APPENDIX C

Kyle Nebres

From: Kyle Nebres
Sent: January 20, 2026 1:18 PM
To: Kyle Nebres
Subject: FW: City Water Demand Parameters for Populations exceeding 3000
Attachments: DraftFinal_SystemLevelDemandParameters_24May2024(JB).xlsx

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From: Alex Tourigny
Sent: November 28, 2024 10:34 AM
To: Adam Fobert <AFobert@dsel.ca>; Marc Pichette <MPichette@dsel.ca>; Matt Wingate <MWingate@dsel.ca>; Braden Kaminski <BKaminski@dsel.ca>; Steve Merrick <SMerrick@dsel.ca>; Peter Mott <PMott@dsel.ca>; Alexandra Marchese <AMarchese@dsel.ca>; Hannah Bulmer <HBulmer@dsel.ca>; Jeremy Chouinard <JChouinard@dsel.ca>
Subject: City Water Demand Parameters for Populations exceeding 3000

FYI – From the City.

Hi Alex,

I have just been made aware that given the population exceeds 3,000, please use the attached system-level parameters to calculate the demands for the application. Please note that these parameters were recently developed internally exclusively for populations exceeding 3,000.

Let me know if you have any questions.

Best Regards,

Mohammed Fawzi, P.Eng.
Senior Project Manager (A), Infrastructure Approvals
Development Review – West Branch
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
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System Level Parameters for MSS (2024)	Consumption Rate[1]	Population Density cap/unit[3]	Average Day Demand (L/unit/day)	Residential Outdoor Water Demand (OWD) (L/unit/day)[4]	Maximum Day Demand (L/unit/day)	Peak Hour Demand
SFH	180	3.4	612	700	Average Day Demand + OWD	2.1 x Maximum Day Demand
MLT	198	2.7	535	350	Average Day Demand + OWD	2.1 x Maximum Day Demand
MLT without rear yards	198	2.7	535	0	Average Day Demand	1.6 x Maximum Day Demand
APT	219	1.8	394	0	Average Day Demand	1.6 x Maximum Day Demand
EMP[2]	138	1	138	N/A	1.5 x Average Day Demand[5]	1.8 x Maximum Day Demand
Water Loss per connection	N/A	N/A	80	N/A	Average Day Demand	Average Day Demand
Total Demand			**Sum above for Total Average Day**		**Sum above for Total Max Day**	**Sum above for Total Peak Hour**

[1] Values represent L/cap/day for residential land uses and L/emp/day for employment areas.

[2] Apply a rate of 17,000 l/h/day if employment totals are unknown. The rate represents the average demand for ICI areas at the 90th percentile.

[3] Occupancy factors should be chosen according to housing type. The values shown were extracted from Section 4.2.8 of the Ottawa Design Guidelines - Water Distribution (2010)

[4] Outdoor water demand is applied to single family, semi-detached and townhome units with rear yards.

[5] The 1.5 multiplier represents the additional outdoor water demand associated with employment areas.

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines

2026-01-20 Domestic Demand (2025 Parameter)

Type of Housing	Per / Unit	Units	Pop	OWD (m3/d)
Single Family	3.4	287	976	200.9
Townhouse	2.7	365	986	127.8
Bungalow Towns	2.7	56	152	19.6
Dual Front Towns	2.7	42	114	14.7
B2B	2.7	152	411	53.2
Multi-Units				
Low Density	2.7	228	616	
Medium Density	2.3	142	327	
High Density	1.8	504	908	

		Population		Average Day Demand			OWD Outdoor Water Demand (L/unit/day)			Max Day	Peak Hour
Dwelling Type	Number of Units	Persons per Unit	Population Per Dwelling Type	(L/cap/d)	(L/d)	(L/s)	(L/unit/d)	(L/d)	(L/s)	(L/s)	(L/s)
Singles	287	3.4	976	180	175,644	2.03	700	200,900	2.33	4.36	12.20
Townhouse	615	2.7	1661	198	328,779	3.81	350	215,250	2.49	6.30	10.07
Multi-Residential (Low Density)	228	2.7	616	198	121,889	1.41	0	0	0.00	1.41	2.26
Multi-residential (Medium Density)	142	2.3	327	219	71,525	0.83	0	0	0.00	0.83	1.32
Apartment	504	1.8	907	219	198,677	2.30	0	0	0.00	2.30	3.68
Subtotal	**1776**		**4486**			**10.38**			**4.82**	**15.19**	**29.54**
					(+10%)	**11.41**				**16.71**	**32.49**

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	4490	986.2	684.8	1443.9	1002.7	2807.2	1949.4

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily m^3/d	Avg. Daily L/min	Max Day m^3/d	Max Day L/min	Peak Hour m^3/d	Peak Hour L/min
Empoyment	17,000.0 L/ha/d	16.57	281.69	195.6	422.5	293.4	760.6	528.2
Parks	17,000.0 L/ha/d	5.07	86.19	59.9	129.3	89.8	232.7	161.6
Total I/CI Demand			367.9	255.5	551.8	383.2	993.3	689.8
Total Demand			**1354.0**	**940.3**	**1995.8**	**1385.9**	**3800.5**	**2639.2**

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines

Domestic Demand (MSS Check 2018 Parameter)

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	319	1085
Townhouse	2.7	746	2015
Bungalow Towns	2.7	-	0
Dual Front Towns	2.7	-	0
B2B	2.7	-	0
Multi-Units			
Low Density	2.7	-	0
Medium Density	2.1	252	530
High Density	1.8	688	1239

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	4869	1117.5	776.0	1485.9	1031.9	2961.8	2056.8

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Area**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Empoyment	35,000.0 L/ha/d	19.42	679.70	472.0	679.7	472.0	883.6	613.6
Parks	9,300.0 L/ha/d	6.26	58.22	40.4	87.3	60.6	113.5	78.8
Total I/CI Demand			737.9	512.4	767.0	532.7	997.1	692.5
Total Demand			**1855.4**	**1288.5**	**2253.0**	**1564.6**	**3958.9**	**2749.2**

Hydraulic Capacity and Modeling Analysis East Urban Community Mixed-Use Centre Development

Final Report

Prepared for:
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Submission Date: July 25, 2018

Contact: Mr. Werner de Schaetzen, Ph.D., P.Eng.
Project: 2018-035-DSE

Document History and Version Control

Revision No.	Date	Document Description	Revised By	Reviewed By
R0	May 25, 2018	Draft	Andrea McCrea	Werner de Schaetzen
R1	July 10, 2018	Update	Andrea McCrea	Werner de Schaetzen
R2	July 25, 2018	Final	Andrea McCrea	Werner de Schaetzen

Statement of Qualifications and Limitations

This document represents GeoAdvice Engineering Inc. best professional judgment based on the information available at the time of its completion and as appropriate for the project scope of work. Services performed in developing the content of this document have been conducted in a manner consistent with that level and skill ordinarily exercised by a member of the engineering profession currently practicing under similar conditions. No warranty, express or implied is made.

Contents

1 Introduction

GeoAdvice Engineering Inc. ("GeoAdvice") was retained by David Schaeffer Engineering Ltd. ("DSEL") to size the proposed water trunk main network for East Urban Community Mixed-Use Centre Development ("development") in the City of Ottawa, ON ("City").

East Urban Community Mixed-Use Centre Development is located between Innes Road and Renaud Road, East of Page Road. The development will be serviced by pressure zone 2E.

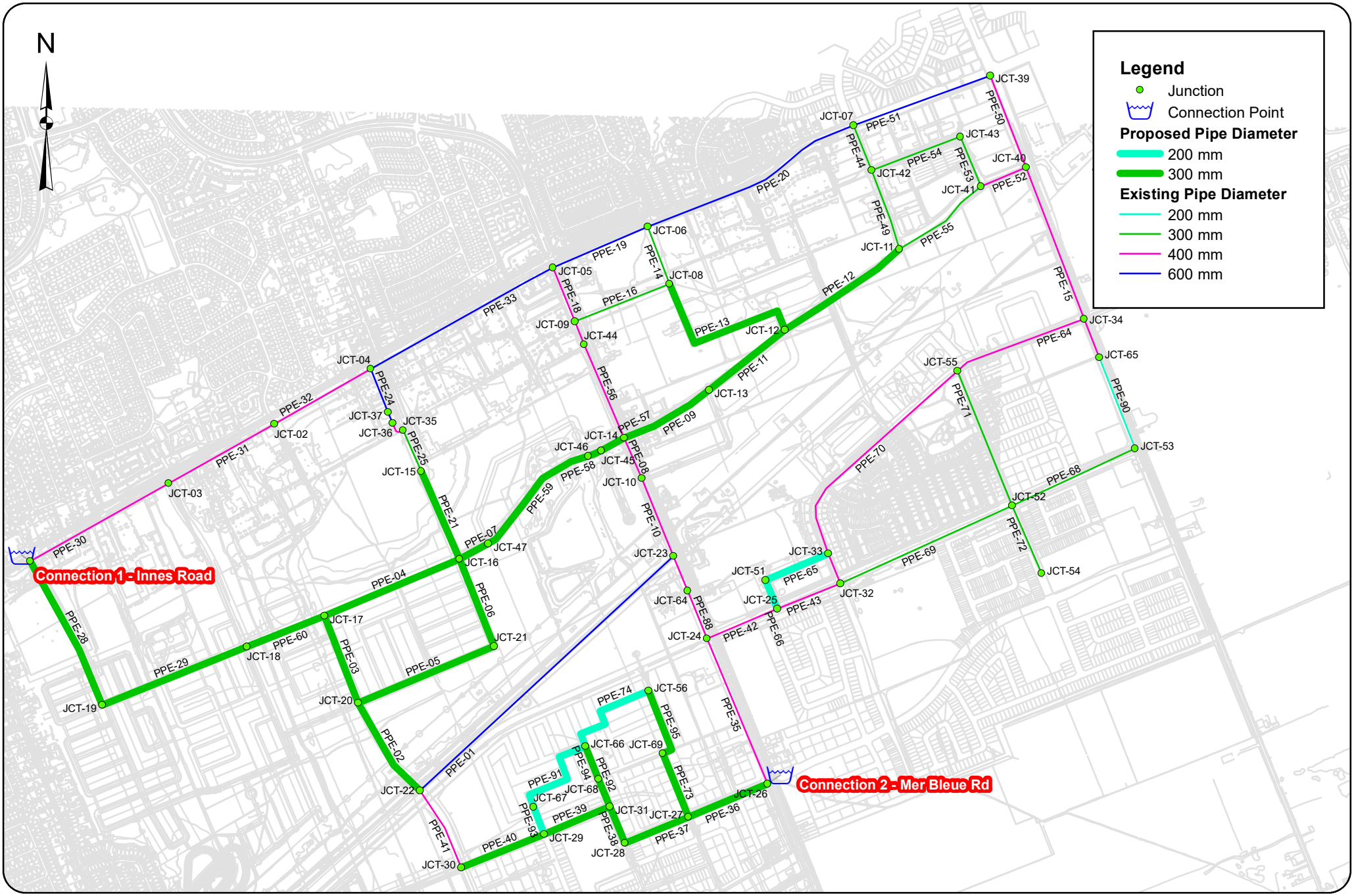
There are 605 single detached dwellings, 1,412 townhomes, 3,243 apartment units and 83.2 ha of commercial and institutional area serviced as part of the development.

The development trunk main network will connect in many locations to the existing City trunk main network. To conduct the hydraulic analysis and to size the proposed development trunk main network, only a few of the major City trunk mains and two (2) connection points were modeled. By simplifying the City network and modeling only two (2) connection points, the analysis results are more conservative. The two (2) connections to the City water system are located on Innes Road at the northwest corner of the development and on Mer Bleue Road at the south end of the development.

The development site is shown in **Figure 1.1** on the following page, with the final recommended pipe diameters.

This report describes the assumptions and results of the hydraulic modeling and capacity analysis using InfoWater (Innovyze), a GIS water distribution system modeling and management software application.

The results presented in this memo are based on the analysis of steady state simulations. The predicted available fire flows, as calculated by the hydraulic model, represent the flow available in the water main while maintaining a residual pressure of 20 psi at the hydrant. No extended period simulations were completed in this analysis to assess the water quality or to assess the hydraulic impact on storage and pumping.



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis East Urban Community Mixed-Use Centre Development**
Client: **David Schaeffer Engineering Ltd.**
Date: **July 2018**
Created by: **AM**
Reviewed by: **WdS**

0 400 800
Meters

Site Layout and Connection Points

Figure 1.1
B5

2 Modeling Considerations

2.1 Water Main Configuration

The water main network was modeled based on the pipe network layout prepared by DSEL (733_Wmain.dwg) and provided to GeoAdvice on May 11, 2018.

2.2 Elevations

Elevations of the modeled junctions in the northwest quadrant of the development were assigned according to a site grading plan prepared by DSEL (733_Grad_Opt1.dwg) and provided to GeoAdvice on May 11, 2018. In the absence of grading plans for the remaining three quadrants of the development, conservative estimates of the elevations were made based on elevations extracted from Google Earth.

2.3 Consumer Demands

The consumer demands were determined based on the factors summarized in **Table 2.1**, as provided by DSEL.

Table 2.1: City of Ottawa Demand Factors

Demand Type	Units
Single Family Residential	
Average Day Demand (ADD)	570 L/unit/day
Outdoor Water Demand (OWD)	1,050 L/unit/day
Maximum Day Demand (MDD)	ADD + OWD L/unit/day
Peak Hour Demand (PHD)	1.5 x ADD + 2.1 x MDD L/unit/day
Minimum Hour Demand (MHD)	0.5 x ADD L/unit/day
Multi-Family Residential	
Average Day Demand (ADD)	560 L/unit/day
Outdoor Water Demand (OWD)	0 L/unit/day
Maximum Day Demand (MDD)	ADD L/unit/day
Peak Hour Demand (PHD)	1.6 x MDD L/unit/day
Minimum Hour Demand (MHD)	0.5 x ADD L/unit/day
Apartment Residential	
Average Day Demand (ADD)	400 L/unit/day
Outdoor Water Demand (OWD)	0 L/unit/day
Maximum Day Demand (MDD)	ADD L/unit/day
Peak Hour Demand (PHD)	1.6 x MDD L/unit/day
Minimum Hour Demand (MHD)	0.5 x ADD L/unit/day

Demand Type	Units
Institutional, Commercial, and Institutional (ICI)	
Average Day Demand (ADD)	8,500 L/ha/day
Outdoor Water Demand (OWD)	0 L/ha/day
Maximum Day Demand (MDD)	ADD L/ha/day
Peak Hour Demand (PHD)	1.3 x MDD L/ha/day
Minimum Hour Demand (MHD)	0.5 x ADD L/unit/day

Table 2.2 and **Table 2.3** summarize the water demand calculations for residential and ICI demands, respectively.

Table 2.2: Residential Demand Calculations

Dwelling Unit		Average Day Demand	Maximum Day Demand	Peak Hour Demand	Minimum Hour Demand
Type	Number of Units	(L/s)	(L/s)	(L/s)	(L/s)
Single Detached	666	4.39	12.48	31.54	2.20
Townhome	1,553	10.07	10.07	16.10	5.03
Apartment Block	3,566	16.51	16.51	26.42	8.26
Total	**5,785**	**30.97**	**39.06**	**74.07**	**15.48**

Table 2.3: ICI Demand Calculations

Land Use Type	Area	Average Day Demand	Maximum Day Demand	Peak Hour Demand	Minimum Hour Demand
	(ha)	(L/s)	(L/s)	(L/s)	(L/s)
Commercial floor space	8.55	0.84	0.84	1.09	0.42
Institutional	11.30	1.11	1.11	1.44	0.56
Employment/Mixed Use	62.11	6.11	6.11	7.94	3.06
Park w/ Splash Pad	9.59	0.94	0.94	1.23	0.47
Total	**91.54**	**9.01**	**9.01**	**11.71**	**4.50**

It is important to note that the unit counts and areas in **Table 2.2** and **Table 2.3** have been increased by 10% to account for potential changes in the proposed land use of the development.

In addition to the demands summarized above, demands from neighbouring developments were included in the following analysis. These developments include:

- The future commercial land to the northeast of the study area;
- The development at 3490 Innes Road;
- The Mer Bleue Expansion development;
- The Trails Edge East development; and
- The Innes Road Commercial to the northwest of the development.

The demands from the additional neighbouring developments were also increased by 10% to account for potential land use changes, with the exception of the 3490 Innes Road and Mer Bleue Expansion developments. The demands from these two developments were included in the analysis but not increased by 10% because these values were considered approved per previous reports.

Demands were grouped into demand polygons then uniformly distributed to the model nodes located within each polygon. The calculation and allocation of the demands is shown in **Appendix A**.

2.4 Fire Flow Demand

At this time, there is not enough information available to calculate the required fire flows of the development. In previous development applications, the City has typically requested a maximum required fire flow of 250 L/s based on their requirement to limit distribution mains to 200 mm in diameter (Technical Bulletin ISDTB-2014-02). As such, a required fire flow of 250 L/s was assumed throughout the development.

Fire flow simulations were completed at each model node in the development. The locations of nodes do not necessarily represent hydrant locations.

2.5 Boundary Conditions

The boundary conditions were provided by the City of Ottawa in the form of Hydraulic Grade Line (HGL) at the following locations:

- Connection 1: Innes Road
- Connection 2: Mer Bleue Road

The above connection points are illustrated in **Figure 1.1**.

Boundary conditions were provided for Peak Hour, Maximum Day plus Fire and Minimum Hour (high pressure check) conditions. Boundary conditions can be found in **Appendix B**.

Table 2.4 summarizes the boundary conditions used to size the development water network.

Table 2.4: Boundary Conditions

Condition	Connection 1 HGL (m)	Connection 2 HGL (m)
Min Hour (max. pressure)	130.3	130.3
Peak Hour (min. pressure)	126.4	125.5
Max Day + Fire Flow (250 L/s)	126.1	124.3

Please note that not all neighbouring developments were included in the boundary conditions; however, the boundary conditions were assumed to be adequate for this study based on discussions with the City of Ottawa staff.

3 Hydraulic Capacity Design Criteria

3.1 Pipe Characteristics

Pipe characteristics of internal diameter (ID) and Hazen-Williams C factors were assigned in the model according to the City of Ottawa Design Guidelines for PVC water main material. Pipe characteristics used for the development are outlined in **Table 3.1** below.

Table 3.1: Model Pipe Characteristics

Nominal Diameter (mm)	ID PVC (mm)	Hazen Williams C-Factor (/)
150	155	100
200	204	110
250	250	110
300	305	120
400	406	120
600	600	120

3.2 Pressure Requirements

As outlined in the City of Ottawa Design Guidelines, the generally accepted best practice is to design new water distribution systems to operate between 350 kPa (50 psi) and 480 kPa (70 psi). The maximum pressure at any point in the distribution system in occupied areas outside of the public right-of-way shall not exceed 552 kPa (80 psi). Pressure requirements are outlined in **Table 3.2.**

Table 3.2: Pressure Requirements

Demand Condition	Minimum Pressure		Maximum Pressure	
	(kPa)	(psi)	(kPa)	(psi)
Normal Operating Pressure (maximum daily flow)	350	50	480	70
Peak Hour Demand (minimum allowable pressure)	276	40	-	-
Maximum Fixture Pressure (Ontario Building Code)	-	-	552	80
Maximum Distribution Pressure (minimum hour check)	-	-	552	80
Maximum Day Plus Fire	140	20	-	-

4 Hydraulic Capacity Analysis

The proposed water mains within the development were sized to the minimum diameter which would satisfy the greater of maximum day plus fire and peak hour demand. Modeling was carried out for minimum hour, peak hour and maximum day plus fire flow using InfoWater.

Detailed pipe and junction model input data can be found in **Appendix C**.

4.1 Development Pressure Analysis

The modeling results indicate that the development can be adequately serviced by the proposed water main layout shown in **Figure 1.1**. Modeled service pressures for the development are summarized in **Table 4.1** below.

Table 4.1: Summary of Available Service Pressures

Minimum Hour Demand Maximum Pressure	Peak Hour Demand Minimum Pressure
400 kPa (58 psi)	297 kPa (43 psi)

Based on **Table 3.2** and **Table 4.1**, pressures fall within the desired range.

Detailed pipe and junction result tables and maps can be found in **Appendix D**.

4.2 Development Fire Flow Analysis

The minimum allowable pressure under fire flow conditions is 140 kPa (20 psi) at the location of the fire. A summary of the minimum available fire flows is shown below in **Table 4.2**.

Table 4.2: Summary of Minimum Available Fire Flows

Required Fire Flow	Minimum Available Flow	Junction ID
250 L/s	263 L/s	JCT-67

As shown in **Table 4.2**, the model predicts that the fire flow requirements can be met throughout the development with the proposed water trunk main layout shown in **Figure 1.1**. Detailed fire flow results and figures illustrating the fire flow results can be found in **Appendix E**.

5 Conclusions

The hydraulic capacity and modeling analysis of East Urban Community Mixed-Use Centre development yielded the following conclusions:

- The proposed water main network can deliver all domestic flows, with service pressures expected to range between 297 kPa and 400 kPa.
- Available fire flows are predicted to exceed 263 L/s at all modeled nodes. All fire flows are achievable (all residual pressures exceed 140 kPa).

Submission

Prepared by:

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Approved by:

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July 25, 2018

Werner de Schaetzen, Ph.D., P.Eng.
Senior Modeling Review / Project Manager

Appendix A Domestic Water Demand Calculations and Allocation

NE Domestic Water Demands

10% increase in demand

Dwelling Type	Number of Units	Average Day Demand			Outdoor Water Demand			Max Day Avg. Day+OWD (L/s)	Fire Flow (L/s)	Peak Hour (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/unit/d)	(L/d)	(L/s)	(L/unit/d)	(L/d)	(L/s)				
Single Family	-	570	-	-	1,050	-	-	-	167	-	-
Townhome	-	560	-	-	-	-	-	-	167	-	-
Apartment	1,547	400	618,640	7.16	-	-	-	7.16	167	11.46	3.58
Subtotal:	**1,547**		**618,640**	**7.16**		**-**	**-**	**7.16**		**11.46**	**3.58**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

Land Use Type	Area (ha)	Average Day Demand			Max Day Avg. Day (L/s)	Fire Flow (L/s)	Peak Hour 1.3 x Max Day (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/ha/d)	(L/d)	(L/s)				
Commercial floor space	3.81	8,500	32,415	0.38	0.38	250*	0.49	0.19
Institutional		8,500	-	-	-	250*	-	-
Employment/Mixed Use	28.12	8,500	239,009	2.77	2.77	250*	3.60	1.38
Park w/ Splash Pad*	0.21	8,500	1,806	0.02	0.02	251*	0.03	0.01
Subtotal:	**32.14**		**273,229**	**3.16**	**3.16**		**4.11**	**1.58**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

Total:	**10.32**	**10.32**	**15.57**	**5.16**

Future Commercial Land

10% increase in demand

Land Use Type	Area (ha)	Average Day Demand			Max Day Avg. Day (L/s)	Fire Flow (L/s)	Peak Hour 1.3 x Max Day (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/ha/d)	(L/d)	(L/s)				
Commercial floor space	32.36	8,500	275,077	3.18	3.18	250*	4.14	1.59
Institutional		8,500	-	-	-	250*	-	-
Employment/Mixed Use	-	8,500	-	-	-	250*	-	-
Park w/ Splash Pad*		8,500	-	-	-	250*	-	-
Subtotal:	**32.36**		**275,077**	**3.18**	**3.18**		**4.14**	**1.59**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

Total:	**3.18**	**3.18**	**4.14**	**1.59**

North of Hydro Easement, East of Mer Bleue Road					
Land Use	Area (Ha)	Singles	THs	Apt	Employment
Mixed Use/Employment	10.15			1406	536
Employment	15.42				812
Commercial	3.47				147
Park	0.19				
Total	29.22	0	0	1406	1495

Total Demands	L/s
Avg. Day	**13.51**
Max Day	**13.51**
Peak Hour	**19.71**
MHD	**6.75**

SW Domestic Water Demands

10% increase in demand

Dwelling Type	Number of Units	Average Day Demand			Outdoor Water Demand			Max Day Avg. Day+OWD (L/s)	Fire Flow (L/s)	Peak Hour (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/unit/d)	(L/d)	(L/s)	(L/unit/d)	(L/d)	(L/s)				
Single Family	157	570	89,728	1.04	1,050	165,289	1.91	2.95	167	7.46	0.52
Townhome	367	560	205,693	2.38	-	-	-	2.38	167	3.81	1.19
Apartment	907	400	362,867	4.20	-	-	-	4.20	167	6.72	2.10
Subtotal:	**1,432**		**658,289**	**7.62**		**165,289**	**1.91**	**9.53**		**17.99**	**3.81**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

Land Use Type	Area (ha)	Average Day Demand			Max Day Avg. Day (L/s)	Fire Flow (L/s)	Peak Hour 1.3 x Max Day (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/ha/d)	(L/d)	(L/s)				
Commercial floor space	4.73	8,500	40,240	0.47	0.47	250*	0.61	0.23
Institutional	1.10	8,500	9,372	0.11	0.11	250*	0.14	0.05
Employment/Mixed Use	6.92	8,500	58,840	0.68	0.68	250*	0.89	0.34
Park w/ Splash Pad*	0.51	8,500	4,375	0.05	0.05	250*	0.07	0.03
Subtotal:	**13.27**		**112,827**	**1.31**	**1.31**		**1.70**	**0.65**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

Total:	**8.92**	**10.84**	**19.69**	**4.46**

Trails Edge East

10% increase in demand

Dwelling Type	Number of Units	Average Day Demand			Outdoor Water Demand			Max Day Avg. Day+OWD (L/s)	Fire Flow (L/s)	Peak Hour (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/unit/d)	(L/d)	(L/s)	(L/unit/d)	(L/d)	(L/s)				
Single Family	275	570	156,750	1.81	1,050	288,750	3.34	5.16	167	13.03	0.91
Townhome	898	560	502,656	5.82	-	-	-	5.82	167	9.31	2.91
Apartment		400	-	-	-	-	-	-	167	-	-
Subtotal:	**1,173**		**659,406**	**7.63**		**288,750**	**3.34**	**10.97**		**22.34**	**3.82**

Total:	**7.63**	**10.97**	**22.34**	**3.82**

South of Hydro Easement, West of Mer Bleue Road

Land Use	Area (Ha)	Singles	THs	Apt	Employment
Mixed Use	6.29			252	265
Medium-High Density Residential	7.16			573	
Low Density Residential	13.87	143	334		
Institutional	1.00				3
Commercial	4.30				183
Park	0.47				
Brian Coburn	6.23				
Total	39.33	143	334	825	451

Total Demands	L/s
Avg. Day	**16.56**
Max Day	**21.81**
Peak Hour	**42.03**
MHD	**8.28**

SE Domestic Water Demands

10% increase in demand

Dwelling Type	Number of Units	Average Day Demand			Outdoor Water Demand			Max Day Avg. Day+OWD (L/s)	Fire Flow (L/s)	Peak Hour (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/unit/d)	(L/d)	(L/s)	(L/unit/d)	(L/d)	(L/s)				
Single Family	-	570	-	-	1,050	-	-	-	167	-	-
Townhome	-	560	-	-	-	-	-	-	167	-	-
Apartment	92	400	36,960	0.43	-	-	-	0.43	167	0.68	0.21
Subtotal:	**92**		**36,960**	**0.43**		**-**	**-**	**0.43**		**0.68**	**0.21**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

Land Use Type	Area (ha)	Average Day Demand			Max Day Avg. Day (L/s)	Fire Flow (L/s)	Peak Hour 1.3 x Max Day (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/ha/d)	(L/d)	(L/s)				
Commercial floor space	-	8,500	-	-	-	250*	-	-
Institutional	10.19	8,500	86,644	1.00	1.00	250*	1.30	0.50
Employment/Mixed Use		8,500	-	-	-	250*	-	-
Park w/ Splash Pad*	0.40	8,500	3,393	0.04	0.04	250*	0.05	0.02
Subtotal:	**10.59**		**90,037**	**1.04**	**1.04**		**1.35**	**0.52**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

Total:				**1.47**	**1.47**		**2.04**	**0.73**

South of Hydro Easement, East of Mer Bleue Road

Land Use	Area (Ha)	Singles	THs	Apt	Employment
Institutional	9.27				1500
Park	0.36				
Medium Density Residential	0.99			84	
Total	10.62	0	0	84	1500

Total Demands	**L/s**
Avg. Day	**28.43**
Max Day	**53.99**
Peak Hour	**121.59**
MHD	**14.22**

Mer Bleue Exp.Water Demands

Not showing 10% increase in demand

Dwelling Type	Number of Units	Average Day Demand			Outdoor Water Demand			Max Day Avg. Day+OWD (L/s)	Fire Flow (L/s)	Peak Hour (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/unit/d)	(L/d)	(L/s)	(L/unit/d)	(L/d)	(L/s)				
Single Family	2,103	570	1,198,710	13.87	1,050	2,208,150	25.56	39.43	167	99.67	6.94
Townhome	1,191	560	666,960	7.72	-	-	-	7.72	167	12.35	3.86
Apartment	395	400	158,000	1.83	-	-	-	1.83	167	2.93	0.91
Subtotal:	**3,689**		**2,023,670**	**23.42**		**2,208,150**	**25.56**	**48.98**		**114.95**	**11.71**

Land Use Type	Area (ha)	Average Day Demand			Max Day Avg. Day (L/s)	Fire Flow (L/s)	Peak Hour 1.3 x Max Day (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/ha/d)	(L/d)	(L/s)				
Commercial floor space	4.00	8,500	34,000	0.39	0.39	250	0.51	0.20
Institutional*		8,500	-	-	-	250	-	-
Employment/Mixed Use	13.00	8,500	110,500	1.28	1.28	250	1.66	0.64
Park w/ Splash Pad**	19.00	8,500	161,500	1.87	1.87	250	2.43	0.93
Subtotal:	**36.00**		**306,000**	**3.54**	**3.54**		**4.60**	**1.77**

*Institutional assumed as light industiral in absence of population estimate

**Park using the 8500 L/ha/day value like commercial

Total:				**26.96**	**52.52**		**119.55**	**13.48**

NW Domestic Water Demands

10% increase in demand

Dwelling Type	Number of Units	Average Day Demand			Outdoor Water Demand			Max Day Avg. Day+OWD (L/s)	Fire Flow (L/s)	Peak Hour (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/unit/d)	(L/d)	(L/s)	(L/unit/d)	(L/d)	(L/s)				
Single Family	508	570	289,637	3.35	1,050	533,541	6.18	9.53	167	24.08	1.68
Townhome	1,186	560	663,962	7.68	-	-	-	7.68	167	12.30	3.84
Apartment	1,020	400	408,112	4.72	-	-	-	4.72	167	7.56	2.36
Subtotal:	**2,714**		**1,361,710**	**15.76**		**533,541**	**6.18**	**21.94**		**43.94**	**7.88**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

Land Use Type	Area (ha)	Average Day Demand			Max Day Avg. Day (L/s)	Fire Flow (L/s)	Peak Hour 1.3 x Max Day (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/ha/d)	(L/d)	(L/s)				
Commercial floor space		8,500	-	-	-	250*	-	-
Institutional		8,500	-	-	-	250*	-	-
Employment/Mixed Use	27.07	8,500	230,068	2.66	2.66	250*	3.46	1.33
Park w/ Splash Pad*	8.47	8,500	71,956	0.83	0.83	250*	1.08	0.42
Subtotal:	**35.53**		**302,024**	**3.50**	**3.50**		**4.54**	**1.75**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

Total:				**19.26**	**25.43**		**48.48**	**9.63**

3490 Innes Road

Not showing 10% increase in demand

Dwelling Type	Number of Units	Average Day Demand			Outdoor Water Demand			Max Day Avg. Day+OWD (L/s)	Fire Flow (L/s)	Peak Hour (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/unit/d)	(L/d)	(L/s)	(L/unit/d)	(L/d)	(L/s)				
Single Family	330	570	188,100	2.18	1,050	346,500	4.01	6.19	167	15.64	1.09
Townhome	491	560	274,960	3.18	-	-	-	3.18	167	5.09	1.59
Apartment	-	400	-	-	-	-	-	-	167	-	-
Subtotal:	**821**		**463,060**	**5.36**		**346,500**	**4.01**	**9.37**		**20.73**	**2.68**

Land Use Type	Area (ha)	Average Day Demand			Max Day Avg. Day (L/s)	Fire Flow (L/s)	Peak Hour 1.3 x Max Day (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/ha/d)	(L/d)	(L/s)				
Commercial floor space	5.40	8,500	45,900	0.53	0.53	250*	0.69	0.27
Institutional		8,500	-	-	-	250*	-	-
Employment/Mixed Use	-	8,500	-	-	-	250*	-	-
Park w/ Splash Pad*	1.43	8,500	12,155	0.14	0.14	250*	0.18	0.07
Subtotal:	**6.83**		**58,055**	**0.67**	**0.67**		**0.87**	**0.34**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

Total:				**6.03**	**10.04**		**21.61**	**3.02**

Innes Road Commercial

10% increase in demand

Land Use Type	Area (ha)	Average Day Demand			Max Day Avg. Day (L/s)	Fire Flow (L/s)	Peak Hour 1.3 x Max Day (L/s)	Min Hour 0.5 x Avg. Day (L/s)
		(L/ha/d)	(L/d)	(L/s)				
Commercial floor space	13.99	8,500	118,932	1.38	1.38	250*	1.79	0.69
Institutional	-	8,500	-	-	-	250*	-	-
Employment/Mixed Use	-	8,500	-	-	-	250*	-	-
Park w/ Splash Pad*	-	8,500	-	-	-	250*	-	-
Subtotal:	**13.99**		**118,932**	**1.38**	**1.38**		**1.79**	**0.69**

*Not enough information at this time to complete FUS calculations. Typical conservative estimate assumed.

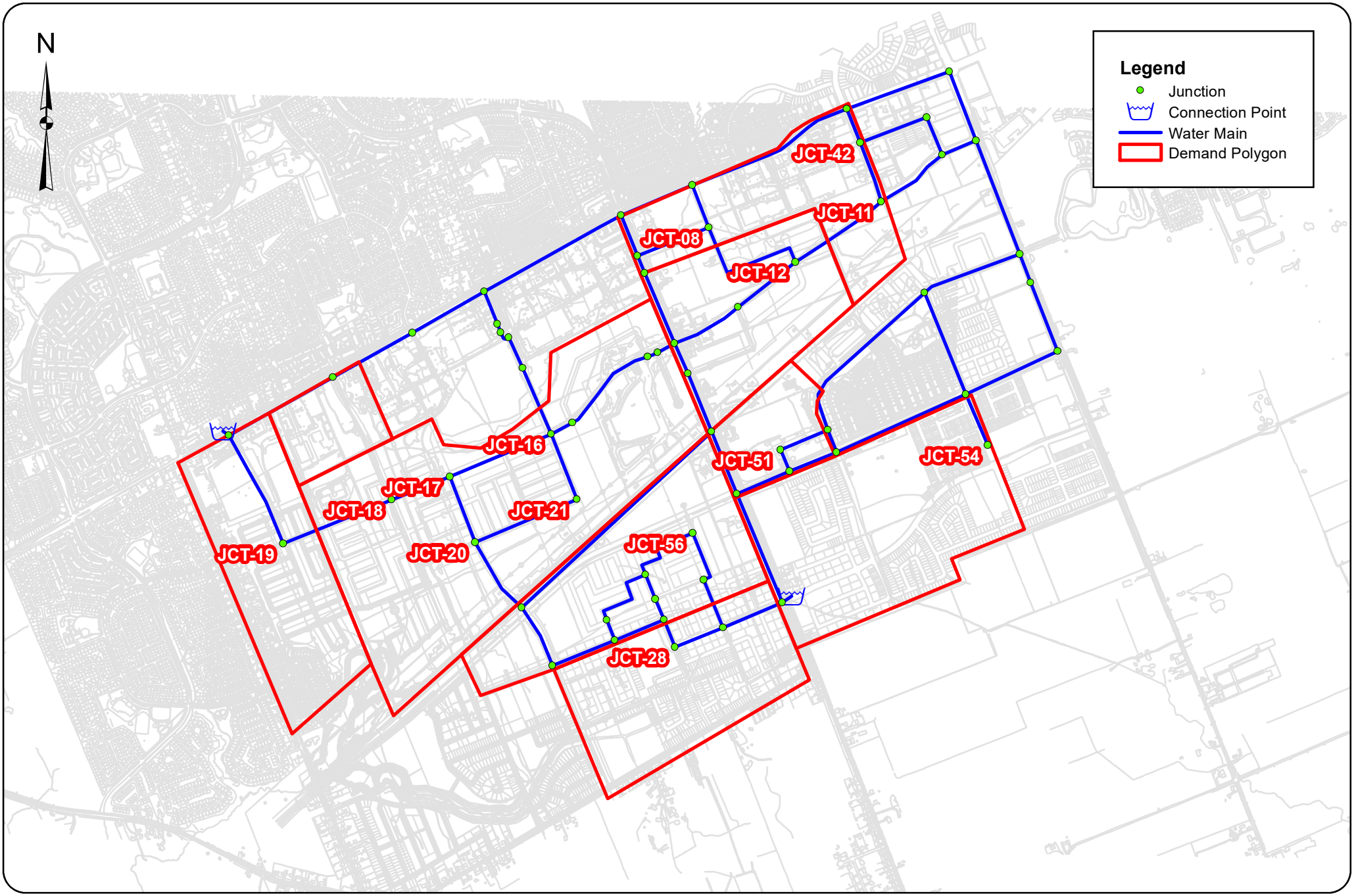
Total:				**1.38**	**1.38**		**1.79**	**0.69**

North of Hydro Easement, West of Mer Bleue Road					
Land Use	Area (Ha)	Singles	THs	Apt	Employment
Low Density Residential	44.76	462	1078		
Medium Density Residential	4.04			250	
Medium-High Density Residential	8.47			677	
Employment	24.61				1431
Park	7.70				
Stormwater Management Facility	1.47				
Rock Barren	5.44				
Total	96.48	462	1078	928	1431

Total Demands	**L/s**	**L/min**
Avg. Day	**26.66**	**1599.848**
Max Day	**36.85**	**2210.987**
Peak Hour	**71.88**	**4312.588**
MHD	**13.33**	**799.9238**

Domestic Demand Calculations and Allocation

Junction ID	Polygon	Quadrant	ADD (L/s)	MDD (L/s)	PHD (L/s)
JCT-8	Future Commercial Land	NE	1.06	1.06	1.38
JCT-11	Future Commercial Land	NE	1.06	1.06	1.38
JCT-12	NE Domestic Water Demands	NE	10.32	10.32	15.57
JCT-16	NW Domestic Water Demands	NW	3.85	5.09	9.70
JCT-17	NW Domestic Water Demands	NW	3.85	5.09	9.70
JCT-18	NW Domestic Water Demands	NW	3.85	5.09	9.70
JCT-19	3490 Innes Road	NW	6.03	10.04	21.61
JCT-20	NW Domestic Water Demands	NW	3.85	5.09	9.70
JCT-21	NW Domestic Water Demands	NW	3.85	5.09	9.70
JCT-54	Mer Bleue Exp.Water Demands	SE	26.96	52.52	119.55
JCT-28	Trails Edge East	SW	7.63	10.97	22.34
JCT-51	SE Domestic Water Demands	SE	1.47	1.47	2.04
JCT-42	Future Commercial Land	NE	1.06	1.06	1.38
JCT-38	Innes Road Commercial	NW	1.38	1.38	1.79
JCT-56	SW Domestic Water Demands	SW	8.92	10.84	19.69
	TOTAL		**85.16**	**126.16**	**255.21**



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis East Urban Community Mixed-Use Centre Development**
Client: **David Schaeffer Engineering Ltd.**
Date: **July 2018**
Created by: **AM**
Reviewed by: **WdS**

0 500 1,000
Meters

Demand Allocation

Figure A.1
B20