1000989284 Ontario Inc. c/o R.W. Tomlinson Limited

Elmwood Subdivision
Water Supply Report

Prepared by:

FOREFRONT Engineering Inc. **613.634.9009 tel**
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Kingston, ON, Canada K7P 0L8

Date: August 2025

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August 7, 2025

1000989284 Ontario Inc
c/o R.W. Tomlinson Limited
Jennifer Ailey, Land Development Manager
100 CitiGate Drive
Nepean ON K2J 6K7

Regarding: **Elmwood Subdivision**
Water Supply Report

Dear Ms. Ailey,

The enclosed report details the existing water infrastructure and our recommendations for water services for the proposed Elmwood Subdivision located in the Town of Gananoque.

The proposed Elmwood Subdivision is located in the east end of Gananoque, south of Elizabeth Drive, Churchill Drive, and Arthur Street, and north of the St. Lawrence River. The site is approximately 11.58 ha. and consists of approximately 77 single-detached lots. The development will include the extension of Elmwood Drive, John Street, two new streets, and a proposed parkland.

It is recommended that a 200 mm watermain be installed along the proposed streets with connections to the existing 300 mm diameter watermain on Elmwood Drive, and the existing 150mm diameter watermain on John Street.

Preliminary calculations demonstrate that the existing water infrastructure is capable of supplying adequate fire flow and pressure to the proposed development.

This Report demonstrates that adequate water servicing is available for the proposed development.

If you have any enquiries or wish to discuss further, please contact this office.

Sincerely,

FOREFRONT Engineering Inc.

Jeff Homer, P.Eng.
Jeff.Homer@Forefronteng.ca

FOREFRONT Signatures

Report Prepared By:

Jeff Homer, P.Eng.

Report Reviewed By:

Kyle Nielissen, P.Eng.

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1. Introduction

Forefront has assembled relevant supporting information for the proposed residential subdivision at Part of Lot 16, Concession 1 in the Town of Gananoque in the County of Leeds.

The proposed Elmwood Subdivision is located in the Town of Gananoque north of the St. Lawrence River, east of William Street South, and south of Arthur Street. The land to the east is undeveloped, zoned Residential and identified as Significant Woodlands in the Official Plan. The property is bounded by existing residential dwellings to the north and west. Refer to Figure 1: Site Location for reference.

Figure 1: Site Location

The subject site is currently zoned Residential within the Town of Gananoque. The property is currently vacant with no existing structures.

The proposed Elmwood Subdivision is approximately 11.58 ha. and consists of approximately 77 single-detached lots. The subdivision will include the extension of Elmwood Drive, John Street, two new streets, and a proposed parkland.

It is recommended that water services be installed along the proposed streets with connections to Elmwood Drive and John Street.

Development of the Elmwood Subdivision will result in an increase in municipal water consumption. This Water Supply Report proposes a plan to provide water services for the proposed subdivision.

Refer to **Appendix A, Concept Plan** for the proposed subdivision plan.

2. Water Supply

2.1 Existing Conditions

The Town of Gananoque's Water Treatment Plant (WTP), located at 110 Kate Street, supplies potable water to the Charles Street North Elevated Storage Tank (EST) and the Town of Gananoque's water distribution system.

Existing 300 mm diameter watermains are located on Elmwood Drive and an existing 150 mm diameter watermain is located on John Street.

2.2 Proposed Development

The proposed Elmwood Subdivision is approximately 11.58 ha. and consists of approximately 77 single-detached lots. The subdivision will include the extension of Elmwood Drive, John Street, two new streets, and a proposed parkland.

A 200 mm diameter watermain and connections to the 300mm diameter watermain on Elmwood Drive, and the existing 150 mm diameter watermain on John Street are proposed. Fire hydrants are proposed at 150 m spacing throughout the subdivision.

25 mm cross-linked high-density polyethylene (PEX) services are proposed throughout.

Please refer to **Appendix A**: **Figure 2: Proposed Water Infrastructure** for further details.

Development of the Elmwood Subdivision will result in an increase in municipal water consumption.

The Town of Gananoque's Public Works Utilities Division and the Ministry of the Environment, Conservation and Parks (MECP) require that the system be assessed at the critical locations for peak hour flow, maximum day, and maximum day plus fire flow demand. MECP requires that the system maintain an operating pressure of 280-700 kPa under peak flow conditions and 140 kPa under maximum day plus fire flow conditions.

Design Flow Parameters	
Average Residential Flow	350 L/cap/day
Maximum Day Factor	2.75
Peak Hour Factor	4.25

Population Density	
Single Family	4.00 people/unit

The Town of Gananoque's Public Works Utilities Division supplied hydrant flow data. Refer to the **Hydrant Flow Data Table** in **Appendix B** for hydrant details. Analysis has been completed to demonstrate that the proposed subdivision can be adequately serviced by the existing infrastructure.

Two fire hydrants, NFPA color-rated blue, are located in proximity to the existing subject. Hydrant number FH232 is located on Elmwood Drive in front of civic #130. FH252 is located at the intersection of John Street and William Street. Given the proximity of the hydrants and modelling junctions to the existing modeling area, the model flows of FH252 will be utilized for assessing the available fire flows.

Hydrant # FH252
Static Pressure: 469 kPa (68 psi)
Residual Pressure: 400 kPa (58 psi) @ 71 L/s / 4,260 L/min (1,126 USGPM)
Rated Flow: 165 L/s / 9,900 L/min (2,626 USGPM) @ 138 kPa (20 psi)

Appropriate demands were assigned to the existing and proposed distribution system and are summarized in the appendix. EPA NET (Version 2.0) was used to model the following: Peak Hour pressure demand (kPa), Maximum Daily pressure demand (kPa), (L/min) at Maximum Day plus Fire demand maintaining 140 kPa. Refer to **Appendix B**, **EPA NET** for modeling results and the proposed water infrastructure schematic.

Peak Hour

The proposed peak-hour demand for the subdivision is approximately 324 L/min (5.4 L/s) based on a peaking factor of 4.25. Maximum daily flow demand is approximately 210 L/min (3.5 L/s) based on a maximum day factor of 2.75. The proposed system maintains a minimum of 441 kPa, up to a maximum of 466 kPa at its critical point during peak hour flow conditions and 438 kPa during maximum day flow conditions. Refer to the **Distribution Demands, Peak Hour Flow,** and **Maximum Day Demand** modelling results in **Appendix B** for calculations and details.

Based on the modelling completed, under peak flow conditions and maximum day flow conditions exceed the minimum required pressure of 280 kPa and are below the maximum pressure of 700 kPa.

Proposed subdivision pressures are within the normal operation range of 280 kPa to 700 kPa.

Fire Flows

Water supply requirements for fire suppression in municipal water works systems are based on the "*Water Supply for Public Fire Protection, 2020*" by Fire Underwriters Survey (FUS).

Minimum requirements for water suppression are not less than 1,000 L/min for two hours or 2,000 L/min for one hour in addition to any domestic consumption at the maximum daily rate. Using the short method within the FUS guidelines, single and small two-family wood frame dwellings require a minimum of 4,000 L/min, where 3 meters of separation between exposures (1.5 m side yards) is provided.

According to the modelling, the maximum daily flow demand plus fire flow demand for the proposed subdivision is 6,000 L/min. The system was assessed at the minimum operating pressure of 140 kPa and the available maximum daily flow plus fire flow. Fire flows are adequate for the proposed single-detached residential dwellings.

200 mm diameter watermain and connections to the existing 300 mm diameter watermain extension on Elmwood Drive, and the existing 150 mm diameter watermain on John Street are proposed. Fire hydrants are proposed at 150 m spacing throughout the subdivision.

The proposed subdivision meets the recommended minimum standards by FUS and the MECP requirements.

Based on the infrastructure review, there will be no negative impact on the local water distribution system. There is adequate water pressure and flow available for the proposed subdivision.

3. Conclusions

Detailed design calculations find that the existing water infrastructure is capable of supplying adequate fire flow and pressure to the proposed subdivision.

Watermain connections to Elmwood Drive, and John Street are proposed.

The water network shall be designed in accordance with the Ministry of Environment, Conservation and Park Guidelines.

Approval by the Town of Gananoque's Public Works for the proposed watermain network is required. An application for watermain additions, modifications, replacements, and extensions for the watermain system will be required.

Appendix A

Concept Plan

FIG.2 – Proposed Water Infrastructure

WOODLAND AMPHIBIAN BREEDING SWH

TURTLE WINTERING SWH

EXISTING WATERCOURSE

30m TOP OF BANK OFFSET

POTENTIAL SAR BAT MATERNITY ROOST HABITAT

TURTLE WINTERING SWH

CONNOR BbGa22 SITE

JASPER BbGa23 SITE

PROPOSED WETLAND

PROPOSED ENHANCED SWALE

EX. OUTLET STRUCTURE (INV.- 76.20)

EX. 750mmØ OUTLET TO WATERCOURSE

ST LAWRENCE RIVER

10m WAVE UPRUSH OFFSET (2024, ZUZEK)

FLOODPLAIN ELEVATION: 76.10m (2024 ZUZEK)

STABLE SLOPE ALLOWANCE

LOT ADDITION TO NEIGHBOUR

PARK

CHURCHILL DRIVE

ELIZABETH DRIVE

ELMWOOD DRIVE

MAPLECROFT COURT

ARTHUR STREET

STREET "H"

EX. 600mmØ TRUNK SEWER @ 0.07%

EX. 250mmØ SAN @ 0.30%

EX. 300mmØ SAN @ 0.30%

EX. 300mmØ WTR

EX. 250mmØ SAN

EX. 150mmØ WTR

EX. 150mmØ STM @ 0.35%

EX. HWL

0 50 100 m H=1:2000

LEGEND

- PROPOSED WETLAND
- PROPOSED WETLAND 15m OFFSET
- ST LAWRENCE RIVER FLOODPLAIN ELEV.: 76.10 (2022, ZUZEK)
- 10m WAVE UPRUSH OFFSET (2022, ZUZEK)
- PROPOSED HWL
- 6m PROPOSED HWL OFFSET
- EXISTING HWL

Benchmark

No.	Revision/Issue	Date

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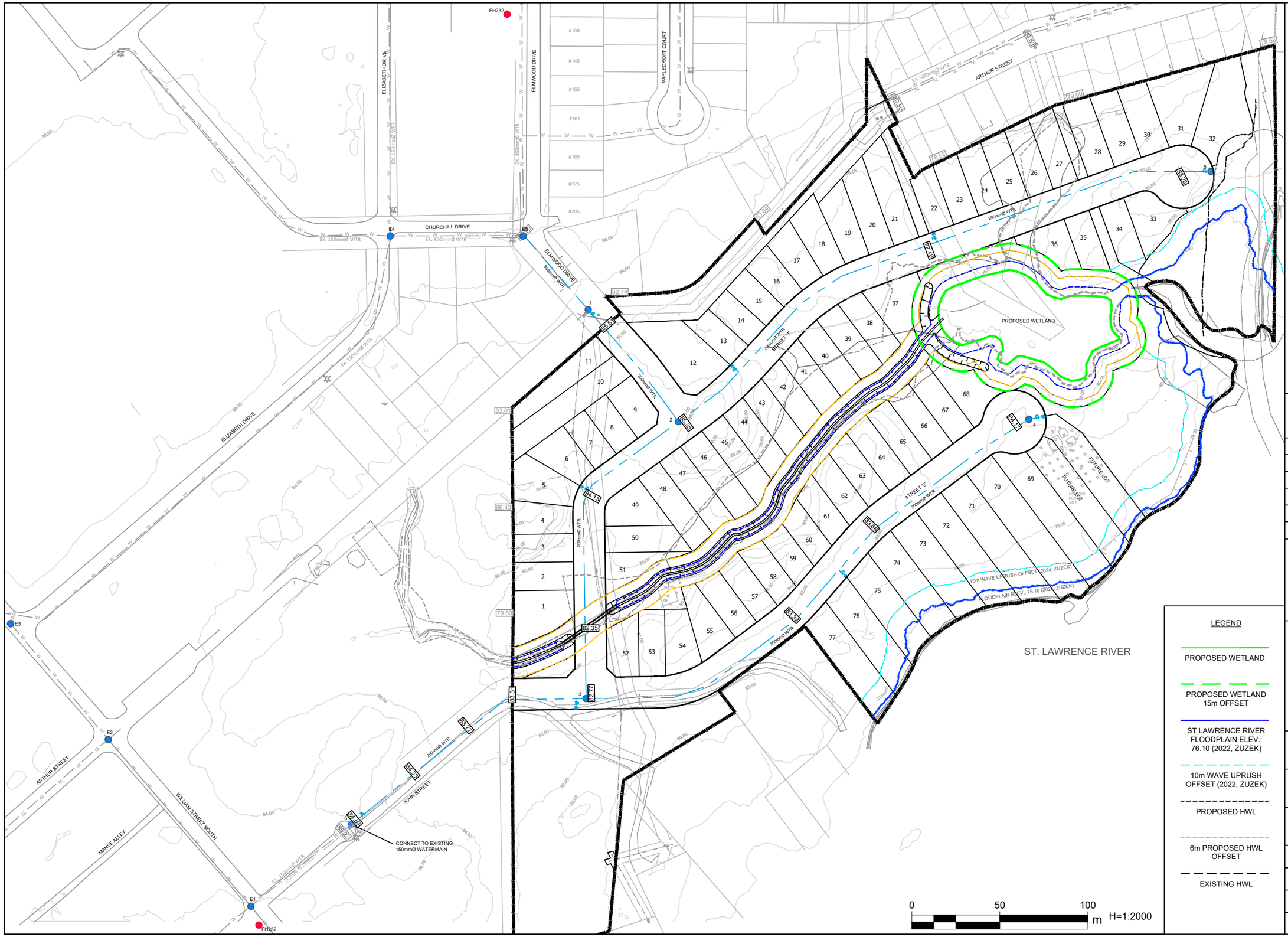
Client: 1000989284 ONTARIO INC.

Project: ELMWOOD SUBDIVISION

Drawing: CONCEPT PLAN

Drawn by:	Checked by:	Project No.
EP	JH	
Designed by:	Approved by:	Drawing No.
KMN	KMN	CP
Date: AUGUST 2025		
Scale: 1:2000 ANSI B (11x17)		



JUNCTION

PROPOSED WATERMAIN

EX. WATERMAIN

HYDRANT

WATERVALVE

Benchmark

No.	Revision/Issue	Date

LEGEND

PROPOSED WETLAND

PROPOSED WETLAND 15m OFFSET

ST LAWRENCE RIVER FLOODPLAIN ELEV.: 76.10 (2022, ZUZEK)

10m WAVE UPRUSH OFFSET (2022, ZUZEK)

PROPOSED HWL

6m PROPOSED HWL OFFSET

EXISTING HWL

Forefront Engineering Inc

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Client: 1000989284 ONTARIO INC.

Project: ELMWOOD SUBDIVISION

Drawing: PROPOSED WATER INFRASTRUCTURE

Drawn by:	Checked by:	Project No.
EP	JH	
Designed by:	Approved by:	Drawing No.
KMN	KMN	FIG.2
Date: AUGUST 2025		
Scale: 1:2000 ANSI B (11x17)		

Appendix B

- Hydrant Flow Data Table
- Proposed Distribution Demands
- EPA NET – Modelling Results
  - Water Distribution Schematic
  - Proposed Maximum Day Plus Fire Flow – Water Model Results
  - Proposed Peak Hour Flow – Water Model Results

Gananoque Hydrant Flow Test Data Table

Flushing Order	Hydrant Number	Location	Year	Date of Work	Make	Port Size	Turbidity - NTU	Free Chlorine (mg/L)	Static PSI	Residual Pressure	Fire Flow (GPM)	New Colour	Pitot Pressure	Time Flushed	Flow GPM
96	FH206	102 John @ Stone	2018	05/24/18	McAvity		0.88	1.59	75	70	4543	Blue	55	10	1244
99	FH207	104 South St @ Stone	2018	05/25/18	Century	3.5 31A	2.01	+2.20	75	65	2826	Blue	45	10	1126
126	FH214	335 Elizabeth	2018	05/29/18	Century										
193	FH215	375 Elizabeth	2018	06/04/18	Century		1.19	+2.20	70	58	2145	Blue	35	10	993
194	FH216	185 Elizabeth @ Churchill	2018	06/03/18	Century	3.5 47A	2.47	2.19	65	24	636	Orange	13	25	605
202	FH217	115 Elizabeth	2018	06/26/18	Darling		2.31	2.01	67	22	384	Red	5	20	370
203	FH218	83 Elizabeth	2018	06/05/18	Century	3.5 31A	2.75	2.01	64	25	474	Red	7	10	444
122	FH222	156 Wellington	2018	05/29/18	Darling										
124	FH223	250 Wellington	2018	05/29/18	Century	3.5 31A	1.83	+2.20	70	52	1457	Green	25	15	839
195	FH231	250 Elmwood @ Churchill	2018	06/05/18	Darling		2.72	+2.20	72	57	1970	Blue	36	10	1007
196	FH232	130 Elmwood	2018	06/05/18	Darling		2.96	+2.20	69	56	2003	Blue	34	15	978
197	FH233	102 Elmwood	2018	06/05/18	Darling	3.5 31A	2.34	+2.20	72	58	2101	Blue	38	20	1034
214	FH236	115 Elmwood @ MacDonald	2018	06/06/18	Darling		2.72	+2.20	68	27	684	Orange	14	10	628
216	FH237	581 MacDonald	2018	06/06/18	Darling		2.8	2.04	66	23	389	Red	5	15	375
217	FH238	651 MacDonald	2018	06/06/18	Century		2.15	2.04	67	23	348	Red	4	15	336
218	FH239	697 MacDonald @ Conner	2018	06/06/18	Century		2.54	2.12	70	23	347	Red	4	15	336
103	FH252	299 John @ William S	2018	05/25/18	Century		0.81	+2.20	68	58	2626	Blue	45	10	1126
120	FH253	291 Arthur @ William S	2018	05/28/18	Century	5 47A	1.08	+2.20	70	50	1628	Blue	35	10	993
125	FH254	290 Wellington @ William S	2018	05/29/18	Darling		1.67	+2.20	70	52	1723	Blue	35	10	993
130	FH255	246 Sydenham	2018	05/29/18	Century		1.62	+2.20	71	25	251	Red	2	10	237
131	FH256	298 Sydenham @ William S	2018	05/29/18	Century	5 47A	1.16	+2.20	66	52	1966	Blue	38	10	1034
138	FH257	298 Pine @ William S	2018	05/29/18	Century		1.08	+2.20	68	54	2064	Blue	40	10	1061
104	FH260	335 John @ deadend	2018	05/25/18	Century	3.5 31A	0.57	+2.20	70	60	2001	Blue	25	10	839
105	FH301	King E by Susan Push	2018	05/25/18	Century	3.5 31A	1.49	+2.20	75	65	2492	Blue	35	15	993

Elmwood Subdivision Plan July 2025

DESIGN NOTES:

Single Family Res.	350	L/cap. D	(Leeds and the Thousand Islands Guideline)
- Single Family and Semi-detached	4	pop/unit	(Leeds and the Thousand Islands Guideline)
Peak Hour Flow Factor	4.25		(MECP Water Guidelines Population <500)
Maximum Day Flow Factor	2.75		(MECP Water Guidelines Population <500)

Note: Node 4 includes two future lots bring the total number of lots to 79 lots up from the 77 lots being proposed.

Table 3-1: Peaking Factors

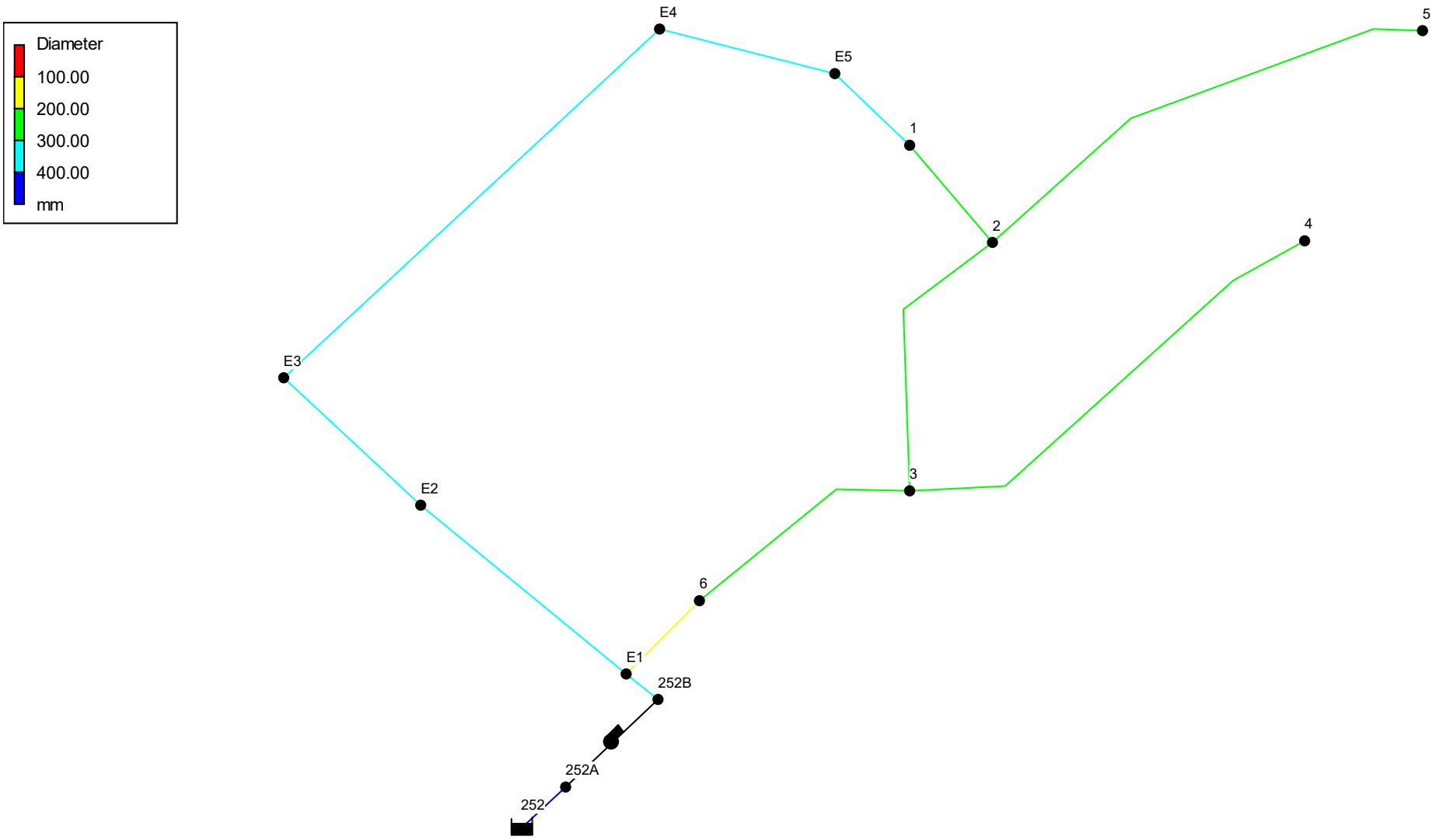
POPULATION	MINIMUM RATE FACTOR (MINIMUM HOUR)	MAXIMUM DAY FACTOR	PEAK RATE FACTOR (PEAK HOUR)
500 - 1 000	0.40	2.75	4.13
1 001 - 2 000	0.45	2.50	3.75
2 001 - 3 000	0.45	2.25	3.38
3 001 - 10 000	0.50	2.00	3.00
10 001 - 25 000	0.60	1.90	2.85
25 001 - 50 000	0.65	1.80	2.70
50 001 - 75 000	0.65	1.75	2.62
75 001 -150 000	0.70	1.65	2.48
greater than 150 000	0.80	1.50	2.25

Single Family Homes	Semi-Detached	Townhouse	Multi -Unit Residential	Street	Block	Nodes	Equivalent Population	Residential L/day	Population L/s	Peak Flow Demands	
										Peak Hour L/s	Maximum Day L/s
Elmwood Subdivision											
11				Street `1`		2	44.00	15,400.00	0.18	0.76	0.49
6				Street `1`		3	24.00	8,400.00	0.10	0.41	0.27
28				Street `2`		4	112.00	39,200.00	0.45	1.93	1.25
34				Street `1`		5	136.00	47,600.00	0.55	2.34	1.52
79	0	0	0	**Total**			316	110,600.00	1.28	5.44	3.52

TOTAL AVERAGE DAY FLOW	1.3 L/s
PEAK DAY FACTOR - 2.75	
MAXIMIUM DAY FLOW	3.5 L/s
PEAK HOUR FACTOR - 4.25	
PEAK HOUR FLOW	5.4 L/s

Elmwood Water Destribution Network

Day 1, 12:00 AM



Elmwood Development

Scenario: Proposed Network Maximum Day Demand

	MD Demand	Head	Pressure	Pressure	Pressure	Fire Flow	Fire Flow
Node ID	LPS	m	m	kPa	psi	lps	lpm
Junc 1	0.00	130.35	44.69	438	64	150	9000
Junc 2	0.490	130.35	45.00	441	64	140	8400
Junc 3	0.270	130.35	47.58	467	68	140	8400
Junc 4	1.250	130.34	46.17	453	66	100	6000
Junc 5	1.600	130.34	47.06	462	67	100	6000
Junc 6	0.000	130.35	45.46	446	65	140	8400
Junc E1	0.000	130.36	44.28	434	63	170	10200
Junc E2	0.000	130.36	45.36	445	65	170	10200
Junc E3	0.000	130.36	45.16	443	64	160	9600
Junc E4	0.000	130.35	43.55	427	62	150	9000
Junc E5	0.000	130.35	44.45	436	63	150	9000

Elmwood Development
Scenario: Proposed Network Peak Demand

Node ID	PK Demand	Head	Pressure	Pressure	Pressure
	LPS	m	m	kPa	psi
Junc 1	0.00	130.32	44.66	438	64
Junc 2	0.760	130.31	44.96	441	64
Junc 3	0.410	130.31	47.54	466	68
Junc 4	1.930	130.30	46.13	453	66
Junc 5	2.480	130.29	47.01	461	67
Junc 6	0.000	130.32	45.43	446	65
Junc E1	0.000	130.33	44.25	434	63
Junc E2	0.000	130.33	45.33	445	64
Junc E3	0.000	130.33	45.13	443	64
Junc E4	0.000	130.32	43.52	427	62
Junc E5	0.000	130.32	44.42	436	63