

**EXISTING THREE-STOREY  
RESIDENTIAL APARTMENT BUILDING  
157-159 JAMES STREET  
CITY OF OTTAWA**

**SERVICEABILITY BRIEF  
REPORT No. R-821-83A (REVISION 1)  
JANUARY 2022**

**T. L. MAK ENGINEERING CONSULTANTS LTD.**

**OCTOBER 2021**

**REF. FILE No. 821-83**

## **1.) INTRODUCTION**

The owner of the said residential property is proposing to restructure the existing 7-unit three-storey apartment building consisting of (3) 2-bedroom and (4) 1-bedroom units to convert to a 12-unit apartment building. Application to the City of Ottawa for “Site Plan Control” is being made for further development of this site.

From the City of Ottawa’s recent review comments, one of the requirements to complete this application is a serviceability brief and in particular for providing the water demands for the site (Avg. Day, Max. Day, Peak Hour and Fire Flow).

The existing residential dwelling at 157-159 James Street is a three-storey low-rise apartment building. It is our understanding that the basement of the building will not be converted into a finished space for occupancy. The existing building is to be restructured to house a total of 12 apartment units consisting of one 2-bedroom unit and eleven 1-bedroom units. The total gross floor area is 6,457 ft<sup>2</sup> (600 m<sup>2</sup>).

T.L. Mak Engineering Consultants Ltd. has been retained to prepare a “Serviceability Brief” for this site as a supplement to the Site Plan Control Application.

## **2.) EXISTING SITE CONDITIONS AND SERVICING**

Presently, a three-storey low-rise residential apartment building occupies the site. For details of the site’s pre-restructuring conditions, refer to the Google image and aerial photography from (GeoOttawa 2019) in Appendix A.

The existing building is currently comprised of two (2) municipal addresses known as 157-159 James Street. Each half of the building has their own separate water service and sanitary lateral. No evidence of any existing storm lateral where found in the building for draining the building weeping tiles due to possibly age of construction. As part of the restructuring of the existing building to contain one (1) municipal address the (2) existing sets of services laterals is proposed to be abandoned and replaced with one set of services consisting of a 150mm dia. sanitary lateral, a 150mm dia. storm lateral and 50mm dia. water service meeting current pipe size and material standards.

As for the availability of underground municipal services, there are existing municipal services along James Street in front of this property consisting of a 300mm dia. combined sewer and a 200mm dia. watermain for development of this property. Refer to the City of Ottawa James Street UCC and As-built plan and profile drawings included in Appendix B for details.

Existing grading and drainage of the lot is primarily sloped from back to front (north to south direction). See Proposed Servicing plan (Dwg. #821-83, S-1) with existing grades for further details.

Currently, there are (2) two-way vehicle entrances and laneway on-site. Along the west side yard is a private vehicle entranceway to the rear of this lot and along the east side yard is a shared

laneway with neighbouring 155 James Street in providing access to the rear parking of this property. Currently an asphalt parking area and a set of metal fire escape stairs are located at the rear of the building.

### 3.) POTABLE WATER

From discussions with the owner and the owner’s house designer, the existing building will not have a sprinkler system. Our analysis will be based on a non-sprinklered building.

The existing building located within Pressure Zone 1W at 157-159 James Street is a 3-storey residential low-rise apartment building with a basement. The building will contain one 2-bedroom unit, and eleven 1-bedroom units. The gross floor area is 6,457 ft<sup>2</sup> (600 m<sup>2</sup>). The building is to be serviced by the 200 mm diameter watermain along James Street.

The ground elevation on the property in question is approximately 73m, as obtained from the attached **Topographic Survey Plan** in Appendix C.

### 3a.) DEMAND PROJECTIONS

The domestic demands were calculated using the City of Ottawa’s Water Design Guidelines and the Technical Bulletin ISTB-2021-03, where the residential consumption rate of 280 L/cap/d was used to estimate average day demands (AVDY). Maximum day (MXDY) demands were calculated by multiplying AVDY demands by a factor of 2.5. Peak hour (PKHR) demands were calculated by multiplying MXDY by a factor of 2.2. Persons per unit (PPU) for each unit were estimated based on the City of Ottawa’s Water Design Guidelines. **Table 1** shows the estimated domestic demands of the proposed building.

**Table 1: Estimated Domestic Demand**

Unit Type	Unit Count	PPU	Consumption	AVDY		MXDY		PKHR	
				L/d	L/s	L/d	L/s	L/d	L/s
Apartment, 2-Bedroom	1	2.1	280	588	0.01	1,470	0.02	3,234	0.04
Apartment, 1-Bedroom	11	1.4		4,312	0.05	10,780	0.12	23,716	0.27
<b>Total</b>	<b>12</b>			<b>4,900</b>	<b>0.06</b>	<b>12,250</b>	<b>0.14</b>	<b>26,950</b>	<b>0.31</b>

The fire flow required was determined following the Fire Underwriter Survey (FUS) method and is provided in the attached worksheet. The existing building was classified as ordinary construction with building contents that are limited in combustibility. It is understood that the building does not have a sprinkler system. It was assumed that the basement is more than 50% below ground level. The resulting total required fire flow is 7,000 L/min (117 L/s) for a duration of 2.25 hours.

Details are provided in the attached **FUS Fire Flow Calculations** in Appendix C. **Figure 1** in Appendix C provides separation distances from adjacent buildings. The **Topographic Survey Plan** attached in Appendix C was used to determine distances from the proposed building to the property lines.

In summary, the estimated water demands for the proposed building are as follows:

- AVDY = 4,900 L/d (0.06 L/s);
- MXDY = 12,250 L/d (0.14 L/s);
- PKHR = 26,950 L/d (0.31 L/s); and,
- Fire Flow = 7,000 L/min (117 L/s).

### 3b.) BOUNDARY CONDITIONS

The hydraulic gradeline (HGL) boundary conditions for 157-159 James Street, as presented in **Table 2**, were provided by the City on August 9, 2021 (see attached **Water Boundary Conditions Email** in Appendix C).

**Table 2: Boundary Conditions**

Demand Scenario	Head (m)
Minimum HGL (Peak Hour)	106.8
Maximum HGL (Average Day)	115.4
Maximum Day + Fire Flow (133 L/s)*	105.6
<i>*Higher fire flow rate of 8,000 L/min (133 L/s) calculated for original boundary conditions request.</i>	

### 3c.) HYDRAULIC ANALYSIS

#### PEAK HOUR & AVERAGE DAY

During peak hour demands, the resulting minimum hydraulic gradeline of 106.8 m corresponds to a peak hour pressure of 331 kPa (48 psi). This value is above the minimum pressure objective of 276 kPa (40 psi) for residential buildings up to two storeys. The peak hour pressure exceeds this objective and is therefore considered acceptable. Given that this apartment building consists of a total of 3 storeys, further consideration will be needed to service the higher floors. Adding 5 psi per floor above two stories, a minimum pressure of 310 kPa (45 psi) would be required for the third floor. The peak hour pressure exceeds this objective and is therefore considered acceptable.

During average day demands, the resulting maximum hydraulic gradeline of 115.4 m corresponds to a maximum pressure of 416 kPa (60 psi). This value is less than the maximum pressure objective of 552 kPa (80 psi) and therefore considered acceptable.

**Supporting Hydraulic Calculations** are attached in Appendix C.



## MAXIMUM DAY + FIRE FLOW

A maximum day plus fire flow hydraulic gradeline of 105.6 m corresponds to a residual pressure of 325 kPa (46 psi) at this location and is well above the minimum residual pressure requirements of 140 kPa (20 psi).

Based on Table 1 of Appendix I of the City of Ottawa Technical Bulletin ISTB-2018-02 and a desktop review (i.e., Google Street View) to confirm hydrant class, the combined hydrant flow coverage for the building is estimated to be 11,356 L/min, which is above the FUS required fire flow (RFF) of 7,000 L/min.

Hydrant coverage and classes are illustrated in **Figure 2** attached in Appendix C. A breakdown of available hydrant flow is summarized in **Table 3**.

**Table 3: Fire Hydrant Coverage**

Building	Calculated FUS Fire Flow Demand (L/min)	Fire Hydrants				Combined Hydrant Flow Coverage (L/min)	
		Hydrant Class	Within 76 m		Between 76 m and 122 m		
			Quantity	Contrib. to RFF	Quantity		Contrib. to RFF
157-159 James St	7,000	AA	2	5,678		11,356	
		A					
		B					
		C					

### **3d.) CONCLUSIONS**

In conclusion, based on the boundary conditions provided, the watermain along James Street provides adequate fire flow capacity as per the Fire Underwriters Survey.

Anticipated pressures at the property line during basic day and peak hour demand conditions are within the pressure objectives as per the City of Ottawa's Drinking Water Design Guidelines.

### **4.) SANITARY FLOW**

Peak sanitary flow for this proposed restructuring of the existing residential apartment building is estimated at  $Q = 0.25$  L/s with an infiltration rate of 0.02 L/s. This flow will enter the existing 300mm diameter combined sewer via a 150 mm diameter PVC sanitary lateral sloped at 1.0% (min.).

The existing peak sanitary flow estimated for this lot prior to the proposed building conversion is  $Q = 0.17$  L/s with a infiltration rate of 0.02 L/s. Therefore, the estimated net increase in peak flow from this proposed re-development property is 0.08 L/s.

In view that the existing combined sewer size is 300 mm diameter in front of this property, an increase in sanitary flow to the existing sewer system by 0.08 L/s from this site is not expected to negatively impact the existing James Street combined sewer.

Therefore, the existing 150mm diameter PVC lateral is estimated to be able to convey the added flow and also meet the current pipe size and material standards. Refer to Appendix D for further details on sanitary flow calculations.

## 5.) STORM FLOW

The existing building currently does not appear to have any storm lateral connection to the existing 300mm dia. combined sewer.

Weeping tile water drainage outlet for the proposed re-structured building is requested by the owner to be installed via a proposed 150mm diameter PVC storm lateral which will be connected to the existing 300mm diameter James Street combined sewer.

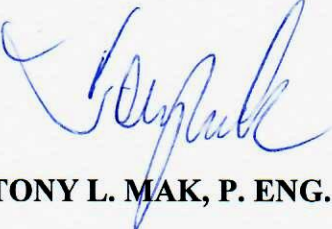
The current lot drainage on-site is primarily graded to surface drain across the site from north to south or (rear to front) where upon surface stormwater outlets to the City's road right of way on James Street.

## 6.) CONCLUSIONS

In conclusion, based on the boundary conditions provided, the 200mm diameter watermain along James Street provides adequate fire flow capacity as per the Fire Underwriters Survey, as well as anticipated demand flows within the pressure objectives during peak demand and basic demand conditions as per the City of Ottawa's Drinking Water Design Guidelines.

The two (2) existing sets of water service and sanitary laterals which will be abandoned and replaced with one (1) set of new services consisting of a 50mm diameter water service, 150mm diameter sanitary lateral, and a 150mm diameter storm lateral that meets City of Ottawa current pipe size and material standards to service the proposed re-structured apartment building.

**PREPARED BY T. L. MAK ENGINEERING CONSULTANTS LTD.**

  
**TONY L. MAK, P. ENG.**



**EXISTING THREE-STOREY  
RESIDENTIAL APARTMENT BUILDING  
157-159 JAMES STREET  
CITY OF OTTAWA**

**APPENDIX A**

**SITE PRE-DEVELOPMENT CONDITION  
GOOGLE IMAGE (2019)  
AND  
AERIAL PHOTOGRAPHY 2019 (GEOOTTAWA)**

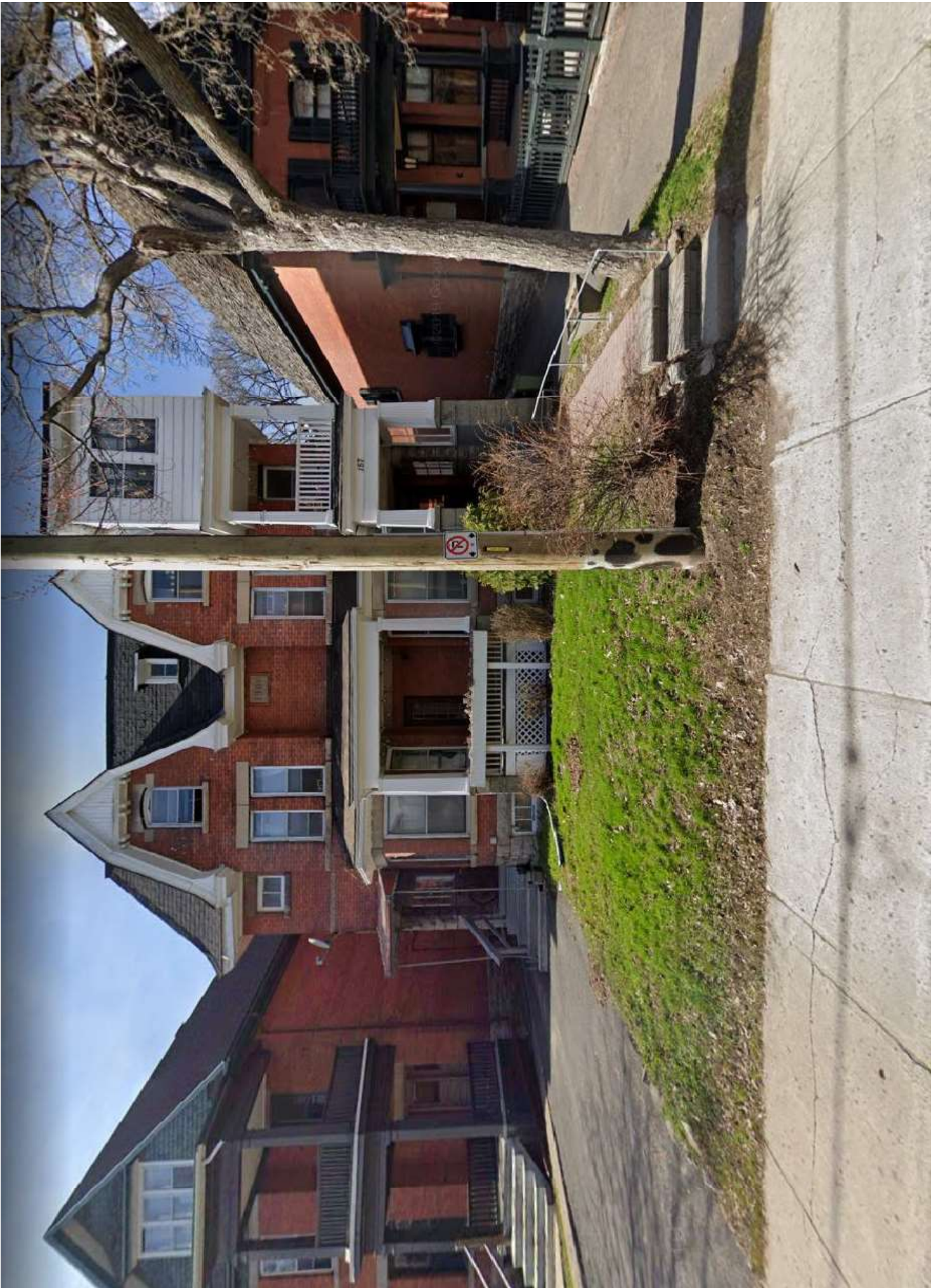












**EXISTING THREE-STOREY  
RESIDENTIAL APARTMENT BUILDING  
157-159 JAMES STREET  
CITY OF OTTAWA**

**APPENDIX B**

**JAMES STREET  
CITY OF OTTAWA  
PLAN AND PROFILE  
AND  
UCC DRAWINGS**











Regional Municipality  
of  
Ottawa-Carleton  
Works Department

FEATERS: W.L. KEAY  
Director, Education Comm.  
Adeas Comm. Super.  
Director, Education Comm.  
Engineer in Charge of  
Design & Construction  
2/1/82  
2/1/82

Project Officer  
Francis G. ...  
2/1/82  
2/1/82  
Drawn by  
J. CARMAI  
9/6/12  
Checked by  
29 JUNE 82

NOTES:  
1. SERVICE CONNECTIONS TO RECEIVE  
PER R.P.O.C. STANDARDS.  
2. PROP. 203 mm. W.M. IN LYON ST. TO BE  
LAID WITH 2.5 m. COVER FROM E  
ROAD SURF.

BASE PLAN INFORMATION TAKEN FROM  
SEPT. OF PHYSICAL ENVIRONMENT PLANS  
577, SR. E.B.3, CONTRACT NO. 32-38

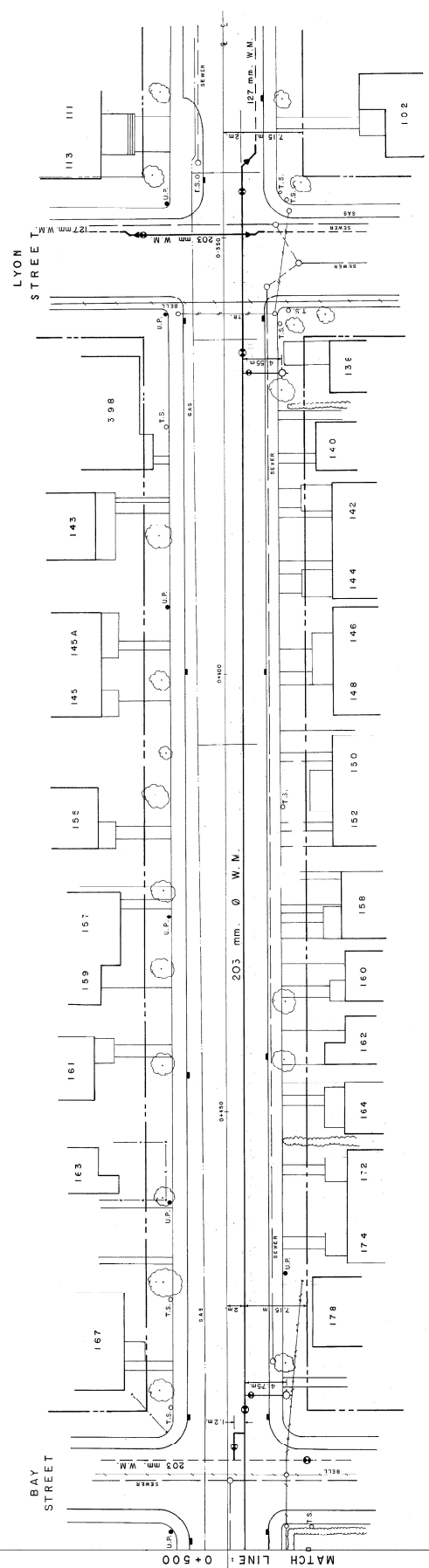
Scale:  
HOR. : 1:250  
VERT. : 1:50

Revisions:  
1. "AS BUILT" FROM FIELD BOOK  
NO. 592 BY L. KENNEDY  
J.C. 11/17/82

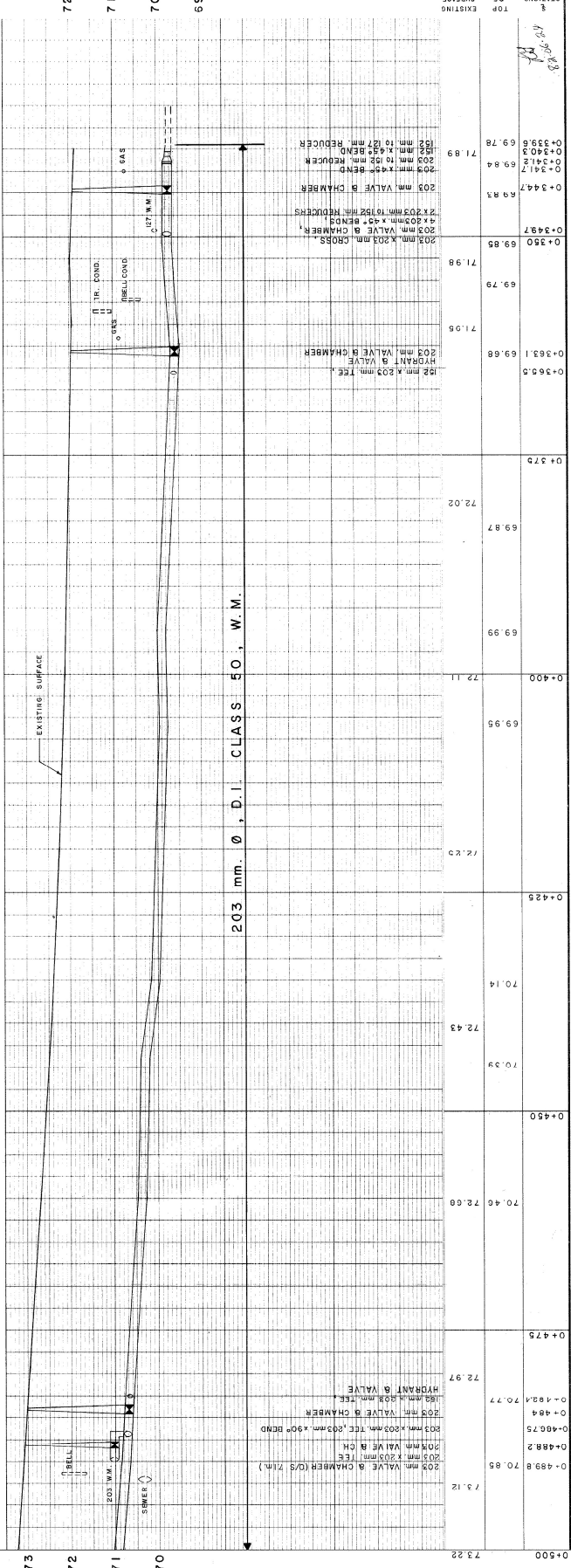
Legend

Project Title:  
203 mm. Ø W.M.  
IN  
JAMES  
STREET  
LYON STREET  
PERCY STREET  
Drawing No. 2880  
Sheet 3

JAMES STREET



"WATERMAIN AND SERVICE CONNECTIONS TO RECEIVE PER R.P.O.C. STANDARDS AS REQUIRED PER R.A.O.C. STANDARDS AND SPECIFICATIONS"



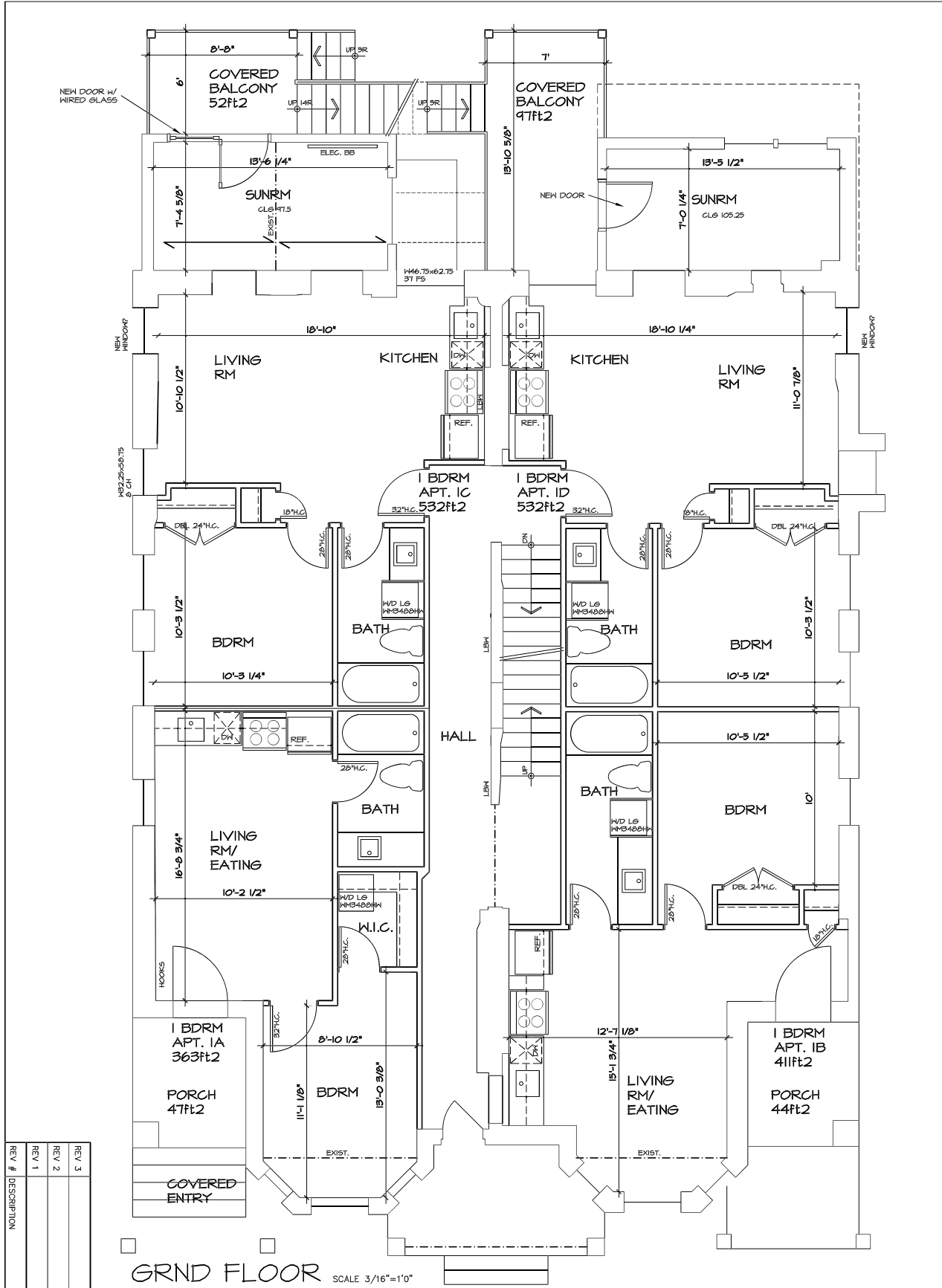


**EXISTING THREE-STOREY  
RESIDENTIAL APARTMENT BUILDING  
157-159 JAMES STREET  
CITY OF OTTAWA**

**APPENDIX C**

- **ARCHITECTURAL DRAWINGS AND TOPOGRAPHICAL SURVEY PLAN**
- **FUS FIRE FLOW CALCULATION**
- **FUS EXPOSURE DISTANCE (FIGURE 1)**
- **WATER BOUNDARY CONDITIONS**
- **SUPPORTING HYDRAULIC CALCULATIONS**
- **HYDRANT SPACING (FIGURE 2)**

**ATTACHMENT 1 : ARCHITECTURAL DRAWINGS AND**  
**TOPOGRAPHICAL SURVEY PLAN**



GRND FLOOR SCALE 3/16"=1'0"

GRND FLR GROSS AREA  
2164ft<sup>2</sup> (201.0m<sup>2</sup>)

GROSS AREA  
6457ft<sup>2</sup>  
(599.8m<sup>2</sup>)

REV #	DESCRIPTION	MMML DD, YYYY
REV 3		
REV 2		
REV 1		

Project: The "JAMES ST" Apartment  
 151, 159 James St.,  
 Ottawa, ON, K1R 5M4  
 Lot 21 & Part Lot 20,  
 RP 306711

Designer: David Bekkers  
 M.A.A.T.O.  
 151 Bay St., Suite 100E  
 Ottawa, Ontario  
 K1R 7T2  
 613-852-8433

Developer/Owner: Aterious Property Management  
 590 Queen Elizabeth Driveway,  
 Ottawa, ON, K1S 3N5  
 613-265-1786

Drawn By: DB.  
 Scale: AS SHOWN  
 Date: \_\_\_\_\_  
 Pkg. No.: \_\_\_\_\_

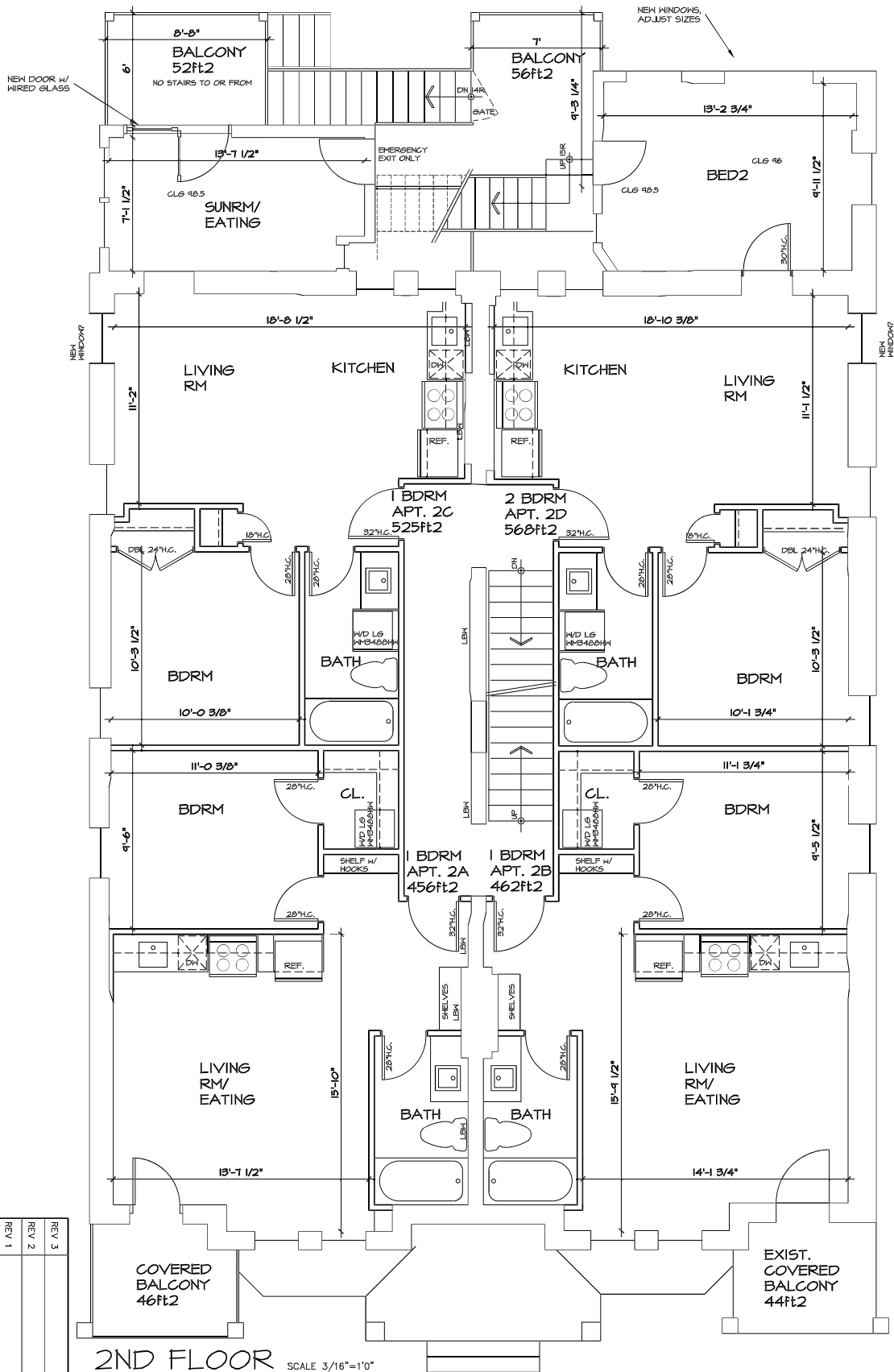
Signature: \_\_\_\_\_  
 22880 BDN

The undersigned has reviewed and takes responsibility for this design, and has the qualifications and meets the requirements set out in the Ontario Building Code

David Bekkers  
 M.A.A.T.O. SIGNATURE

MMML DD, YYYY

A2



2ND FLOOR SCALE 3/16"=1'0"

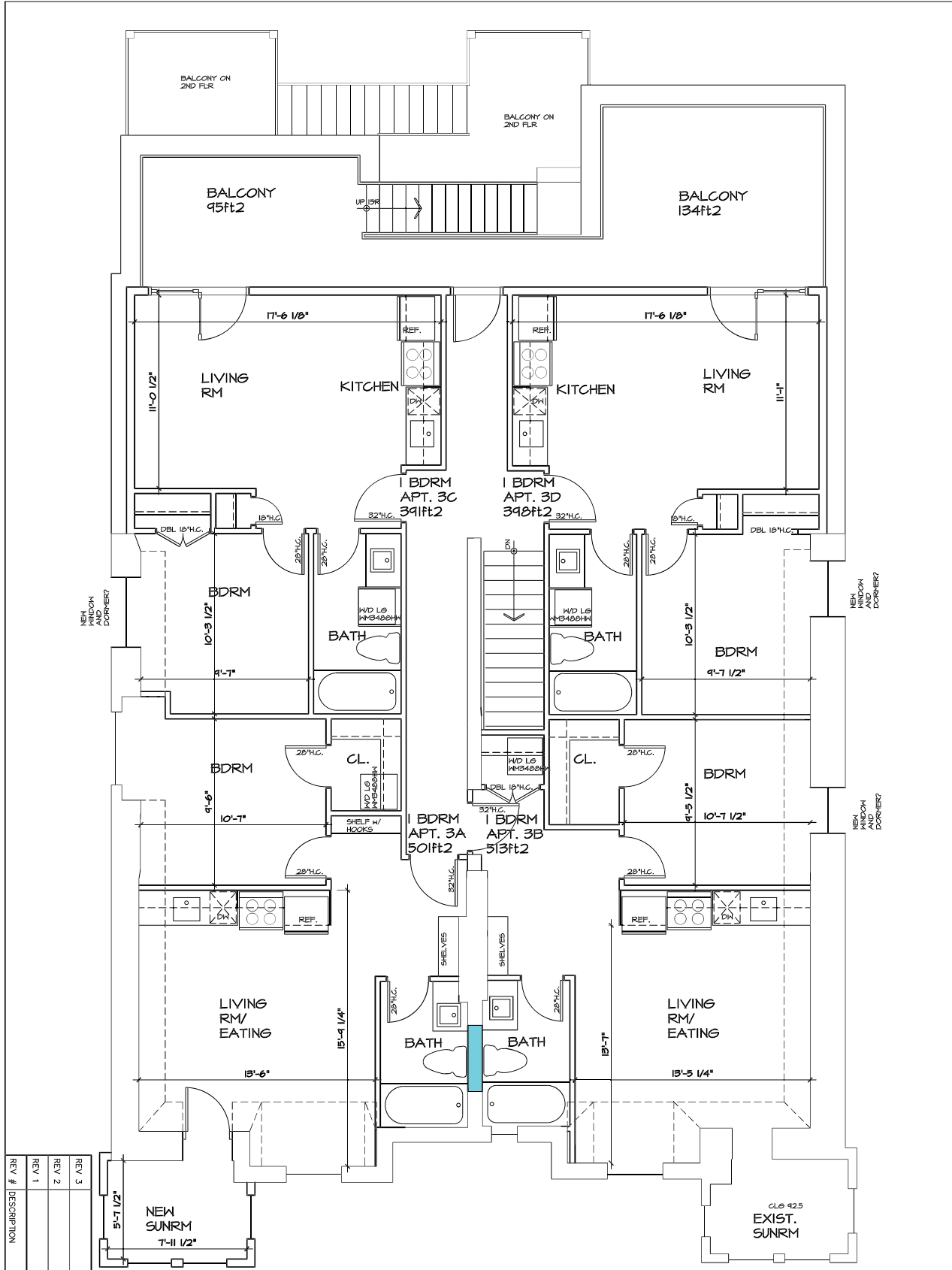
2ND FLR GROSS AREA  
2270ft<sup>2</sup> (210.8m<sup>2</sup>)

REV 3		DATE	22/08/00
REV 2		DATE	
REV 1		DATE	
REV #	DESCRIPTION	MM, DD, YYYY	

NAME	DAVID BEKERS	SIGNATURE	[Signature]
DATE			
SCALE	AS SHOWN		
DATE			
PROJECT	The "JAMES ST" Apartment		
ADDRESS	151 Bay St., Suite 1006 Ottawa, Ontario K1R 7T2 613-852-8433		
DESIGNER	David Bekers M.A.A.T.O.		
MANAGER/OWNER	Aferous Property Management 590 Queen Elizabeth Drive, Ottawa, ON, K1S 3N5 613-265-1786		

The undersigned has reviewed and takes responsibility for this design, and has the qualifications and meets the requirements set out in the Ontario Building Code

A3



3RD FLOOR SCALE 3/16"=1'0"

CONFIRM  
INTEGRITY OF  
STRUCTURE  
DURING RENO  
(REPAIR AS  
REQUIRED)

3RD FLR GROSS  
AREA  
2023ft<sup>2</sup> (187.9m<sup>2</sup>)

REV #	DESCRIPTION	MM, DD, YYYY
REV 3		
REV 2		
REV 1		

DATE	22820
NAME	DAVID BEKERS
NO.	17/9
SCALE	AS SHOWN
DRAWN BY	DB.
DATE	
DWG. NO.	A4

The undersigned has reviewed and takes responsibility for this design, and has the qualifications and meets the requirements set out in the Ontario Building Code RP 306711

Project: The "JAMES ST" Apartment  
151, 159 James St.  
Ottawa, ON, K1R 5M4  
Lot 21 & Part Lot 20,  
RP 306711

151 Bay St., Suite 1006  
Ottawa, Ontario  
K1R 7T2  
613-852-8433

Designer:  
**David Bekers**  
**M.A.A.T.O.**  
590 Queen Elizabeth  
Drive, Ottawa, ON, K1S 3N5  
613-265-1786

Developer/Owner:  
**Altitude Property Management**  
590 Queen Elizabeth  
Drive, Ottawa, ON, K1S 3N5  
613-265-1786





Developer/Owner:  
**Allerous Property Management**  
 590 Queen Elizabeth  
 Driveway, ON, K1S 3N5  
 613-265-7286

Designer:  
**David Bekkers  
 M.A.A.T.O.**  
 151 Bay St., Suite 1006  
 Ottawa, Ontario  
 K1R 7T2  
 613-852-8433

Project:  
**The "JAMES ST"  
 Apartment**  
 157, 159 James St.  
 Ottawa, ON, K1R 5N4  
 Lot 21 & Part Lot 20,  
 RP 30671

The undersigned has retained and  
 takes responsibility for this  
 design, and has the qualifications  
 and meets the requirements set  
 out in the Ontario Building Code

David  
 Bekkers  
 M.A.A.T.O. 22960

Drawn By:	Date:	
D.B.		
Scale:	Fig. No.:	
AS SHOWN		
Job:	n/o	
REV #	DESCRIPTION	MM. DD. YYYY
REV 3		
REV 2		
REV 1		

**A5**



**ATTACHMENT 2 : FUS FIRE FLOW CALCULATION**



## FUS Fire Flow Calculation

Calculations based on: "Water Supply for Public Fire Protection" by Fire Underwriters' Survey, 1999

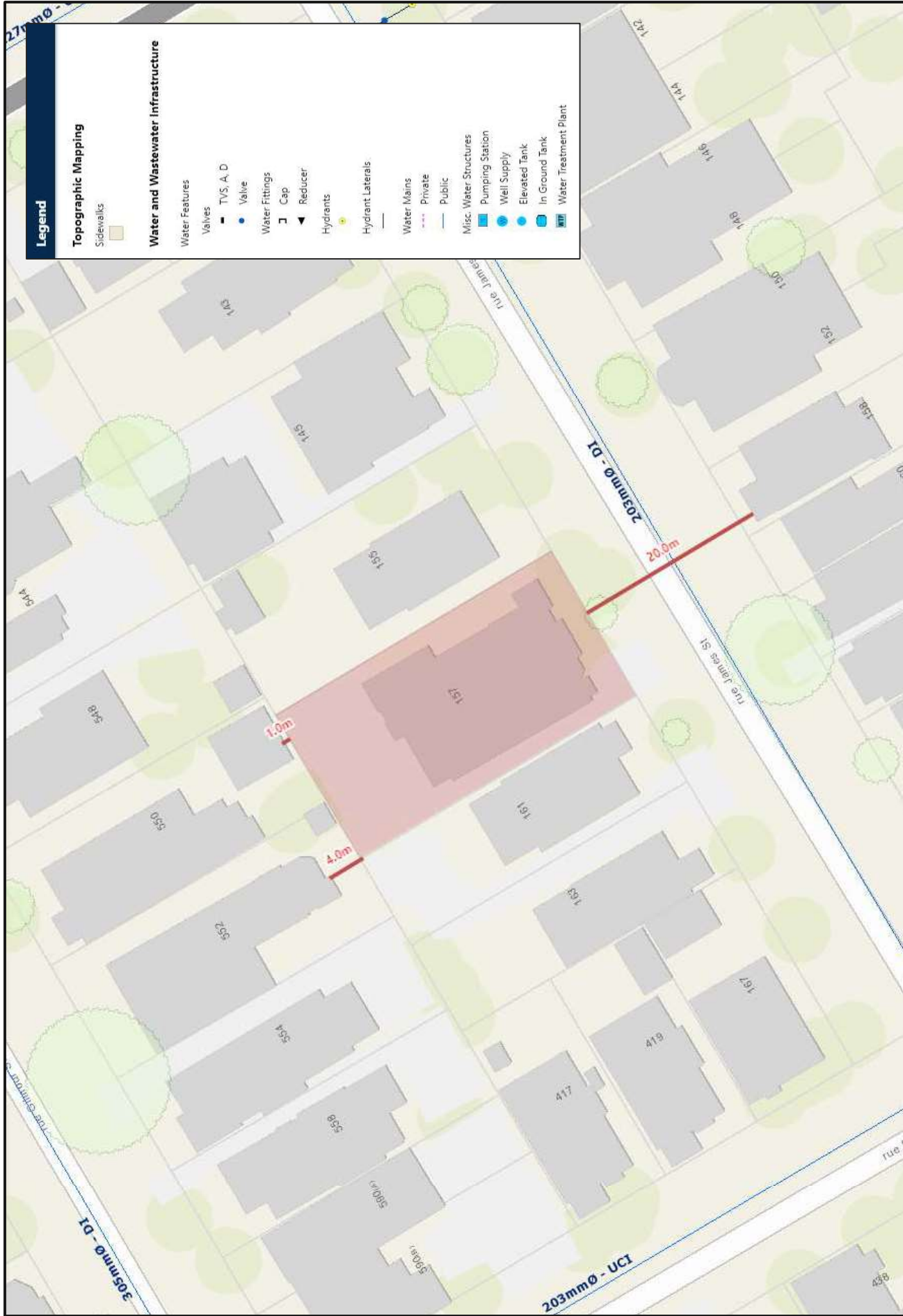
Stantec Project #: 163401084  
 Project Name: 157-159 James St  
 Date: January 6, 2022  
 Data inputted by: Christène Razafimaharo, M.Sc., EIT  
 Data reviewed by: Kevin Alemany, M.A.Sc., P.Eng.

Fire Flow Calculation #: 2  
 Building Type/Description/Name: Residential

Notes: Based on drawings received on 2021/12/23. Basement is more than 50% below grade.

Table A: Fire Underwriters Survey Determination of Required Fire Flow - Long Method									
Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)	
1	Choose Frame Used for Construction of Unit	Framing Material							
		Coefficient related to type of construction (C)	Wood Frame	1.5	Ordinary construction	1	m		
			Ordinary construction	1					
			Non-combustible construction	0.8					
			Fire resistive construction (< 2 hrs)	0.7					
Fire resistive construction (> 2 hrs)	0.6								
2	Choose Type of Housing (if TH, Enter Number of Units Per TH Block)	Floor Space Area							
		Type of Housing	Single Family	1	Other (Comm, Ind, Apt etc.)	12	Units		
			Townhouse - indicate # of units	1					
	Other (Comm, Ind, Apt etc.)	12							
2.2	# of Storeys	Number of Floors/Storeys in the Unit (do not include basement if 50% below grade):			3	3	Storeys		
3	Enter Ground Floor Area of One Unit	Average Floor Area (A) based total floor area of all floors (non-fire resistive construction):			200	600	Area in Square Meters (m <sup>2</sup> )		
					Square Metres (m2)				
4	Obtain Required Fire Flow without Reductions	Required Fire Flow (without reductions or increases per FUS) ( $F = 220 * C * \sqrt{A}$ ) Round to nearest 1,000 L/min						5,000	
5	Apply Factors Affecting Burning	Reductions/Increases Due to Factors Affecting Burning							
5.1	Choose Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	4,250	
			Limited combustible	-0.15					
			Combustible	0					
			Free burning	0.15					
			Rapid burning	0.25					
5.2	Choose Reduction Due to Presence of Sprinklers	Sprinkler reduction	Adequate Sprinkler conforms to NFPA13	-0.3	None	0	N/A	0	
			None	0					
		Water Supply Credit	Water supply is standard for sprinkler and fire dept. hose line	-0.1	Water supply is not standard or N/A	0	N/A	0	
			Water supply is not standard or N/A	0					
		Sprinkler Supervision Credit	Sprinkler system is fully supervised	-0.1	Sprinkler not fully supervised or N/A	0	N/A	0	
Sprinkler not fully supervised or N/A	0								
5.3	Choose Separation Distance Between Units	Exposure Distance Between Units	North Side	10.1 to 20.0m	0.15	0.65	m	2,763	
			East Side	3.1 to 10.0m	0.2				
			South Side	20.1 to 30.1m	0.1				
			West Side	3.1 to 10.0m	0.2				
6	Obtain Required Fire Flow, Duration & Volume	<b>Total Required Fire Flow, rounded to nearest 1,000 L/min, with max/min limits applied:</b>						<b>7,000</b>	
		<b>Total Required Fire Flow (above) in L/s:</b>						<b>117</b>	
		<b>Required Duration of Fire Flow (hrs)</b>						<b>2.25</b>	
		<b>Required Volume of Fire Flow (m<sup>3</sup>)</b>						<b>945</b>	

**ATTACHMENT 3 : FIGURE 1 – FUS EXPOSURE DISTANCES**



**Figure 1: FUS Exposure Distances (Property Line to Adjacent Buildings)**

Source: geoOttawa 2021; Contains information licensed under the Open Government Licence – City of Ottawa

**ATTACHMENT 4 : WATER BOUNDARY CONDITIONS**

## Razafimaharo, Christene

---

**From:** TL MaK <tlmakecl@bellnet.ca>  
**Sent:** Monday, August 16, 2021 12:06 PM  
**To:** Alemany, Kevin  
**Cc:** Razafimaharo, Christene  
**Subject:** RE: 157-159 James Street - Water Boundary Conditions Request  
**Attachments:** 157-159 James Street August 2021.pdf

Hi Kevin,

Attached please find water boundary conditions received on August 9, 2021 from the City of Ottawa regarding 157-159 James Street.

Could you please proceed with your calculations at your earliest convenience for our serviceability report preparation.

Let us know if you have any questions or comments.

Regards,

Tony Mak

T.L. Mak Engineering Consultants Ltd.  
1455 Youville Drive, Suite 218  
Ottawa, ON. K1C 6Z7  
Tel. 613-837-5516 | Fax: 613-837-5277  
E-mail: tlmakecl@bellnet.ca

---

**From:** Jhamb, Nishant [mailto:nishant.jhamb@ottawa.ca]  
**Sent:** August 9, 2021 10:15 AM  
**To:** TL MaK  
**Cc:** chaunei@aliferous.ca; christian szpilfogel  
**Subject:** RE: 157-159 James Street - Water Boundary Conditions Request

Hi Tony,

The following are boundary conditions, HGL, for hydraulic analysis at 157-159 James Street (zone 1W) assumed connected to the 203 mm watermain on James Street (see attached PDF for location).

Minimum HGL: 106.8 m

Maximum HGL: 115.4 m

Max Day + FF (133 L/s): 105.6 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

Nishant Jhamb, P.Eng

Project Manager | Gestionnaire de projet

Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure 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 23112, [nishant.jhamb@ottawa.ca](mailto:nishant.jhamb@ottawa.ca)

**Please note: Given the current pandemic, I will be working from home until further notice; reaching me by email is easiest. I will be checking my voicemail, just not as frequently as I normally would be.**

---

**From:** TL MaK <[tmakecl@bellnet.ca](mailto:tmakecl@bellnet.ca)>

**Sent:** July 30, 2021 4:43 PM

**To:** Wu, John <[John.Wu@ottawa.ca](mailto:John.Wu@ottawa.ca)>

**Cc:** christian szpilfogel <[christian@aliferous.ca](mailto:christian@aliferous.ca)>; 'Chaunei Chan' <[chaunei@aliferous.ca](mailto:chaunei@aliferous.ca)>

**Subject:** 157-159 James Street - Water Boundary Conditions Request

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

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

Hi John,

Regarding this site, we are requesting for water boundary conditions from the City of Ottawa to be provided for our hydraulic analysis. The particulars are as follows:

The existing building located within Pressure Zone 1W at 157-159 James St is a 3-storey residential low-rise apartment building with a basement. The building will contain two bachelor units, and eight 1-bedroom units. Each floor covers an area of 2,325 ft<sup>2</sup> (216 m<sup>2</sup>) for a gross floor area of 6,975 ft<sup>2</sup> (648 m<sup>2</sup>). The building is to be serviced by the 200 mm diameter watermain along James St.

The domestic demands were calculated using the City of Ottawa's Water Design Guidelines, where the residential consumption rate of 350 L/cap/d was used to estimate average day demands (AVDY). Maximum day (MXDY) demands were calculated by multiplying AVDY demands by a factor of 2.5. Peak hour (PKHR) demands were calculated by multiplying MXDY by a factor of 2.2. Persons per unit (PPU) for each unit were estimated based on the City of Ottawa's Water Design Guidelines. **Table 1** shows the estimated domestic demands of the existing building.

**Table 1: Estimated Domestic Demand**

Unit Type	Unit Count	PPU	Consumption	AVDY		MXDY		PKHR	
				L/d	L/s	L/d	L/s	L/d	L/s
Apartment, Bachelor	2	1.4	350	980	0.01	2,450	0.03	5,390	0.06
Apartment, 1-Bedroom	8	1.4		3,920	0.05	9,800	0.11	21,560	0.25
<b>Total</b>	<b>10</b>			<b>4,900</b>	<b>0.06</b>	<b>12,250</b>	<b>0.14</b>	<b>26,950</b>	<b>0.31</b>

The fire flow required was determined following the Fire Underwriter Survey (FUS) method and is provided in the attached worksheet. The existing building was classified as ordinary construction with building contents that are limited in combustibility. It is understood that the building does not have a sprinkler system. It was assumed that the basement is more than 50% below ground level. The resulting total required fire flow is 8,000 L/min (133 L/s) for a duration of 2.00 hours.

In summary:

- AVDY = 4,900 L/d (0.06 L/s);
- MXDY = 12,250 L/d (0.14 L/s);
- PKHR = 26,950 L/d (0.31 L/s); and,
- Fire Flow = 8,000 L/min (133 L/s)

The City is requested to provide boundary conditions for the Average Day, Maximum Day, Peak Hour and Fire Flow conditions indicated above.

Thank you for your prompt attention to this matter. Please forward the boundary conditions as soon as possible.

Regards,

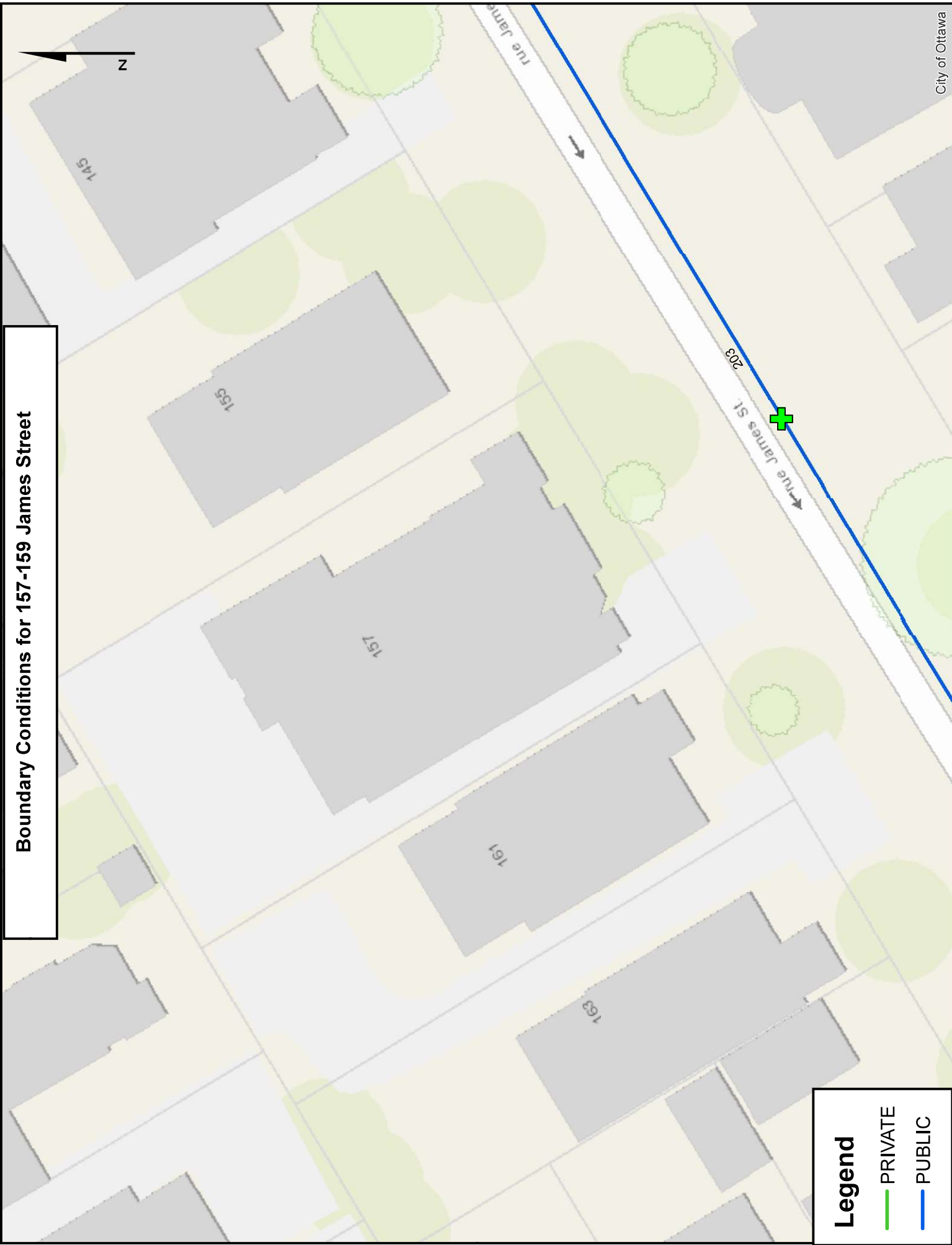
Tony Mak

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Boundary Conditions for 157-159 James Street



**Legend**

- PRIVATE
- PUBLIC

**ATTACHMENT 5 : SUPPORTING HYDRAULIC CALCULATIONS**



### Supporting Hydraulic Calculations

Stantec Project #: 163401084

Project Name: 157-159 James St

Date: January 6, 2022

Data inputted by: Christène Razafimaharo, M.Sc., EIT

Data reviewed by: Kevin Alemany, M.A.Sc., P.Eng.

#### Boundary Conditions provided by the City:

Scenario 1: Peak Hour (Min HGL): 106.8 m;

Scenario 2: Average Day (Max HGL): 115.4 m; and

Scenario 3: Maximum Day plus Fire Flow: 105.6 m.

#### Sample Calculations

$$HGL (m) = hp + hz \quad (1)$$

where:  $hp$  = Pressure Head (m); and  $hz$  = Elevation Head (m), estimated from topography.

For Scenario 1, we have:

$$HGL(m) = 106.8 \text{ and } hz (m) = 73.$$

Rearranging Equation 1, we can calculate the Pressure Head ( $hp$ ) as follow:

$$hp (m) = HGL - hz$$

$$\therefore hp = 106.8 - 73.0 \text{ m} = 33.8 \text{ m}.$$

To convert from Pressure Head (m) to a pressure value (kPa), the following equation can be used:

$$P (kPa) = (\rho * g * hp) / 1000 \quad (2)$$

where:  $\rho$  = density of water = 1000 kg/m<sup>3</sup>; and  $g$  = gravitational acceleration = 9.81 m/s<sup>2</sup>.

Using Equation 2, we can calculate the Pressure ( $P$ ) as follow:

$$P (kPa) = (1000 * 9.81 * 33.8) / 1000$$

$$\therefore P = 331 \text{ kPa}.$$

Considering that 1 kPa = 0.145 psi, the pressure under Scenario 1 is equal to:

$$P = 48 \text{ psi}.$$

Applying the same procedures, the pressures under Scenario 2 and Scenario 3 are calculated as follows:

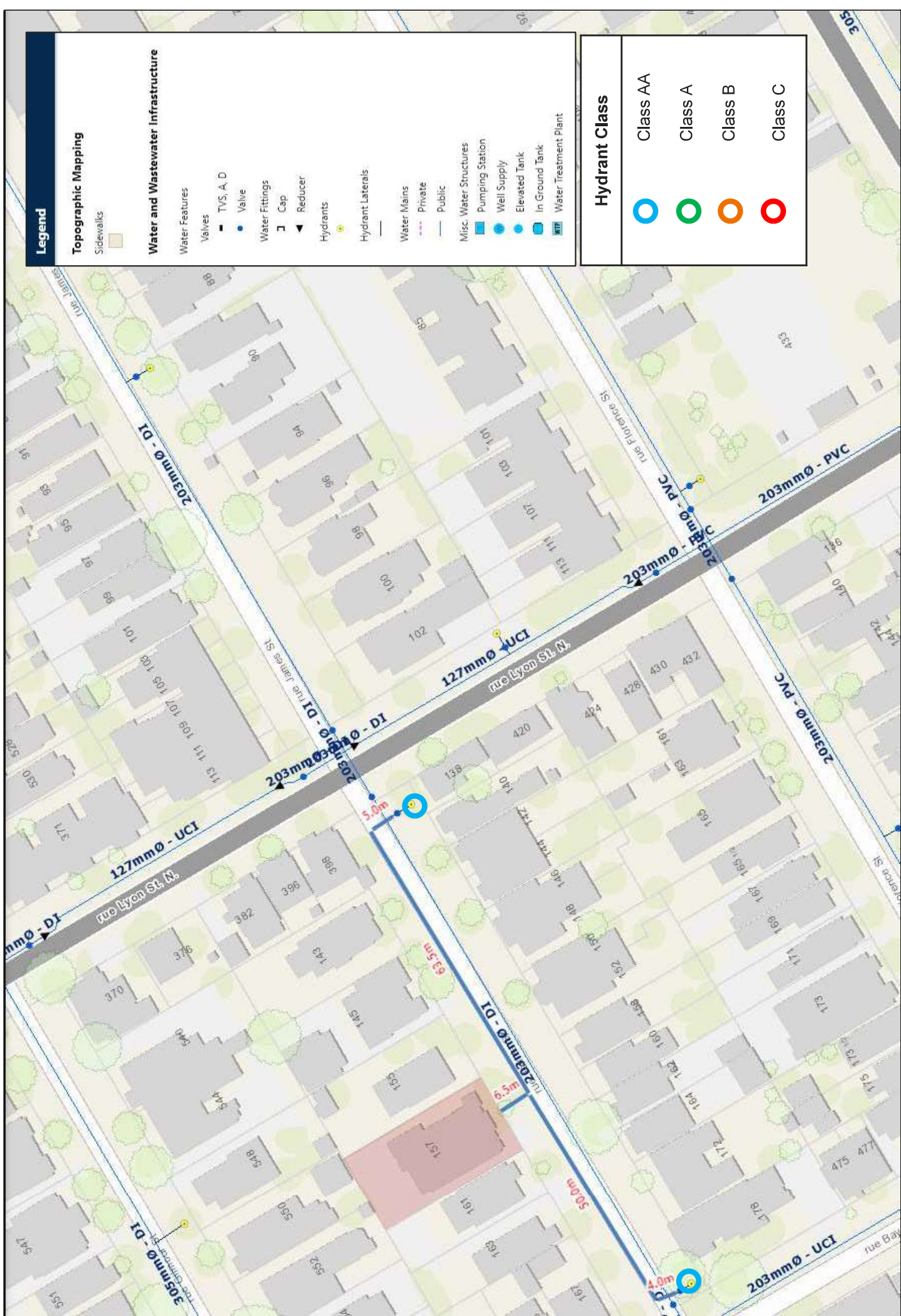
Scenario 2:  $P = 60$  psi; and Scenario 3:  $P = 46$  psi.

To summarize:

Scenario 1: Minimum Pressure under Peak Hour Demand: 331 kPa (48 psi)
Scenario 2: Maximum Pressure under Average Day Demand: 416 kPa (60 psi)
Scenario 3: Minimum Pressure under Maximum Day + Fire Flow Demand: 320 kPa (46 psi)

**ATTACHMENT 6 : FIGURE 2 – HYDRANT SPACING**





**Figure 2: Hydrant Spacing**

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**EXISTING THREE-STOREY  
RESIDENTIAL APARTMENT BUILDING  
157-159 JAMES STREET  
CITY OF OTTAWA**

**APPENDIX D**

**SANITARY SEWER DESIGN SHEET**

**PAGE 1 OF 1**



