heads — Protection applied to the ends of the rolls on the outside (*A*). This head is applied after the wrapper is crimped.

Edge protectors
Edge bands — Refers to extra padding to prevent damage to roll edges (*C*).

Overwrap — The distance the body wrap or wrapper overlaps itself (*D*).

Roll cap — A protective cover placed over the end of a roll. Edges of cap lap over the end of the roll and are secured to the sides of the roll.



Educational
Hospitals
Institutional
Libraries, except large stack rooms
Museums
Nursing or convalescent homes
Offices, including data processing
Residential
Restaurant seating areas
Theaters and auditoriums, excluding stages and prosceniums
Unused attics

A-2-1.2.1 Ordinary hazard occupancies (Group 1) include occupancies having uses and conditions similar to the following:

Automobile parking and showrooms
Bakeries
Beverage manufacturing
Canneries
Dairy products manufacturing and processing
Electronic plants
Glass and glass products manufacturing
Laundries
Restaurant service areas

A-2-1.2.2 Ordinary hazard occupancies (Group 2) include occupancies having uses and conditions similar to the following:

Cereal mills
Chemical plants — ordinary
Confectionery products
Distilleries
Dry cleaners
Feed mills
Horse stables
Leather goods manufacturing
Libraries — large stack room areas
Machine shops
Metal working
Mercantile
Paper and pulp mills
Paper process plants
Piers and wharves
Post offices
Printing and publishing
Repair garages
Resin application area
Stages
Textile manufacturing
Tire manufacturing
Tobacco products manufacturing
Wood machining
Wood product assembly

A-2-1.3.1 Extra hazard occupancies (Group 1) include occupancies having uses and conditions similar to the following:

Aircraft hangars (except as governed by NFPA 409, *Standard on Aircraft Hangars*)
Combustible hydraulic fluid use areas
Die casting
Metal extruding
Plywood and particle board manufacturing
Printing [using inks having flash points below 100°F (38°C)]
Rubber reclaiming, compounding, drying, milling, vulcanizing
Saw mills
Textile picking, opening, blending, garnetting, or carding, combining of cotton, synthetics, wool shoddy, or burlap
Upholstering with plastic foams

A-2-1.3.2 Extra hazard occupancies (Group 2) include occupancies having uses and conditions similar to the following:

Asphalt saturating
Flammable liquids spraying
Flow coating
Manufactured home or modular building assemblies (where finished enclosure is present and has combustible interiors)
Open oil quenching
Plastics processing
Solvent cleaning
Varnish and paint dipping

A-2-1.4 Other NFPA standards contain design criteria for fire control or fire suppression *(see 2-1.4 and Chapter 13)*. While these can form the basis of design criteria, this standard describes the methods of design, installation, fabrication, calculation, and evaluation of water supplies that should be used for the specific design of the system.

Other NFPA standards contain sprinkler system design criteria for fire control or suppression of specific hazards. This information has been either referenced or copied into Chapters 5 and 7 using NFPA's extract policy.

A-2-2 Specification of the type, amount, and arrangement of combustibles for any commodity classification is essentially an attempt to define the potential fire severity, based on its burning characteristics, so the fire can be successfully controlled by the prescribed sprinkler protection for the commodity class. In actual storage situations, however, many storage arrays do not fit precisely into one of the fundamental classifications; therefore, the user needs to make judgments after comparing each classification to the existing storage conditions. Storage arrays consist of thousands of products, which make it impossible to specify all the acceptable variations for any class. As an alternative, a variety of common products are classified in this appendix based on judgment, loss experience, and fire test results.

Table A-2-2 provides examples of commodities not addressed by the classifications in Section 2-2.

Table A-2-2.3 is an alphabetized list of commodities with corresponding classifications.

Tables A-2-2.3.1 through A-2-2.3.4 and A-2-2.4.1 provide examples of commodities within a specific class.

Table A-2-2 Examples of Commodities Not Addressed by the Classifications in Section 2-2

Boxes, Crates
- Empty, wood slatted
Lighters (butane)
- Loose in large containers (Level 3 aerosol)

*Should be treated as idle pallets.

APPENDIX B
Servicing Study Guidelines Checklist

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Comments
Executive Summary (for larger reports only).	NA	
Date and revision number of the report.	Y	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y	Figure 1
Plan showing the site and location of all existing services.	Y	Figure 3
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Y	Refer to Site Plan
Summary of Pre-consultation Meetings with City and other approval agencies.	N	
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	NA	
Statement of objectives and servicing criteria.	Y	
Identification of existing and proposed infrastructure available in the immediate area.	Y	
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	NA	
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	N/A	
Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	NA	
Proposed phasing of the development, if applicable.	NA	
Reference to geotechnical studies and recommendations concerning servicing.	NA	
All preliminary and formal site plan submissions should have the following information:		
Metric scale	Y	
North arrow (including construction North)	Y	
Key plan	Y	Figure 1
Name and contact information of applicant and property owner	N	
Property limits including bearings and dimensions	Y	Figures 2 & 3
Existing and proposed structures and parking areas	Y	Figures 2 & 3
Easements, road widening and rights-of-way	Y	
Adjacent street names	Y	

Development Servicing Study Checklist

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

Development Servicing Study Checklist

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

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	
Analysis of the available capacity in existing public infrastructure.	NA	
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	NA	
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y	
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	N/A	
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	
Set-back from private sewage disposal systems.	NA	
Watercourse and hazard lands setbacks.	NA	
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	NA	
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	NA	
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	N	Will be addressed during detailed design for Site Plan application.
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	NA	
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	N	Will be addressed during detailed design for Site Plan application.
Any proposed diversion of drainage catchment areas from one outlet to another.	NA	
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	Y	
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	NA	
Identification of municipal drains and related approval requirements.	NA	
Description of how the conveyance and storage capacity will be achieved for the development.	Y	
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N	Will be addressed during detailed design for Site Plan application.
Inclusion of hydraulic analysis including HGL elevations.	NA	
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	N	Will be addressed during detailed design for Site Plan application.
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	NA	
Identification of fill constrains related to floodplain and geotechnical investigation.	NA	

Development Servicing Study Checklist

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

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

RESIDENTIAL / HOTEL DEVELOPMENT
141 GEORGE STREET / 325 DALHOUSIE STREET
OTTAWA, ONTARIO

SERVICING DESIGN BRIEF
(INCL. INTERIM CONDITION)

Prepared by:

NOVATECH ENGINEERING CONSULTANTS LTD.
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Ottawa, Ontario
K2M 1P6

File No.: 112142
Report Reference No.: R-2014-020
December 07, 2012 (R-2012-171)
February 28, 2013 (R-2013-019)
Revised February 14, 2014

NOVATECH
ENGINEERING
CONSULTANTS LTD.

February 14, 2014

City of Ottawa
Planning and Growth Management Department
Development Review (Urban) Services Branch
Infrastructure Approvals Division
110 Laurier Avenue West, 4th Floor
Ottawa ON, K1P 1J1

Attention: **Mr. John Wu, P. Eng.**

Dear Sir:

Reference: **Residential / Hotel Development**
141 George Street / 325 Dalhousie Street
Servicing Design Brief (Incl. Interim Condition)
Our File No.: 112142

Enclosed herein is the revised Servicing Design Brief (including interim condition) for the proposed Residential / Hotel development at 141 George Street / 325 Dalhousie Street, located east of Dalhousie Street between York Street and George Street. This brief is submitted in support of the zoning amendment and site plan application for the site and outlines how the site will be serviced with sanitary, storm and watermain.

Trusting this report is adequate for your purposes. Should you have any questions, or require additional information, please contact us.

Yours truly,

NOVATECH ENGINEERING CONSULTANTS LTD.

John Riddell, P.Eng.
President

JAG/jag

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1.0 INTRODUCTION

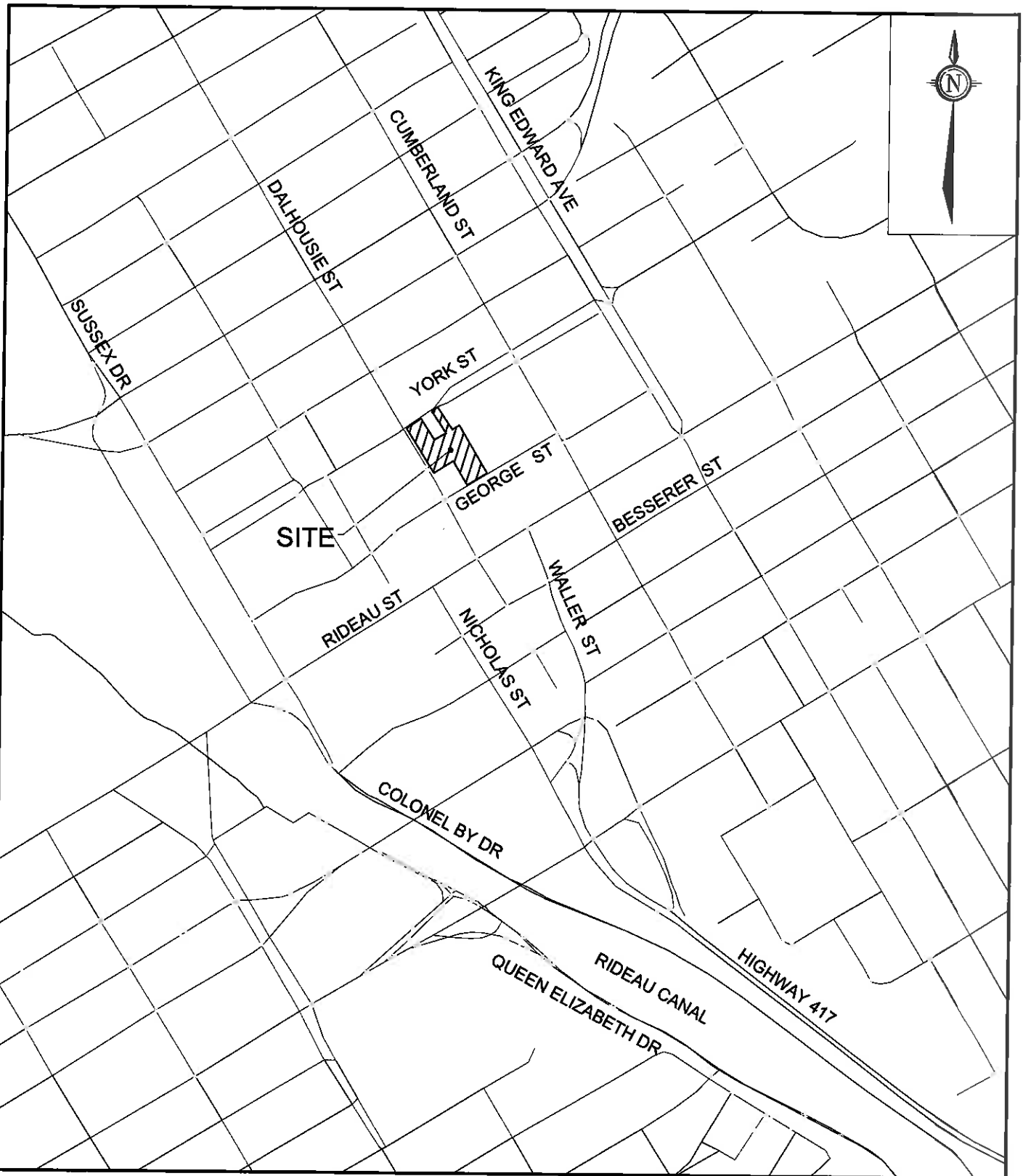
The proposed Residential / Hotel (141 George Street / 325 Dalhousie Street) development is located in the Byward Market, east of Dalhousie Street between York Street and George Street in the City of Ottawa, as shown in Figure 1a – Aerial Photo and Figure 1b – Key Plan. The existing properties are currently occupied by the Honest Lawyer bar/restaurant, the 11-storey Union du Canada office building as well as privately-owned surface parking lots which serve the office building. The proposed re-development of the site will consist of a 15-storey hotel with 187 units and a 22-storey tower with 282 condominium units (Ph. 1 – 156 & Ph. 2 - 126) to be constructed in three phases. The hotel building will include a rooftop pool as well as approximately 3,145 ft^2 of commercial floor space and the condominium building will include approximately 11,810 ft^2 of commercial floor space (Ph. 1 – ±1,505 ft^2 & Ph. 2 – ±10,300 ft^2), both located on the ground floor. Also, a total of approximately 227 underground parking spaces will be provided on 4 levels of underground parking and 5 surface parking spaces. Refer to Figure 2 – Site Plan for details.

Figure 1a: Aerial Photo of Subject Site

Photo courtesy of www.bing.com/maps

As identified in the City of Ottawa's Zoning By-law (ZBL), this site is currently designated as both MD2 S74 – Mixed-Use Downtown (325 Dalhousie Street) and R5R[235] S76 – Residential Fifth Density (141 George Street). The minor zoning by-law amendment will revise the site's current designation for the proposed development to deal with building height, parking requirements and any applicable zoning provisions that cannot be met. The specific details regarding the changes proposed to the zoning of the subject site are provided in a Planning Rationale submitted as part of the ZBL Amendment application.

The subject site is approximately 0.42 ha in area. The development will have a single two-way ramp access to the underground parking garage located on George Street, mid-block between Dalhousie Street and Cumberland Street. The pick-up/drop-off area outside the main entrance to the hotel/condominiums will be accessed from the existing access driveway at 321 Dalhousie



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CITY OF OTTAWA

325 DALHOUSIE STREET & 141 GEORGE STREET

KEY PLAN

JAN 2014 112142 FIGURE # 1B

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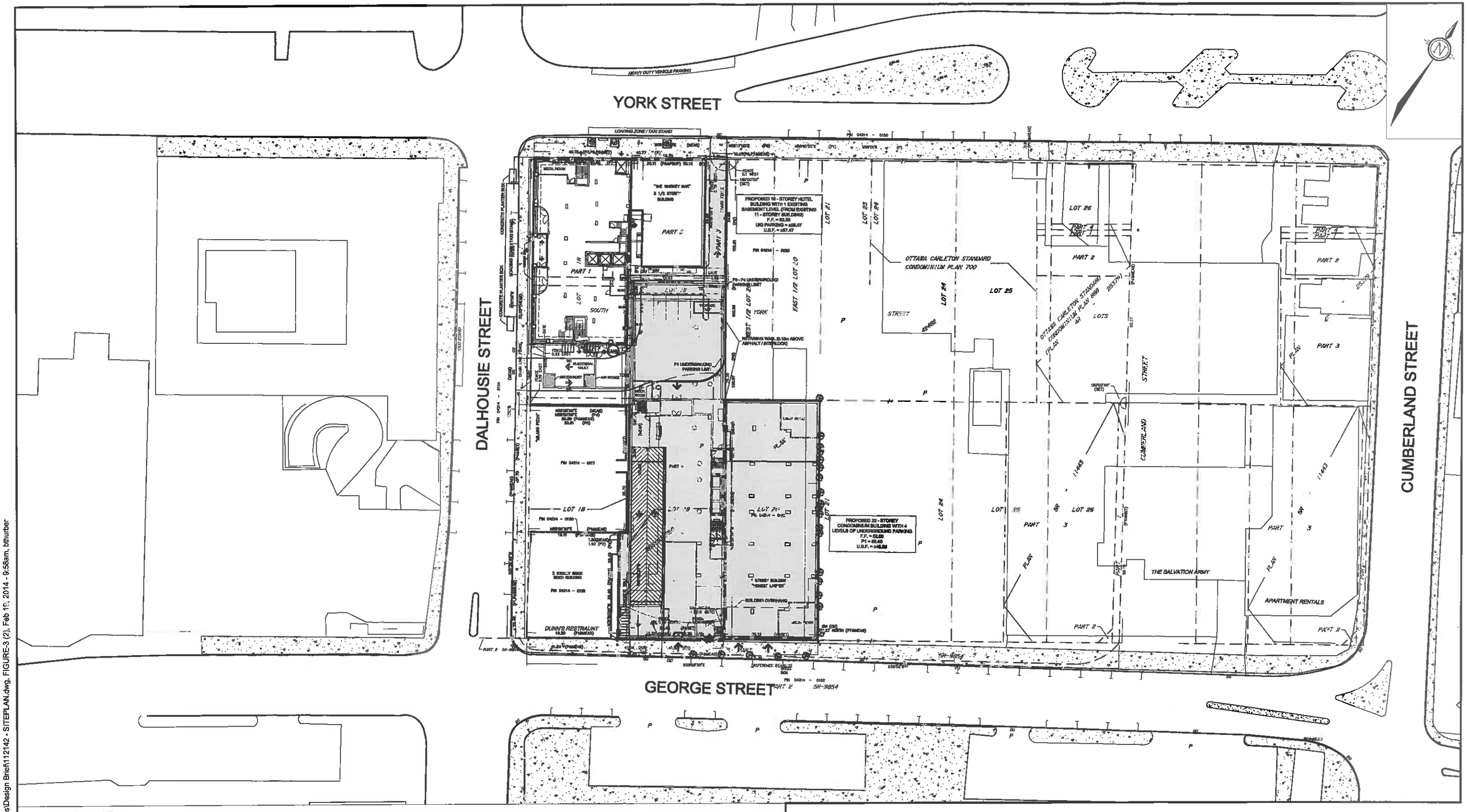

LEGEND

SITE PLAN AREA

PROPOSED FUTURE DEVELOPMENT (PHASE 2 & 3)

ON STREET PARKING

NTS

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CITY OF OTTAWA
325 DALHOUSIE STREET &
141 GEORGE STREET
SITE PLAN
JAN 2014 112142 FIGURE 2

SHTIIX17.DWG - 278.1mmX431mm

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Street, mid-block between George Street and York Street (adjacent to the Union du Canada office building). A secondary right-out egress only will also be provided at 110 York Street, immediately east of The Whiskey Bar. A copy of the topographical survey which shows the property outline is included in the back of this report. Refer to Figure 3 – Existing Conditions. The construction schedule for the proposed development is as follows:

- Phase 1 (hotel) starting in June 2013, build-out expected in 2014;
- Phase 2 (condo ph.1) scheduled for completion in 2015;
- Phase 3 (condo ph. 2) scheduled for completion in 2017 (subject to market demand).

This servicing design brief will outline how the site will be serviced with sanitary, storm and watermain; and will demonstrate that adequate municipal capacity is available within the existing infrastructure to service the development.

2.0 SANITARY SEWER

The proposed hotel development will be serviced by a 200 mm dia. sanitary service that will connect to the existing 1200 mm dia. sanitary sewer on York Street; therefore the existing 200 mm dia. sanitary service that is currently connected to the existing 1200 mm dia. sanitary sewer on York Street will need to be abandoned. The new sanitary service connection to the building will be equipped with a full-port backwater valve. It is to be noted that the attached neighboring 2 ½ storey property has its own existing sanitary service (approx. 200 mm dia.) that also connects to the existing 1200 mm dia. sanitary sewer on York Street (was previously interconnected, but is currently separated).
The hotel will have a rooftop pool with controlled deck drains and the pool drains will be directed to a pump. Both will drain through a dedicated pipe within the building until it connects to the main service prior to exiting the building.

Furthermore, the proposed condominium development will be serviced by a 200 mm dia. sanitary service that will connect to the existing 1980x1500 mm dia. sanitary sewer on George Street. The proposed sanitary service connection to the building will be equipped with a full-port backwater valve.

The proposed development flows are based on the City of Ottawa Sewer Design Guidelines (refer to Appendix A). The flows are comprised of residential, retail, and office space as presented below and are compared to the design flows based on current zoning.

Sanitary Flows Under Proposed Development

Hotel
Residential: Q_{SAN} = 187 units x 1.1 persons/unit* x 350 L/cap/day = 71,995.0 L/day
Restautant: Q_{SAN} = 0.02922 ha (3,145 ft^2) x 50,000 L/ha/d = 1,461.0 L/day

Average Sanitary Flow = 73,456 L/day = 0.85 L/sec
Peak Sanitary Flow = 3.43 L/sec (with Res. PF = 4.14 ∴ use 4.0 ⇒ max, Comm. PF = 1.5)
* Based on predominantly one person per room (business travel).

Condominium – Phase 1
Residential: Q_{SAN} = 156 units x 1.8 persons/unit x 350 L/cap/day = 98,280.0 L/day
Commercial: Q_{SAN} = 0.01398 ha (1,505 ft^2) x 50,000 L/ha/d =699.0 L/day

LEGEND

SITE PLAN AREA

PROPOSED FUTURE DEVELOPMENT (PHASE 2 & 3)

ON STREET PARKING

NTS

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CITY OF OTTAWA

325 DALHOUSIE STREET &
141 GEORGE STREET

EXISTING CONDITIONS

JAN 2014 112142 FIGURE 3

SHTIIX17.DWG - 279mmX431mm

Average Sanitary Flow = 98,979 L/day = 1.15 L/sec
Peak Sanitary Flow = 4.56 L/sec (with Res. PF = 4.09 ∴ use 4.0 ⇒ max, Comm. PF = 1.5)

Condominium – Phase 2
Residential: Q_{SAN} = 126 units x 1.8 persons/unit x 350 L/cap/day = 79,380.0 L/day
Commercial: Q_{SAN} = 0.09569 ha (10,300 ft^2) x 50,000 L/ha/d = 4,784.5 L/day

Average Sanitary Flow = 84,164.5 L/day = 0.97 L/sec
Peak Sanitary Flow = 3.76 L/sec (with Res. PF = 4.13 ∴ use 4.0 ⇒ max, Comm. PF = 1.5)

Infiltration Flow = 0.28L/s/ha x 0.42 ha = 0.12 L/s

Therefore,
Total Average Sanitary Flow = 3.09 L/sec
Total Peak Sanitary Flow = 11.87 L/sec (with PF)

Hotel Rooftop Pool
As per discussion with the pool designers, the pool will use cartridge filters and therefore eliminating the need for backwashes. The only flow from the pool will be when it needs to be emptied for maintenance/closure and from the surrounding roof drains during a rainfall event. This will slightly increase the flows to the sanitary sewer; consequently, this would have negligible impact on the existing City sanitary sewer system.

Pool Drainage Flow = 3.0m x 9.75m x 1.0m* per day = 29.25m^3/day
= 0.34L/s for that day only

* Approximate depth of water in pool.

Sanitary Flows Under Current Zoning

Currently, the site is zoned as both MD2 S74 – Mixed-Use Downtown (325 Dalhousie Street) and R5R[235] S76 – Residential Fifth Density (141 George Street). The current zoning by-law permits hotel and a restaurant component as well as residential mid to high use development and a commercial component ancillary to residential. Based on this, sanitary flows are calculated below. (Zoning flows are calculated using the City's general population densities from Table 4.1 of the City of Ottawa Sewer Design Guidelines)

Site Area = 0.42 ha (0.21 ha each MD and R5 zones)

Commercial Area = 0.21 ha
Existing building = 8,999.73 m^2 (11-storey: 818.16)

Q_{ave} = (8,999.73 m2 + 1,281.84 m^2)* 5 L/m2 = 51,407.85 L/day = 0.59 L/sec
Q_{peak} = 0.59 L/sec * 1.5 = 0.89 L/sec

Residential Area = 0.21 ha
Population density = 1800 persons/ha

Q_{ave} = 0.21 ha * 1800 persons/ha * 350L/person/day = 132,300 L/day = 1.53 L/sec

$P.F. = 1 + \frac{14}{4+\left(\frac{378}{1000}\right)^{1/2}} = 4.03 \therefore$ use 4.0 $\Rightarrow$ max

Q_{peak} = 1.53 L/sec * 4.0 = 6.12 L/sec

Infiltration Flow = 0.28L/s/ha x 0.42 ha = 0.12 L/s

Therefore,
Total Average Sanitary Flow = 2.24 L/sec
Total Peak Sanitary Flow = 7.13 L/sec (with PF)

Therefore, the development sanitary flows under the proposed development are in close proximity to the flows calculated under the existing zoning (note that the existing zoning permits more then what has been accounted for, which would offset the variation); consequently, this would have negligible impact on the existing City sanitary sewer system.

Sanitary Flows Under Existing Conditions

The site in question which is currently occupied by two existing buildings and surface parking lots would generate the following approximate flows:

Existing building at 325 Dalhousie = 8,999.73 m^2 (11-storey: 818.16)

Q_{ave} = 8,999.73 m2 * 5 L/m2 = 44,998.65 L/day = 0.52 L/sec
Q_{peak} = 0.52 L/sec * 1.5 = 0.78 L/sec

Existing building at 141 George Street = 1,128.71 m^2 (1-storey: 1,128.71)

Q_{ave} = (1,128.71 m^2)* 5 L/m2 = 5,643.55 L/day = 0.07 L/sec
Q_{peak} = 0.07 L/sec * 1.5 = 0.11 L/sec

Infiltration Flow = 0.28L/s/ha x 0.42 ha = 0.12 L/s

Therefore,
Total Average Sanitary Flow = 0.71 L/sec
Total Peak Sanitary Flow = 1.01 L/sec (with PF)

Development sanitary flows under proposed zoning are greater than the flows under existing conditions; but as mentioned previously, the existing zoning permits greater development. Also, the existing receiving sewers are a 1200 mm dia. sanitary sewer at ±2.0% slope on York Street with a capacity of approximately 5,750 L/s and a 1500 mm dia. sanitary sewer at ±1.5% slope on George Street with a capacity of approximately 11,650 L/s. Consequently, this would have negligible impact on the existing City sanitary sewer system.

3.0 STORMWATER

Stormwater flows from the site are currently conveyed to the existing storm sewer system via on-site catchbasins and overland flows to York Street, Dalhousie Street as well as George Street. The stormwater from the existing building at 325 Dalhousie Street as well as 110 York Street is captured by roof drains and outlet through their respective existing service connection. As for stormwater from the existing building at 141 George Street, approximately half is captured by roof

drains whereas the balance of the building has a pitched roof. As part of this development, all stormwater will be controlled on site prior to being discharged to the storm system.

The proposed hotel development will be serviced by a new 150 mm dia. storm service that will connect to the existing 675 mm dia. storm sewer on York Street; therefore the existing 150 mm dia. storm service that is currently connected to the existing 675 mm dia. storm sewer on York Street will need to be abandoned. The new storm service connection to the building will be equipped with a backwater valve. Also, a portion of the roof will be directed to sanitary due to the rooftop pool (refer to sanitary section for further details). It is to be noted that the attached neighboring 2 ½ storey property has its own existing storm service (approx. 150 mm dia.) that also connects to the existing 675 mm dia. storm sewer on York Street (was previously interconnected, but is currently separated).

Furthermore, the proposed condominium development will be serviced by a 250 mm dia. storm service that will connect to the existing 900 mm dia. storm sewer on George Street. The proposed storm service connection to the building will be equipped with a backwater valve.

The City will require that on-site stormwater management be implemented to control post-development stormwater discharge for both the 5 & 100 year storm events based on an allowable runoff coefficient (C) of 0.50, a time of concentration (t_c) of 20 minutes, and a 5-year storm control. Stormwater management will be achieved through the use of rooftop controls and surface ponding (as required). Should surplus storage be required, stormwater management alternatives such as storage tanks or super-pipes will be implemented. Temporary storage will be provided at the surface as required to supply the necessary release rate during all phases until full build out is achieved with underground systems.

The site will be graded such that flows in excess of the 100-year storm event will be conveyed overland to York Street, Dalhousie Street and George Street. Erosion and sediment control measures will be implemented during all phases of construction and inspected regularly.

A detailed stormwater management report addressing these requirements is also submitted under separate cover as part of the site plan application.

4.0 WATERMAIN

4.1 Domestic Water Demand

The proposed hotel development will be serviced by a 150 mm dia. water service that will connect to the existing 200 mm dia. watermain on York Street, therefore the existing 150 mm dia. water service that is currently connected to the existing 200 mm dia. watermain on York Street will need to be abandoned. An existing shut off valve is present within the right of way outside the property line of the site as per old City of Ottawa Specifications for the existing service, but a new shut off valve will be provided at the property line of the site as per City of Ottawa Specifications for the new service. The existing water meter is located in the basement level mechanical room of the building (replace in new location as required, refer to mechanical). Similarly, a remote receptacle will be located at the surface near the entrance to the building on the exterior. It is to be noted that the attached neighboring 2 ½ storey property now has its own 40 mm dia. water service that is also connected to the existing 200 mm dia. watermain on York Street (it was previously interconnected). An existing shut off valve is present within the right of way outside the property line of the site as per old City of Ottawa Specifications.

Furthermore, the proposed condominium development will be serviced by a 200 mm dia. water service that will connect to the existing 300 mm dia. watermain on George Street. A shut off valve will be provided at the property line of the site as per City of Ottawa Specifications. The water meter will be located in the basement level mechanical room of the building. Similarly, a remote receptacle will be located at the surface near the entrance to the building on the exterior.

Estimated domestic water demands for the development are roughly the same as the proposed development sanitary flows listed above in Section 2.0.

Hotel
Average daily demand (L/sec): Q_{WATER} = 73,456.0 L/day ÷ 86,400 sec/day = 0.85 L/sec
Using a peak factor of 2.5, the required maximum daily demand yields: Q_{WATER} = 2.13L/sec
Using a peak factor of 2.2, the required maximum hour demand yields: Q_{WATER} = 4.69 L/sec

Condominium – Phase 1
Average daily demand (L/sec): Q_{WATER} = 98,979.0 L/day ÷ 86,400 sec/day = 1.15 L/sec
Using a peak factor of 2.5, the required maximum daily demand yields: Q_{WATER} = 2.88 L/sec
Using a peak factor of 2.2, the required maximum hour demand yields: Q_{WATER} = 6.34 L/sec

Condominium – Phase 2
Average daily demand (L/sec): Q_{WATER} = 84,164.5 L/day ÷ 86,400 sec/day = 0.97 L/sec
Using a peak factor of 2.5, the required maximum daily demand yields: Q_{WATER} = 2.43 L/sec
Using a peak factor of 2.2, the required maximum hour demand yields: Q_{WATER} = 5.35 L/sec

Based on the data provided by the City, the existing watermains in the area are adequate to service this development. According to hydrant test results, the watermain in the street can deliver in the range of approximately 1000 igpm (±75.8 L/sec) at a dynamic pressure greater than 56 psi. A copy of the watermain data is attached in Appendix B.

4.2 Fire Demand

Section 4.2.11 of the City of Ottawa Water Design Guidelines reads:

"When calculating the fire flow requirements and affected pipe sizing, designers shall use the method developed by the Fire Underwriters Survey.", and

"The requirements for levels of fire protection on private property are covered in Section 7.2.11 of the Ontario Building Code."

The Fire Underwriters Survey is used to assess the performance of the water distribution system on a "City Block" basis rather than an individual building basis. The Ontario Building Code governs the assessment of fire demand for individual buildings.

Section 7.2.11.1 of the Ontario Building Codes states that the design, construction, installation and testing of fire service mains and water service pipe combined with fire service mains shall be in conformance with NFPA 24.

NFPA 24 is the standard for the "Installation of Private Fire Service Mains and their Appurtenances". Chapter 13 of NFPA 24 discusses sizing the private service fire mains for fire protection systems which shall be approved by the authority having jurisdiction, considering the following factors:

- Construction and Occupancy of the building

- Fire Flow and Pressure of the Water Required
- Adequacy of the Water Supply

Specific to this project the buildings will be sprinklered per Section 3.2.2.45 of the Ontario Building Code (OBC). Section 3.2.5.7 of the OBC requires that an adequate water supply for fire fighting be provided to each building, and references Appendix A of the OBC. Sentence 3 of Section A 3.2.5.7 of the OBC (Appendix A) states that NFPA 13 be used for determining both sprinkler and hose stream demands for a sprinklered building.

The design of the sprinkler system is completed by a Fire Protection Engineer, or typically computed by the sprinkler contractor and approved by the Fire Protection Engineer. The process involves detailed hydraulic calculations based on building layout, pipe runs, head losses, fire pump requirements, etc. At this stage in the development process, e.g. Site Plan Submission, these details are not available. However, using Chapter 7 of NFPA 13, it is possible to provide a fairly accurate estimate of the fire demand for the building. This estimate is provided below.

NFPA Chapter 7 Calculation

22 Storey Residential Building - Light Hazard
15 Storey Hotel Building - Light Hazard [incl. restaurant - Ordinary Hazard (Group 1)]
4 Level Underground Parking (under residential building - serve both) - Ordinary Hazard (Group 1)

Section 7.2.3 of NFPA 13, "Water Demand Requirements – Hydraulic Calculation Methods" is used to estimate the hose stream demand and the sprinkler demand. The water demand for sprinklers is estimated using the most remote area in the building. Figure 7.2.3.1.2 – Area/Density Curves is used for the worst case scenario, which in this case is the Ordinary Hazard Classification in the underground parking garage. For this classification, Figure 7.2.3.1.2 provides a density of 0.15 gpm/ft2 using a coverage of 1500 ft2, or 225 gpm (US).

Table 7.2.3.1.1 is used to determine the hose stream demand. For Ordinary Hazard a total combined inside and outside hose stream demand of 250 gpm is required. Typically, 150 gpm would be drawn off the hydrant and 100 gpm off the hose cabinets.

Therefore, total estimated demand would be 225 gpm + 250 gpm = 475 gpm. Adding an allowance for head losses though out the sprinkler system, an estimated fire demand of between 550 – 600 gpm, or say 600 USgpm (2,270 L/min) would be required. According to the fire hydrant data provided by the City, the 200 mm and 300 mm watermains on York Street and George Street respectively can deliver in the range of 1,000 lgpm (1,200 USgpm) under normal conditions and 2,100 lgpm (2,500 USgpm) at 20 psi residual. The building will also be equipped with a fire pump, if necessary, to provide the minimum residual pressure at the sprinkler heads.

Reference material from NFPA 13 is contained in Appendix B.

5.0 CONCLUSIONS

Based on the foregoing, adequate sanitary, storm and water services are available to support this development.

NOVATECH ENGINEERING CONSULTANTS LTD.

Prepared by:

Justin Gauthier, B.Eng.
Junior Engineer

Reviewed by:

John Riddell, P.Eng.
President

APPENDIX A
Excerpts from Ottawa Sewer Design Guidelines

specifically the downtown core. The construction of new combined sewer systems is no longer permitted in the City of Ottawa other than for the replacement of existing combined sewers within the City's defined Combined Sewer Area (see Section 5.1.6).

New storm drainage systems cannot be connected to existing combined sewers except as an interim measure where sewer separation is to be ultimately implemented or where circumstances allow no other alternative.

Section 5 discusses combined sewers in greater detail since their design must consider peak storm flows.

4.2.4 Private Sanitary Servicing

Private servicing consists mainly of private sewage collection and treatment systems on individual lots and do not form part of these guidelines.

4.3 GENERAL POPULATION DENSITIES

Pre-zoned Land – When lands are zoned for a specific residential use and detailed information is not available, the following population densities shall apply:

Table 4.1 Population Densities

Unit Type (Min Lot Area M^2)	Zoning (And all similar zonings)	Persons per unit[1]	Units per net ha avg.[2]	Persons (per net ha)[3]	Persons (per gross ha)[4]
Res-Single Family (600)	R1A-B*	3.4	16.7	57	34
Res-Single Family (501)	R1C-E*	3.4	20.0	68	41
Res-Single Family (441)	R1F-H*	3.4	22.7	77	47
Res-Single Family (360)	R1I-K*	3.4	27.8	94	57
Res-Single Family (270)	R1L-N*	3.4	37.1	126	76
Res-Single Family (197)	R1P-Q*	3.4	50.8	173	105
Res-Semi-detached (278)	R2A-B*	2.7	36.0	97	59
Res-Semi-detached (232)	R2C*	2.7	43.1	116	71
Res-Semi-detached (180)	R2D-E*, G*	2.7	55.6	150	91
Res-Semi-detached (135)	R2F*	2.7	74.1	200	121
Townhouse (170)	R3F*, R4A-B*	2.7	58.8	159	96
Townhouse (110)	R3M*	2.7	90.9	246	149
Res-Duplex (441)	R2A-C*	2.3	45.4	104	63
Res-Duplex (360)	R2D*, R3F-G*	2.3	55.6	128	77
Res-Duplex (270)	R2E-F*, R3K*	2.3	74.1	170	103
Res-Duplex (197)	R2G*, R4F*	2.3	101.6	234	141
Res-Triplex (557)	R3A-C*	2.3	53.9	124	75

Unit Type (Min Lot Area M^2)	Zoning (And all similar zonings)	Persons per unit[1]	Units per net ha avg. [2]	Persons (per net ha)[3]	Persons (per gross ha) [4]
Res-Triplex (330)	R3D-E*, H-J*, L*, N*, R4C-E*	2.3	90.9	209	127
Apartments:					
Low Density		1.8	100	180	
Medium Density		1.8	300	540	
High Density		1.8	1000	1800	
Very High Density[5]		1.8	1000 +	1800 +	

*) former City of Ottawa zoning designation.
1) from 1996 census data.
2) new suburban construction, 5-year average (1997-2001), except apartments data which is based on site plans & duplex density which is an assumed average.
3) "net ha" refers to population densities per hectare of purely residential land (i.e. area of the building lots only including private parking and roads but excluding all public road rights-of-way and all other non-residential uses such as parks, stormwater management facilities, commercial developments, schools, community centres, etc.).
4) "gross ha" refers to population densities per hectare of residential and all other non-residential land uses such as streets, schools and parks. Numbers provided apply to large subdivision situations. For smaller residential situations the persons per gross ha will be higher, about 75% of the persons per net ha.
5) apartment densities in the downtown have been as high as 4,000 units/net ha. Proposals with a units/net ha density greater than 1000 will be evaluated on a case-by-case basis.

Development Proposed Land – When the number and type of housing units within a proposed development are known, the calculation of population for the proposed development shall be based on the following:

Table 4.2 Per Unit Populations

Unit Type	Persons Per Unit
Single Family	3.4
Semi-detached	2.7
Duplex	2.3
Townhouse (row)	2.7
Apartments:	
Bachelor	1.4
1 Bedroom	1.4
2 Bedroom	2.1
3 Bedroom	3.1
Average Apt.	1.8

4.4.1 Calculation of Peak Design Flows

The formulae and parameters to be applied in the calculation of peak design flows (standard peak flow design parameters) for new or infill developments are illustrated in Figure 4.3 and described as follows:

Figure 4.3 Peak Flow Design Parameters Summary

AVERAGE WASTEWATER FLOWS:

Residential Average Flow:	350 L/c/day
Commercial Average Flow:	50,000 L/gross ha/d
Institutional Average Flow:	50,000 L/gross ha/d
Average Light Industrial Flow:	35,000 L/gross ha/d
Average Heavy Industrial Flow	55,000 L/gross ha/d

PEAKING FACTORS:

Residential Peak factor: Harmon Equation

$$P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{\frac{1}{2}}} \right) * K$$

where: P=Population
K=Correction Factor = 1

Commercial Peak factor:	1.5
Institutional Peak factor:	1.5
Industrial Peak Factor:	Per Figure in Appendix 4-B

PEAK EXTRANEOUS FLOWS: (design event)

Infiltration Allowance:	0.28 L/s/effective gross ha (for all areas)
Less than 10 ha.	
Foundation Drain Allowance:	5.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)
10 ha – 100 ha	
Foundation Drain Allowance:	3.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)
Greater than 100 ha	
Foundation Drain Allowance:	2.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)

APPENDIX B
Hydrant Flow Data/Fire Fighting Information

FAX TRANSMISSION FORM - Supply Pressure/Flow Capacity

City of Ottawa
Transportation Utilities and Public Works
Customer Service & Operational Support
951 Clyde Avenue
Ottawa, On, K1Z 5A6
Joseph Hannewyk **email: joseph.hannewyk@ottawa.ca**
Business Consultant/Water Resources Analyst **phone 560-6065 x22617**
fax 728-4183

Date/Time: 12/09/24-10:20:54
Our File: 49-01-2006
1 of 2 Page(s)

To: **Justin Gauthier**
Company: **Novatech Engineering Consultants Ltd.**
Tel: **254-9643x217**
Fax: **254-5867**
Location: **George @ Dalhousie**
Request_dt: 12/09/24-10:14:12
Email: **j.gauthier@novatech-eng.com**

Pressure Only ? (Y):

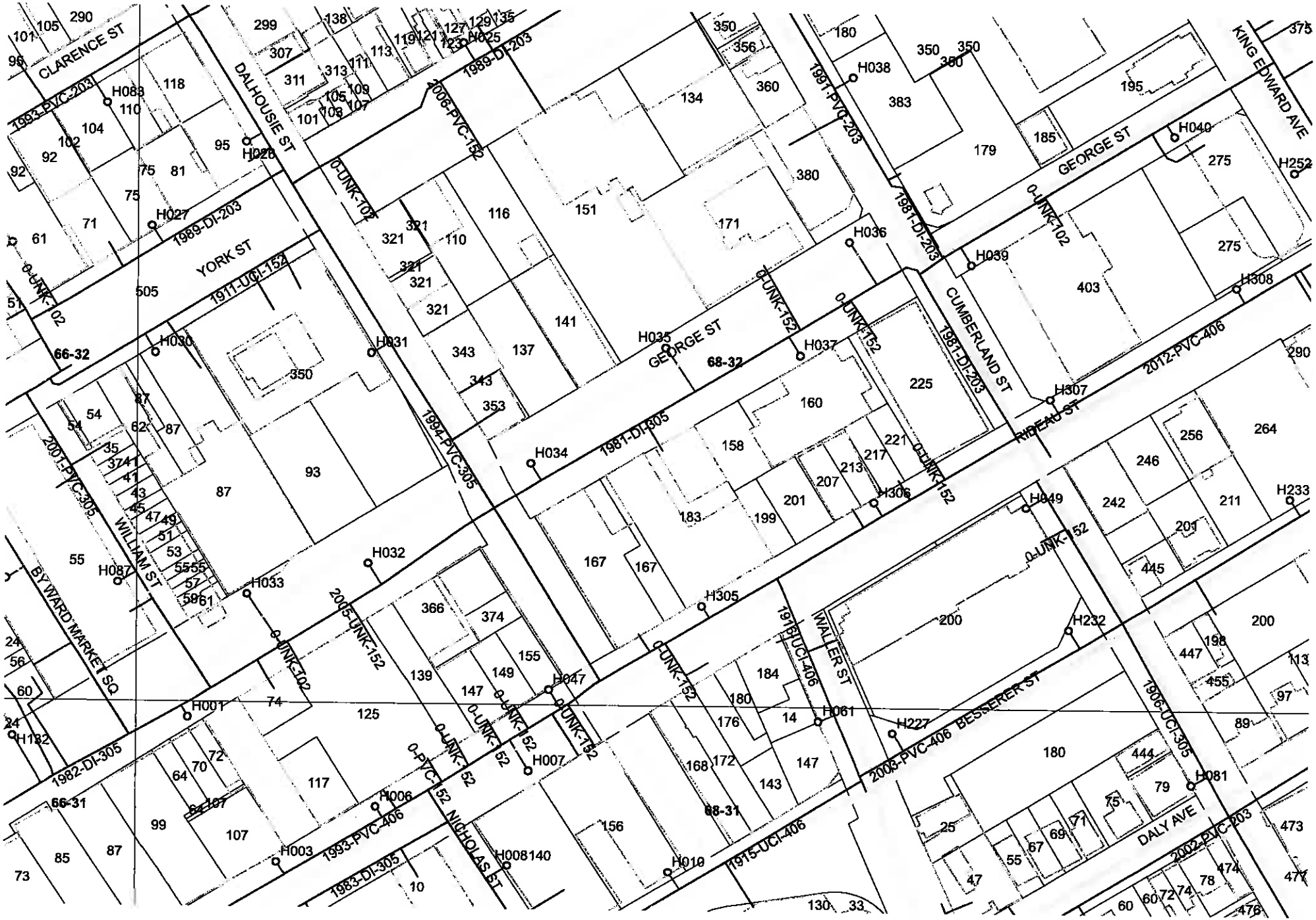
6350

Preferred Response Method:

Inspection Date	Flow Hydrant	Residual Hydrant	Pressure (psi)			Flow (igpm)	
			Static	Dynamic	Pitot	Actual	@ 20 psi
2011/09/26	6832034	6832035	66	>56	46	950	2166
2011/09/26	6832035	6832039	68	>56	52	1010	2135
2011/09/26	6832036	6832039	68	>58	56	1048	2445
2011/09/26	6832037	6832035	66	>56	54	1029	2346
2011/09/27	6832031	6832026	68	>58	56	1048	2445
?	6832029	?	?	?	?	?	?
?	6832215	?	?	?	?	?	?
2011/09/26	6832038	6832039	68	>58	58	1067	2488

Note: the computed flows are approximate and performed for hydrant colour coding purposes, thus these values are not intended for design purposes.

Ref# **6350**


CLARENCE ST
DALHOUSIE ST
YORK ST
GEORGE ST
RIDEAU ST
CUMBERLAND ST
KING EDWARD AVE
BYWARD MARKET SQ
WILLIAM ST
WALLER ST
DALY AVE
NICHOLAS ST
BESSERER ST
1989-DI-203
2006-PVC-152
1991-PVC-203
1911-UCI-152
1994-PVC-305
1981-DI-305
2001-PVC-305
2005-UNK-152
1982-DI-305
1993-PVC-406
1983-DI-305
1915-UCI-406
1976-UCI-406
2003-PVC-406
1906-UCI-305
2002-PVC-203
2012-PVC-406
0-UNK-102
0-UNK-152
0-PVC-152
66-32
68-32
66-31
68-31
H088
H026
H027
H030
H031
H032
H033
H087
H001
H132
H006
H003
H008140
H007
H047
H034
H035
H036
H037
H038
H039
H040
H252
H308
H307
H306
H305
H049
H233
H232
H227
H061
H081
H010

6-4.5.9* For individual fasteners, the loads determined in 6-4.5.6 shall not exceed the allowable loads provided in Figure 6-4.5.9.

The type of fasteners used to secure the bracing assembly to the structure shall be limited to those shown in Figure 6-4.5.9. For connections to wood, through bolts with washers on each end shall be used. Holes for through bolts shall be $^1/_{16}$ in. (1.6 mm) greater than the diameter of the bolt.

Exception No. 1: Where it is not practical to install through bolts due to the thickness of the member or inaccessibility, lag screws shall be permitted. Holes shall be pre-drilled $^1/_8$ in. (3.2 mm) smaller than the maximum root diameter of the lag screw.

Exception No. 2: Other fastening methods are acceptable for use if certified by a registered professional engineer to support the loads determined in accordance with the criteria in 6-4.5.9. Calculations shall be permitted where required by the authority having jurisdiction.

6-4.5.10 Sway bracing assemblies shall be listed for a maximum load rating. The loads shall be reduced as shown in Table 6-4.5.10 for loads that are less than 90 degrees from vertical.

Exception: Where sway bracing utilizing pipe, angles, flats, or rods as shown in Table 6-4.5.8 is used, the components do not require listing. Bracing fittings and connections used with those specific materials shall be listed.

Table 6-4.5.10 Allowable Horizontal Load on Brace Assemblies Based on the Weakest Component of the Brace Assembly

Brace Angle	Allowable Horizontal Load
30–40 degrees from vertical	Listed load rating divided by 2.000
45–59 degrees from vertical	Listed load rating divided by 1.414
60–89 degrees from vertical	Listed load rating divided by 1.155
90 degrees from vertical	Listed load rating

6-4.5.11 Bracing shall be attached directly to feed and cross mains. Each run of pipe between changes in direction shall be provided with both lateral and longitudinal bracing.

Exception: Pipe runs less than 12 ft (3.6 m) in length shall be permitted to be supported by the braces on adjacent runs of pipe.

6-4.5.12 A length of pipe shall not be braced to sections of the building that will move differentially.

6-4.6 Restraint of Branch Lines.

6-4.6.1* Restraint is considered a lesser degree of resisting loads than bracing and shall be provided by use of one of the following:

(1) A listed sway brace assembly

(2) A wraparound U-hook satisfying the requirements of 6-4.5.3, Exception No. 3

(3) No. 12, 440-lb (200-kg) wire installed at least 45 degrees from the vertical plane and anchored on both sides of the pipe

(4) Other approved means

Wire used for restraint shall be located within 2 ft (610 mm) of a hanger. The hanger closest to a wire restraint shall be of a type that resists upward movement of a branch line.

6-4.6.2 The end sprinkler on a line shall be restrained against excessive vertical and lateral movement.

6-4.6.3* Where upward or lateral movement would result in an impact against the building structure, equipment, or finish materials, branch lines shall be restrained at intervals not exceeding 30 ft (9 m).

6-4.6.4* Sprig-ups 4 ft (1.2 m) or longer shall be restrained against lateral movement.

6-4.7 Hangers and Fasteners Subject to Earthquakes.

6-4.7.1 C-type clamps (including beam and large flange clamps) used to attach hangers to the building structure in areas subject to earthquakes shall be equipped with a restraining strap. The restraining strap shall be listed for use with a C-type clamp or shall be a steel strap of not less than 16 gauge thickness and not less than 1 in. (25.4 mm) wide for pipe diameters 8 in. (203 mm) or less and 14 gauge thickness and not less than $1^1/_4$ in. (31.7 mm) wide for pipe diameters greater than 8 in. (203 mm). The restraining strap shall wrap around the beam flange not less than 1 in. (25.4 mm). A lock nut on a C-type clamp shall not be used as a method of restraint. A lip on a "C" or "Z" purlin shall not be used as a method of restraint.

Where purlins or beams do not provide an adequate lip to be secured by a restraining strap, the strap shall be through-bolted or secured by a self-tapping screw.

6-4.7.2 C-type clamps (including beam and large flange clamps), with or without restraining straps, shall not be used to attach braces to the building structure.

6-4.7.3 Powder-driven fasteners shall not be used to attach braces to the building structure.

Exception: Powder-driven fasteners shall be permitted where they are specifically listed for service in resisting lateral loads in areas subject to earthquakes.

6-4.7.4 Powder-driven fasteners shall not be used to attach hangers to the building structure where the systems are required to be protected against earthquakes using a horizontal force factor exceeding 0.50 W_p, where W_p is the weight of the water-filled pipe.

Exception: Powder-driven fasteners shall be permitted where they are specifically listed for horizontal force factors in excess of 0.50 W_p.

Chapter 7 Design Approaches

7-1 General.

7-1.1 Water demand requirements shall be determined from the occupancy hazard fire control approach of Section 7-2.

Exception: Special design approaches as permitted in Section 7-9.

7-1.2 For buildings with two or more adjacent occupancies that are not physically separated by a barrier or partition capable of delaying heat from a fire in one area from fusing sprinklers in the adjacent area, the required sprinkler protection for the more demanding occupancy shall extend 15 ft (4.6 m) beyond its perimeter.

7-2 Occupancy Hazard Fire Control Approach.

7-2.1 Occupancy Classifications.

7-2.1.1 Occupancy classifications for this standard relate to sprinkler installations and their water supplies only. They shall not be used as a general classification of occupancy hazards.

7-2.1.2 Occupancies or portions of occupancies shall be classified according to the quantity and combustibility of contents, the expected rates of heat release, the total potential for energy release, the heights of stockpiles, and the presence of flammable and combustible liquids, using the definitions contained in Section 1-4. Classifications are as follows:

Light hazard

Ordinary hazard (Groups 1 and 2)

Extra hazard (Groups 1 and 2)

Special occupancy hazard *(see Section 7-10)*

7-2.2 Water Demand Requirements — Pipe Schedule Method.

7-2.2.1 Table 7-2.2.1 shall be used in determining the minimum water supply requirements for light and ordinary hazard occupancies protected by systems with pipe sized according to the pipe schedules of Section 8-5. Pressure and flow requirements for extra hazard occupancies shall be based on the hydraulic calculation methods of 7-2.3. The pipe schedule method shall be permitted only for new installations of 5000 ft² (465 m²) or less or for additions or modifications to existing pipe schedule systems sized according to the pipe schedules of Section 8-5. Table 7-2.2.1 shall be used in determining the minimum water supply requirements.

Exception No. 1: The pipe schedule method shall be permitted for use in systems exceeding 5000 ft² (465 m²) where the flows required in Table 7-2.2.1 are available at a minimum residual pressure of 50 psi (3.4 bar) at the highest elevation of sprinkler.

Exception No. 2: The pipe schedule method shall be permitted for additions or modifications to existing extra hazard pipe schedule systems.

7-2.2.2 The lower duration value of Table 7-2.2.1 shall be acceptable only where remote station or central station waterflow alarm service is provided.

7-2.2.3* The residual pressure requirement of Table 7-2.2.1 shall be met at the elevation of the highest sprinkler. *(See the Exceptions to 7-2.2.1).*

7-2.2.4 The lower flow figure of Table 7-2.2.1 shall be permitted only where the building is of noncombustible construction or the potential areas of fire are limited by building size or compartmentation such that no open areas exceed 3000 ft² (279 m²) for light hazard or 4000 ft² (372 m²) for ordinary hazard.

Table 7-2.2.1 Water Supply Requirements for Pipe Schedule Sprinkler Systems

Occupancy Classification	Minimum Residual Pressure Required (psi)	Acceptable Flow at Base of Riser (Including Hose Stream Allowance) (gpm)	Duration (minutes)
Light hazard	15	500–750	30–60
Ordinary hazard	20	850–1500	60–90

For SI units, 1 gpm = 3.785 L/min; 1 psi = 0.0689 bar.

7-2.3 Water Demand Requirements — Hydraulic Calculation Methods.

7-2.3.1 General.

7-2.3.1.1* The minimum water supply requirements for a hydraulically designed occupancy hazard fire control sprinkler system shall be determined by adding the hose stream demand from Table 7-2.3.1.1 to the water supply for sprinklers determined in 7-2.3.1.2. This supply shall be available for the minimum duration specified in Table 7-2.3.1.1.

Exception No. 1: An allowance for inside and outside hose shall not be required where tanks supply sprinklers only.

Exception No. 2: Where pumps taking suction from a private fire service main supply sprinklers only, the pump need not be sized to accommodate inside and outside hose. Such hose allowance shall be considered in evaluating the available water supplies.

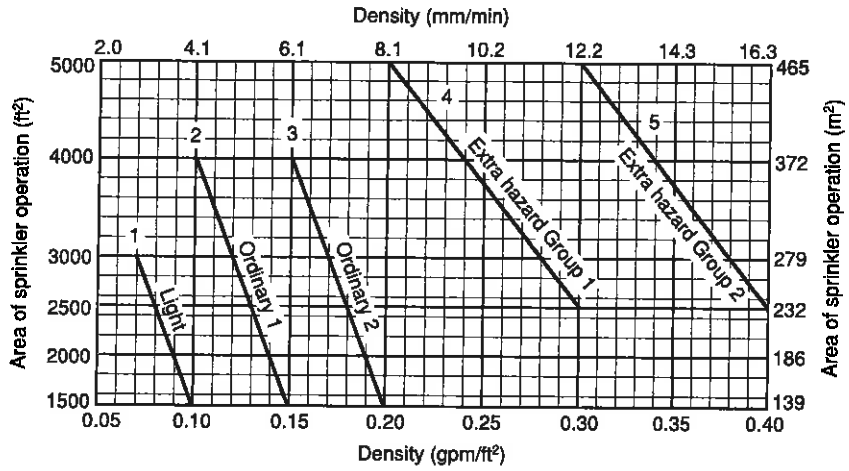
7-2.3.1.2 The water supply for sprinklers only shall be determined either from the area/density curves of Figure 7-2.3.1.2 in accordance with the method of 7-2.3.2 or be based upon the room design method in accordance with 7-2.3.3, at the discretion of the designer. For special areas under consideration, as described in 7-2.3.4, separate hydraulic calculations shall be required in addition to those required by 7-2.3.2 or 7-2.3.3.

Table 7-2.3.1.1† Hose Stream Demand and Water Supply Duration Requirements for Hydraulically Calculated Systems

Occupancy or Commodity Classification	Inside Hose (gpm)	Total Combined Inside and Outside Hose (gpm)	Duration (minutes)
Light hazard	0, 50, or 100	100	30
Ordinary hazard	0, 50, or 100	250	60–90
Extra hazard	0, 50, or 100	500	90–120
Rack storage, Class I, II, and III commodities up to 12 ft (3.7 m) in height	0, 50, or 100	250	90
Rack storage, Class IV commodities up to 10 ft (3.1 m) in height	0, 50, or 100	250	90
Rack storage, Class IV commodities up to 12 ft (3.7 m) in height	0, 50, or 100	500	90
Rack storage, Class I, II, and III commodities over 12 ft (3.7 m) in height	0, 50, or 100	500	90
Rack storage, Class IV commodities over 12 ft (3.7 m) in height and plastic commodities	0, 50, or 100	500	120
General storage, Class I, II, and III commodities over 12 ft (3.7 m) up to 20 ft (6.1 m)	0, 50, or 100	500	90
General storage, Class IV commodities over 12 ft (3.7 m) up to 20 ft (6.1 m)	0, 50, or 100	500	120
General storage, Class I, II, and III commodities over 20 ft (6.1 m) up to 30 ft (9.1 m)	0, 50, or 100	500	120
General storage, Class IV commodities over 20 ft (6.1 m) up to 30 ft (9.1 m)	0, 50, or 100	500	150
General storage, Group A plastics ≤ 5 ft (1.5 m)	0, 50, or 100	250	90
General storage, Group A plastics over 5 ft (1.5 m) up to 20 ft (6.1 m)	0, 50, or 100	500	120
General storage, Group A plastics over 20 ft (6.1 m) up to 25 ft (7.6 m)	0, 50, or 100	500	150

For SI units, 1 gpm = 3.785 L/min.

Figure 7-2.3.1.2 Area/density curves.



7-2.3.1.3 Regardless of which of the two methods is used, the following restrictions shall apply:

(a) For areas of sprinkler operation less than 1500 ft² (139 m²) used for light and ordinary hazard occupancies, the density for 1500 ft² (139 m²) shall be used. For areas of sprinkler operation less than 2500 ft² (232 m²) for extra hazard occupancies, the density for 2500 ft² (232 m²) shall be used.

(b) *For buildings having unsprinklered combustible concealed spaces (as described in 5-13.1.1 and 5-13.7), the minimum area of sprinkler operation shall be 3000 ft² (279 m²).

Exception No. 1: Combustible concealed spaces filled entirely with noncombustible insulation.

*Exception No. 2: *Light or ordinary hazard occupancies where noncombustible or limited combustible ceilings are directly attached to the bottom of solid wood joists so as to create enclosed joist spaces 160 ft³ (4.8 m³) or less in volume.*

*Exception No. 3: *Concealed spaces where the exposed surfaces have a flame spread rating of 25 or less and the materials have been demonstrated to not propagate fire in the form in which they are installed in the space.*

(c) Water demand of sprinklers installed in racks or water curtains shall be added to the ceiling sprinkler water demand at the point of connection. Demands shall be balanced to the higher pressure. *(See Chapter 8.)*

(d) Water demand of sprinklers installed in concealed spaces or under obstructions such as ducts and cutting tables need not be added to ceiling demand.

(e) Where inside hose stations are planned or are required, a total water allowance of 50 gpm (189 L/min) for a single hose station installation or 100 gpm (378 L/min) for a multiple hose station installation shall be added to the sprinkler requirements. The water allowance shall be added in 50-gpm (189-L/min) increments beginning at the most remote hose station, with each increment added at the pressure required by the sprinkler system design at that point.

(f) When hose valves for fire department use are attached to wet pipe sprinkler system risers in accordance with 5-15.5.2, the water supply shall not be required to be added to standpipe demand as determined from NFPA 14, *Standard for the Installation of Standpipe and Hose Systems.*

Exception No. 1: Where the combined sprinkler system demand and hose stream allowance of Table 7-2.3.1.1 exceeds the requirements of NFPA 14, Standard for the Installation of Standpipe and Hose Systems, this higher demand shall be used.

Exception No. 2: For partially sprinklered buildings, the sprinkler demand, not including hose stream allowance, as indicated in Table 7-2.3.1.1 shall be added to the requirements given in NFPA 14, Standard for the Installation of Standpipe and Hose Systems.

(g) Water allowance for outside hose shall be added to the sprinkler and inside hose requirement at the connection to the city water main or a yard hydrant, whichever is closer to the system riser.

(h) The lower duration values in Table 7-2.3.1.1 shall be permitted where remote station or central station waterflow alarm service is provided.

(i) Where pumps, gravity tanks, or pressure tanks supply sprinklers only, requirements for inside and outside hose need not be considered in determining the size of such pumps or tanks.

7-2.3.1.4 Total system water supply requirements shall be determined in accordance with the hydraulic calculation procedures of Section 8-4.

7-2.3.2 Area/Density Method.

7-2.3.2.1 The water supply requirement for sprinklers only shall be calculated from the area/density curves in Figure 7-2.3.1.2 or from Section 7-10 where area/density criteria is specified for special occupancy hazards. When using Figure 7-2.3.1.2, the calculations shall satisfy any single point on the appropriate area/density curve as follows:

(1) Light hazard area/density curve 1
(2) Ordinary hazard (Group 1) area/density curve 2
(3) Ordinary hazard (Group 2) area/density curve 3
(4) Extra hazard (Group 1) area/density curve 4
(5) Extra hazard (Group 2) area/density curve 5

It shall not be necessary to meet all points on the selected curve.

Exception: Sprinkler demand for storage occupancies as determined in Sections 7-3 through 7-8.

7-2.3.2.2 For protection of miscellaneous storage, miscellaneous tire storage, and storage up to 12 ft (3.7 m) in height, the discharge criteria in Table 7-2.3.2.2 shall apply.

Table A-1-4.11 Typical Cotton Bale Types and Approximate Sizes

Bale Type	Dimensions		Average Weight		Volume		Density	
	in.	mm	lb	kg	ft^3	m^3	lb/ft^3	kg/m^3
Gin, flat	55 × 45 × 28	1397 × 1143 × 711	500	226.8	40.1	1.13	12.5	201
Modified gin, flat	55 × 45 × 24	1397 × 1143 × 610	500	226.8	34.4	0.97	14.5	234
Compressed, standard	57 × 29 × 23	1448 × 736 × 584	500	226.8	22.0	0.62	22.7	366
Gin, standard	55 × 31 × 21	1397 × 787 × 533	500	226.9	20.7	0.58	24.2	391
Compressed, universal	58 × 25 × 21	1475 × 635 × 533	500	226.8	17.6	0.50	28.4	454
Gin, universal	55 × 26 × 21	1397 × 660 × 533	500	226.8	17.4	0.49	28.7	463
Compressed, high density	58 × 22 × 21	1473 × 559 × 533	500	226.8	15.5	0.44	32.2	515

A-1-4.11 Baled Cotton. See Table A-1-4.11.

A-1-4.12 Array, Standard (Paper). The occasional presence of partially used rolls on top of columns of otherwise uniform diameter rolls does not appreciably affect the burning characteristics.

A-1-4.12 Roll Paper Storage, Wrapped. Rolls that are completely protected with a heavyweight kraft wrapper on both sides and ends are subject to a reduced degree of fire hazard. Standard methods for wrapping and capping rolls are outlined in Figure A-1-4.12.

In some cases, rolls are protected with laminated wrappers, using two sheets of heavy kraft with a high-temperature wax laminate between the sheets. Where using this method, the overall weight of wax-laminated wrappers should be based on the basis weight per 1000 ft^2 (92.9 m^2) of the outer sheet only, rather than on the combined basis weight of the outer and inner laminated wrapper sheets. A properly applied wrapper can have the effect of changing the class of a given paper to essentially that of the wrapper material. The effect of applying a wrapper to tissue has not been determined by test.

A-1-4.12 Roll Paper Storage Height. The size of rolls and limitations of mechanical handling equipment should be considered in determining maximum storage height.

A-2-1 Occupancy examples in the listings as shown in the various hazard classifications are intended to represent the norm for those occupancy types. Unusual or abnormal fuel loadings or combustible characteristics and susceptibility for changes in these characteristics, for a particular occupancy, are considerations that should be weighed in the selection and classification.

The light hazard classification is intended to encompass residential occupancies; however, this is not intended to preclude the use of listed residential sprinklers in residential occupancies or residential portions of other occupancies.

A-2-1.1 Light hazard occupancies include occupancies having uses and conditions similar to the following:

Churches

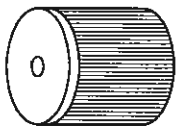
Clubs

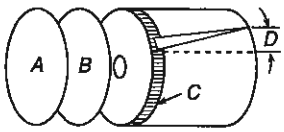
Eaves and overhangs, if of combustible construction with no combustibles beneath

Figure A-1-4.12 Wrapping and capping terms and methods.

Wrapper
Exterior wrapper
Body wrapper — General term for protective wrapping of sides and ends on roll.

Body wrap
Sleeve wrap
Wrap — do not cap — Wrapper placed around circumference of roll. No heads or caps needed.





Heads
Headers — Protection applied to the ends of the rolls (*A* and *B*). Heads do not lap over the end of the roll.

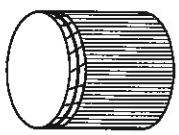
Inside heads — Protection applied to the ends of the rolls next to the roll itself (*B*). The wrapper of the rolls is crimped down over these heads.

Outside heads — Protection applied to the ends of the rolls on the outside (*A*). This head is applied after the wrapper is crimped.

Edge protectors
Edge bands — Refers to extra padding to prevent damage to roll edges (*C*).

Overwrap — The distance the body wrap or wrapper overlaps itself (*D*).

Roll cap — A protective cover placed over the end of a roll. Edges of cap lap over the end of the roll and are secured to the sides of the roll.



Educational
Hospitals
Institutional
Libraries, except large stack rooms
Museums
Nursing or convalescent homes
Offices, including data processing
Residential
Restaurant seating areas
Theaters and auditoriums, excluding stages and prosceniums
Unused attics

A-2-1.2.1 Ordinary hazard occupancies (Group 1) include occupancies having uses and conditions similar to the following:

Automobile parking and showrooms
Bakeries
Beverage manufacturing
Canneries
Dairy products manufacturing and processing
Electronic plants
Glass and glass products manufacturing
Laundries
Restaurant service areas

A-2-1.2.2 Ordinary hazard occupancies (Group 2) include occupancies having uses and conditions similar to the following:

Cereal mills
Chemical plants — ordinary
Confectionery products
Distilleries
Dry cleaners
Feed mills
Horse stables
Leather goods manufacturing
Libraries — large stack room areas
Machine shops
Metal working
Mercantile
Paper and pulp mills
Paper process plants
Piers and wharves
Post offices
Printing and publishing
Repair garages
Resin application area
Stages
Textile manufacturing
Tire manufacturing
Tobacco products manufacturing
Wood machining
Wood product assembly

A-2-1.3.1 Extra hazard occupancies (Group 1) include occupancies having uses and conditions similar to the following:

Aircraft hangars (except as governed by NFPA 409, *Standard on Aircraft Hangars*)
Combustible hydraulic fluid use areas
Die casting
Metal extruding
Plywood and particle board manufacturing
Printing [using inks having flash points below 100°F (38°C)]
Rubber reclaiming, compounding, drying, milling, vulcanizing
Saw mills
Textile picking, opening, blending, garnetting, or carding, combining of cotton, synthetics, wool shoddy, or burlap
Upholstering with plastic foams

A-2-1.3.2 Extra hazard occupancies (Group 2) include occupancies having uses and conditions similar to the following:

Asphalt saturating
Flammable liquids spraying
Flow coating
Manufactured home or modular building assemblies (where finished enclosure is present and has combustible interiors)
Open oil quenching
Plastics processing
Solvent cleaning
Varnish and paint dipping

A-2-1.4 Other NFPA standards contain design criteria for fire control or fire suppression *(see 2-1.4 and Chapter 13)*. While these can form the basis of design criteria, this standard describes the methods of design, installation, fabrication, calculation, and evaluation of water supplies that should be used for the specific design of the system.

Other NFPA standards contain sprinkler system design criteria for fire control or suppression of specific hazards. This information has been either referenced or copied into Chapters 5 and 7 using NFPA's extract policy.

A-2-2 Specification of the type, amount, and arrangement of combustibles for any commodity classification is essentially an attempt to define the potential fire severity, based on its burning characteristics, so the fire can be successfully controlled by the prescribed sprinkler protection for the commodity class. In actual storage situations, however, many storage arrays do not fit precisely into one of the fundamental classifications; therefore, the user needs to make judgments after comparing each classification to the existing storage conditions. Storage arrays consist of thousands of products, which make it impossible to specify all the acceptable variations for any class. As an alternative, a variety of common products are classified in this appendix based on judgment, loss experience, and fire test results.

Table A-2-2 provides examples of commodities not addressed by the classifications in Section 2-2.

Table A-2-2.3 is an alphabetized list of commodities with corresponding classifications.

Tables A-2-2.3.1 through A-2-2.3.4 and A-2-2.4.1 provide examples of commodities within a specific class.

Table A-2-2 Examples of Commodities Not Addressed by the Classifications in Section 2-2

Boxes, Crates
- Empty, wood slatted
Lighters (butane)
- Loose in large containers (Level 3 aerosol)

*Should be treated as idle pallets.

APPENDIX C
Correspondence

APPENDIX D
Servicing Study Guidelines Checklist

NOVATECH ENGINEERING CONSULTANTS LTD.

Project Name: 141 George Street / 325 Dalhousie Street
Project Number: 112142
Date: 01/24/2014

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Executive Summary (for larger reports only).	NA		
Date and revision number of the report.	Y	Cover	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y		Figures 1, 2 and 3
Plan showing the site and location of all existing services.	Y		Figures 2 and 3
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Y	1.0	
Summary of Pre-consultation Meetings with City and other approval agencies.	N		
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Y	2.0 - 4.0	
Statement of objectives and servicing criteria.	Y		Addressed in Section 2.0, 3.0. 4.0.
Identification of existing and proposed infrastructure available in the immediate area.	Y		Figures 2 and 3
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	NA		
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	N		Will be addressed in Site plan application.

Development Servicing Study Checklist

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

Development Servicing Study Checklist

4.2 Water	Addressed (Y/N/NA)	Section	Comments
Confirm consistency with Master Servicing Study, if available.	Y	5.0	Also refer to Appendix B for Hydrant Flow data.
Availability of public infrastructure to service proposed development.	Y		Figures 2 and 3
Identification of system constraints.	Y	4.0	
Identify boundary conditions.	Y	4.0	
Confirmation of adequate domestic supply and pressure.	Y	4.0	
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Y	4.0	
Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Y	4.0	
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	NA		
Address reliability requirements such as appropriate location of shut-off valves.	Y	4.0	
Check on the necessity of a pressure zone boundary modification.	NA		
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Y	4.0	
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Y	4.0	
Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	NA		
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	4.0	
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N		Figure 3 shows main.

Development Servicing Study Checklist

4.3 Wastewater	Addressed (Y/N/NA)	Section	Comments
Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Y	2.0	
Confirm consistency with Master Servicing Study and/or justifications for deviations.	Y	2.0	
Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	Y	2.0	
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Y	2.0	
Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Y	2.0	
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Y	2.0	
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	2.0	Figures 2 and 3
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	NA		
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	NA		
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	NA		
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	NA		
Special considerations such as contamination, corrosive environment etc.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	3.0	
Analysis of the available capacity in existing public infrastructure.	Y	3.0	
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	Y		Figures 2 and 3
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y	3.0	
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	NA		
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	3.0	
Set-back from private sewage disposal systems.	NA		
Watercourse and hazard lands setbacks.	NA		
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	NA		
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Y	3.0	
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y	3.0	
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	NA		
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Y	3.0	
Any proposed diversion of drainage catchment areas from one outlet to another.	NA		
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	Y	3.0	
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Identification of municipal drains and related approval requirements.	NA		
Description of how the conveyance and storage capacity will be achieved for the development.	Y	3.0	
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Y	3.0	
Inclusion of hydraulic analysis including HGL elevations.	N		
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	3.0	
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	NA		
Identification of fill constrains related to floodplain and geotechnical investigation.	NA		

Development Servicing Study Checklist

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

4.6 Conclusion	Addressed (Y/N/NA)	Section	Comments
Clearly stated conclusions and recommendations.	Y	5.0	
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	NA		
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y	5.0	