PEARSON
ENGINEERING LTD.

August 7, 2020 File: 18079

Attention: Carlissa McLaren

City of Barrie
70 Collier Street
Barrie, ON
L4M 4T5

Dear Carlissa,

Re: 18079 – Sean Mason Homes
Vet. Lane Inc., Barrie
File Number D12-449 & D14-1686 - Fire Flow Letter

PEARSON Engineering Ltd. has been retained by Sean Mason Homes (Vet Lane Inc.) (Client) to prepare a Fire Flow Letter in support of the proposed residential development at 335 Veteran's Drive and 341 Veteran's Lane (Project) located on the east and west sides of Veteran's Lane in the City of Barrie (City). The subject lands are located north of Veteran's Drive and south of Montserrand Street and can be seen on Figure 1.

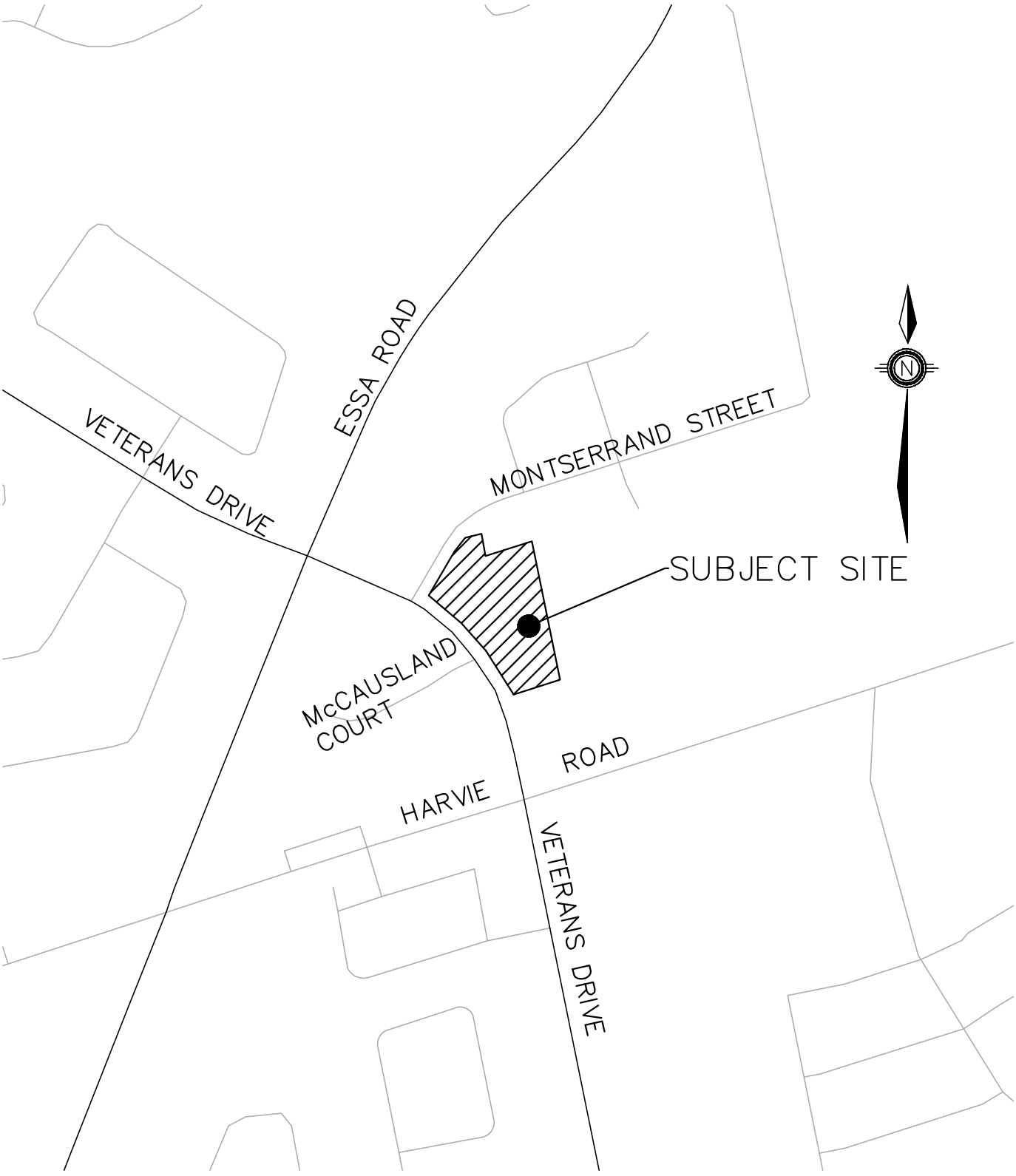
The Project site consists of two parcels of land separated by Veteran's Lane with a combined area of approximately 0.91 ha in size. The east parcel has an existing house and the west parcel is an undeveloped lot. The east parcel drains from west to east across the adjacent residential properties and is bound by Veteran's Lane to the west and existing single detached residential homes to the north, east and south. The west triangular parcel drains from south to north towards Montserrand Street and is bound by Veteran's Drive to the south, Montserrand Street to the west and north and Veteran's Lane to the east. The Project proposes the development of the site through the construction of a 5-storey apartment building with 39 units and 35 townhouse units on the east property. A population density of 1.67 ppu for the Apartments and 2.34 ppu for the Townhouses has been used for the project resulting in a design population of 147 persons.

The water servicing for this project has been considered from an internal perspective. The domestic water requirements of the proposed site have been developed based on the following demands and design criteria set out by the City of Barrie:

- 1.67 people/unit for Apartments
- 2.34 people/unit for Townhomes
- Demand per Person (Q) = 225 L/person/day
- Estimated Average Day Demand = 0.38 L/s
- Estimated Max Day Flow = 1.05 L/s
- Estimated Peak Hour Demand = 1.58 L/s (25.05 GPM)

The Project is proposed to be serviced by the municipal watermain for domestic and fire purposes and will be designed as per City standards. A proposed 300 mm diameter watermain will extend to the proposed apartment building from a connection to the existing 200 mm watermain on Montserrand Street fronting the site and with a proposed 200 mm diameter watermain extending through the remaining project site to create a looped system. Individual 100 mm diameter domestic and 200 mm diameter fire service connections will be installed to the proposed apartment building and individual 25 mm diameter services to the Townhomes. One proposed hydrant will service the development.

A water pressure test was performed by Vipond Inc. on July 7, 2020 on the existing fire hydrants closest to the site on Montserrand Street and Veterans Drive. A static pressure of 50 psi was established at the existing hydrant. The results from this flow test are included in Appendix A and were used to determine the availability of fire flow and domestic flow for the Project.



SEAN MASON HOMES
VET. LANE INC.
BARRIE, ON

SITE LOCATION PLAN

PEARSON ENGINEERING LTD.
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC	HORIZ SCALE	NTS	PROJECT #	18079
DRAWN BY	AMC	VERT SCALE	NTS	DRAWING #	FIG-1
CHECKED BY	MWD	DATE	APRIL 2019	REVISION #	0

The water model uses the peak domestic demand flows found below in Table 1. The minimum pressure at the listed junctions can also be found in Table 1, which shows that the pressure is adequate to supply domestic flow for the development. Detailed demand calculations and model results can be found in Appendix C.

Table 1: Domestic Servicing Summary

Junction Label	Demand (GPM)	Pressure (psi)
TH1	1.20	47.0
TH2	2.79	46.5
TH3	2.39	50.0
TH4	1.20	45.8
TH5	3.19	46.4
TH6	3.19	46.9
BLD1	11.10	46.9

The 300 mm diameter fire service to the apartment building will provide water supply for internal fire suppression. The proposed fire hydrant located on the Project site will provide adequate firefighting coverage for the proposed buildings as per City of Barrie Standards.

The required fire flow was calculated and can be found in Appendix B and in Table 2 below.

Table 2: Fire Flow Servicing Summary

Junction Label	Fire Flow Demand (GPM)	Pressure (psi)
TH1	3,168	39.6
TH2	3,168	36.2
TH3	3,168	39.1
TH4	3,168	35.0
TH5	3,168	35.9
TH6	3,168	37.5
BLD1	4,752	33.7

Detailed fire flow calculations included in Appendix C and show that adequate flow can be provided for the proposed development.

The analysis completed demonstrates that sufficient pressure and flow is available within the existing 200 mm diameter watermain on Montserrand Street to supply domestic and fire flow demands for this Project.

If you have any questions regarding the above or require any further information, please feel free to call me at 705-719-4785. Ext. 224.

Regards,

PEARSON ENGINEERING LTD.

Mike Dejean, P. Eng.
Partner, Manager of Engineering Services

Appendix A
Vipond Flow Test Results

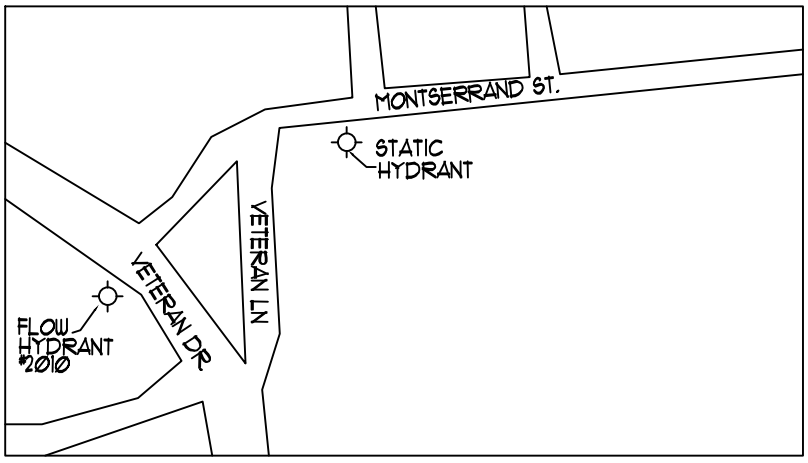
FLOW TEST RESULTS

FIRST FOR FIRE, LIFE SAFETY & SECURITY
VIPOND INC
est. 1945

DATE : JULY 7,2020 TIME : 9:30 AM

LOCATION : MONTSERRAND STREET
BARRIE
ONTARIO

TEST BY : VIPOND FIRE PROTECTION AND LOCAL PUC



STATIC PRESSURE : 50 PSI UNDERGROUND TYPE & SIZE : 150 mm CPVC

TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.G.P.M.)
1	1	1 3/4"	0.995	49	35	527
2	1	2 1/2"	0.90	48	18	716
3	2	2 1/2"	0.90	45	15	1306

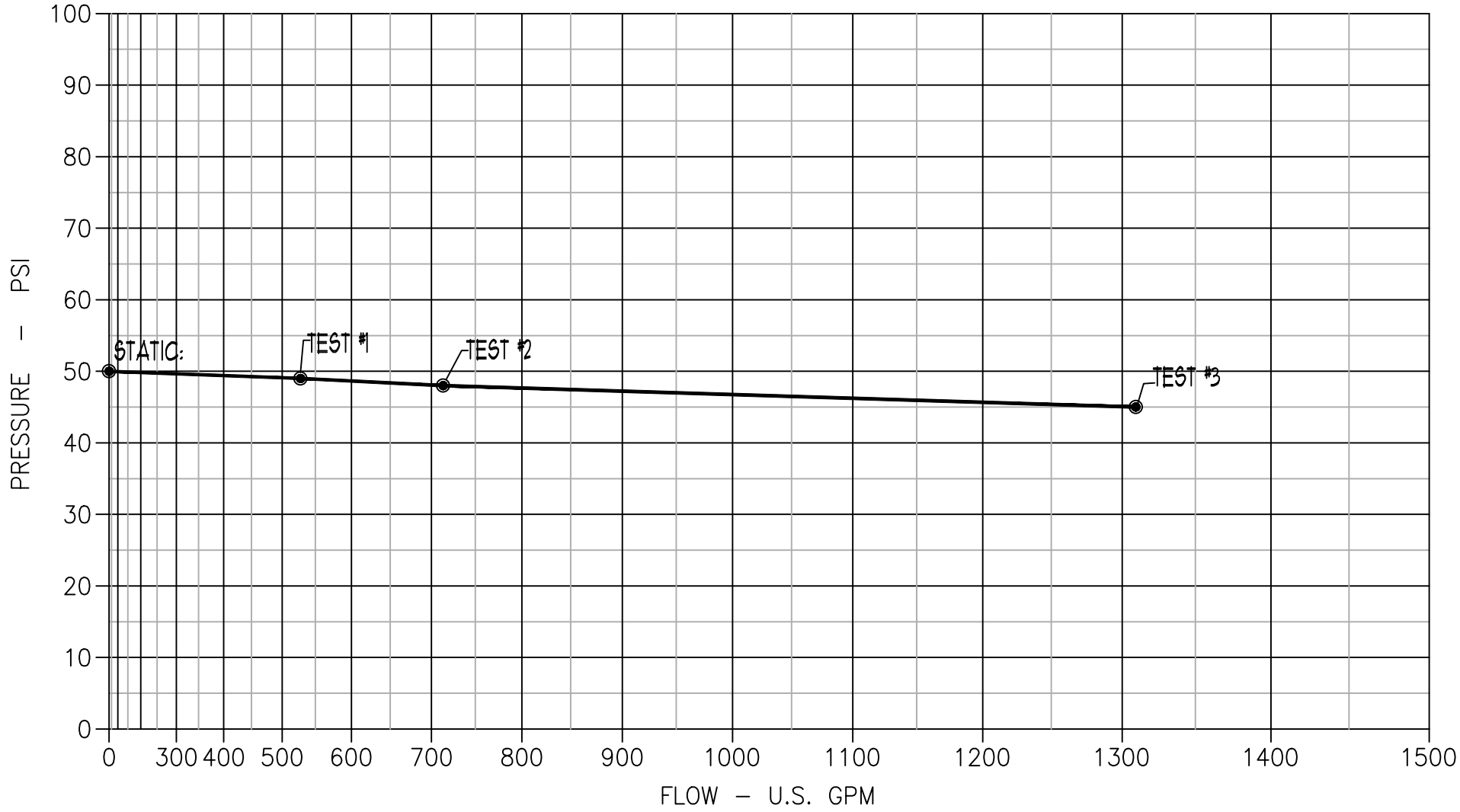
FIRST FOR FIRE, LIFE SAFETY & SECURITY

VIPOND INC

est. 1945

MONTSERRAND STREET	BY :	LEN K.
BARRIE	VIPOND OFFICE :	BARRIE
ONTARIO	TEST BY :	VIPOND & PUC
	DATE :	JULY 7,2020

STATIC:		RESIDUAL:		FLOW:
50 PSI	TEST#1	49 PSI	@	527 GPM
	TEST#2	48 PSI	@	716 GPM
	TEST#3	45 PSI	@	1306 GPM



Appendix B
Demand Calculations

GRADE FROM PROPOSED
PROPERTY LINE INTO EXISTING
GRADES AT MAX 3:1 SLOPE

PROP 200mmø WATERMAIN

PROP 200mmø WATERMAIN

BLOCK 1
3 LANE
TOWNHOUSE
UNITS

BLOCK 2
7 LANE TOWNHOUSE
UNITS

BLOCK 3
6 LANE TOWNHOUSE
UNITS

BLOCK 4
3 TOWNHOUSE UNITS

BLOCK 5
8 TOWNHOUSE UNITS

BLOCK 6
8 TOWNHOUSE UNITS

5-STOREY APARTMENT BUILDING
41 UNITS
(42 U/G PARKING SPACES)

TOP OF UNDERGROUND PARKING

J1 EX-HYD1 P1

J2 P3 J3 P4 J4 P18 J9 P16 J8

J5 P7 TH2 P8 TH3 P9 J6 P10 TH4 P11

P6 TH1 P5 P2

HYD1 P13 J7 TH5 P12 P14 TH6 P15

BLD1 P17

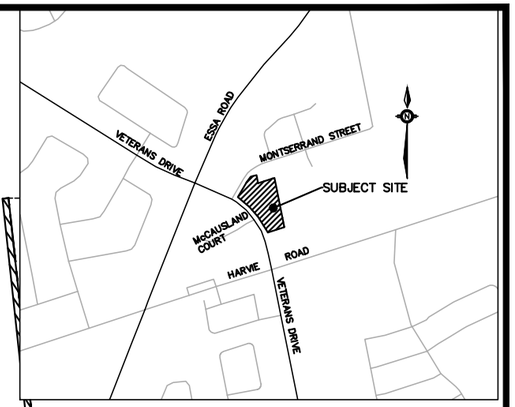
PROP 300mmø WATERMAIN
PROP 300mmø WATERMAIN
PROP 300mmø WATERMAIN
PROP 200mmø WATERMAIN

EX. 200mmø PVC W/M
EX. 200mmø PVC W/M
EX. 300mm PVCø W/M

EX H&V

CONCRETE SIDEWALK
BACK OF CURB
EDGE OF PAVEMENT

MONTSERRAND
VETERANS DRIVE



KEY PLAN
NTS

LEGEND:

- J3 JUNTION
- VB VALVE BOX
- HYD1 RESERVOIR
- P11 WATERMAIN PIPE SECTION

NO.	REVISION NOTE	DATE	BY

SEAN MASON HOMES
VET. LANE INC.
BARRIE, ONTARIO

HYDRAULICAD MODEL LAYOUT

PEARSON ENGINEERING LTD.
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY MWD	HORIZ SCALE 1:500	PROJECT # 18079
DRAWN BY MJWP	VERT SCALE N/A	DRAWING # WC-1
CHECKED BY MWD	DATE AUG 2020	REVISION # 0

Sean Homes - Veteran's Lane
Water Flow Calculations

Design Criteria:

Demand per capita (Q):	225	L/cap/day
Peak Rate Factor (Max. Hour)	4.13	(Table 3-1: Peaking Factors, MOE Design Guidelines for Drinking-Water Systems)
Max. Day Factor	2.75	(Table 3-1: Peaking Factors, MOE Design Guidelines for Drinking-Water Systems)

Site Data:

Description		Density		Units	Flow Rate
Townhomes	2.34	person/unit		35 units	225 L/cap/d
Apartments	1.67	person/unit		39 units	225 L/cap/d

Calculate Population

Pop. Townhomes	=	2.34	x	35
Pop. Apartments	=	1.67	x	39
Pop.	=	147	people	

Calculate Average Day Demand

ADD	=	225	x	147
ADD	=	33082	L/day	
ADD	=	0.38	L/s	

Calculate Max Day Flow

MDF	=	0.38	x	2.75
MDF	=	1.05	L/s	

Calculate Peak Hour Demand

PHD	=	0.38	x	4.13
PHD	=	1.58	L/s	
PHD	**=**	**25.05**	**GPM**	

Peak Hour Demand (Breakdown)

PHD (3-Unit TH)	=	1.20	GPM
PHD (6-Unit TH)	=	2.39	GPM
PHD (7-Unit TH)	=	2.79	GPM
PHD (8-Unit TH)	=	3.19	GPM
PHD (Apartment)	=	11.10	GPM

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Sean Homes - Veteran's Lane
HydrauliCAD FlexTable: Junction Table - Domestic Peak Hour

Label	Elevation (m)	Demand (gpm)	Head (m)	Pressure (psi)
J1	308.30	0.00	35.24	50.1
J2	309.06	0.00	34.48	49.0
J3	309.44	0.00	34.10	48.5
J4	309.86	0.00	33.68	47.9
TH1	310.50	1.20	33.04	47.0
J5	309.37	0.00	34.17	48.6
TH2	310.81	2.79	32.73	46.5
TH3	308.36	2.39	35.18	50.0
J6	311.37	0.00	32.17	45.7
TH4	311.30	1.20	32.24	45.8
TH5	310.89	3.19	32.65	46.4
J7	310.84	0.00	32.70	46.5
HYD1	310.92	1.00	32.62	46.4
TH6	310.59	3.19	32.95	46.9
J8	310.59	0.00	32.95	46.9
J9	310.42	0.00	33.12	47.1
BLD1	310.53	11.10	33.01	46.9

Note: - J1 Elevation estimated from City of Barrie As-Builts.
- Watermains assumed to be 1.7m below grade.

Appendix C
Fire Flow Calculations

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Sean Homes - Veteran's Lane
Fire Flow Calculations - Townhouses

Location:	Veterans Lane Inc., Barrie, ON	
OBC Occupancy:	Residential Occupancies - Class C	
Building Foot Print:	470 m^2	
# of Stories:	3 Storey	**Townhouse Buidings**

Project: Sean-Veteran's Drive

Project Number: 18079

**Utilizing worst case scenario for townhouse units

Construction Class	Charge
Wood Frame	1.5
Ordinary	1.0
Non-Combustible	0.8
Fire Resistive	0.6

Construction Class: Ordinary Construction

Automated Sprinkler Protection:		Credit	Total
NFPA 13 sprinkler standard	No	30%	
Standard Water Supply	No	10%	0%
Fully Supervised System	No	10%	

Contents	Charge
Non-Combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Contents Factor: Combustible **Charge:** 0%

Exposure 1 (north) 5-Storey Apartment	Distance to Exposure Building (m) / Length - Height	18.3	15%
Exposure 2 (east) Townhouse - Block 3	Distance to Exposure Building (m) / Length - Height	23.5	10%
Exposure 3 (south) Townhouse - Block 5	Distance to Exposure Building (m) / Length - Height	1.5	25%
Exposure 4 (west) Ex. Commercial	Distance to Exposure Building (m) / Length - Height	39.6	5%

Separation	Charge
0 - 3.0 m	25%
3.1 - 10.0 m	20%
10.1 - 20.0 m	15%
20.1 - 30.0 m	10%
30.1 - 45.0 m	5%
> 45.1 m	0%

Total: 55% *no more than 75%

Are Buildings Contigious? No

Fire Resistant Building: Are vertical openings and exterior vertical communications protected with a minimum one (1) hr rating?

Calculations: *C* = 1.0 Ordinary Construction

RFF = 220 x C x √A *A* = 1,409 m²

Where: *RFF* = required fire flow in liters per minute
C = Coefficient related to the type of construction
A = the total floor area in square meters (excluding basements in building considered

RFF = 8,258 L/min

Round to Nearest 1000 L/min RFF = 8,000 L/min *Must be > 2000 L/min or < 45,000 L/min

Correction Factors:

Occupancy		0	L/min
Fire Flow Adjusted for Occupancy	**E =**	8,000	L/min
Reduction For Sprinkler	**F =**	0	L/min
Fire Flow w/ Sprinkler Reduction		8,000	L/min
Exposure Charge	**G =**	4,400	L/min
Fire Flow w/ Exposure Charge		12,400	L/min

As per "Water Supply for Public Fire Protection" pg.20 note H:
RFF = **E - F + G**
RFF= 8,000 L/min - 0 L/min + 4,400 L/min
RFF = 12,000/min

Required Fire Flow: **RFF =** 12,400 L/min

Round to Nearest 1000 L/min **RFF = 12,000 L/min**

RFF= 3,168 GPM

RFF = 200 L/s

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Sean Homes - Veteran's Lane
Fire Flow Calculations - Walk-Up 24-Plex

Location:	Veterans Lane Inc., Barrie, ON	
OBC Occupancy:	Residential Occupancies - Class C	
Building Foot Print:	736 m^2	
# of Stories:	5 Storey	**Apartment Building**

Project: Sean-Veteran's Drive

Project Number: 18079

Construction Class	Charge
Wood Frame	1.5
Ordinary	1.0
Non-Combustible	0.8
Fire Resistive	0.6

Construction Class: Ordinary Construction

Automated Sprinkler Protection:		**Credit**	**Total**
NFPA 13 sprinkler standard	No	30%	
Standard Water Supply	No	10%	0%
Fully Supervised System	No	10%	

Contents	Charge
Non-Combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Contents Factor: Combustible **Charge:** 0%

Exposure 1 (north) Ex. House	Distance to Exposure Building (m) / Length - Height	22.5	10%
Exposure 2 (east) Townhouse - Block 1	Distance to Exposure Building (m) / Length - Height	9.5	20%
Exposure 3 (south) Ex. Building	Distance to Exposure Building (m) / Length - Height	> 45.0	0%
Exposure 4 (west) Ex. Building	Distance to Exposure Building (m) / Length - Height	31.9	5%

Separation	Charge
0 - 3.0 m	25%
3.1 - 10.0 m	20%
10.1 - 20.0 m	15%
20.1 - 30.0 m	10%
30.1 - 45.0 m	5%
> 45.1 m	0%

Total: 35% *no more than 75%

Are Buildings Contigious? No

Fire Resistant Building: Are vertical openings and exterior vertical communications protected with a minimum one (1) hr rating?

Calculations: *C* = 1.0 Ordinary Construction

RFF = 220 x C x √A *A* = 3,680 m²

Where: *RFF* = required fire flow in liters per minute
C = Coefficient related to the type of construction
A = the total floor area in square meters (excluding basements in building considered

RFF = 13,346 L/min

Round to Nearest 1000 L/min RFF = 13,000 L/min *Must be > 2000 L/min or < 45,000 L/min

Correction Factors:

Occupancy		0	L/min
Fire Flow Adjusted for Occupancy	**E =**	13,000	L/min
Reduction For Sprinkler	**F =**	0	L/min
Fire Flow w/ Sprinkler Reduction		13,000	L/min
Exposure Charge	**G =**	4,550	L/min
Fire Flow w/ Exposure Charge		17,550	L/min

As per "Water Supply for Public Fire Protection" pg.20 note H:
RFF = **E - F + G**

RFF = 11,000 L/min - 0 L/min + 2,750 L/min
RFF = 13,750/min

Required Fire Flow: **RFF =** 17,550 L/min

Round to Nearest 1000 L/min **RFF = 18,000 L/min**

RFF= 4,752 GPM

RFF = 300 L/s

Sean Homes - Veteran's Lane
HydrauliCAD FlexTable: Fire Flow Report

Townhouse Block Fire Flow Summary:

Label	Satisfies Fire Flow Constraints?	Fire Flow (Required) (GPM)	Fire Flow (Available)* (Upper Limit) (GPM)	Pressure Required (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
TH1	TRUE	3,168	3,500	20.0	39.6
TH2	TRUE	3,168	3,500	20.0	36.2
TH3	TRUE	3,168	3,500	20.0	39.1
TH4	TRUE	3,168	3,500	20.0	35.0
TH5	TRUE	3,168	3,500	20.0	35.9
HYD1	TRUE	3,168	3,500	20.0	34.9
TH6	TRUE	3,168	3,500	20.0	37.5
BLD1	TRUE	3,168	3,500	20.0	40.7

* Available fire flows above the stated upper limit of 3,500 GPM are capped due to adequate fire flow available.

Apartment Building Fire Flow Summary:

Label	Satisfies Fire Flow Constraints?	Fire Flow (Required) (GPM)	Fire Flow (Available)* (Upper Limit) (GPM)	Pressure Required (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)
TH1	TRUE	4,752	5,000	20.0	31.4
TH2	TRUE	4,752	5,000	20.0	24.7
TH3	TRUE	4,752	5,000	20.0	26.8
TH4	TRUE	4,752	5,000	20.0	22.9
TH5	TRUE	4,752	5,000	20.0	24.2
HYD1	TRUE	4,752	5,000	20.0	22.1
TH6	TRUE	4,752	5,000	20.0	27.0
BLD1	TRUE	4,752	5,000	20.0	33.7

* Available fire flows above the stated upper limit of 5,000 GPM are capped due to adequate fire flow available.