

File 423392

February 20, 2024

Rob Vellinga
2820485 Ontario Inc.
57 Marks Road
Springwater, Ontario L9X 0S3
rvellinga@dominionlending.ca

Re: 12 Ottaway Avenue, Barrie
Water Servicing Brief

Dear Rob:

Tatham Engineering Limited (Tatham) has completed a water servicing brief in support of the proposed development of two single-family detached dwellings located at 12 Ottaway Avenue, within the City of Barrie (City), as per the attached Proposed Concept Plan. This water servicing brief has been requested by the City in support of a Zoning By-law Amendment (ZBA) application for the property.

EXISTING WATER SYSTEM

The site is located within an area of the City serviced by the municipal water distribution system. Specifically, the site is located within Pressure Zone 2N, supplied by the City's Groundwater system, as per the *Water Storage and Distribution Mater Plan Update* (WSDMP) by WSP. Water is directly supplied to Zone 2N by Well Nos. 9 and 13 (both located at 168 Johnson Street) and Well No. 16 (located at 101 Brown Wood Drive). Zone 2N is also supplied by wells in Zone 1 via the Sunnidale Road and Anne Street Reservoirs and Booster Pumping Stations (BPS).

Existing Infrastructure

There is an existing 150 mm dia. dead end watermain fronting the site on Ottaway Avenue with an existing fire hydrant located at the west end of Ottaway Avenue (where the main terminates) approximately 65 m from the subject site. There is another existing hydrant located at the southwest corner of Ottaway Avenue and Davidson Street approximately 260 m from the site.

Municipal Water Supply

Per Tables 6-4 and 6-5 of the WSDMP, both Well Nos. 9 and 13 have firm capacities of 6.55 ML/day (6,550 m³/day) and Well No. 16 has a firm capacity of 7.86 ML/day (7,860 m³/day). These three wells contribute to supplying Pressure Zone 2N, which has an overall zone firm capacity of 38.83 ML/day

(38,830 m³/day). It is noted that Zone 2N's firm capacity includes the Codrington Street BPS, which only has a firm capacity of 5.44 ML/day (5,440 m³/day) due to one of its pumps being removed in 2017.

Per Table 4-1 of the WSDMP, the maximum average day demand (ADD) for Zone 2N between 2011 and 2017 was 13,849 m³/day and the highest maximum day demand (MDD) was 19,587 m³/day, resulting in significant residual capacity within the existing supply system.

Per Table 3-2 of the WSDMP, the estimated ADD and MDD based on projected growth within Pressure Zone 2N (i.e. an area of the City supplied via the groundwater) are summarized in Table 1 below.

Therefore, there is sufficient water supply to service additional planned development within Pressure Zone 2N.

Table 1: Municipal Water Supply - Projected Zone 2N Demands

SCENARIO	AVERAGE DAY DEMAND (m ³ /DAY)	MAXIMUM DAY DEMAND (m ³ /DAY)	RESIDUAL (m ³ /DAY)
2021	11,671	21,008	17,822
2026	11,965	21,537	17,293
2031	12,454	22,374	16,456
2036	13,027	23,376	15,454
2041	13,901	24,905	13,925

Municipal Water Storage

Water storage for Pressure Zone 2N is provided by the Bayfield Street Elevated Storage Tank (located at 444 Bayfield Street). Under existing conditions, there is a local deficit of storage within the Zone 2N system; however, some of the storage surplus in adjacent Zone 1 is assigned to Zone 2N to offset this deficit. As a result, there is a total net storage surplus of 9.10 ML for the City's groundwater supplied zones (Zones 1, 2N and 3N) (all as per Table 6-3 of the WSDMP). Therefore, there is sufficient water storage within the existing municipal system to service additional planned development in the area.

Under growth projections to 2041 there is a storage surplus of 3.91 ML within the groundwater supplied zones (per Table 6-7 of the WSDMP).

PROPOSED WATER SERVICE

Each of the proposed single-family detached dwellings will be serviced with a 25 mm dia. water service connected to the existing 150 mm dia. watermain on Ottawa Avenue. The final water service design will be confirmed at the building permit stage.



Proposed Demands

Water demands for the proposed development have been estimated by applying relevant City design standards and criteria from the *Drinking Water Infrastructure Design Standard* (2024), including the following:

- Per capita ADD = 225 L/person/day; and
- Person per unit (PPU) = 3.25 for low density (single detached dwellings).

MDD and peak hour demand (PHD) factors of 2.75 and 4.13, respectively, have been applied in accordance with Table 3-1 of the MECP's 2008 *Design Guidelines for Drinking-Water Systems* (updated in 2019).

The water demands for the proposed development are summarized in Table 2. Detailed calculations are included in the attached Water Demand Calculations.

Table 2: Summary of Water Demands

PROPOSED WATER DEMAND	DEMAND (m ³)	FLOW (L/S)
ADD	1.58	0.02
MDD	4.33	0.05
PHD	-	0.08
Fire Flow (FF)	-	83.00
MDD + FF	-	83.05

Fire Protection

Using the Fire Underwriters Survey (FUS) method outlined in the *Water Supply for Public Fire Protection* (2020) document, the required fire flow for each of the Lot 'A' and 'B' dwellings was calculated as 83.00 L/s (assuming Type V Wood Frame Construction). It is noted the required fire flows are slightly less than the City's conservative minimum required fire flow of 100 L/s for residential lots as stipulated in City design standards. Detailed FUS calculations are attached.

Vipond Inc. conducted hydrant flow tests on April 24, 2023 at hydrants in the proximity of the proposed development to assess the fire flows available at the property. The flowing and residual hydrants were located at the west end of Ottaway Avenue (where the main terminates) and the southwest corner of Ottaway Avenue and Davidson Street, respectively. Test #3 produced an actual flow from the flowing hydrant of 88.77 L/s (exceeding the minimum MDD + FF for the subject site of 83.05 L/s) while the pressure at the residual hydrant was 90 psi (significantly exceeding the minimum requirement of 20 psi).



Vipond's hydrant test report is attached. We have also confirmed that the velocity in the 150 mm dia. watermain under MDD + FF scenario of 83.05 L/s is 4.70 m/s (where $V=Q/A$), which does not exceed the City's maximum of 5.0 m/s under fire flow conditions. In accordance with the formulas for available fire flow in the American Water Works Association (AWWA) *M17 Fire Hydrants: Installation, Field Testing, and Maintenance* manual and section 4.3.4. of the City's design standard, the theoretical available fire flow from the flowing hydrant in Test #3 is 303.6 L/s when the pressure in the residual hydrant is at 20 psi. However, this theoretical flow would not be available, and as the actual flow results at the flowing hydrant during Test #3 exceed the requirements for this site, relying on the theoretical values is not required. Refer to results as shown in the City's 2022 Fire Flow Testing Calculator (appended).

Through consultation with the City and a review of the City's WaterCAD model by WSP (Figure F1-6) in the WSDMP, it has been noted that flows at the end of the Ottaway Avenue watermain under MDD + FF scenario are less than 70 L/s. Output from the WaterCAD model for available fire flow for the 2041 growth scenario is attached. However, as described above, the actual flow available at this hydrant during Test #3 was 88.77 L/s (exceeding the results of the City model). As the MDD+FF demand is 83.05 L/s, the existing infrastructure appears sufficient to meet the fire fighting water demands of the proposed development.

It should also be noted that the existing residences on Ottaway Avenue are single-family detached dwelling units which are consistent with the proposed development type. As such, the proposed development does not increase the fire protection water demands beyond what is already required to adequately service the area.

Therefore, we are of the opinion that the existing municipal system can sufficiently provide the required fire protection water demands for the proposed development. Detailed calculations are attached.

Should you have any questions or concerns please do not hesitate to contact us.

Yours truly,

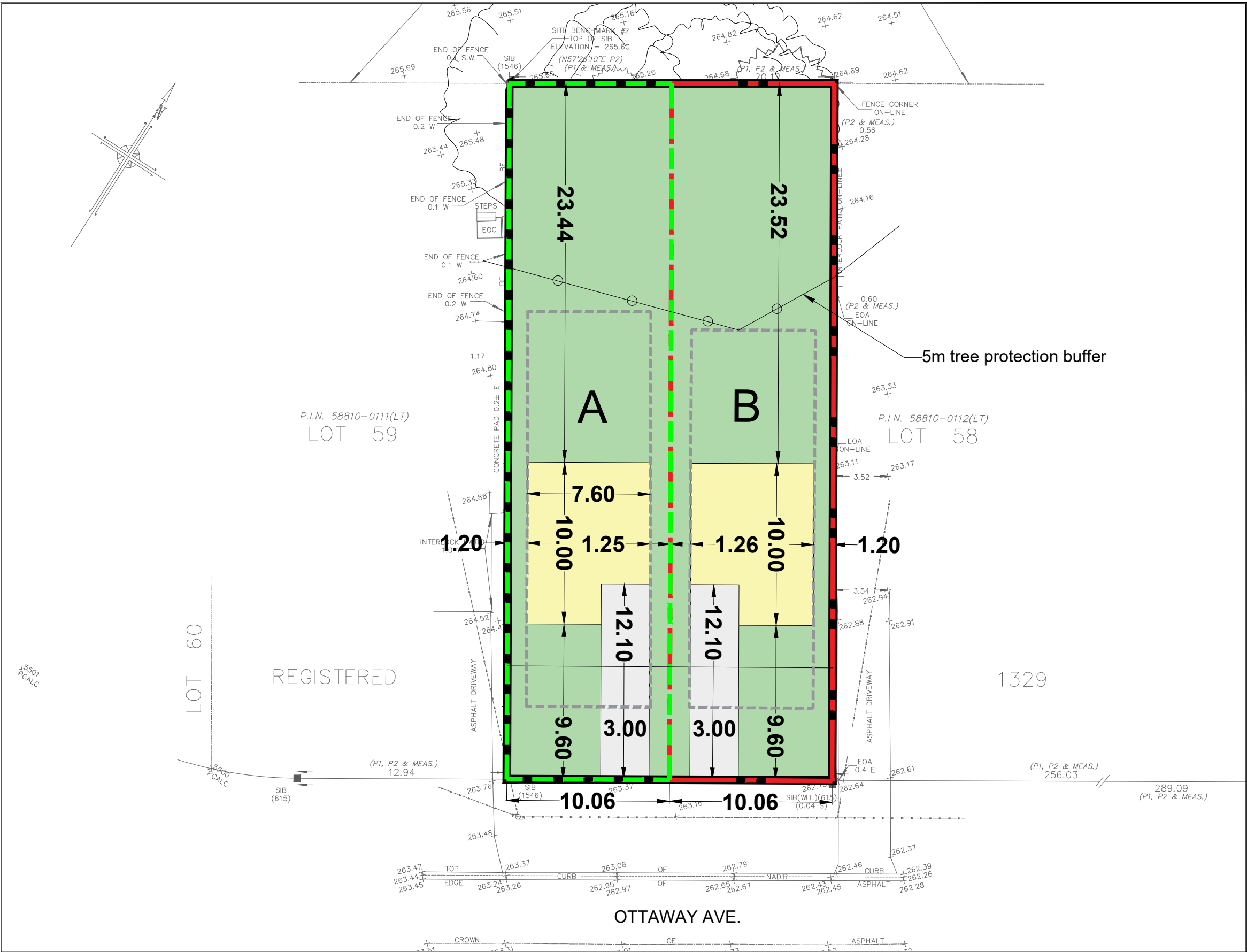
Tatham Engineering Limited

John-Lui Marra, B.Eng., EIT
Engineering Intern
JLM/NM:klc



Nick Millington, P.Eng.
Manager – Land Development





Key Map



PART OF BLOCK C, REGISTERED PLAN 1329,
CITY OF BARRIE,
COUNTY OF SIMCOE

LEGEND

- Subject Site (866.12m²)
- Retained Lot A:
 - Lot Area: 432.85m²
 - Zoning Envelope: 241.58m²
- Severed Lot B:
 - Lot Area: 433.27m²
 - Zoning Envelope: 242.06m²
- Limits of Development
- Landscape Open Space
- Potential Buildings

RESIDENTIAL FOUR (R4) ZONE

Provisions	Required	Severed Lot (Lot A)	Retained Lot (Lot B)
Lot Area (min.)	335.0m ²	432.85m ²	433.27m ²
Lot Frontage (min.)	10.0m	10.06m	10.06m
Front Yard (to dwelling) (min.)	4.5m	>4.50m	>4.50m
Front Yard (to attached garage) (min.)	7.0m	>7.00m	>7.00m
Interior Side Yard (min.)	1.2m	>1.20m	>1.20m
Interior Sideyard (to attached garage) (min.)	0.6m	>0.60m	>0.60m
Rear Yard (min.)	7.0m	>7.00m	>7.00m
Lot Coverage (max.)	45%	<45%	<45%
Max Dwelling Height (max.)	10.0m	<10.00m	<10.00m

Note: This drawing is for discussion purposes only.
The information shown is approximate and subject to change.



Date:	January 19, 2024	Drawn By:	A.G.
File:	22-1244	Checked By:	J.H.

PROPOSED CONCEPT PLAN

12 OTTAWAY AVENUE, BARRIE, ON

SCHEDULE OF REVISIONS

No.	Date	Description	By



INNOVATIVE PLANNING SOLUTIONS
PLANNERS • PROJECT MANAGERS • LAND DEVELOPERS

647 WELHAM RD., UNIT 9, BARRIE, ONTARIO, L4N 0B7

tel: 705 • 812 • 3281 fax: 705 • 812 • 3434 e: info@ipsconsultinginc.com www.ipsconsultinginc.com

PROJECT	12 Ottaway Avenue, Barrie	FILE	423392
		DATE	February 14, 2024
SUBJECT	Water Demand Calculations	NAME	JLM
		PAGE	1 OF 1

Design Criteria (as per City of Barrie standards)
Demands

Low Density PPU = 3.25
 Per Capita Demand = 225 L/cap/day

Peaking Factors (from MOE Design Guidelines for Drinking Water Systems - Table 3-1)

Max Day Demand = 2.75
 Peak Hour Demand = 4.13

Proposed Development

Single-Family Detached = 2 dwellings Population = 7 persons

Average Day Demand (ADD) = 1,575 L/d = 1.58 m³/d = 0.02 L/s

Max Day Demand (MDD) = 4,331 L/d = 4.33 m³/d = 0.05 L/s

Peak Hour Demand (PHD) = 6,505 L/d = 6.50 m³/d = 0.08 L/s

Required Fire Flow (FF) = 83.00 L/s

MDD + FF = 83.05 L/s

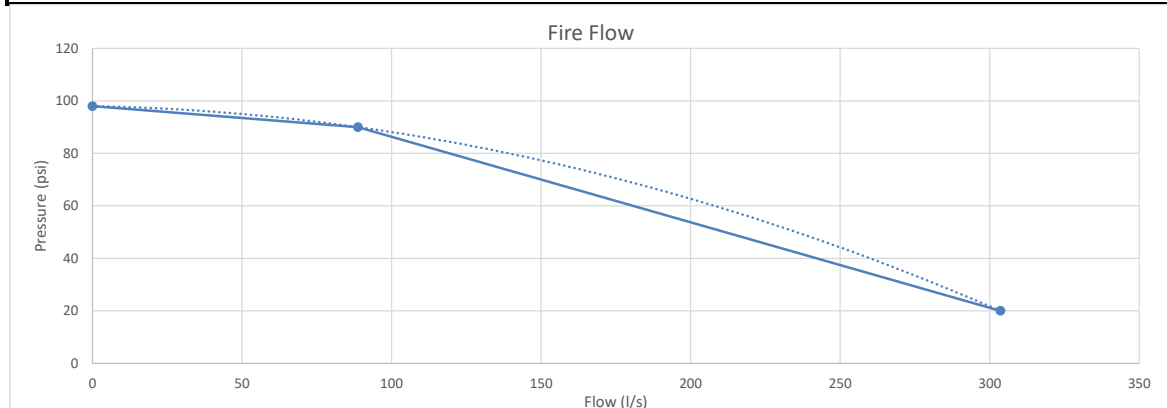
	Project: 12 Ottaway Avenue, Barrie	Date: February 14, 2024
	File No.: 423392	Designed: JLM
	Subject: FUS Fire Flow Calculations	Checked: NM
	Revisions:	

Fire Underwriters Survey Fire Flow Calculations

Calculation based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS). Below calculation assumes a two-storey dwelling.

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)		
1	Frame Use for Construction of Unit	Coefficient related to type of construction (Construction Coefficient) (C)	Framing Material				1.5	%	N/A	
			Type V - Wood Frame Construction	1.5						
			Type IVA - Mass Timber Construction	0.8						
			Type IVB - Mass Timber Construction	0.9						
			Type IVC - Mass Timber Construction	1.0						
			Type IVD - Mass Timber Construction	1.5						
			Ordinary Construction	1.0						
			Non-combustible Construction	0.8						
			Fire Resistive Construction	0.6						
2	Total Effective Area	Largest Floor Area				69	m ²	N/A		
		Percentage of the Total Area of the Other Floors for Coefficient 1.0 to 1.5				100%				69
		Percentage of the Total Area of the Other Floors for Coefficient below 1.0:								
		a) If any vertical opening in the building are unprotected, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight, or				50%				
		b) If all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.				25%				
		Total Effective Area				137				
3	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (RFF= 220 x C x A ^{0.5})							4,000	
4	Factors Affecting Burning	Reductions / Increases Due to Factors Affecting Burning								
4.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	%	(600)	3,400	
			Limited combustible	-0.15						
			Combustible	0.00						
			Free burning	0.15						
			Rapid burning	0.25						
4.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	For a fully supervised system the conditions a), b) and c) below must be met.			0	%	-	3,400	
			a) Automatic sprinkler protection designed and installed in accordance with NFPA 13	-0.3	No					
			b) Water supply is standard for both the system and the Fire Department hose lines	-0.1	No					
			c) Fully supervised system	-0.1	No					
			None	0.0	No					
4.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side	Greater than 30.0 m	0.00	0.5	%	1,700	5,100	
			East Side	0 to 3.0 m	0.25					
			South Side	Greater than 30.0 m	0.00					
			West Side	0 to 3.0 m	0.25					
4.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	5,100	
			Low risk of fire spread	2000						
			Moderate risk of fire spread	3000						
			High risk of fire spread	4000						
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:									5,000	
5	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:							83	
		Required Duration of Fire Flow of 5,000 L/min (hrs):					1.75			
		Required volume for Fire Flow of 5,000 L/min (m³):					525			

Fire Flow Test (v1.0)	
City of Barrie	
5-Jul-2023	
Hydrant Number (Residual and Static Pressure)	Residual Pressure H2560
Hydrant Number(s) (Flow)	Pitot Pressure H193
Hydrant Street / Address (Residual and Static Pressure)	Davidson Street @ 39 Ottaway Avenue
Hydrant Street / Address (Flow)	2 Ottaway Avenue @ termination of watermain
Hydrant Locations Figure (Residual/Static and Flow)	Please refer to Vipond's "Flow Test Results"
Date of Test (DD/MM/YYYY)	24/04/2023
Time (HH:MM AM or PM)	08:30:00 AM
Time (HH:MM AM or PM)	09:30:00 AM
Company Name	Vipond Inc.
Employee Name(s)	Imran Ahmad - T.H.
City of Barrie Employee Name(s)	Unknown
Static Pressure	98 psi
Residual Pressure	90 psi
Hydrant Elevation (Residual and Static Pressure)	255 m
Hydrant Elevation (Flow)	266 m
Elevation Difference (m)	-11 m
Pitot Pressure - Outlet 1	20 psi
Pitot Pressure - Outlet 2	15 psi
Outlet Size	2.5 inch
Outlet Coefficient	0.9
Pressure Drop Check (NFPA 291)	8.16 % Minimum pressure drop of 25% is recommended, please consider opening other outlets or flowing additional hydrants
Pressure Drop Check (AWWA M17)	8.00 psi Minimum pressure drop of 10 psi is recommended, please consider opening other outlets or flowing additional hydrants
Q Hydrant Flow - Outlet 1	1407.00 US gpm
Q Hydrant Flow - Outlet 2	0.00 US gpm
Q Total Flow	88.77 l/s
Pressure at Desired Fire Flow	20.00 psi
Q Outlet 1 _R	4812.34 US gpm
Q Outlet 2 _R	0.00 US gpm
Q Total _R	4812.34 US gpm
Q Total _R	303.61 l/s
Have any Cell formulas been changed? (Yes/No)	Yes C28 (Q hydrant flow) was revised to measured value instead of theoretical calculation. Measured value is more conservative of actual flow scenario.
Hydrant Colour:	Blue
Boundary Conditions (ET, Reservoir, BPS, PRV, Wells etc): Unknown	
Other Considerations (flushing, fire, operational issues, outlet coefficient etc): Entered data for Flow Test #3 Estimated hydrant elevations from ground elevations from Barrie OpenData GIS (Contours 2016)	



FLOW TEST RESULTS



DATE : APRIL 24, 2023 TIME VALVE OPENED: 8:30 AM

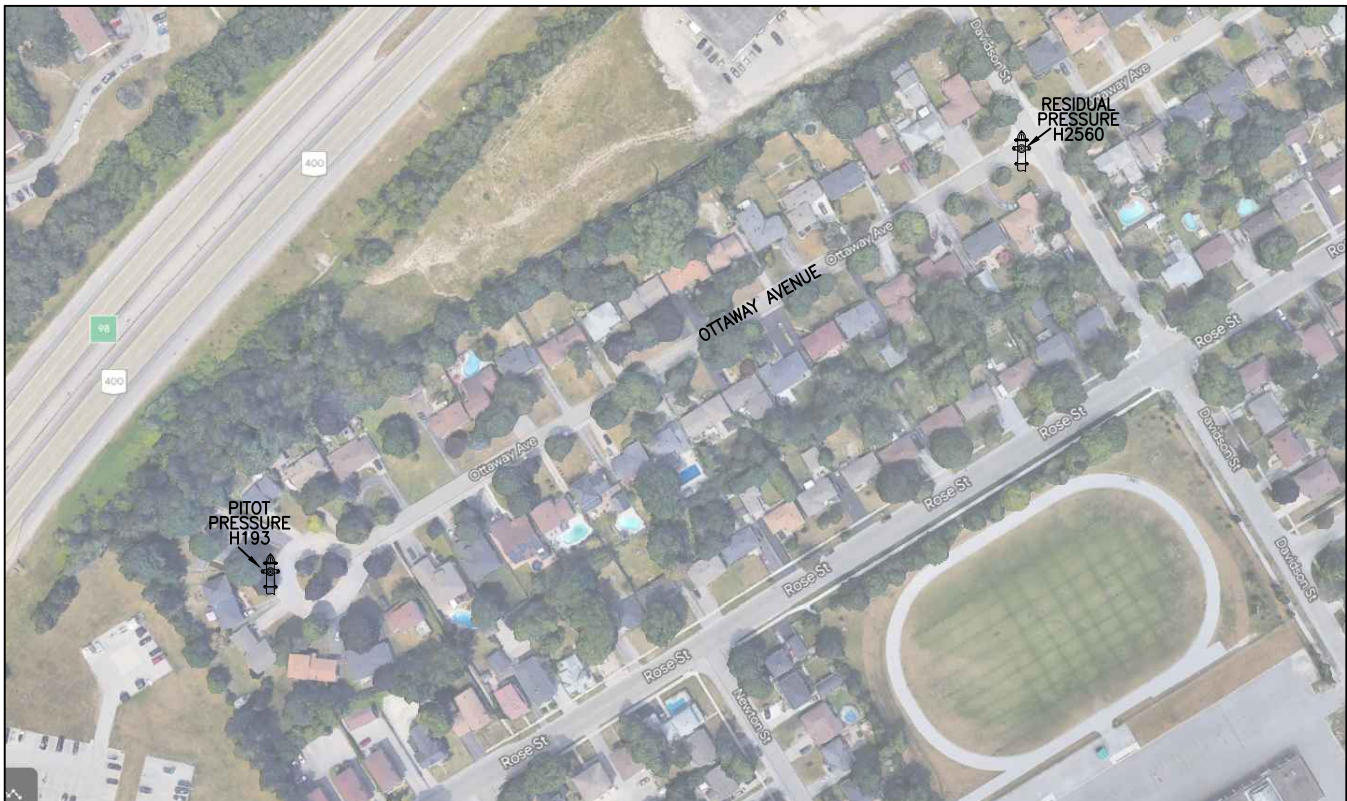
TIME LAST VALVE CLOSED: 9:30 AM

LOCATION : 12 OTTAWAY AVENUE

BARRIE

ONTARIO

TEST BY : IMRAN AHMAD – T.H.



STATIC PRESSURE : 98 PSI

TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1-3/4	0.995	93	68	734
2	1	2-1/2	0.90	92	42	1093
3	2	2-1/2	0.90	90	20/15	1407

Q total Flow
= 88.77 L/s



12 OTTAWAY AVENUE

BARRIE

ONTARIO

BY : IMRAN AHMAD- T.H.

OFFICE : BARRIE

TEST BY : VIPOND & PUC

DATE : APRIL 24, 2023

STATIC:

98 PSI

RESIDUAL:

TEST#1 93 PSI

TEST#2 92 PSI

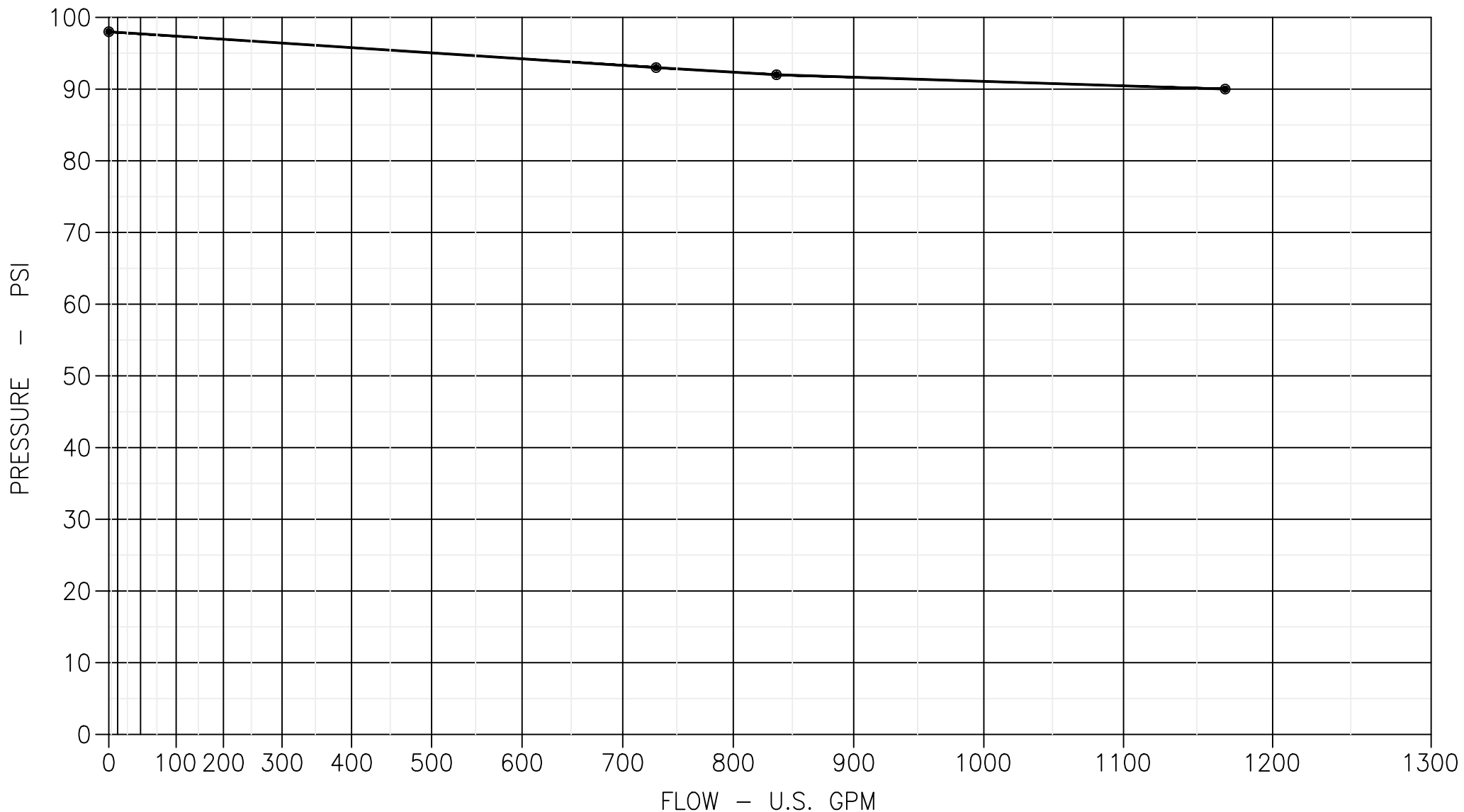
TEST#3 90 PSI

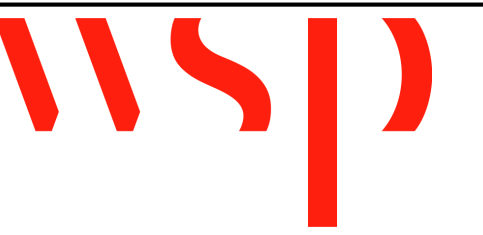
FLOW:

@ 734 GPM

@ 843 GPM

@ 1168 GPM





1224 GARDINERS RD, SUITE 201
KINGSTON, ONTARIO,
CANADA, K7P 0G2
WWW.WSP.COM



CITY OF BARRIE
P.O. BOX 400
BARRIE, ONTARIO

Legend

- BS BOOSTER STATION
- WATER RESERVOIR
- ELEVATED STORAGE TANK
- WELL PUMP HOUSE
- WTP WATER TREATMENT PLANT
- HEWITT SECONDARY PLAN AREA
- SALEM SECONDARY PLAN AREA
- ROADS
- WATERBODY

WATER PRESSURE ZONE

- 1
- 2N
- 2N REDUCED
- 2S
- 3N
- 3N REDUCED
- 3S
- 3S REDUCED
- CHIEFTAIN DECREASED PRESSURE

MDD+FF AVAILABLE FLOW

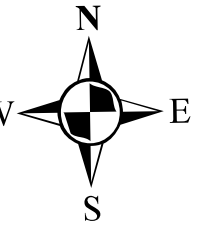
- Less than 70 L/s
- 70 - 155 L/s
- 155 - 200 L/s
- 200 - 333 L/s
- Greater than 333 L/s

MDD PIPE VELOCITY

- Less than 5 m/s
- Greater than 5 m/s

Data Source: Ontario Base Mapping, Ministry of Natural Resources, August 2013. Engineering Department, City of Barrie 2017.

Scale:
0 325 650 1,300 Meters
1:25,000



Project:

Water and Wastewater
Master Plan Updates

City of Barrie, Ontario

Title:

2041 - MDD+FF Simulation
Available Fire Flow and
Pipe Velocity Results

Project No.:
171-07636-03

Date:
APRIL 2019

Drawn By: BY

Checked By: MF

Code: MP

Figure No.: F1-6

