SERVICING REPORT REPORT No. (R-822-26)

T.L. MAK ENGINEERING CONSULTANTS LTD.

APRIL 2022

REFERENCE FILE NUMBER 822-26

Introduction

The developer of the residential property under consideration is proposing to re-zone the site at 1 Old Sunset Boulevard from R1QQ to R2E designation in order to construct a 3-storey semi-detached residential building with secondary unit (SDU) in the basement. The building contains four (4) total units, namely two (2) 2-bedroom units in the basement, one (1) 3-bedroom unit and one (1) 4-bedroom unit.

The semi-detached unit located on the north half of the lot shall be referenced as **Unit A** which has frontage along Madawaska Drive and Bronson Avenue. The other unit located on the south half of the lot shall be referenced as **Unit B** which has frontage along Bronson Avenue and Old Sunset Boulevard.

Unit A houses a 2-bedroom SDU in the basement with a gross floor area (GFA) of 690.0 $\rm ft^2$ ($\pm 64.10~\rm m^2$). Above the basement level is a three level (main, second and third floor) suite that contains 3 bedrooms with a GFA of 2,322.0 $\rm ft^2$ ($\pm 215.7~\rm m^2$).

Unit B, also houses a 2-bedroom SDU in the basement with a (GFA) of 722.0 $\rm ft^2$ (±67.08 $\rm m^2$). Above the basement level is a three level suite that contains 4 bedrooms with a GFA of 2,166.0 $\rm ft^2$ (±201.2 $\rm m^2$)

In terms of the semi-detached building in its entirety, each floor covers an area of approximately 137.0 m², with a total gross floor area of 548.0 m² (including basement). This residential property is located on the west side of Bronson Avenue, south of Madawaska Drive and north of Old Sunset Boulevard.

Lot area size for re-zoning is 284.8 m^2 ($\pm 0.0285 \text{ ha.}$). Site plan details provided by Hamel Design and Planning depicts Unit A situated on a 152.6 m² of land identifies as Lot A and Unit B is situated on a 132.2 m² parcel of land identified as Lot B. Refer to Appendix A for details.

In addition to the residential building proposed on this site, other development features of the site are walkway/pedestrian access from Bronson Avenue, bicycle racks and main front entrance access from Old Sunset Boulevard for Unit B and from Madawaska Drive for Unit A. A vehicle driveway and parking space is proposed for Unit B only. Other features will include soft landscaping throughout the property, window wells, retaining wall, etc. to meet City of Ottawa requirements for urban development. Refer to Appendix A for site plan details from Hamel Design and Planning.

T.L. Mak Engineering Consultants Ltd. has been retained to provide a "Serviceability Brief" for this site as a supplement to the site re-zoning application process.

Existing Site Conditions

Presently, a 2-storey stucco sided house is situated on this property along with an asphalt parking area and driveway that accesses Bronson Avenue. Most of the site is grassed/landscaped with the exception of the existing house, asphalt driveway and rock retaining walls that occupied the perimeters at the north half of the site. Refer to the Google image (2012 and 2021) and aerial photography from (GeoOttawa 2019) in Appendix A.

Drainage pattern of the existing lot is considered to be mid splitted drainage type with approximately half the site draining towards Old Sunset Boulevard at ±5.0% average slope. The land slopes more significantly towards Madawaska Drive but aided with high rock type retaining walls placed along the north side of this property. Refer to Appendix B for topographical survey details completed by Annis O'Sullivan Vollebekk LTD. for existing site conditions.

Existing underground municipal services are available along Old Sunset Boulevard road right of way to service **Unit B**. The Old Sunset Boulevard municipal mains are: a 200mm dia. watermain and a 250mm dia. combined sewer.

For **Unit A**, The municipal mains along Bronson Avenue are a 125mm dia. watermain a 600mm feeder watermain and a 600mm dia. combined sewer for servicing this unit. Along Madawaska Drive, only a 150mm dia. watermain is available to service this property. Refer to the City of Ottawa Old Sunset Boulevard, Bronson Avenue and Madawaska Drive plan and profile and UCC drawings in Appendix C for details.

SERVICING

A. Water Supply

The proposed building, located within the City of Ottawa's Pressure Zone 1W at 1 Old Sunset Boulevard, is a 3-storey residential apartment building with a basement, and a deck on the roof. The building contains four (4) total units, namely two (2) 2-bedroom units in the basement, one (1) 3-bedroom units, and one (1) 4bedroom unit. Each floor covers an area of approximately $137m^2$, with a total gross floor area of $548m^2$ (including the basement). It is proposed to service a portion of the building (one 2-bedroom unit and one 4bedroom unit) by the 150mm diameter watermain along Old Sunset Boulevard (Connection 1) and the remaining portion (one 2-bedroom unit and one 3-bedroom unit) of the building by the 150mm diameter watermain along Madawaska Drive (Connection 2).

The ground elevation on the property is approximately 68.9m along Old Sunset Boulevard (Connection 1) and approximately 67.6m along Madawaska Drive (Connection 2), as obtained from GeoOttawa elevation contours (Figure 1), and the Water Boundary Conditions provided to Stantec (see attached Water Boundary Conditions Email). Refer to Appendix D for details of Figure 1 and water boundary conditions.

Demand Projections

The domestic demands were calculated using the City of Ottawa's Water Design Guidelines, 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 existing building, separated based on the proposed service connection.

Table 1: Estimated Domestic Demand

Connection to	Unit Type	Unit Count	PPU	Consumption Rate (L/c/d)	AVDY		MXDY		PKHR	
					L/d	L/s	L/d	L/s	L/d	L/s
Old Sunset Blvd. Connection 1	Apartment, 2-Bedroom	1	2.1	280	588	0.01	1,470	0.02	3,234	0.04
	Apartment, 4-Bedroom	1	3.4*	280	952	0.01	2,380	0.03	5,236	0.06
	Sub Total	2			1,540	0.02	3,850	0.04	8,470	0.10
Madawaska Drive Connection 2	Apartment, 2-Bedroom	1	2.1	280	588	0.01	1,470	0.02	3,234	0.04
	Apartment, 3-Bedroom	1	3.1	280	868	0.01	2,170	0.03	4,774	0.06
	Sub Total	2			1,456	0.02	3,640	0.04	8,008	0.09
	Total	4			2,996	0.03	7,490	0.09	16,478	0.19

^{*} The PPU for the 4-bedroom unit was assumed to be equal to the PPU for a single family unit.

The fire flow required was determined following the Fire Underwriter Survey (FUS) method. For this analysis, the building was classified as wood frame construction with building contents that are limited in combustibility. It is understood that it will not have a sprinkler system, and that the basement be built more than 50% above ground level, according to the architectural drawings. The resulting total required fire flow is 11,000 L/min (183 L/s) for a duration of 2.25 hours. Details are provided in the attached **FUS Fire Flow Calculations** in Appendix D. **Figure 2** in Appendix D provides separation distances from adjacent buildings. The proposed **Site Plan** attached in Appendix D was used to determine distances from the proposed building to the property lines.

As per the City of Ottawa's Water Design Guidelines, the FUS method is to be used for fire flow requirements affecting watermain sizing; with regards to fire protection on private property, these are covered by the Ontario Building Code (OBC).

As such, the fire flow requirement was also determined following the OBC's Office of the Fire Marshal (OFM) method. Details are provided in the attached **OFM Fire Flow Calculations** in Appendix D. The proposed building will be of wood frame construction, where floors are fire separations, but without fire-resistance ratings. The resulting total required fire flow (RFF) for a non-sprinklered building is 2,700 L/min (45 L/s) for a minimum duration of 30 min. The proposed **Site Plan** attached was used to determine distances from the proposed building to the property lines. For street facing sides, **Figure 3** in Appendix D provides separation distances from the street.

In summary, the following water demands are for the connection to the <u>150mm diameter</u> watermain along Madawaska Drive:

- AVDY = 1,456 L/d (0.02 L/s);
- MXDY = 3,640 L/d (0.04 L/s);
- PKHR = 8,008 L/d (0.09 L/s);
- Fire Flow (FUS) = 11,000 L/min (183 L/s); and
- Fire Flow (OBC/OFM) = 2,700 L/min (45 L/s).

In summary, the following water demands are for the connection to the <u>150mm diameter</u> watermain along Old Sunset Boulevard:

- AVDY = 1,540 L/d (0.02 L/s);
- MXDY = 3,850 L/d (0.04 L/s);
- PKHR = 8,470 L/d (0.10 L/s);
- Fire Flow (FUS) = 11,000 L/min (183 L/s); and
- Fire Flow (OBC/OFM) = 2,700 L/min (45 L/s).

Boundary Conditions

The boundary conditions (hydraulic gradeline – HGL or available fire flow) for 1 Old Sunset Blvd., as presented in **Table 2**, were provided by the City on April 4, 2022 (see attached **Water Boundary Conditions Email** in Appendix D).

Table 2: Boundary Conditions

Demand Scenario	Value		
Minimum HGL (Peak Hour)	106.3 m		
Maximum HGL (Average Day)	115.3 m		
Maximum Day + Fire Flow HGL (OBC/OFM: 45 L/s)	100.5 m (Connection 1) 101.9 m (Connection 2)		
Available Fire Flow at 20 psi residual pressure	83 L/s (Connection 1) 93 L/s (Connection 2)		

Hydraulic Analysis

Peak Hour & Average Day

During peak hour demands, the resulting minimum hydraulic gradeline of 106.3 m corresponds to a peak hour pressure of 367 kPa (53 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 115.3 m corresponds to a maximum pressure of 455 kPa (66 psi). This value is less than the maximum pressure objective of 552 kPa (80 psi) and is therefore considered acceptable. **Supporting Hydraulic** Calculations are attached Appendix D.

Maximum Day + Fire Flow

A maximum day plus fire flow hydraulic gradeline of 100.5 m at Connection 1 (Old Sunset Boulevard) corresponds to a residual pressure of 310 kPa (45 psi) at this location and is well above the minimum residual pressure requirements of 140 kPa (20 psi). As for Connection 2 (Madawaska Drive), a maximum day plus fire flow hydraulic gradeline of 101.9 m corresponds to a residual pressure of 336 kPa (49 psi) at this location, which is also above the minimum residual pressure requirements of 140 kPa (20 psi).

Furthermore, the reported available fire flow at a residual pressure of 20 psi (138 kPa) is 83 L/s (4,980 L/min) at Connection 1 (Old Sunset Boulevard), and 93 L/s (5,580 L/min) at Connection 2 (Madawaska Drive). This exceeds the required OFM fire flow of 2,700 L/min (45 L/s).

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, two (2) Class AA hydrants are located within 76 m from the site, each with a capacity contribution of up to 5,678 L/min. Three (3) other hydrants are located within 122 m from the site, two of which are Class AA hydrants (capacity contribution of up to 3,785 L/min), the third hydrant being unrated.

Thus, the combined hydrant flow coverage for the building is estimated to be 18,926 L/min, which exceeds the OFM required fire flows (RFF) of 2,700 L/min. It is worth mentioning that the combined hydrant flow coverage also exceeds the FUS RFF of 11,000 L/min. Hydrant coverage and classes are illustrated in **Figure 4** attached in Appendix D. A breakdown of available hydrant flow is summarized in **Table 3**.

Table 3: Fire Hydrant Coverage

Building	Calculated Fire Flow Demand (L/min)		Combined				
		Hydrant	Withi	n 76 m	Between 76 m and 122 m		Hydrant Flow
		Class	Quantity	Contrib. to RFF	Quantity	Contrib. to RFF	Coverage (L/min)
1 Old Sunset Blvd.	OFM: 2,700 FUS: 11,000	AA	2	5,678	2	3,785	
		Α					
		В					18,926
		С					

Conclusions

In conclusion, based on the boundary condition provided, the 150 mm diameter watermains along Old Sunset Blvd. (Connection 1) and Madawaska Drive (Connection 2) provides adequate fire flow capacity as per the Office of the Fire Marshal (OFM) to the proposed development at 1 Old Sunset Blvd. Anticipated demand flows meet the pressure objectives during average and peak demand conditions, as per the City of Ottawa's Drinking Water Design Guidelines.

B. Sanitary Flow

The peak sanitary flow for the three storey semi-detached residential building totaling 4-units consisting of two (2) - 2 bedroom SDU in the basement, one (1) - 3 bedroom unit and one (1) - 4-bedroom unit is estimated at 0.16 L/s with an infiltration rate of 0.02 L/s. Refer to Appendix E regarding sanitary flow calculations. The combined sewage flow of Unit A and Unit B from this site will enter the existing 600mm dia. concrete combined sewer on Bronson Avenue.

The existing peak sanitary flow of the site for the existing single detached residential dwelling unit is Q = 0.06 L/s with an infiltration rate of 0.02 L/s. The net increase in flow from this proposed development therefore is 0.10 L/s which is not expected to negatively impact the existing 600mm diameter Bronson Avenue combined sewer system.

Waste water from the Bronson Avenue 600mm dia. combined sewer fronting this lot then in turn flow north and outlets into the existing 1200mm diameter brick combined sewer at Bronson Avenue and Fifth Avenue.

C. Storm Flow

The existing residential building currently at 1 Old Sunset Boulevard does not appear to have a storm lateral connection to the existing Old Sunset Boulevard 250mm dia. combined sewer. Weeping tile water drainage outlet for the new semi-detached building will be provided for Unit A and Unit B. For Unit A, a 100mm dia. PVC storm lateral is proposed to be connected to the existing 600mm dia. Bronson Avenue combined sewer. For Unit B, a 100mm dia. PVC storm lateral is proposed to be connected the existing 250mm dia. Old Sunset Boulevard combined sewer.

The current lot drainage pattern on-site is found to be primarily graded to provide for a split lot drainage type. The proposed lot grading plan for re-development will maintain the current drainage pattern where upon split lot drainage is achieved and surface stormwater from Unit A will be directed to outlet towards the front yard and onto the Madawaska Drive and Bronson Avenue road right of way. Similarly, Unit "B" will have proposed grading that will direct surface storm water towards the front yard and onto the Old Sunset Boulevard and Bronson Avenue road right of way.

Erosion and Sediment Control

The contractor shall implement Best Management Practices to provide for protection of the receiving storm sewer during construction activities. These practices are required to ensure no sediment and/or associated pollutants are released to the receiving watercourse. These practices include installation of a "siltsack" catch basin sediment control device or equal in catch basins as recommended by manufacturer on-site and off-site within the Old Sunset Boulevard, Madawaska Drive and Bronson Avenue road right of way adjacent to this property. Siltsack shall be inspected every 2 to 3 weeks and after every major storm. The deposits will be disposed of as per the requirements of the City.

Conclusion

In conclusion, based on the boundary conditions provided, the existing watermain network along Old Sunset Boulevard, Bronson Avenue and Madawaska Drive 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.

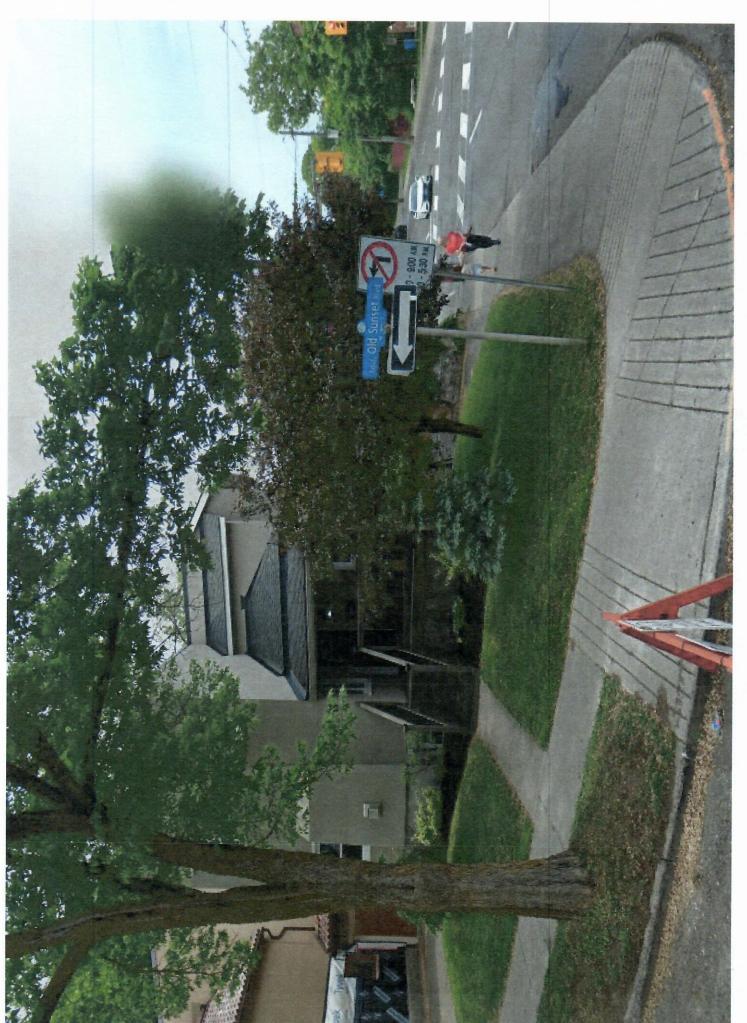
The existing water service and sanitary lateral currently servicing 1 Old Sunset Boulevard will be abandoned and replaced with one (1) set of new services consisting of a 25mm dia. water service, 125mm dia. sanitary lateral and a 100mm dia. storm lateral for each of Unit A and Unit B that meets City of Ottawa current pipe size and material standards to service the proposed semi-detached residential building.

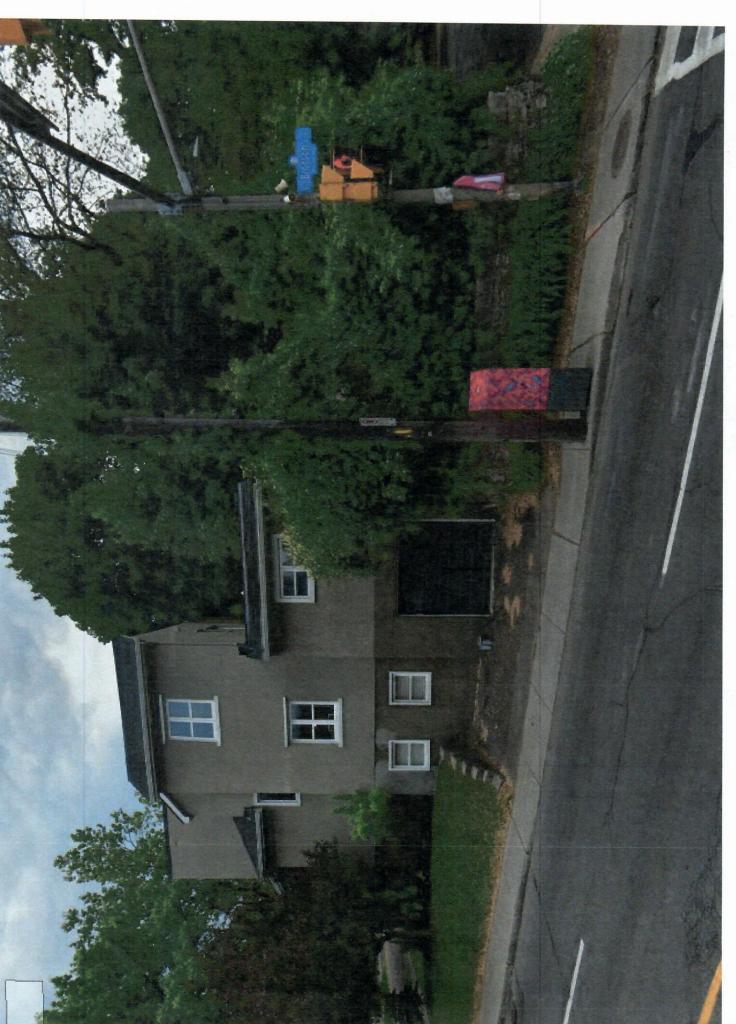
PREPARED BY T.L. MAK ENGINEERING CONSULTANTS LTD.

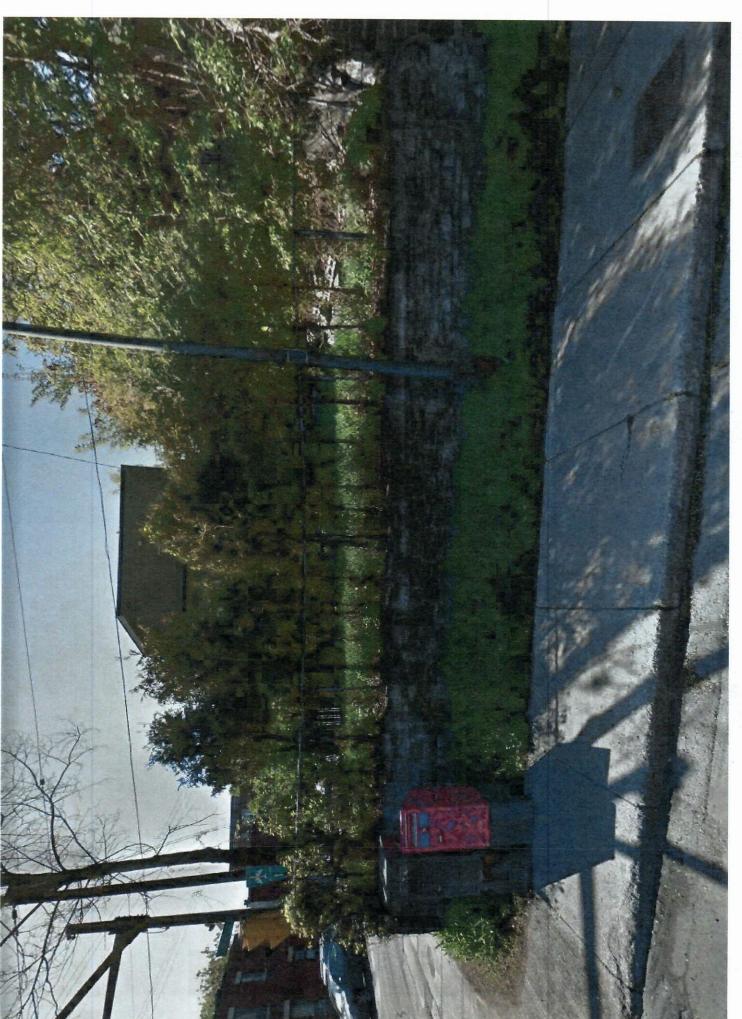
TONY L. MAK, P. ENG.

APPENDIX A SITE PRE-DEVELOPMENT CONDITION GOOGLE IMAGE (2012 & 2021) AND AERIAL PHOTOGRAPHY 2019 (GEOOTTAWA)







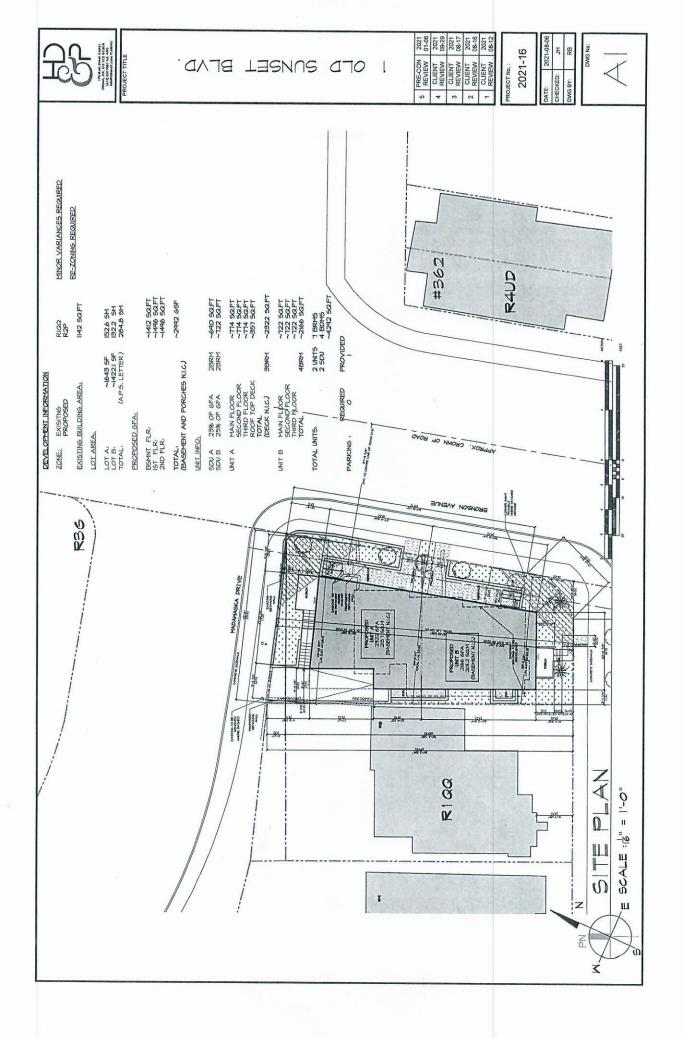


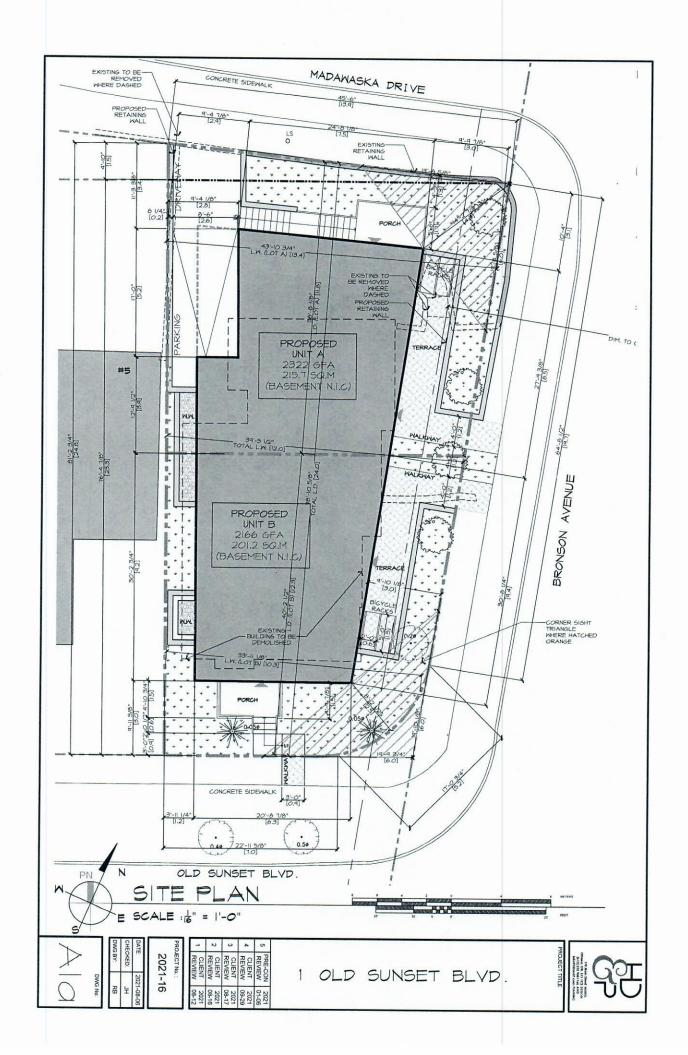
APPENDIX B

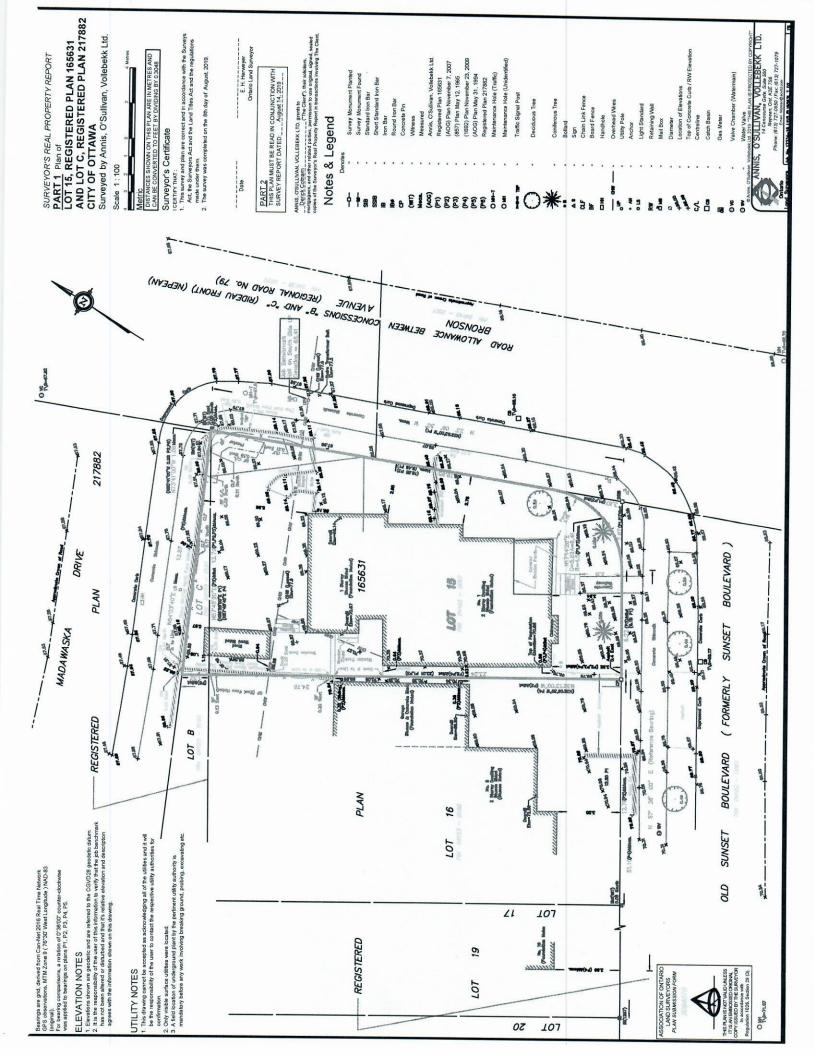
SITE PLAN

AND

TOPOGRAPHICAL SURVEY PLAN

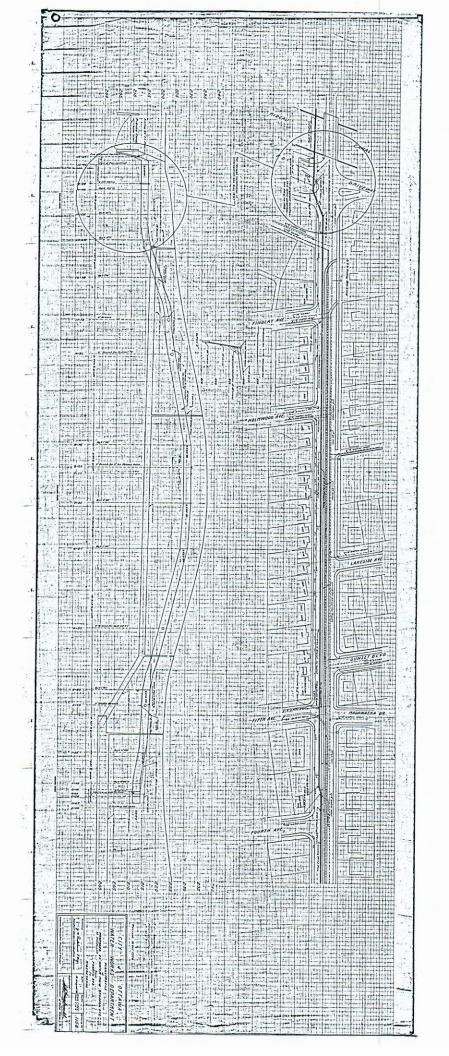


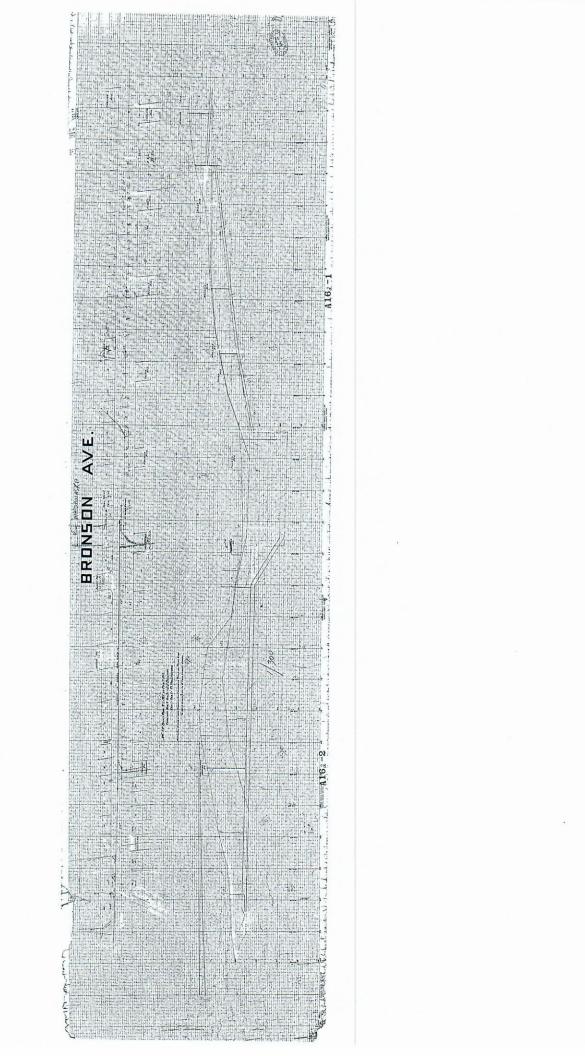


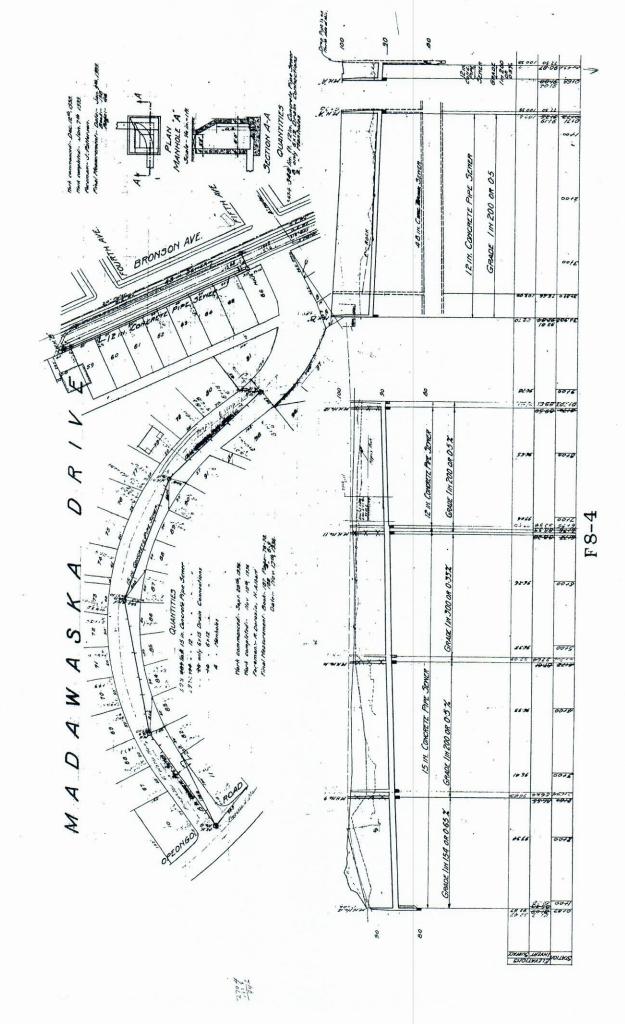


APPENDIX C OLD SUNSET BOULEVARD BRONSON AVENUE AND MADAWASKA DRIVE CITY OF OTTAWA UCC AND PLAN & PROFILE "AS-BUILT" WATERMAIN AND SEWERS DRAWINGS

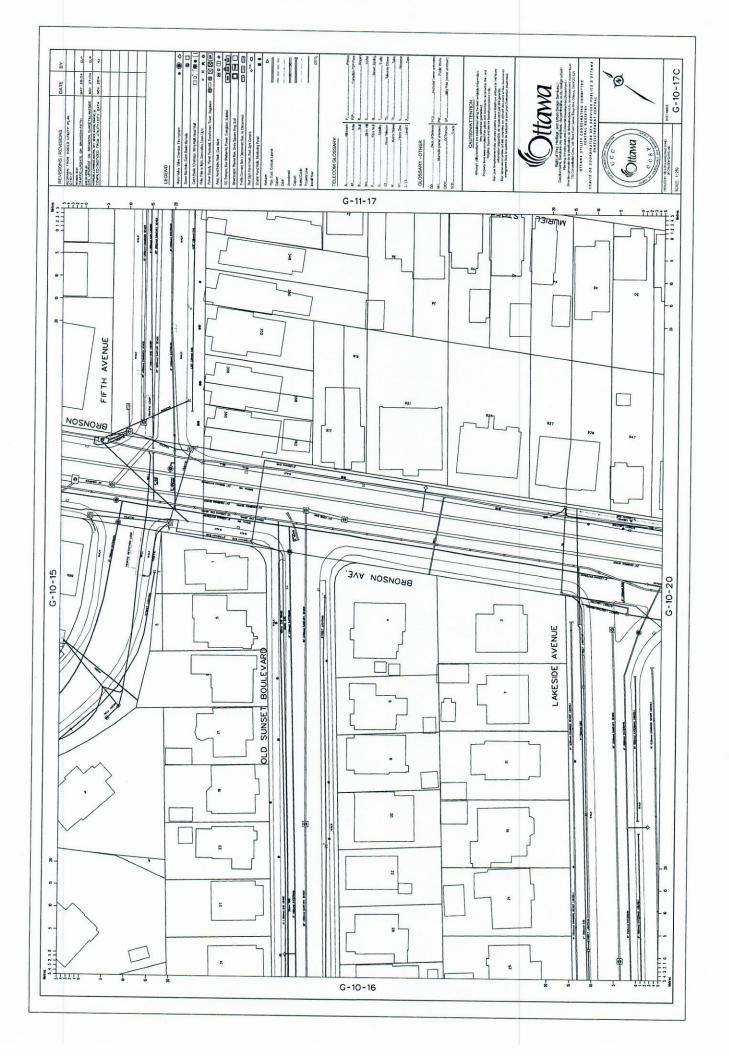
2196 SUNSET BOULEVARD (2 of 3)







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APPENDIX D

- SITE PLAN AND ARCHITECTURAL DRAWING
- FIGURE 1 ELEVATION CONTOURS
- FUS FIRE FLOW CALCULATIONS
- FIGURE 2 FUS EXPOSURE DISTANCES
- OFM FIRE FLOW CALCULATIONS
- FIGURE 3 OFM EXPOSURE DISTANCES
- CITY OF OTTAWA WATER DATA BOUNDARY CONDITIONS
- SUPPORTING HYDRAULIC CALCULATIONS
- FIGURE 4 HYDRANT SPACING

ATTACHMENT 1: SITE PLAN AND ARCHITECTURAL DRAWINGS

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PLANSING

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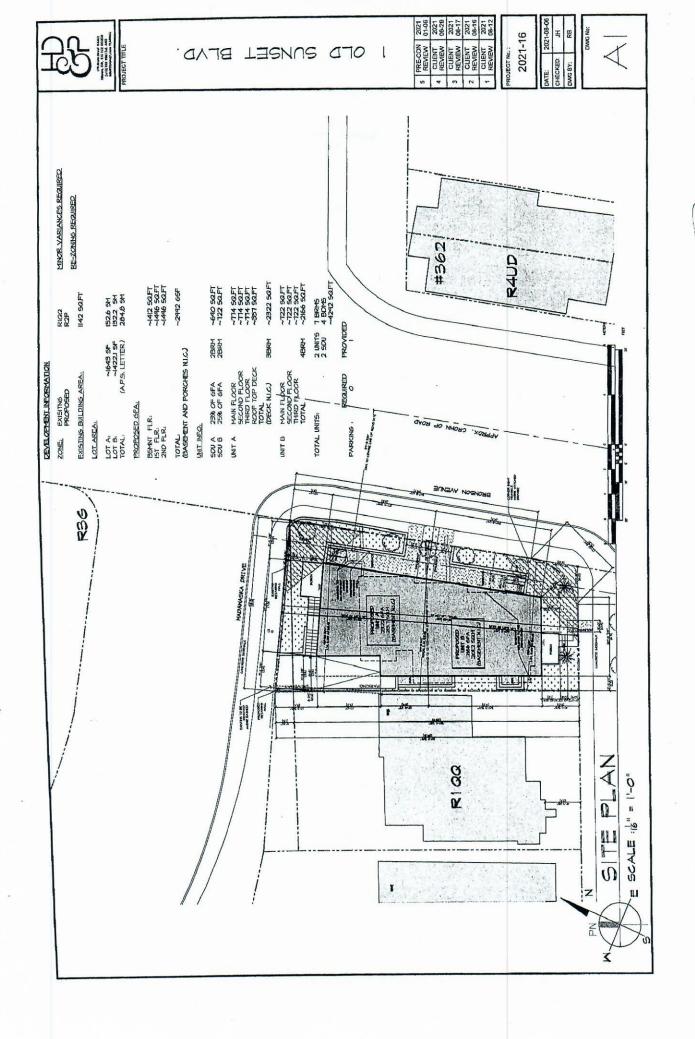
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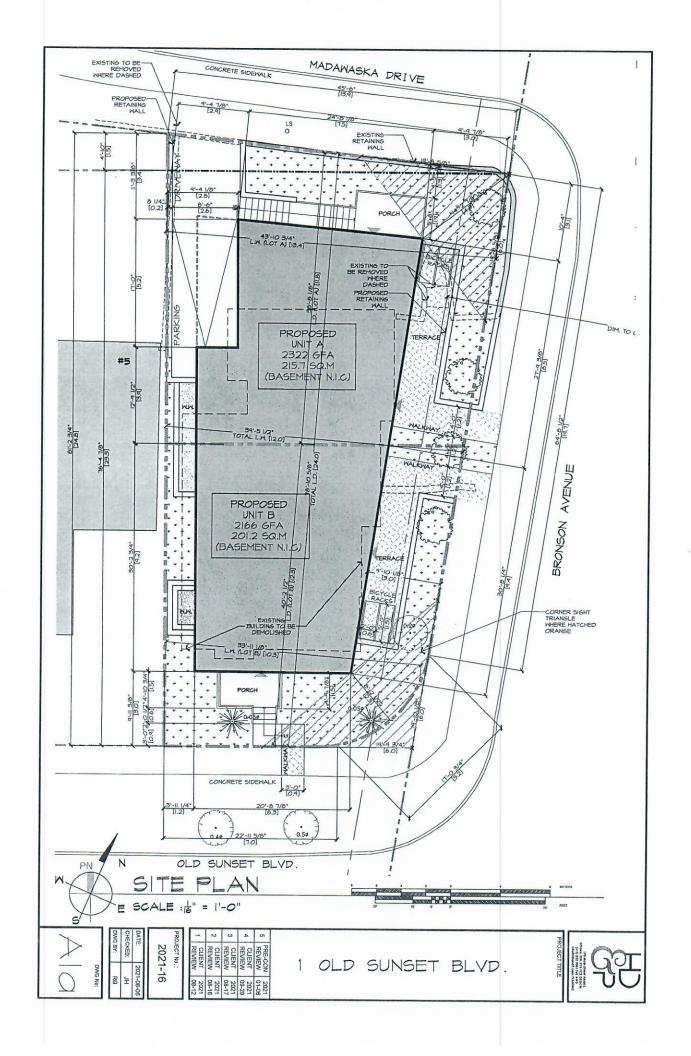
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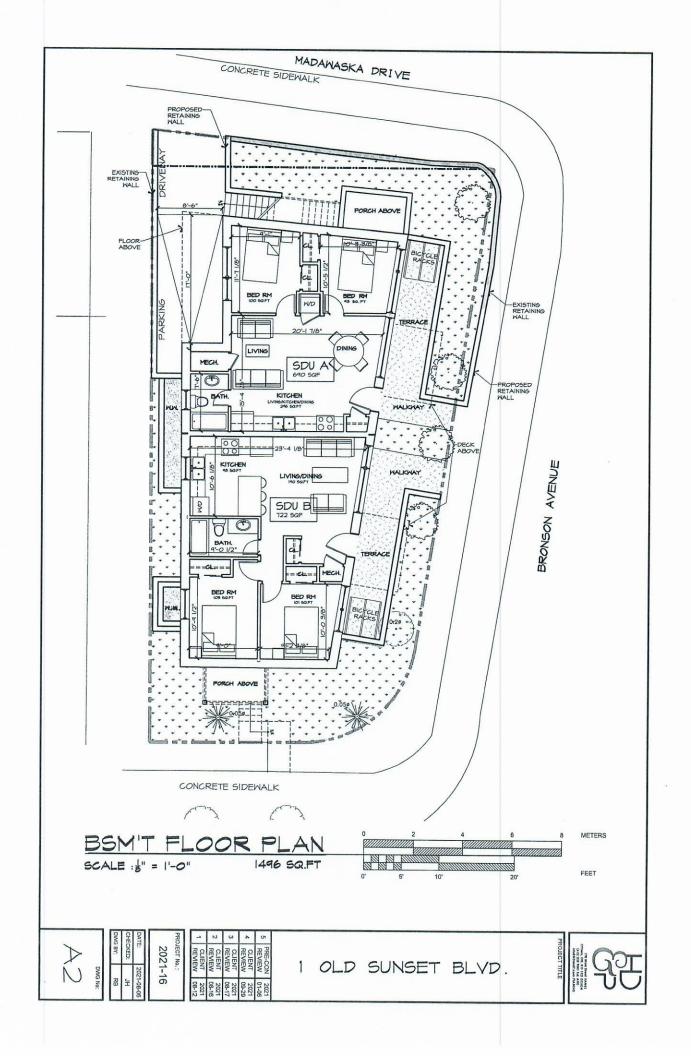
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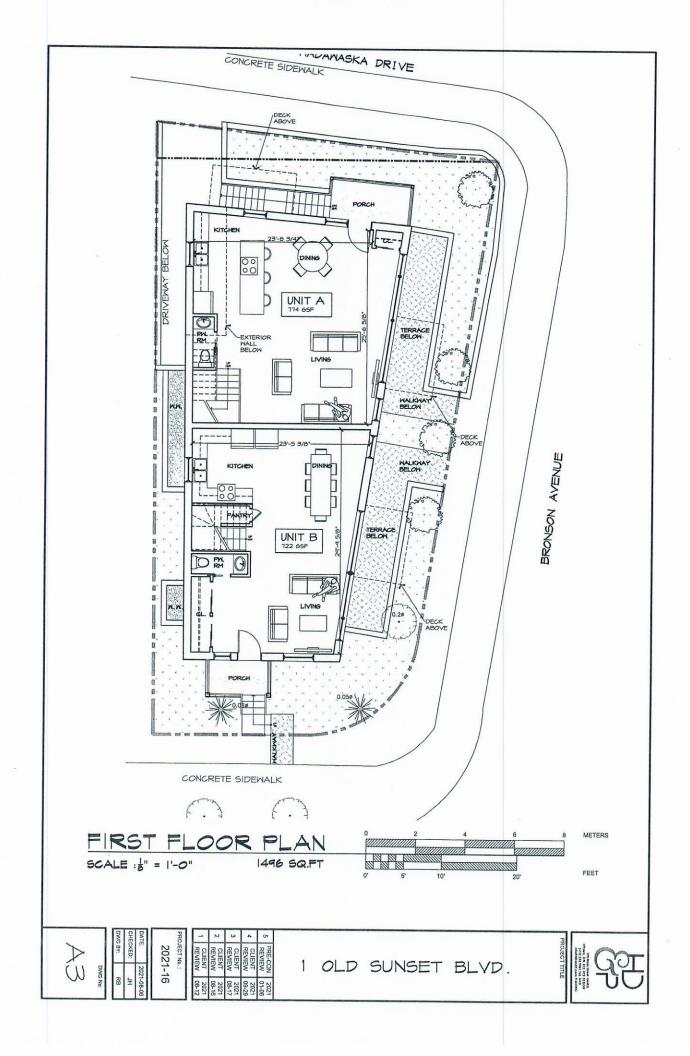
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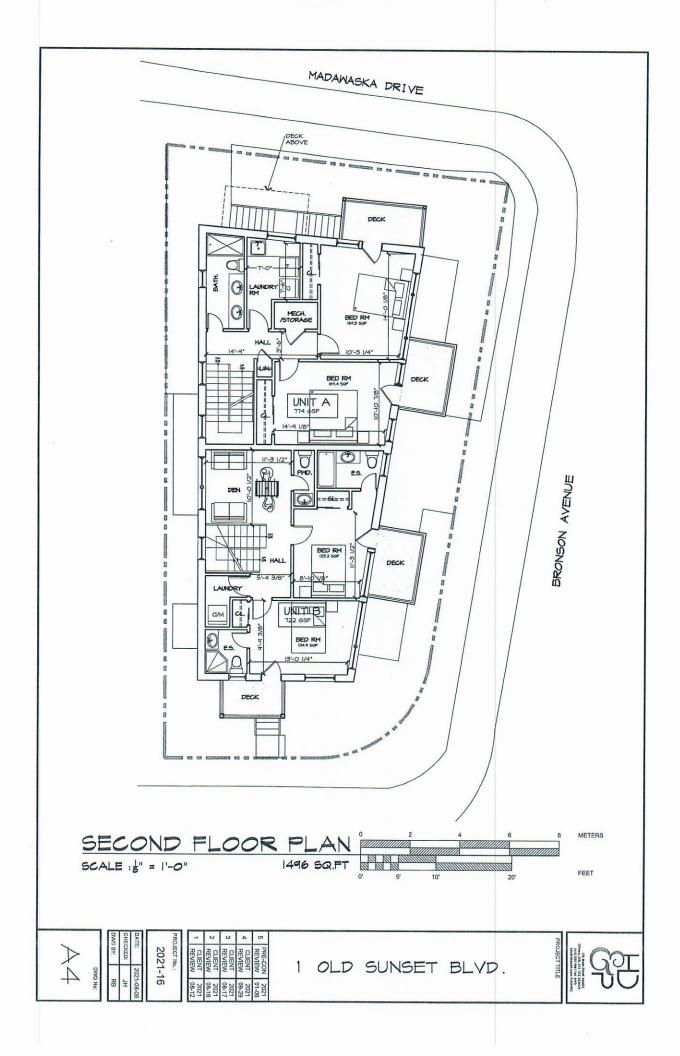
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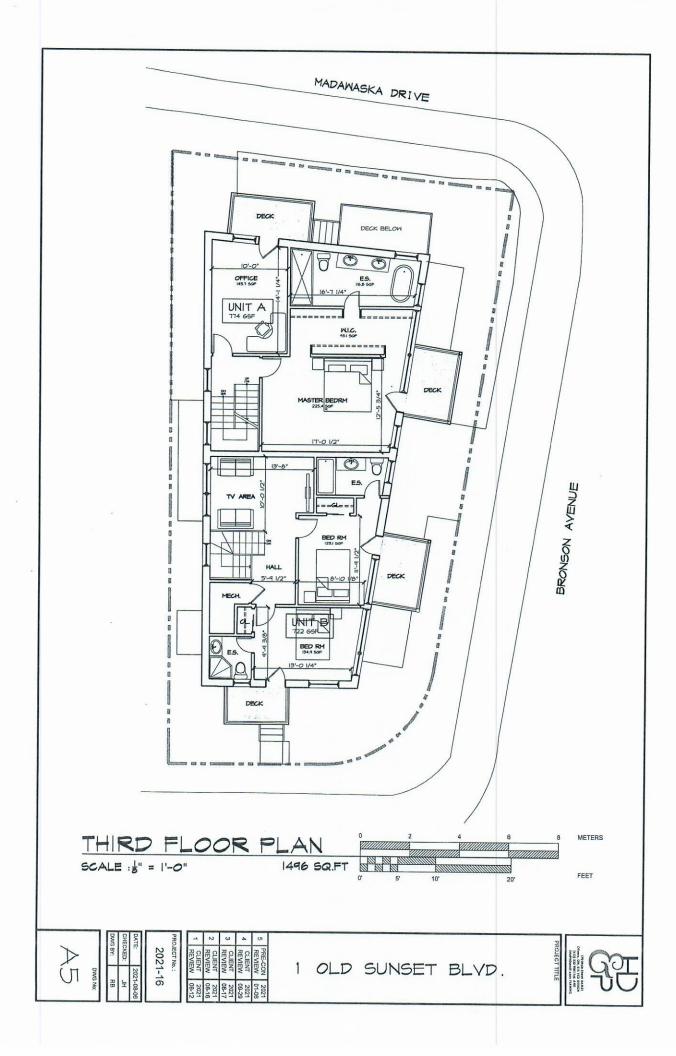


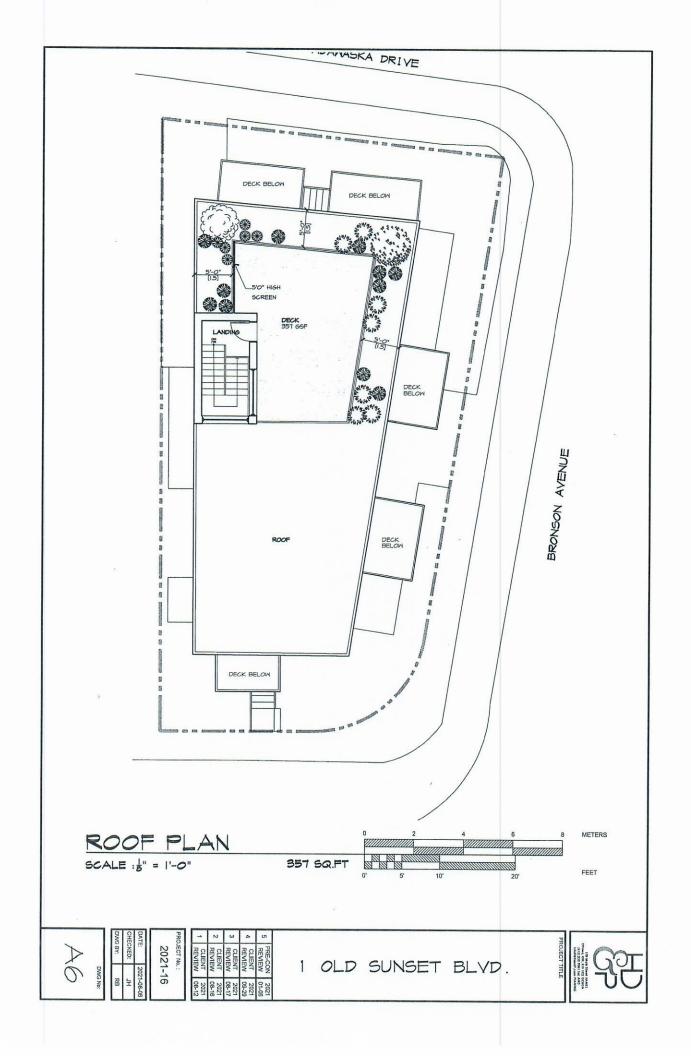


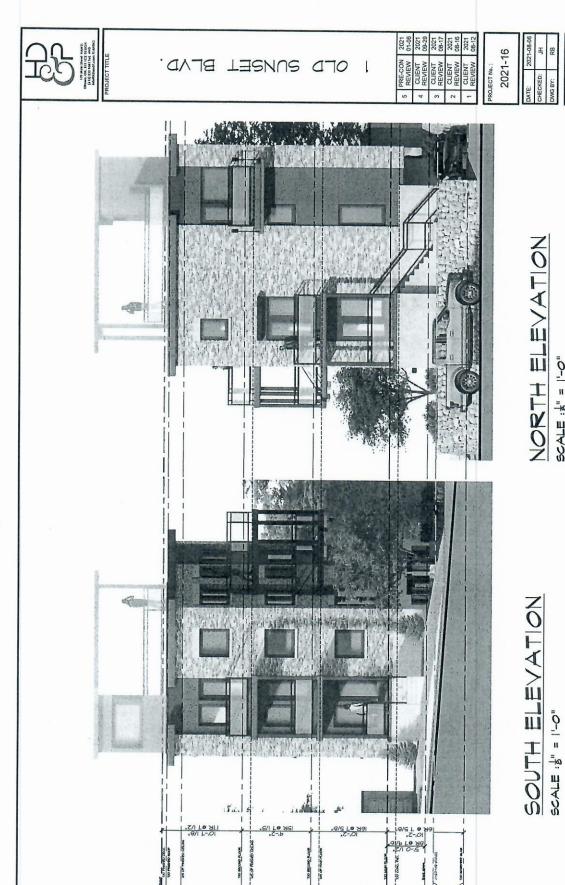












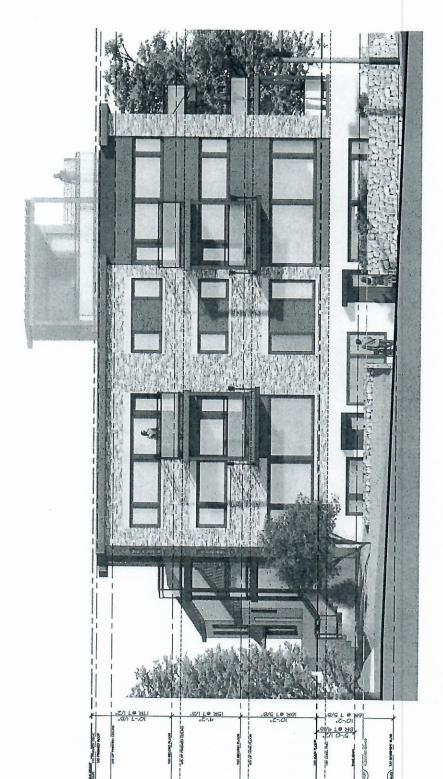
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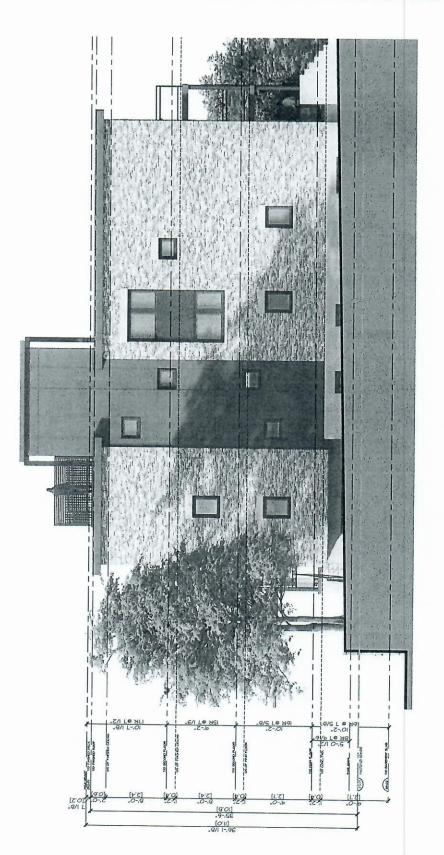
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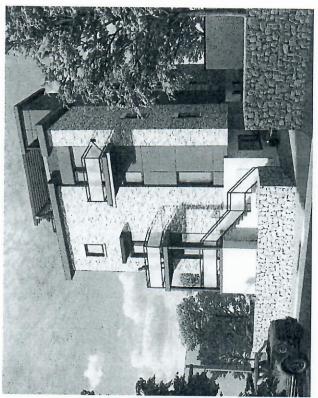




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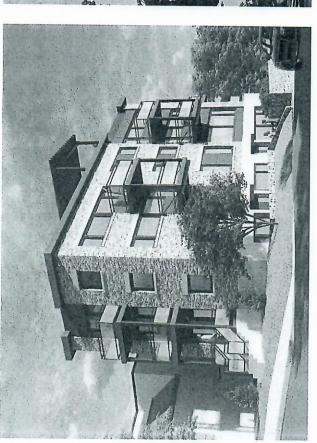
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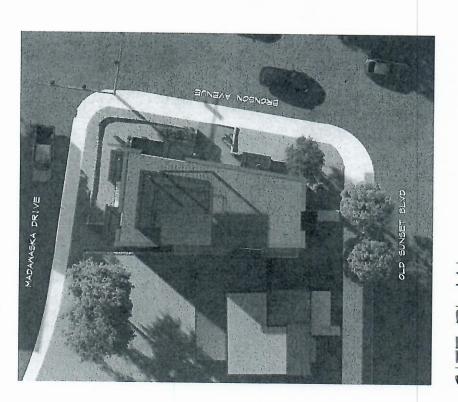
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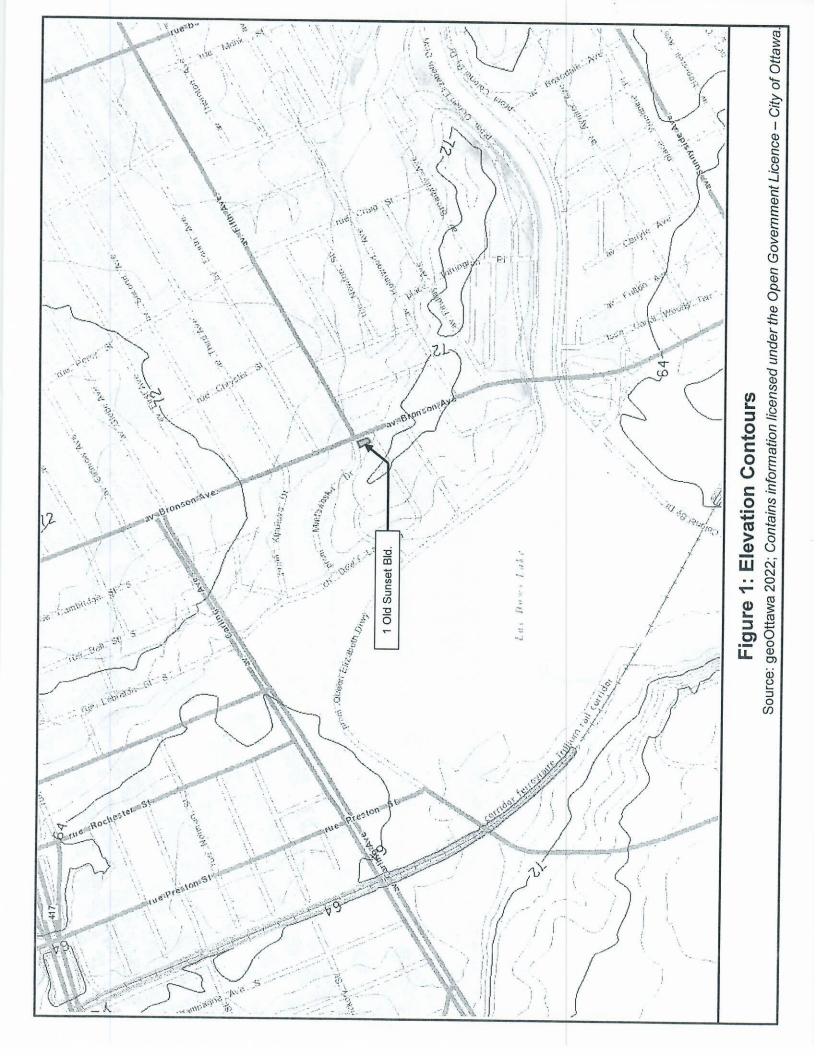


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SITE PLAN SCALE:NTS

ATTACHMENT 2: FIGURE 1 – ELEVATION CONTOURS



ATTACHMENT 3: FUS FIRE FLOW CALCULATIONS



FUS Fire Flow Calculation

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

Fire Flow Calculation #: 1

Building Type/Description/Name: Residential

Stantec Project #: 163401084

Project Name: 1 Old Sunset Boulevard

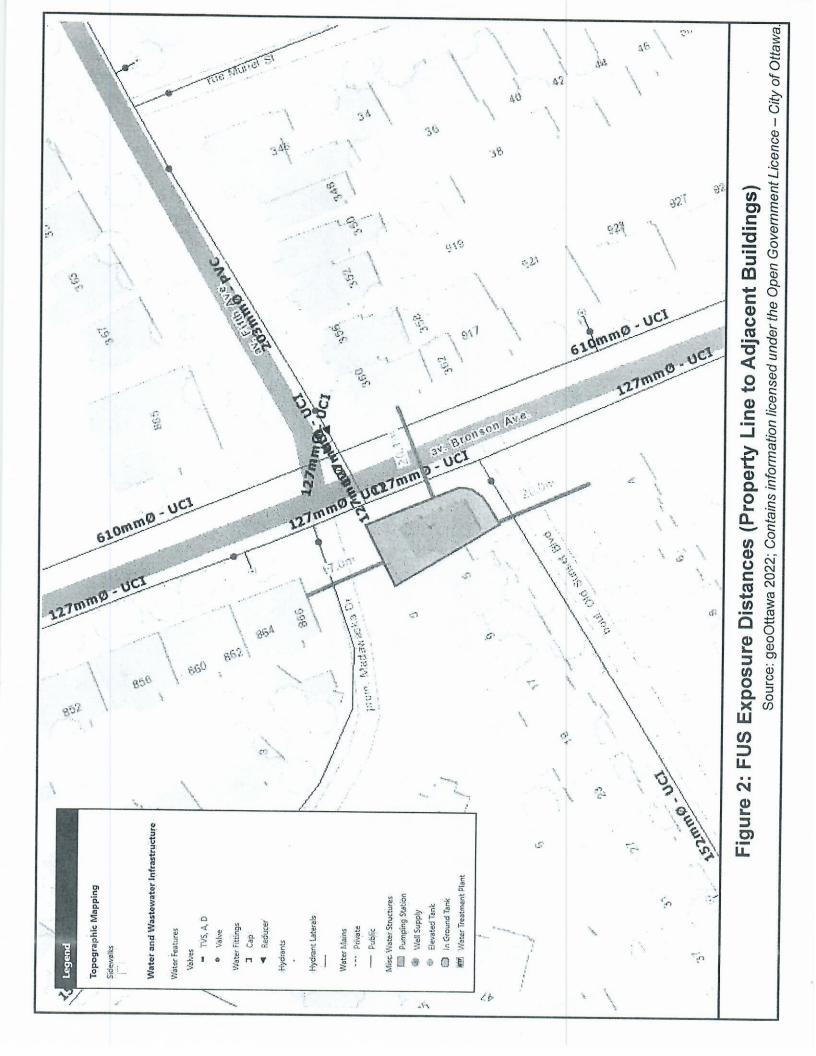
Date: March 24, 2022

Data inputted by: Alexandre Mineault-G, M.A.Sc., ing., EIT

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

		Table A. Fil	e Underwriters Survey Determination	n of Required F	ire Flow - Long Meth	od						
Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)				
			F									
	Choose Frame		Wood Frame 1									
1		Coefficient related to	Ordinary construction	1								
	Unit	type of construction	Non-combustible construction	0.8	Wood Frame	1.5	m					
	(C)	(6)	Fire resistive construction (< 2 hrs)	0.7		100.00						
		Fire resistive construction (> 2 hrs)	0.6	Rent letter								
	Choose Type of Housing (if TH,		Floor Space Area									
2	Enter Number of	umber of Single Family										
	Units Per TH	Type of Housing	Townhouse - indicate # of units 1 Other (Comm, Ind, Ap etc.)		4	Units						
	Block)		Other (Comm, Ind, Apt etc.)	4	etc.)		00					
2.2	# of Storeys	Number of Floors/	Storeys in the Unit (do not include basement i	4	4	Storeys						
3	Enter Ground Floor Area of One	Average	Floor Area (A) based total floor area of all floo	1,475		Area in						
ŭ	Unit	construction): Square Feet (ft2)										
4	Obtain Required Fire Flow without Reductions		Required Fire Flow (without reductions or increases per FUS) (F = 220 * C * √A) Round to nearest 1,000 L/min									
5	Apply Factors Affecting Burning		Reductions/Increase		Affecting Burning							
	Affecting Burning		Non-combustible		Anecting burning			- Historia III -				
-	Choose	Choose	Limited combustible	-0.25		-0.15	N/A					
5.1	Combustibility of	Occupancy content hazard reduction or	Combustible	-0.15 0	Limited combustible							
	Building Contents	surcharge	Free burning		Limited combustible			N/A	6,800			
			Rapid burning	0.15 0.25								
			Adequate Sprinkler conforms to NFPA13	-0.3								
		Sprinkler reduction	None	-0.3	None	0	N/A	0				
5.2	Choose Reduction Due to Presence of	Water Supply Credit	Water supply is standard for sprinkler and fire dept. hose line	-0.1)	0	N/A	0				
	Sprinklers		Water supply is not standard or N/A	0	standard or N/A		N/A	0				
		Sprinkler Supervision	Sprinkler system is fully supervised	-0.1	Sprinkler not fully	-						
		Credit	Sprinkler not fully supervised or N/A	0	supervised or N/A	0	N/A	0				
	Change Separation		North Side	10.1 to 20.0m	0,15	0.6						
		Exposure Distance	East Side	20.1 to 30.1m	0.1							
		Between Units	South Side	20.1 to 30.1m	0.1		m	4,080				
			West Side	0 to 3.0m	0.25							
			Total Required Fire Flow, round	ed to nearest 1,0	000 L/min, with max/	min limi	ts applied:	11,000				
6	Obtain Required Fire Flow, Duration				otal Required Fire F			183				
	& Volume	-			Required Duration	of Fire	Flow (hrs)	2.25				
					Required Volume	of Fire	Flow (m ³)	1,485				

ATTACHMENT 4: FIGURE 2 – FUS EXPOSURE DISTANCES



ATTACHMENT 5: OFM FIRE FLOW CALCULATIONS

Fire Flow Calculations as per the Ontario Building Code (OBC)



OFM Fire Flow Calculation

Calculations based on Fire Protection Water Supply Guideline for Part 3 in the Ontario Building Code by the Office of the Fire Marshal (OFM 1999)

Stantec Project #: 163401084

Project Name: 1 Old Sunset Boulevard

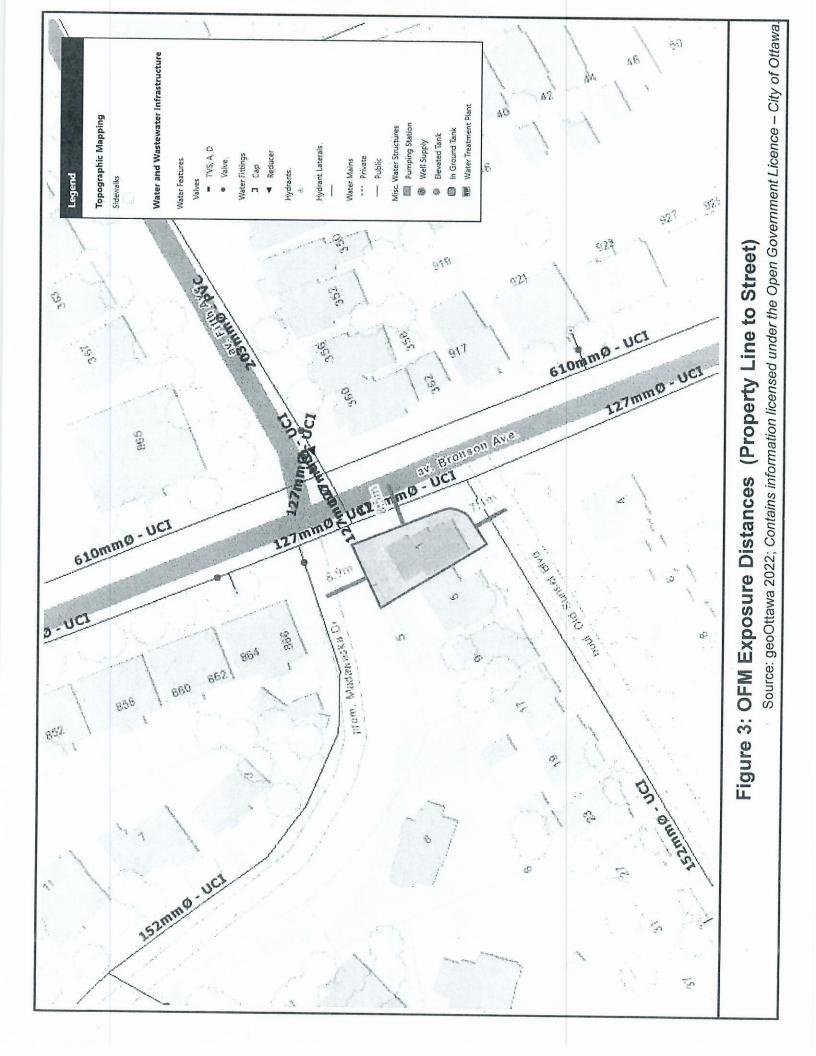
Date: March 24, 2022

Data inputted by: Alexandre Mineault-G, M.Sc.A., ing., EIT Data reviewed by: Kevin Alemany, M.A.Sc., P.Eng.

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

	18	Die A. Offic	e of the Fire Marshal Determination of Requ	uired Fire Prote	ction Water	Supply			
Step	Task	Term	Options	Choose:	Value Used	Unit			
1	Enter Number of		General Building De						
1.1	Storeys		Number of Floors/Storeys in the U	4	4	Storeys			
	Choose Type of		Single Family						
1.2	Housing (if TH, Enter Number of Units Per TH	Type of	Townhouse - indicate # of units	0	Other (Comm,	4	l laite		
	Block)	Housing	Other (Comm, Ind, Apt etc.)		Ind, Apt etc.)	7	Units		
1.3	Choose Presence of								
	Sprinklers Choose Presence of			None	None	N/A			
1.4	Firewalls		Fi	None	None	N/A			
1.5	Choose Presence of								
2	Stand-Pipe System			Stand-pipe system?	None	None	N/A		
			Determining Water Supply						
			Type of Non-combustible construction + fire separations + fire-	Construction					
			resistance ratings in accordance with Section 3.2.2 of						
			OBC						
2.1	Choose Type of	Type of	Non-combustible construction + fire separations + no fire-resistance rating	Type II					
	Construction	Construction	Combustible construction + fire separations + fire-		Type IV	N/A	N/A		
			resistance ratings in accordance with Section 3.2.2 of OBC	Type III					
				Combustible construction + fire separations + no fire-	party and the same of the same				
			resistance rating	Type IV					
			Building	Classification					
2.2		Occupancy	A-2, B-1, B-2, B-3, C, D A-4, F-3	23					
	Choose Classification	Classifi	Classification	A-1, A-3	28 32	С	A-2, B-1, B-2,	N/4	
		(OBC)	E, F-2	39	C	B-3, C, D	N/A		
			F-1	53					
2.3	Water Supply Coefficient (K)		Water Supply Coefficient K			23	N/A		
3			Determining Building Vo	20	10//				
			Floor						
3.1	Enter Ground Floor								
	Area of One Unit		Avera	1,475 Square Feet	137	Area in Square Meter			
					(ft2)		(m²)		
			Build	ing Height	0.0				
3.2	Building Height (h)	ling Height (h) Bottom Elevation :							
				Meters (m) 12.0	12.0	Height in Meters (n			
		Meters (m)							
3.3	Building Volume (V)		Building Volume V = A * h		1,650	Volume in Meters Cub			
4			Determining Spatial Coef		1,030	(m ³)			
			North Side						
	,			Property Line to Street Centreline (Street Facing)	3.0 8.9	0.00			
			Total Exposure Distance	11.9					
	Choose Exposure	Exposure	East Side	3.0					
	Distances from	Distance from	Property Line to Street Centreline (Street Facing)	8.5	0.00				
4.1		Building to	Total Exposure Distance South Side	11.5		0.50	Distance in Meters (m		
	Line Property	Building to Property Propert	I Toperty Line	Property Line to Street Centreline (Street Facing)	3.0	0.00		and an inotoro (ii	
			in weters (m)	Total Exposure Distance	7.1	0.00			
				West Side	1.2				
			Property Line to Street Centreline (Street Facing)	0	0.50				
		1100	Total Exposure Distance	1.2					
42			Total Spatial Coefficient S _{tot} = 1 + Σ S			1.50	N/A		
_	Total Spatial Coefficient	The second secon	Determining Dequired Minimum County	f Water O and F	iro Flow				
4.2	Total Spatial Coefficient	Determining Required Minimum Supply of Water Q and Fire Flow							
			Minimum Supply of Water, rounded to	nearest 1,000 L;	Q = K"V"S tot	57,000			
	Obtain Required Fire		Minimum Supply of Water, rounded to Required Minimum Wate	nearest 1,000 L; r Supply Flow F	Q = K"V"S tot Rate (L/min)				
5			Minimum Supply of Water, rounded to	nearest 1,000 L; r Supply Flow F	Q = K"V"S tot Rate (L/min)	57,000 2,700 45	L/min		

ATTACHMENT 6: FIGURE 3 – OFM EXPOSURE DISTANCES



ATTACHMENT 7: WATER BOUNDARY CONDITIONS

Mineault-Guitard, Alexandre

From: Sent:

TL MaK <tlmakecl@bellnet.ca> Monday, April 4, 2022 11:24 AM

To:

Alemany, Kevin

Cc:

Mineault-Guitard, Alexandre

Subject:

RE: 1 Old Sunset Boulevard - Water Boundary Conditions Request

Attachments:

1 Old Sunset Boulevard March 2022.pdf

Hi Kevin,

Attached please find water boundary conditions received today from the City of Ottawa regarding 1 Old Sunset Boulevard.

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: Fawzi, Mohammed [mailto:mohammed.fawzi@ottawa.ca]

Sent: April 4, 2022 10:29 AM

To: TL MaK

Subject: RE: 1 Old Sunset Boulevard - Water Boundary Conditions Request

Hi Tony,

The following are boundary conditions, HGL, for hydraulic analysis at 1 Old Sunset Boulevard (zone 1W) assumed to be connected to the 152 mm watermain on Old Sunset Boulevard and the 152 mm watermain on Madawaska Drive (see attached PDF for location).

Both Connections

Minimum HGL: 106.3 m Maximum HGL: 115.3 m

Max Day + FF (45 L/s): 100.5 m (Connection 1), 101.9 m (Connection 2)

Available FF at 20 psi: 83 L/s, assuming a ground elevation of 68.9 m (Connection 1) Available FF at 20 psi: 93 L/s, assuming a ground elevation of 67.6 m (Connection 2)

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

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Best Regards,

Mohammed Fawzi, E.I.T.

Project Manager

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 20120, Mohammed.Fawzi@ottawa.ca

From: TL MaK <tlmakecl@bellnet.ca>

Sent: March 25, 2022 4:56 PM

To: Fawzi, Mohammed < mohammed.fawzi@ottawa.ca>

Subject: 1 Old Sunset Boulevard - Water Boundary Conditions Request

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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 Mohammed,

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 proposed building is located within Pressure Zone 1W at 1 Old Sunset Boulevard is a 3-storey residential apartment building with a basement, and a deck on the roof. The building contains eight (4) total units, namely two (2) 2-bedroom units in the basement, one (1) 3-bedroom units, and one (1) 4-bedroom unit. Each floor covers an area of approximately 137 m², with a total gross floor area of 548 m² (including the basement). It is proposed to service half (one 2-bedroom unit and one 3-bedroom unit) of the building by the 150 mm diameter watermain along Madawaska Drive and the other half (one 2-bedroom unit and one 4-bedroom unit) by the 150 mm diameter watermain along Old Sunset Boulevard.

The domestic demands were calculated using the City of Ottawa's Water Design Guidelines, 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

^{**}Please note that due to the current situation, I am working remotely. Email is currently the best way to contact me**

Water Design Guidelines. **Table 1** shows the estimated domestic demands of the existing building, separated based on the proposed service connection.

Table 1: Estimated Domestic Demand

Connection	Unit Type	Unit	PPU	Consumption	AV	DY	MX	DY	PKF	IR
to		Count	110	Rate (L/c/d)	L/d	L/s	L/d	L/s	L/d	L/s
Madawaska	Apartment, 2- Bedroom	1	2.1	280	588	0.01	1,470	0.02	3,234	0.04
Drive	Apartment, 3- Bedroom	1	3.1	280	868	0.01	2,170	0.03	4,774	0.06
	Sub Total	2			1,456	0.02	3,640	0.04	8,008	0.09
Old Course	Apartment, 2- Bedroom	1	2.1	280	588	0.01	1,470	0.02	3,234	0.04
Old Sunset Blvd	Apartment, 4- Bedroom	1	3.4*	280	952	0.01	2,380	0.03	5,236	0.06
	Sub Total	2			1,540	0.02	3,850	0.04	8,470	0.10
	Total	4			2,996	0.03	7,490	0.09	16,478	0.19

^{*} The PPU for the 4-bedroom unit was assumed to be equal to the PPU for a single family.

The fire flow required was determined following the Fire Underwriter Survey (FUS) method and is provided in the attached worksheet. For this analysis, the building was classified as wood frame construction with building contents that are limited in combustibility. It is understood that it will not have a sprinkler system, and that the basement be built more than 50% above ground level, according to the architectural drawings. The resulting total required fire flow is 11,000 L/min (183 L/s) for a duration of 2.25 hours.

The City had previously indicated that the City's Fire Marshall and various City departments are currently reviewing fire flow requirements for low- and mid-rise buildings. As per the City of Ottawa's Water Design Guidelines, the FUS method is to be used for fire flow requirements affecting watermain sizing; with regards to fire protection on private property, these are covered by the Ontario Building Code (OBC).

As such, the fire flow requirement was also determined following the OBC's Office of the Fire Marshal (OFM) method. The proposed building will be of wood frame construction, where floors are fire separations, but without fire-resistance ratings. The resulting total required fire flow (RFF) for a non-sprinklered building is 2,700 L/min (45 L/s) for a minimum duration of 30 min.

In summary, the following water demands are for the connection to the $\underline{150 \text{ mm}}$ diameter watermain along Madawaska \underline{Drive} :

- AVDY = 1,456 L/d (0.02 L/s);
- MXDY = 3,640 L/d (0.04 L/s);
- PKHR = 8,008 L/d (0.09 L/s);
- Fire Flow (FUS) = 11,000 L/min (183 L/s); and
- Fire Flow (OBC/OFM) = 2,700 L/min (45 L/s).

In summary, the following water demands are for the connection to the <u>150 mm diameter watermain along Old Sunset Boulevard</u>:

AVDY = 1,540 L/d (0.02 L/s);

- MXDY = 3,850 L/d (0.04 L/s);
- PKHR = 8,470 L/d (0.10 L/s);
- Fire Flow (FUS) = 11,000 L/min (183 L/s); and
- Fire Flow (OBC/OFM) = 2,700 L/min (45 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.

Have a good weekend.

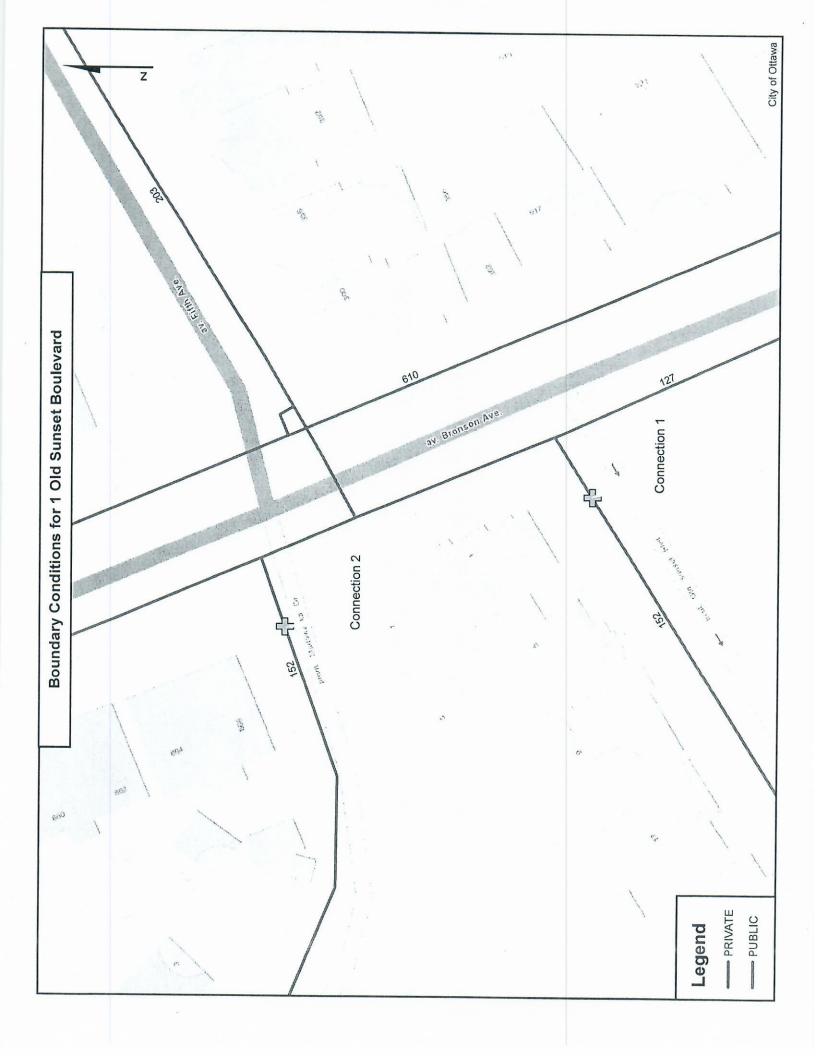
Regards,

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

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ATTACHMENT 8: SUPPORTING HYDRAULIC CALCULATIONS



Supporting Hydraulic Calculations

Stantec Project #: 163401084

Project Name: 1 Old Sundet Bld

Date: April 4, 2022

Data inputted by: Alexandre Mineault-G, M.A.Sc., ing., EIT

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

Boundary Conditions provided by the City:

Scenario 1: Peak Hour (Min HGL): 106.3 m;

Scenario 2: Average Day (Max HGL): 115.3 m; and

Scenario 3: Maximum Day plus Fire Flow: 100.5 m.

Sample Calculations

HGL(m) = hp + hz

(1)

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

For Scenario 1, we have:

HGL(m) = 106.3 and hz (m) = 68.9.

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

hp(m) = HGL - hz

 \therefore hp = 106.3 - 68.9 m = 37.4 m.

To convert from Pressure Head (m) to a pressure value (kPa), the following equation can be used: P(kPa) = (p * g * hp) / 1000 (2)

where: ρ = density of water = 1000 kg/m³; and g = gravitational acceleration = 9.81 m/s².

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

P (kPa) = (1000 * 9.81 * 37.4) / 1000

∴ P = 367 kPa.

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

P = 53 psi.

Applying the same procedures, the pressures under Scenario 2 and Scenario 3 are calculated as follows: Scenario 2: P = 66 psi; and Scenario 3: P = 45 psi.

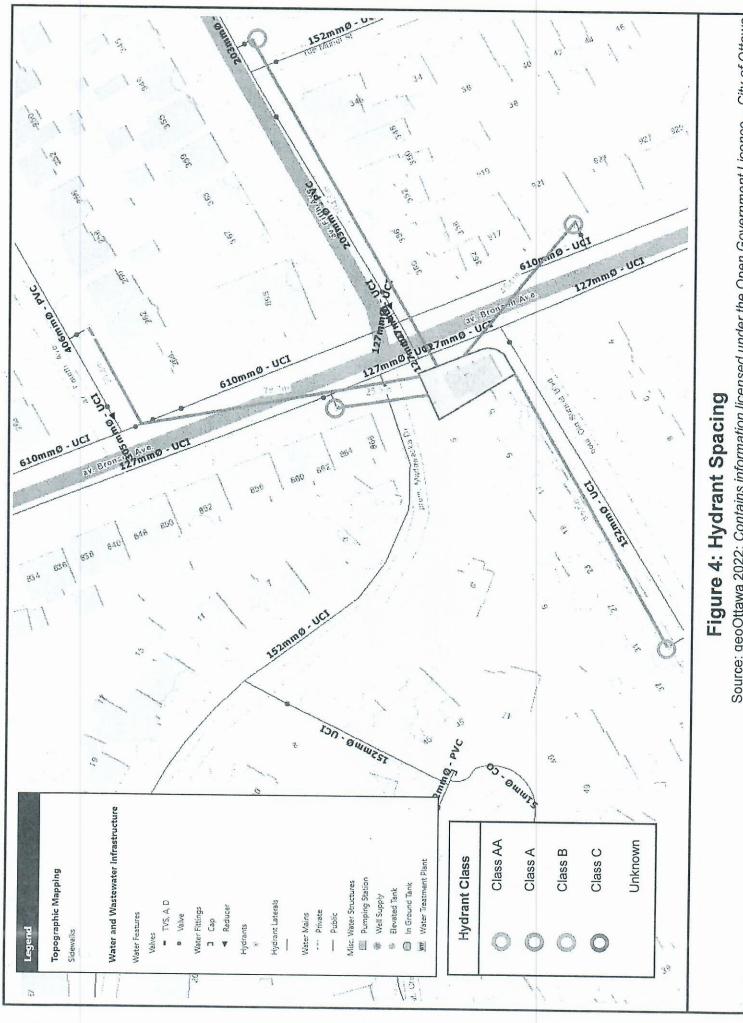
To summarize:

Scenario 1: Minimum Pressure under Peak Hour Demand: 367 kPa (53 psi)

Scenario 2: Maximum Pressure under Average Day Demand: 455 kPa (66 psi)

Scenario 3: Minimum Pressure under Maximum Day + Fire Flow Demand: 310 kPa (45 psi)

ATTACHMENT 9: FIGURE 4 - HYDRANT SPACING



Source: geoOttawa 2022; Contains information licensed under the Open Government Licence – City of Ottawa.

PROPOSED RESIDENTIAL RE-ZONING 1 OLD SUNSET BOULEVARD LOT 15 R-PLAN 165631 AND LOT C R-PLAN 217882 CITY OF OTTAWA

APPENDIX E SANITARY SEWER DESIGN SHEET SHEET 1 OF 1

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	opulation in 1000 area in hectares		Full flow A velocity ve (m/s)		0.99	+		1	0.00		1		1	\dagger		/	100	ba	JOE	IN A MILE	10		100		-	SHE	
	ا م	1000	Capacity Fu (L/s) ve n = 0.013	H	2.7.0				2-20					+		001	000110	of Int	Bala	IV L-M		3	Ver or		RAM CAMP	S S S S S S S S S S S S S S S S S S S	
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	$M = 1 + \frac{14}{4 + \sqrt{p}}$ $Q(p) = \frac{PqM}{86.4} (L/s)$ $Q(i) = IA (L/s) \text{ where}$ $Q(d) = Q(p) + Q(i) (L/s)$	PROPC	Type ol pipe		PVC				7														-				DWG
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SHEET		\vdash	Longth (m)		12.5				13.0			1		- -					-			-			- -	DESEL	d
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SANITARY	10 m 4	CI	Pop.	M	70		¥		200					1	ŀ							-			1		7-77
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