GEI Consultants Canada

Servicing Feasibility Study

East Court Residence Apartments

1111 15th Avenue East, Owen Sound

Owen Sound, Ontario

Submitted to:
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1193 Dundas Street
Woodstock, ON N4S 8W3

Submitted by:
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April 8, 2026
Project No. 2401411

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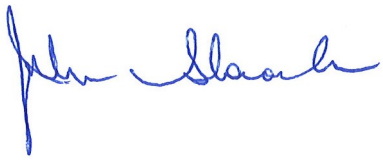

John Slocombe, P.Eng.
Senior Project Manager

Record of Revisions

Identification	Date	Description of Issued and/or Revision
Servicing Feasibility	April 8th, 2026	Issued for ZBA

Statement of Conditions

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Table of Contents

Appendices

1. Introduction

1.1. Background

GEI Consultants Canada Ltd (GEI) has been retained by Sierra General Contracting to provide engineering services in support of the development of a 128-unit apartment building located on Block 6 of Park Lot 5 within the City of Owen Sound. The proposed development, herein referred to as the subject property, is located at 1111 15th Avenue East Owen Sound, as illustrated in **Figure 1** in **Appendix A**.

The 1.01 ha site is planned to support a multi-storey apartment building with a total gross floor area of 1,732 m^2 containing 128 units. The development includes underground parking, a small car wash, paved parking areas and driveways, as well as outdoor amenities such as pickleball courts and an amenity area.

In support of Site Plan Approval (SPA), the City of Owen Sound (City) has requested a Servicing Feasibility Study to confirm that the proposed water and sanitary servicing connections are adequate and can be accommodated by existing municipal infrastructure.

1.2. Site Description and Existing Servicing

The subject property is currently vacant, with stockpiles of topsoil and vegetation throughout the property. Access is provided from 15th Avenue East, which is classified as a local road. The site generally slopes downward from south to north, with overland drainage directed towards 15th Avenue East. The surrounding lands consists of residential, commercial, and vacant parcels designated for future development.

The subject property forms part of the previously approved AndPet East Court Residential Subdivision. A Stormwater Management (SWM) Report prepared by GM BluePlan Engineering (S1364 – SWM Report – September 2019) established drainage design, flow constraints, and stormwater management criteria for the subdivision. As the subject property is located within the catchment area of the approved 2019 SWM Report, development of the property is required to remain in accordance with the approved report.

GEI's historical data indicates that the site currently has no active water or sanitary service connections. However, servicing stubs were installed as part of earlier phases of subdivision construction, including:

- 450mm Ø HDPE storm sewer at the end of 15th Avenue East,
- 250mm Ø PVC sanitary sewer stub at the end of 15th Avenue East, and
- 200mm Ø PVC watermain stub at the end of 15th Avenue East.

The proposed development is intended to utilize these existing stubs. The water connection at 15th Avenue East is located within the Industrial Pressure Zone. Should pressures from the 15th Avenue East connection be insufficient, an alternate water supply connection from 10th Street East, located within the East Hill Pressure Zone, maybe considered.

A Sanitary Sewer Design Brief prepared by GM BluePlan (S1364 – Sanitary Sewer Design Brief – September 2019) established the peak design flow and pipe capacities for each lot within the subdivision catchment area. The existing sanitary sewer stub at 15th Avenue East was designed to convey a peak capacity of 59.5 L/s. Based on the approved SWM Report, the corresponding peak storm capacity at the storm sewer stub located at 15th Avenue East is 285 L/s. The drainage areas from the previously approved reports from GM BluePlan for both sanitary and storm can be found in **Appendix A**. The capacity for each of the sanitary and storm sewers can be found in the design sheets in **Appendix B**.

1.3. Standards and Guidelines

This report has been prepared recognizing the following Government Guidelines, Provincial and Municipal Standard and Publications:

- Ministry of Environment, Conservation & Parks (MECP), Design Guidelines for Drinking-Water Systems, (www.ontario.ca), (May 2023)
- Site Development Engineering Standards, The Owen Sound Engineering Standards, (www.owensound.ca), (February 2021)
- Subdivision Policies & Engineering Design Standards, Owen Sound, (www.owensound.ca), (June 2021)
- The Building Code Act, Ontario Building Code
- MECP, Design Guidelines for Sewage Works
- S1364 – SWM Report – September 2019
- S1364 – Sanitary Design Brief – September 2019

2. Stormwater Management

Based on the approved SWM Report for the AndPet Subdivision referenced in Section 1.2, no additional stormwater management measures are required for the proposed development. The subject property (Block 30), identified in Figure 2 of the 2019 SWM Report (**Appendix A.3**), was assigned a runoff coefficient of 0.75 with a corresponding imperviousness of approximately 79% in accordance with Section 3.5 of the City's Subdivision Policies and Engineering Design Standards.

The site plan prepared by BIM Architecture indicates an imperviousness of approximately 66.1%, which is lower than the previously approved conditions. As a result, the proposed development remains consistent with the stormwater parameters previously established for the subdivision.

Further, the proposed development has a designated 5-year storm peak flow of 189 L/s, as provided in **Appendix B** and based on the catchment areas shown in Figure 2 (**Appendix A.2**). As the existing 450mm storm stub into the site allowed for a full-flow capacity of 285 L/s the proposed peak flows fall well within this approved capacity, no additional on-site stormwater management measures are required.

3. Sanitary Servicing

Sanitary design flows for the proposed 128-unit apartment building have been calculated in accordance with the City of Owen Sound Standards, MECP Design Guidelines, and the Ontario Building Code (OBC). The average daily flow, peak flows, and extraneous flows have been included to determine the required sanitary capacity based on 400L/capita/day and 2.3 persons per unit. A summary of the design inputs and resulting flows is provided in **Table 1**.

Table 1: Sanitary Peak Flow Calculations

Site Development Standards	Calculations
Average Flow (q)	= 400 (L/capita/day)
Residential Equivalent Population (P)	= 2.3 persons/unit x [128 units] = 295 persons
Site Area	= 1.01 ha
Peak Extraneous Flow (I)	=0.20 (L/ha/s)
Harmon Peaking Factor (M)	= 1+(14/ (4+$(P/1000^{0.5})$) = 4.08
Peak Design Flow (Q) – MECP Guidelines	= (M*q*(P/1000))/86.4) + IA = **5.77 (L/s)**
OBC Peak Design Flow	= 250 GPM = **15.77 L/s**

Note:
* OBC Design Flows were provided by the Mechanical Engineer (DEI) on March 13th, 2026.

The Mechanical Engineer's calculated OBC sanitary peak flow rate is 15.77 L/s, as shown in **Table 1.** Based on the full flow capacity of the sanitary stub on 15th Avenue East (refer to Section 1.2), the calculated peak flow represents approximately 68.0% of the pipe's full capacity, indicating that the existing sanitary sewer has sufficient capacity to accommodate the proposed development.

The sanitary service is designed in accordance with City Guidelines and the Ontario Building Code. A 200 mmØ PVC sanitary service, at a minimum grade of 0.5%, provides a capacity of about 23.2 L/s, which is adequate to accommodate the anticipated peak flows of 15.77 L/s from the proposed building. The proposed service follows the City guidelines for a full flow velocity of 0.74 m/s and provides an adequate capacity for the development. A sanitary sewer design sheet is provided in **Appendix B**.

4. Water Servicing

Currently there is no water service connection for the subject property, however, a 200 mmØ PVC DR18 watermain stub is available at the end of 15th Avenue East. The development proposes to utilize this stub as the primary water service connection for the proposed 200 mmØ water service.

A hydrant flow test was completed on October 7, 2025, by Vipond Inc. on hydrant #IC230, which noted a residual pressure of 70 psi at 591 GPM (37.29 L/s). Results of the hydrant flow test are included in **Appendix B**.

As the City of Owen Sound does not specify their average daily flow rates and people per unit for water demand. We have assumed 400L/capita/d and 2.3 persons per unit based on the City's sanitary design guidelines. Maximum Day and Peak Hour flows are calculated by applying peaking factors, as summarized in **Table 2**.

Table 2: Water Maximum Day Demand & Average Daily Demand

Site Development Standards	Calculations
Average Daily Demand Per Person (q)	= 400 (L/capita/day)
Residential Equivalent Population (REP)	= 2.3 persons/unit x [128 units] = 295 persons
Site Area	= 1.01 ha
Average Daily Demand (ADD)	=REP x Avg Daily Demand Per Person = 118,000 L/d = 1.37 L/s
Peak Hour – (Table 3-3: MECP Design Guidelines)	= ADD x Peak hour factor = 1.37 L/s x 5.4 = 7.40 L/s
*Fire Peak Flow Rates (FF)	= 300 GPM = 18.93 L/s
*Maximum Day Demand (MDD)	= 150 GPM = 9.46 L/s
Peak Flow	= MDD + FF = 9.46 L/s + 18.93 L/s = **28.39 L/s**

Note:
* Fire and Maximum Day Demand Flow Rates for the 128-unit apartment building were obtained from the Mechanical Engineer on March 10th, 2026.

The proposed development will be sprinklered and, therefore, fire flow calculations were completed for this site. MECP Design Guidelines for Drinking Water systems indicate "drinking water systems should be designed to satisfy the greater of the Maximum Day Demand (MDD) plus fire flow (FF) or the Peak Hour demand". As the proposed development includes sprinklers, friction headloss calculations were completed to ensure the proposed water service met the maximum of either the MDD plus fire flow or Peak Hour Demand for the 128-unit apartment building.

The residential development will be serviced with municipally treated water. The site will be serviced with the proposed 200 mmØ PVC DR18 water service by connecting to 15th Avenue East, and the apartment building will be connected via internal plumbing. As provided in **Appendix B**, a total headloss of about 0.32 psi would occur between the hydrant at the end of 15th Ave East and the apartment building. The proposed 200 mmØ water service is anticipated to provide a peak flow capacity of about 28.39 L/s at a residual pressure of 69.68 psi based on the City of Owen Sound's criteria for discharge calculations.

The above calculations are intended to justify the size of the proposed water service to the building. Plumbing design is expected to be completed by a mechanical engineer prior to a Building Permit Application.

5. Summary

Based on the previously approved SWM Report, no new stormwater management is required. The subject property will produce a peak flow rate of 189 L/, which is adequately sized based on the SWM Report. The proposed storm includes:

- Double catch basin maintenance holes (DCBMHs), maintenance holes (MH), ditch inlet catch basins (DICBs), and storm sewer pipes of various diameters. These components will be connected to a new storm MH which will connect to the existing 450 mmØ PE storm sewer stub.

The proposed on-site sanitary service is expected to provide adequate capacity for the development and consists of the following:

- A 200 mmØ PVC sanitary service installed from the proposed apartment building and connected to a new sanitary maintenance hole at the property line, which will drain north to the existing 250 mmØ PVC sanitary sewer on 15th Avenue East.

The proposed on-site water servicing work includes the following:

- The new apartment building will be serviced by a 200 mmØ PVC DR18 water service connected to the existing 200 mmØ PVC DR18 watermain stub on 15th Avenue East, within the City's Industrial Pressure Zone. This service will provide a fire flow capacity of 28.39 L/s with a anticipated residual pressure of 69.68 psi.

Storm, sanitary, and water services have been designed in accordance with the applicable Ontario Building Code, MECP, and City design standards.

Appendix A GEI Figures

A.1. Site Location Map – Figure #1

A.2. Drainage Area Plan – Figure #2

A.3. Figure No. 2 - Inlet Storm Sewer System Drainage Areas (S1364)

A.4. Figure No. 2 - Sanitary Sewer Drainage Areas (S1364)

EAST COURT RESIDENCE APARTMENTS
15th AVENUE EAST
OWEN SOUND, ONTARIO

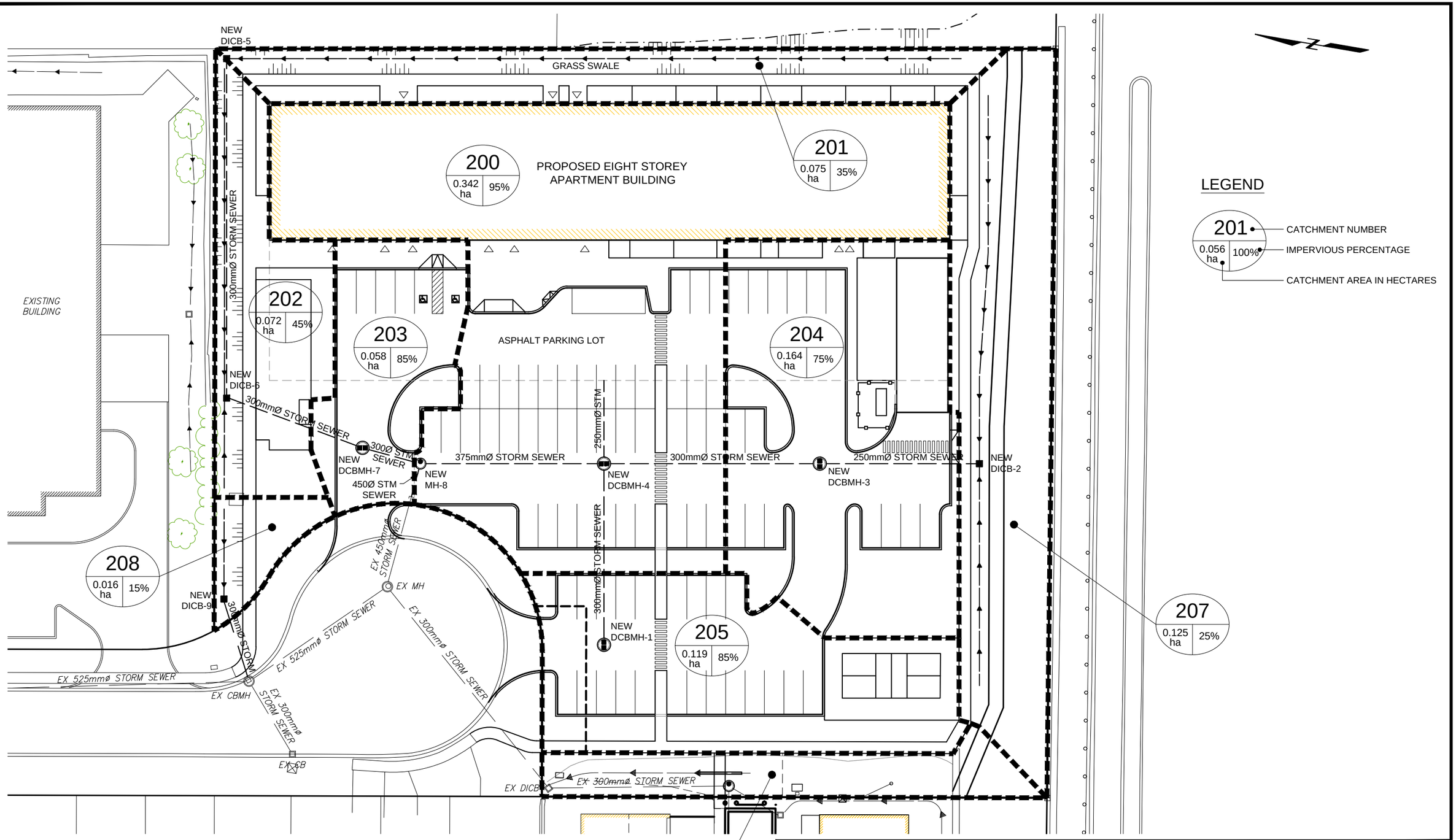
Andpet Realty
Owen Sound, Ontario

GEI Consultants

SITE LOCATION PLAN

Project 2401411 | April 2026 | Fig. 1

BOERS, KEN C:\AutoCAD Drawings\2401411 SP-K Option 2.dwg - 4/7/2026



SCALE 1:500

EAST COURT RESIDENCE APARTMENTS
15th AVENUE EAST
OWEN SOUND, ONTARIO

Andpet Realty
Owen Sound, Ontario

GEI Consultants

DRAINAGE AREA PLAN

Project 2401411 | April 2026 | Fig. 2

S-1364
Andpet Subdivision
City of Owen Sound

16th AVE EAST

10th ST EAST

14th ST EAST

MH-B-18
CB-21
CB-20
MH-B-17
DCBMH-B-15
DCBMH-B-16
MH-B-14

OUTLET STORM SEWER SYSTEM CATCHMENT AREA

INLET STORM SEWER SYSTEM CATCHMENT AREA

BLOCK 31
BLOCK 30
BLOCK 33
BLOCK 32
BLOCK 28
BLOCK 29

SWM FACILITY
PROPOSED FOREBAY BERM

102
A=0.14 ha
c=0.70

500
A=1.02 ha
c=0.75

204
A=0.17 ha
c=0.70

200
A=0.17 ha
c=0.70

205
A=0.14 ha
c=0.70

400
A=1.08 ha
c=0.75

103
A=0.22 ha
c=0.70

102
A=0.12 ha
c=0.75

203
A=0.17 ha
c=0.75

301
A=0.38 ha
c=0.75

201
A=0.11 ha
c=0.75

200
A=0.09 ha
c=0.75

100
A=0.04 ha
c=0.75

300
A=0.85 ha
c=0.75

101
A=0.06 ha
c=0.75

DCBMH-B-12
DCBMH-B-11
CB-8
CBMH-B-10
DCBMH-B-5
CBMH-B-9
CB-14
CB-16
CBMH-B-8
MH-B-7
DICB-12
MH-B-6
DICB-15
DICB-13
CBMH-B-4
MH-B-3A

STREET A

FUTURE MH
FUTURE DCB
FUTURE CB
FUTURE CBMH
FUTURE DICB

LEGEND

100
A=0.04 ha
c=0.75

SUB-CATCHMENT
DRAINAGE AREA
RUNOFF COEFFICIENT

CATCHMENT BOUNDARY
SUB-CATCHMENT BOUNDARY

SCALE = 1:1,500
SEPTEMBER 2019

INLET STORM SEWER SYSTEM DRAINAGE AREAS

Part of Park Lots 4 & 5
Range 5 EGR, PL
Owen Sound

Figure No. 2

BluePlan ENGINEERING

FILE:\\os-2k8\users_private\etwining\Documents\Drawings\s1364fige1.dwg LAYOUT:FIG 2
LAST SAVED BY:ETwining, 9/11/2019 5:14:40 PM PLOTTED BY:Ed Twining - GM BluePlan 9/12/2019 9:51:59 AM

S-1364
Andpet Subdivision
City of Owen Sound

16th AVE EAST

10th ST EAST

14th ST EAST

BLOCK 33

BLOCK 32

BLOCK 31

BLOCK 30

BLOCK 29

BLOCK 28

STREET 'A'

SWM FACILITY

MH-A-21
MH-A-20
MH-A-19
MH-A-17
MH-A-18
MH-A-16
MH-A-15
MH-A-14
MH-A-13
MH-A-12
MH-A-11
MH-A-10
MH-A-9
MH-A-8
MH-A-7
MH-A-6
MH-A-5
MH-A-4
MH-A-3
MH-A-2
MH-A-1

300mmø PVC SAN
250mmø PVC SAN
200mmø PVC SAN

103
A=0.32 ha
p=5

600
A=1.02 ha
p=304

200
A=0.19 ha
p=7

500
A=1.06 ha
p=276

101
A=0.33 ha
p=14

201
A=0.33 ha
p=14

102
A=0.27 ha
p=12

100
A=0.25 ha
p=7

202
A=0.15 ha
p=5

300
A=0.63 ha
p=37

400
A=1.38 ha
p=83

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

LEGEND

100
A=0.25 ha
p=7

CATCHMENT
DRAINAGE AREA
POPULATION

CATCHMENT BOUNDARY

SCALE = 1:1,500
SEPTEMBER 2019

SANITARY SEWER
DRAINAGE AREAS

Part of Park Lots 4 & 5
Range 5 EGR, PL
Owen Sound

Figure No. 2

BluePlan ENGINEERING

Appendix B Design Calculations

B.1. AndPet Subdivision - Sanitary Sewer Design Sheet

B.2. AndPet Subdivision - Storm Sewer Design Sheet

B.3. Storm Design Sheet

B.4. Sanitary Service Calculations

B.5. Friction Headloss Calculations

B.6. Hydrant Flow Test

q = average daily per capita flow
i = unit of peak extraneous flow
M = peaking factor
Q(p) = peak population flow (L/s)
Q(i) = peak extraneous flow (L/s)
Q(o) = peak off-site flows (L/s)
Q(d) = peak design flow (L/s)

DESIGN FLOWS
Domestic Flows = **325**
Infiltration Flows = **0.20**
Res. Pop. Density= **2.3**

SANITARY SEWER DESIGN SHEET

M = 1 + 14 / [4 + (P)^1/2]
where P = population in 1000's
Q(p) = PqM (L/s)
Q(i) = IA (L/s) ; where A = area in hectares
Q(o) = Flows as per Sanitary Servicing Feasibility Letter
Q(d) = Q(p) + Q(i) + Q(o) (L/s)

LOCATION				ON-SITE CATCHMENT CHARACTERISTICS				Peaking Factor M	Pop. Flow Q (p) (L/s)	Peak Extraneous Flow Q (i) (L/s)	Peak Design Flows (L/s)			SEWER DATA						
CATCHMENT	STREET	FROM (Structure #)	To (Structure #)	INDIVIDUAL		CUMULATIVE					On-Site Peak Design Flow Q (d) (L/s)	Off-Site Peak Design Flow Q (o) (L/s)	Total Peak Design Flow	Type of Pipe	Roughness Coefficient (n)	Diameter (mm)	Slope (%)	Length (m)	Capacity Q_{full} (L/s)	Full Flow Velocity (m/s)	Actual Velocity at Q (d) (m/s)
				Pop.	Area A (ha)	Pop.	Area A (ha)													
300	14th Street East	STUB	MH-A-8	37	0.63	37	0.63	4.34	0.60	0.13	0.73		0.73	PVC	0.013	250	0.60	11.5	46.1	0.94	0.34
400	14th Street East	STUB	MH-A-8	83	1.38	83	1.38	4.26	1.33	0.28	1.61		1.61	PVC	0.013	250	2.50	11.0	94.0	1.92	0.72
100	14th Street East	MH-A-8	MH-A-9	7	0.25	127	2.26	4.21	2.01	0.45	2.46		2.46	PVC	0.013	250	0.30	28.0	32.6	0.66	0.39
	14th Street East	MH-A-9	MH-A-13			127	2.26	4.21	2.01	0.45	2.46		2.46	PVC	0.013	250	0.30	36.5	32.6	0.66	0.39
500	Street 'A'	STUB	MH-A-10	276	1.05	276	1.05	4.09	4.25	0.21	4.46		4.46	PVC	0.013	250	1.00	9.0	59.5	1.21	0.70
200	Street 'A'	MH-A-10	MH-A-11	7	0.21	283	1.26	4.09	4.35	0.25	4.61		4.61	PVC	0.013	250	2.50	28.0	94.0	1.92	0.99
201	Street 'A'	MH-A-11	MH-A-12	14	0.33	297	1.59	4.08	4.56	0.32	4.88		4.88	PVC	0.013	250	2.40	65.0	92.1	1.88	0.99
202	Street 'A'	MH-A-12	MH-A-13	5	0.15	302	1.74	4.08	4.63	0.35	4.98		4.98	PVC	0.013	250	2.00	41.5	84.1	1.71	0.93
101	14th Street East	MH-A-13	MH-A-14	14	0.35	443	4.35	4.00	6.67	0.87	7.54		7.54	PVC	0.013	250	0.30	80.0	32.6	0.66	0.54
600	14th Street East	STUB	MH-A-14	304	1.02	304	1.02	4.08	4.66	0.20	4.86		4.86	PVC	0.013	200	2.00	12.0	46.4	1.48	0.95
102	14th Street East	MH-A-14	MH-A-15	12	0.27	759	5.64	3.87	11.06	1.13	12.19		12.19	PVC	0.013	250	0.30	48.5	32.6	0.66	0.61
103	14th Street East	MH-A-15	MH-A-16	5	0.32	764	5.96	3.87	11.13	1.19	12.32		12.32	PVC	0.013	250	0.30	50.0	32.6	0.66	0.62
	14th Street East	MH-A-16	MH-A-18			764	5.96	3.87	11.13	1.19	12.32		12.32	PVC	0.013	250	0.30	58.5	32.6	0.66	0.62
Southerly Portion of East Court Plaza	14th Street East	MH-A-17	MH-A-18			0	0.00	4.50	0.00	0.00	0.00	0.37 *	0.37	PVC	0.013	200	1.00	8.0	32.8	1.04	0.34
	14th Street East	MH-A-18	MH-A-19			764	5.96	3.87	11.13	1.19	12.32	0.37 *	12.69	PVC	0.013	250	0.30	15.0	32.6	0.66	0.62
U/S 16th Avenue East Lands and Canadian Tire Property *	16th Avenue East	MH-A-19	MH-A-21			764	5.96	3.87	11.13	1.19	12.32	15.22 *	27.54	PVC	0.013	250	0.30	140.5	32.6	0.66	0.74

* Please see **Updated Sanitary Servicing Feasibility** *prepared by GM BluePlan Engineering Ltd., dated November 9, 2019*
(Attached as Appendix A of the Sanitary Sewer Design Brief)

DESIGNER: AW & JS
DATE: September 2019
PROJECT: AndPet Subdivision
PROJECT NO: S-1364
SHEET NO: 1 of 1

Design Storm	A	B
2 yr	22.3	-0.714
5 yr	**29.1**	**-0.724**
10 yr	33.6	-0.729
25 yr	39.3	-0.734
50 yr	43.5	-0.736
100 yr	47.7	-0.738

Where Q = 2.78 AIC and I = A x TcB (where Tc in hours)
Q = total peak design flow in litres per second (L/s)
A = area in hectares (ha)
I = rainfall intensity in millimetres per hour (mm/h)
C = runoff coefficient
A, B = design storm coefficients
Tc = time of concentration in minutes (minimums as per City of OS Site Dev. Eng. Stds.)

ESTIMATED DESIGN FLOWS

STORM SEWER DESIGN SHEET

(Based on Owen Sound Site Development Engineering Standards)

DESIGN: AW & JS, GM BluePlan Engineering Ltd.

PROJECT: AndPet Subdivision

SHEET NO. 1 of 1

DATE: Sept. 2019

PROJECT: S-1364

LOCATION				AREA (ha)										SEWER DATA							
SUB-CATCHMENT	STREET	FROM (STRUCTURE)	TO (STRUCTURE)	R =	R =	R =	R =	R =	Individual 2.78 AC	Cumulative 2.78 AC	Time of Concentration Tc (minutes)	5-Year Rainfall Intensity I (mm/h)	Peak Flow from Site Runoff (L/s)	Total Peak Design Flow Q (L/s)	Type of Pipe	Roughness Coefficient (n)	Diameter (mm)	Slope (%)	Length (m)	Capacity (L/s)	Full Flow Velocity (m/s)	Time of Flow (minutes)
				0.70	0.75																
100	14TH ST E	STUB	MH-B-3A		0.04				0.08	0.08	10.00	106	9	9	PVC / PE	0.013	300	0.50	14.0	68	0.97	0.24
	14TH ST E	MH-B-3A	CBMH-B-4						0.00	0.08	10.24	105	9	9	PVC / PE	0.013	300	0.50	22.5	68	0.97	0.39
300	14TH ST E	STUB	CBMH-B-4		0.85				1.77	1.77	10.00	106	189	189	PE	0.013	450	0.50	7.0	202	1.27	0.09
101	14TH ST E	CBMH-B-4	DCBMH-B-5		0.06				0.13	1.98	10.63	102	202	202	PE	0.013	525	0.25	33.5	215	0.99	0.56
102	14TH ST E	CB-8	DCBMH-B-5		0.12				0.25	0.25	10.00	106	27	27	PVC / PE	0.013	300	0.50	15.5	68	0.97	0.27
205	14TH ST E	DCBMH-B-5	CBMH-B-10	0.14					0.27	2.50	11.19	98	246	246	PE	0.013	525	0.40	8.5	272	1.26	0.11
400	STREET 'A'	STUB	MH-B-7		1.08				2.25	2.25	10.00	106	240	240	PE	0.013	450	1.00	12.5	285	1.79	0.12
301	STREET 'A'	MH-B-6	DICB-12		0.38				0.79	0.79	10.00	106	84	84	PVC / PE	0.013	300	1.00	25.0	97	1.37	0.30
200	STREET 'A'	DICB-12	MH-B-7		0.09				0.19	0.98	10.30	104	102	102	PVC / PE	0.013	300	2.00	35.0	137	1.93	0.30
	STREET 'A'	MH-B-7	CBMH-B-8						0.00	3.23	10.61	102	330	330	PE	0.013	525	1.00	23.0	430	1.99	0.19
201	STREET 'A'	DICB-13	CB-14		0.11				0.23	0.23	10.00	106	24	24		0.013	250	1.00	40.5	59	1.21	0.56
202	STREET 'A'	CB-14	CBMH-B-8	0.17					0.33	0.56	10.56	102	57	57	PVC / PE	0.013	300	1.00	11.5	97	1.37	0.14
	STREET 'A'	CBMH-B-8	CBMH-B-9						0.00	3.79	10.80	101	382	382	PE	0.013	525	1.20	45.5	471	2.18	0.35
203	STREET 'A'	DICB-15	CB-16		0.17				0.35	0.35	10.00	106	38	38	PVC / PE	0.013	250	1.00	40.5	59	1.21	0.56
204	STREET 'A'	CB-16	CBMH-B-9	0.17					0.33	0.69	10.56	102	70	70	PVC / PE	0.013	300	1.00	8.5	97	1.37	0.10
	STREET 'A'	CBMH-B-9	CBMH-B-10						0.00	4.48	11.15	98	441	441	PE	0.013	525	1.20	44.0	471	2.18	0.34
	14TH ST E	CBMH-B-10	DCBMH-B-11						0.00	6.98	11.48	96	672	672	PE	0.013	750	0.40	24.5	704	1.59	0.26
500	14TH ST E	STUB	DCBMH-B-11		1.02				2.13	2.13	10.00	106	226	226	PE	0.013	450	1.00	7.0	285	1.79	0.07
102	14TH ST E	DCBMH-B-11	DCBMH-B-12	0.14					0.27	9.38	11.74	95	889	889	PE	0.013	900	0.35	9.0	1071	1.68	0.09
103	SWM BLOCK	DCBMH-B-12	SWM FACILITY	0.22					0.43	9.81	11.83	94	925	925	PE	0.013	900	0.30	41.0	992	1.56	0.44

Remaining portion of the proposed Storm Sewer System is governed by orifice flow
Please refer to SWM Report for additional information

OS Site Dev. Eng. Stds (2021)		
Design Storm	A	B
2 yr	22.3	-0.714
5 yr	**29.1**	**-0.724**
10 yr	33.6	-0.729
25 yr	39.3	-0.734
50 yr	43.5	-0.736
100 yr	47.7	-0.738

Where Q = 2.78 AIC and I = A x Tc^B (where Tc in hours)
Q = peak flow in litres per second (L/s)
A = area in hectares (ha)
I = rainfall intensity in millimetres per hour (mm/h)
C = runoff coefficient
A, B = design storm coefficients
Tc = time of concentration in minutes (MIN. 10.0 minutes)

EAST COURT RESIDENCE
STORM SEWER DESIGN SHEET

DESIGN: L.H.
GEI Consultants Canada Ltd.

PROJECT: Proposed Seniors Apartment - 15th Avenue East

SHEET NO. 1 of 1

DATE: April, 2026

Project No: 2401411

GEI Consultants Canada

LOCATION			AREA (ha)			Individual 2.78 AC	Cumulative 2.78 AC	Time of Concentration Tc (minutes)	Rainfall Intensity I (mm/h)	Peak Flow Q (L/s)	SEWER DATA								
Catchment Area	FROM	TO	C = 0.30	C = 0.60	C = 0.90						Type of Pipe	Roughness Coefficient (n)	Diameter (mm)	Slope (%)	Length (m)	Capacity (L/s)	Full Flow Velocity (m/s)	Time of Flow (minutes)	Percent of Capacity Used (%)
205	DCBMH-1	DCBMH-4			0.119	0.30	0.30	5.00	176	52	PVC	0.013	300	0.50	24.5	68	0.97	0.42	76.6%
207	DICB-2	DCBMH-3	0.125			0.10	0.10	10.00	106	11	PVC	0.013	250	0.50	22.0	42	0.86	0.43	26.4%
204	DCBMH-3	DCBMHY-4		0.164		0.27	0.38	10.43	103	39	PVC	0.013	300	0.50	29.5	68	0.97	0.51	57.1%
200	DCBMH-4	MH-8			0.342	0.86	1.53	10.94	100	153	PVC	0.013	375	2.00	25.0	248	2.25	0.19	61.6%
201	DICB-5	DICH-6		0.075		0.13	0.13	10.00	106	13	PVC	0.013	250	0.50	46.5	42	0.86	0.90	31.7%
202	DICB-6	DCBMH-7		0.072		0.12	0.25	10.90	100	25	PVC	0.013	250	0.50	19.5	42	0.86	0.38	58.3%
203	DCBMH-7	MH-8			0.058	0.15	0.39	11.28	98	38	PVC	0.013	300	0.50	8.0	68	0.97	0.14	55.7%
	MH-8	EX MH					1.92	11.12	99	**189**	HDPE	0.013	450	1.00	4.5	285	1.79	0.04	66.4%
206	EX MH	EX DICB	0.041			0.03	0.03	10.00	106	**4**	PE	0.013	300	0.50	35.2	68	0.97	0.61	5.3%
208	DICB-9	EX	0.016			0.01	0.01	10.00	106	**1**	PVC	0.013	250	1.00	12.0	59	1.21	0.17	2.4%

q = average daily per capita flow (L/cap/d)
i = unit of peak extraneous flow (L/ha/s)
M = peaking factor
Q(p) = peak population flow (L/s)
Q(i) = peak extraneous flow (L/s)
Q(d) = peak design flow
A = Area (ha)

Assumed:
400 *L/cap/da*
0.20 *L/ha/s*
2.3 *Persons/Unit*

EAST COURT RESIDENCE
SANITARY SEWER DESIGN SHEET

M = 1 + 14 / [4 + P^1/2]
where P = population in 1000's, and,

Q(p) = PqM/86.4 (L/s)
Q(i) = IA (L/s)
Q(d) = Q(p) + Q(i) (L/s)

GEI Consultants Canada

LOCATION			RESIDENTIAL		CUMULATIVE		Peaking Factor M	Pop. Flow Q (p) (L/s)	Peak Extraneous Flow Q (i) (L/s)	Peak Design Flow Q (d) (L/s)	SEWER DATA							
STREET	FROM	TO	Pop.	Area A (ha)	Pop.	Area A (ha)					Type of Pipe	Roughness Coefficient (n)	Diameter (mm)	Slope (%)	Length (m)	Capacity Q_{full} (L/s)	Full Flow Velocity (m/s)	Actual Velocity at Q (d) (m/s)
15th Ave E	Building	MH-A-10	294	1.01	294	1.05	4.08	5.56	0.21	5.77	PVC	0.013	200	0.50	29.0	23.2	0.74	0.61

DESIGNER: Lauren Holliday
DATE: March 27, 2026
PROJECT: Proposed Seniors Apartment - 15th Avenue East
PROJECT NO: 2401411
SHEET NO: 1 of 1

GEI Consultants Canada	**Project:**	Proposed Seniors Apartment - 15th Avenue East
	File No.:	2401411
	Date:	March 27, 2026
	Designed	Lauren Holliday
	Checked:	John Slocombe
	Subject:	Friction Loss Calculations

*Assuming Initial and Final velocity is consistant

Step #1: Determine Discharge, Pressure, Initial, and Final Elevation

Required Discharge	**28.39**	L/s
Initial Pressure	**70.0**	psi
Initial Elevation	**223.0**	masl
Final elevation	**222.9**	masl

Step #2: Hazen-Williams Formula Calculating headloss

$$h_L = \frac{10.675 * L * Q^{1.85}}{C^{1.85} * d^{4.8655}}$$

Pipe Size (mm)	C' Values
150	100
200 to 300	110
350 to 600	120
over 600	130

Length (m)	Diameter (mm)	Discharge m3/s	v (m/s)	C - Hazen constant	Head Loss (m)
53	200	0.02839	0.90	110	0.328

Step #3: Final Results

Water service pressure	**69.68**	psi
Water service flow rate	**28.39**	L/s

FLOW TEST RESULTS

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

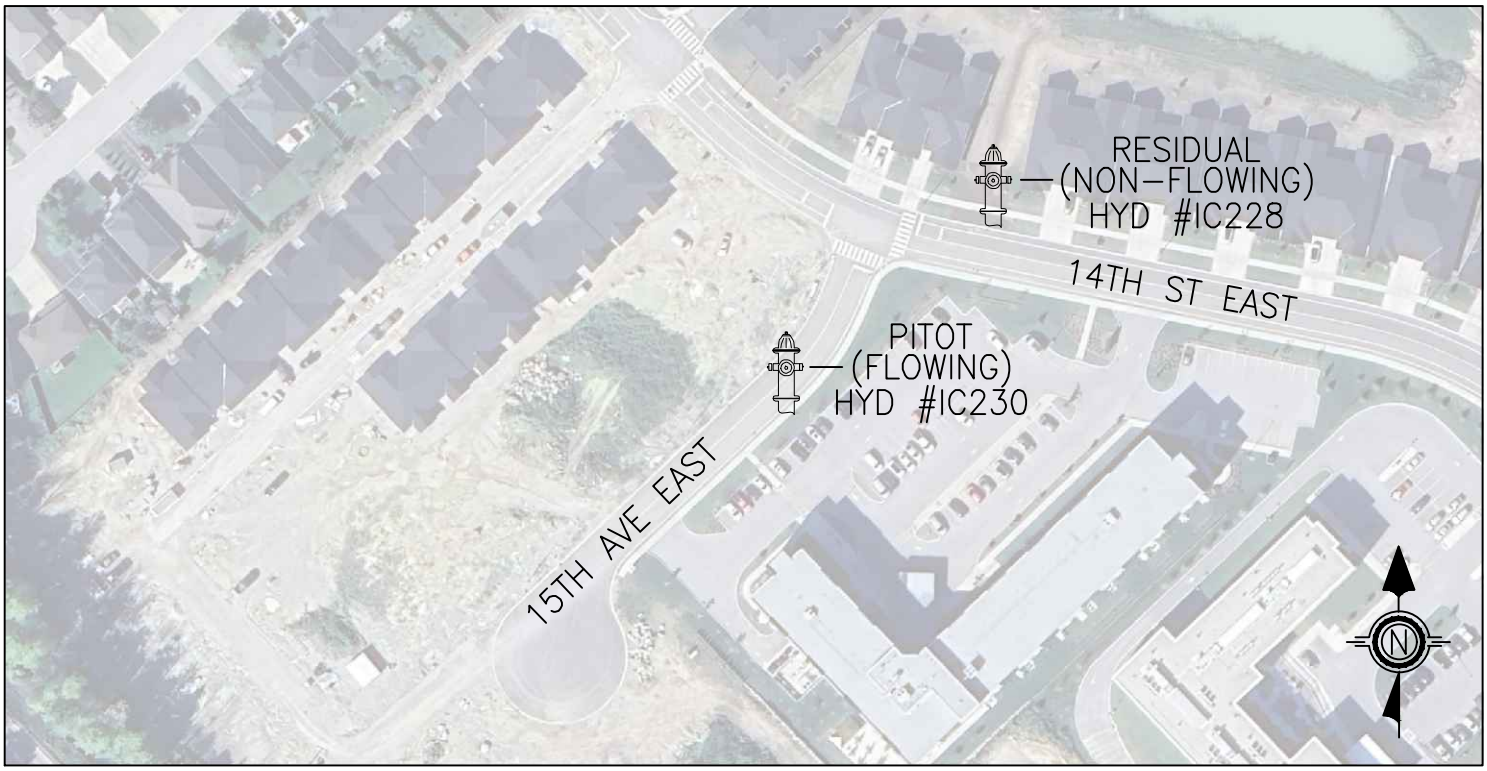
DATE : OCTOBER 7, 2025

TIME VALVE OPENED: 9:15 AM
TIME VALVE CLOSED: 9:36 AM

LOCATION : 15TH AVENUE EAST
OWEN SOUND
ONTARIO

TEST BY : L. KELLINGTON

NAME OF CITY OPERATOR:



STATIC PRESSURE : 76 PSI UNDERGROUND TYPE AND SIZE :

TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1-1/8	0.97	74	66	304
2	1	1-3/4	0.9	70	44	591
3	1	2-1/2	0.9	64	30	924
4	2	2-1/2	0.9	60	22	1582

PREDICTED FIRE FLOW AT 20PSI RESIDUAL PRESSURE: 3111.7 USGPM

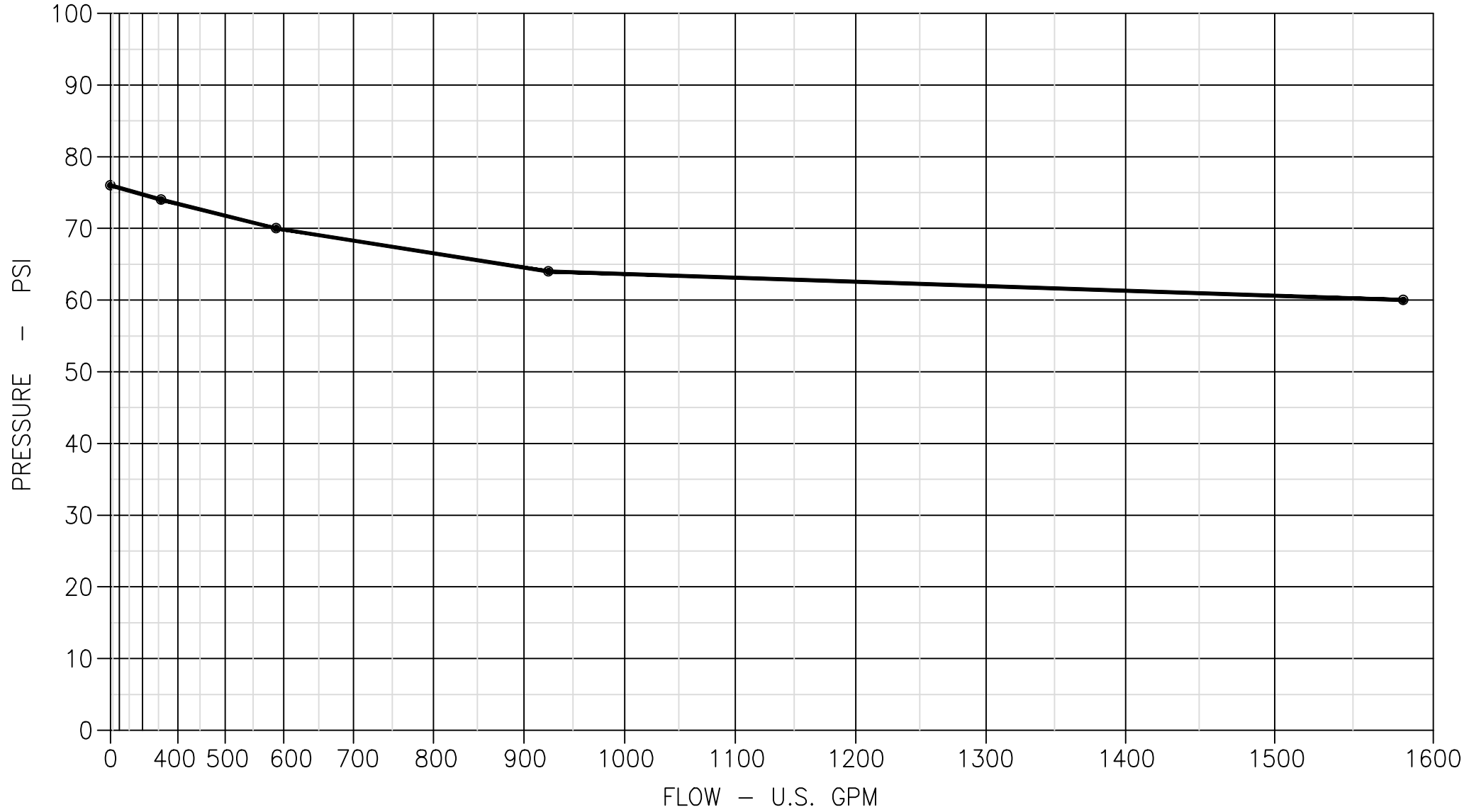
FIRST FOR FIRE, LIFE SAFETY & SECURITY

VIPOND INC est. 1945

15TH AVENUE EAST	BY : E. BUSH
OWEN SOUND	OFFICE : BARRIE
ONTARIO	TEST BY : VIPOND
	DATE : OCTOBER 7, 2025

STATIC:		RESIDUAL:		FLOW:
76 PSI	TEST#1	74 PSI	@	304 GPM
	TEST#2	70 PSI	@	591 GPM
	TEST#3	64 PSI	@	924 GPM
	TEST#4	60 PSI	@	1582 GPM

PREDICTED FIRE FLOW AT 20PSI RESIDUAL PRESSURE: 3111.7 USGPM



PRESSURE EXTRAPOLATION FORMULA

(hr)

DISCHARGE (Q_F)

1582

X

$$\frac{\left(\text{STATIC PRESSURE } 76 - \text{DESIRED PRESSURE } 20\right)^{0.54}}{\left(\text{STATIC PRESSURE } 76 - \text{RESIDUAL PRESSURE } 60\right)^{0.54}}$$

,

PREDICTED FLOW (QR) = 3111.739 USGPM

▲ **4.10.1.2** The formula that is generally used to compute the discharge at the specified residual pressure or for any desired pressure drop is Equation 4.10.1.2:

$$Q_R = Q_F \times \frac{h_r^{0.54}}{h_f^{0.54}} \qquad \textbf{(4.10.1.2)}$$

where:

Q_R = flow predicted at desired residual pressure
Q_F = total flow measured during test
h_r = pressure drop to desired residual pressure
h_f = pressure drop measured during test

4.10.1.3 In Equation 4.10.1.2, any units of discharge or pressure drop can be used as long as the same units are used for each value of the same variable.