

TOWN OF CALEDON  
PLANNING  
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**WATER SUPPLY ANALYSIS REPORT**

**SNELL'S HOLLOW SECONDARY PLAN AREA**

**TOWN OF CALEDON**

**PROJECT 2019-4851**

**FEBRUARY 2021**



**SCHAEFFERS**  
CONSULTING ENGINEERS

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## 1.0 MUNICIPAL SERVICING

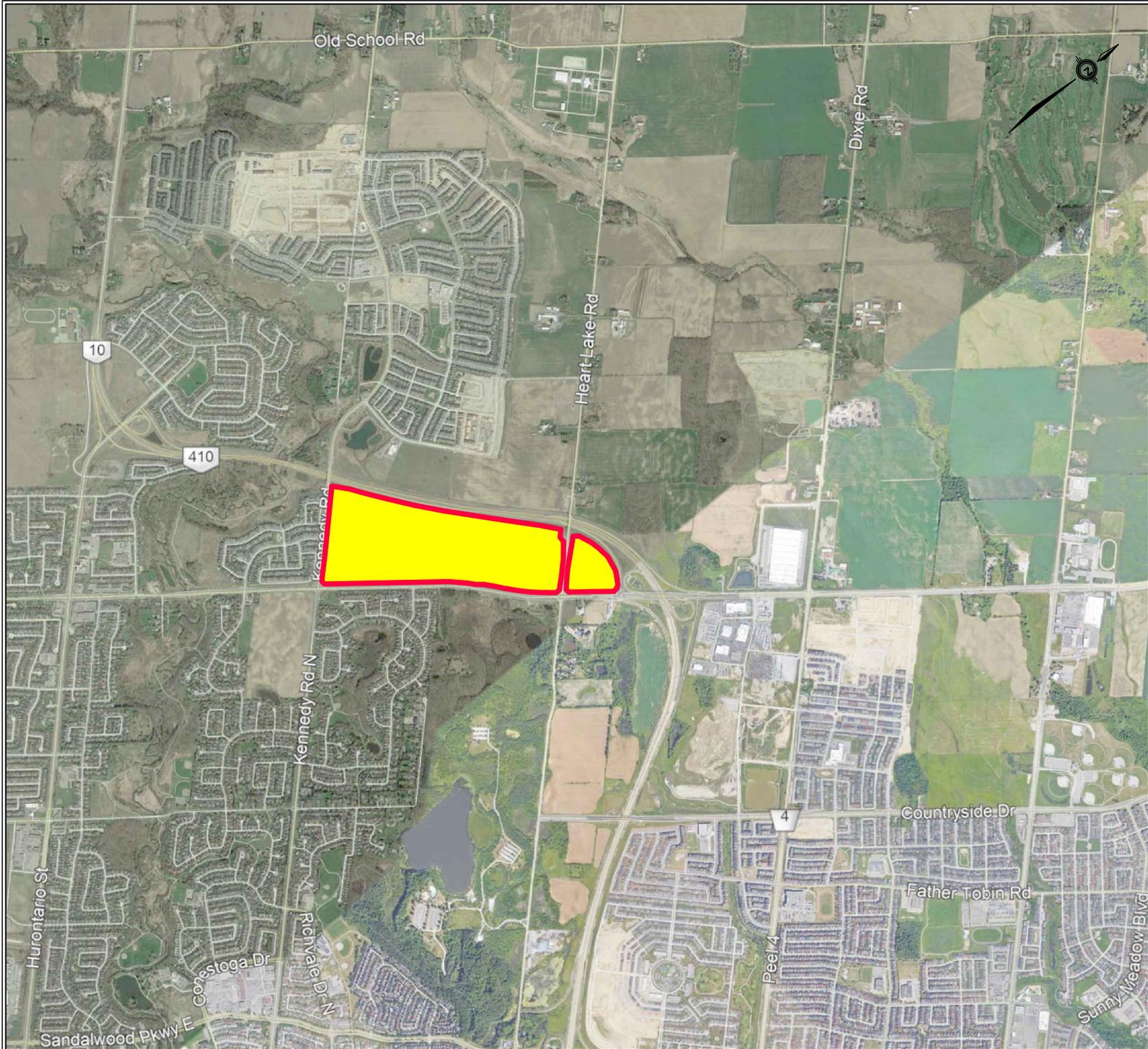
### 1.1 Introduction

The following sections demonstrate that the proposed water distribution plan can adequately supply potable drinking water to the proposed developments within the Snell's Hollow Secondary Plan Area. The subject site is bound by Highway 410 to the north, Kennedy Road to the southwest, Mayfield Road to the south as illustrated in **Figure 1.1**.

The Snell's Hollow Secondary Plan Area is approximately 62.4 ha that includes lands on both sides of Heart Lake Road, with the majority of the site area on the west side of Heart Lake Road. Out of the 62.4 ha, development is proposed in approximately 36.97 ha.

### 1.2 Existing Conditions

The existing water supply network adjacent to the subject site consists of watermains and feeder mains along Mayfield Road, Heart Lake Road and Kennedy Road. There are 400mm diameter, 750mm diameter and 600mm diameter watermains along Mayfield Road, and 400mm diameter watermain, as well as 900mm diameter and 1200mm diameter feeder mains running along Heart Lake Road. There is a 300mm watermain and a 600mm feeder main on Kennedy Road.



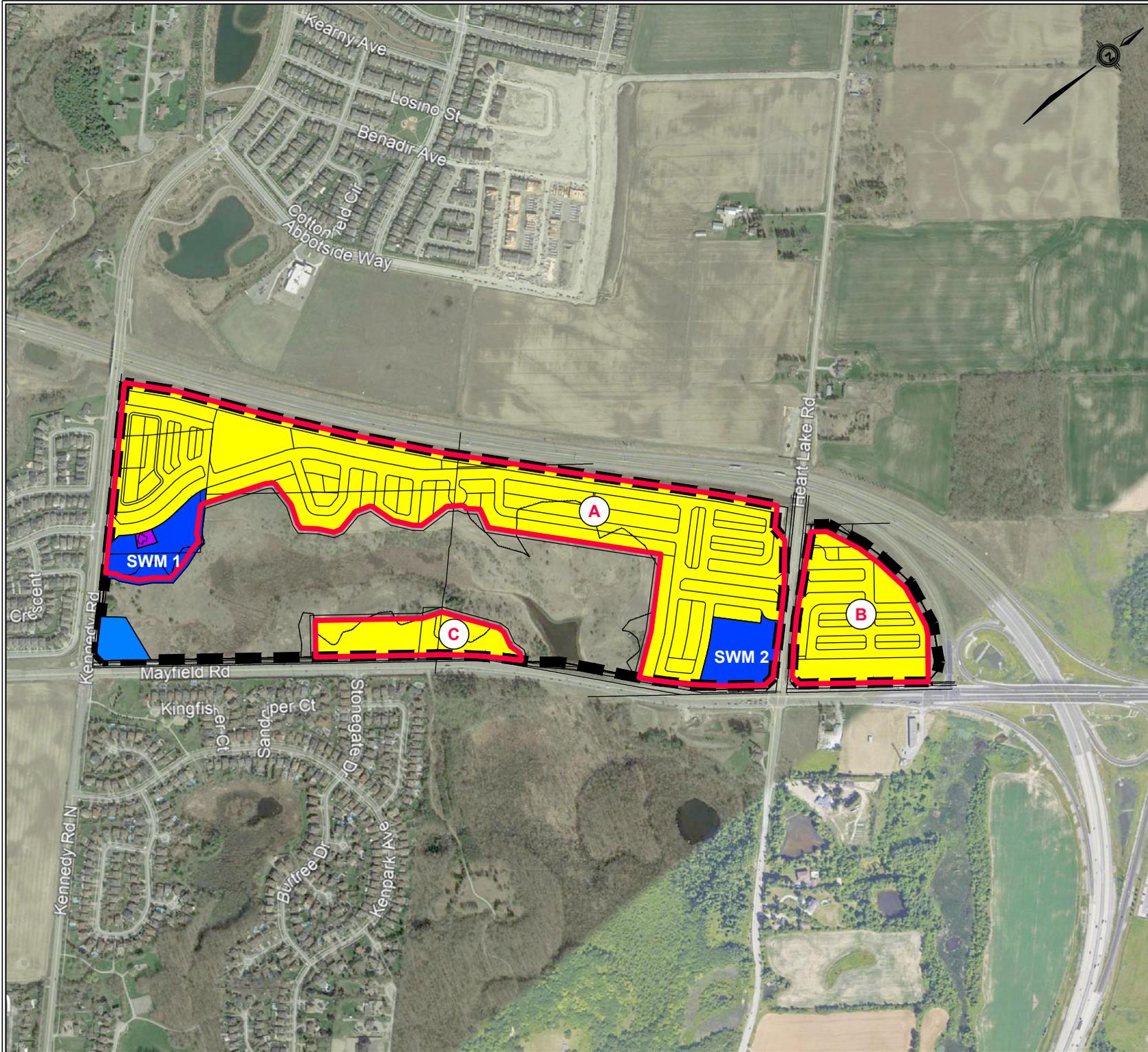
SNELL'S HOLLOW SECONDARY PLAN  
TOWN OF CALEDON

LEGEND

 SNELL'S HOLLOW SECONDARY PLAN AREA

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FIGURE 1.1  
LOCATION PLAN



SNELL'S HOLLOW SECONDARY PLAN  
TOWN OF CALEDON

LEGEND

-  SNELL'S HOLLOW SECONDARY PLAN AREA
-  DEVELOPEMNT BOUNDARY
-  PROPOSED SWM POND
-  EXISTING SWM POND
-  EXISTING HERITAGE DWELLING

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FIGURE 1.2  
DEVELOPMENT PLAN

### 1.3 Pressure Zone 7

The subject site is located within Region of Peel Pressure Zone 7 Central (7C) within the Central Transmission System. Pressure Zone 7C is supplied from the elevated Mayfield West tank (CS7) with the top water level (TWL) of 327.7m. The elevated tank is supplied from the North Brampton pumping station HLP7C. Pressure Zone 7 services the areas with the elevation of 243.4m – 289.6m. The entirety of the subject area is within the Pressure Zone 7 serviceable area.

### 1.4 Proposed Connections and Boundary Conditions

It is proposed to connect the southwest portion of the site to the 300mm watermain Kennedy Road and the 400mm watermain on Heart Lake Road. It is proposed to connect the northeast portion of the site to the 400mm watermain on Heart Lake Road at two locations for looping purposes. The commercial medium-high residential blocks on Mayfield Road will have connections directly to the Mayfield Road 400mm watermain. Two hydrant tests were performed in October 2020, one on Kennedy Road north of Mayfield Road and one on Heart Lake Road north of Mayfield Road. Hydrant tests reported static pressure of 78 psi and 80 psi respectively, resulting in the hydraulic grade of 317.85 m and 317.26m. These values were used as the boundary conditions in the water supply model. The TWL of 327.7m was used in the Minimum Hour Demand scenario. Hydrant tests are presented in the **Appendix A**.

### 1.5 Design Criteria

As per the Region of Peel's Design Criteria for watermains, the following guidelines were used in the design calculations for the water supply:

- an average residential daily demand of 280 l/person/day and 300/employee/day for industrial, commercial or institutional areas (ICI);
- a maximum day demand factor of 2.0 for residential and 1.4 for ICI;
- a peak hour demand factor of 3.0;
- minimum hour demand factor of 0.5 per the MOE *Design Guidelines for Drinking Water Systems – 2008*, Table 3-1: Peaking factors, population range of 3000 – 10000;
- a minimum pressure of 275 kPa (40 psi) during the peak hour demand;
- a minimum pressure of 140 kPa (20 psi) tested for fire flow under maximum day flow;

- a maximum pressure of 690 kPa (100 psi) under static load or during the minimum hourly demand;
- a minimum watermain diameter of 150mmØ for residential areas;
- Fire Underwriters Survey fire flow calculation cannot be performed since residential unit details are not available, therefore, fire flow requirements from the neighbouring municipalities will be used until the detailed water supply analysis:
  - a minimum fire flow demand of 7,000 l/min for single family & semi-detached units;
  - a minimum fire flow demand of 9,000 l/min for townhouses;
  - a minimum fire flow demand of 19,000 l/min for multi-unit apartment buildings;
  - a minimum fire flow demand of 25,000 l/min for commercial areas.

Water Demands were calculated for the proposed development based on the land use, units per area and persons per unit rate provided by Region of Peel. Land use per the *Preliminary Development Concept Plan*, by GSAI, dated December 16, 2020. Water demand calculations for the proposed development can be found in **Appendix B** for reference.

The Hazen Williams coefficients used in the model are listed in **Table 1-1**.

**Table 1-1: Hazen-Williams Coefficients**

Pipe Diameter (mm)	Coefficient
150	100
200-250	110
300-600	120
600+	130

## 1.6 Proposed Water Supply System

Approximately 364 low-density units, 345 medium-density units, and 378 medium-high-density units are proposed with the total population of 3099 residents. The commercial area and work from home will account for approximately 217 jobs. The residential areas east of Heart Lake Road and

between Heart Lake Road and Kennedy Road will be serviced internally by a network of 200mm diameter watermains. Commercial area and medium-high density residential area will connect to the Mayfield Road. The water supply demands for the subject site are summarized in **Table 1-2** below including each design demand scenario. For further detail of the water demands please refer to the calculations provided in **Appendix B** and the WaterCAD modeling provided in **Appendix C**.

**Table 1-2: Snell's Hollow Water Supply Demand Scenarios**

Land Use	Demand				Fire Flow	Critical Scenario
	Average Day	Min Hour	Peak Hour	Max Day		Max Day + Fire
	<i>l/s</i>	<i>l/s</i>	<i>l/s</i>	<i>l/s</i>	<i>l/s</i>	
Residential	10.04	5.02	30.13	20.09	317	438.14
ICI, WFH	0.75	0.38	2.26	1.05	417	

## 1.7 WaterCAD Modelling and Results

WaterCAD (CONNECT Edition) water supply modelling was prepared in order to analyze the proposed system under various demand scenarios (Average Day, Max Day, Peak Hour, Fire Flow, Minimum Hour). WaterCAD modelling outputs for the demand scenarios are included in Appendix C for reference. **Table 1-3** below presents the pressure range expected as per the WaterCAD modeling.

### 1.7.1 Domestic Demand Results

**Table 1-3: Expected Pressure Range in Snell's Hollow Secondary Plan Area**

Servicing Scenario	Maximum Pressure (kPa)	Minimum Pressure (kPa)
Average Day	520	454
Peak Hour	517	451
Max Day	519	453
Min Hour	622	557

All of the expected pressures in the Snell's Hollow Secondary Plan Area are in the required ranges per the Region of Peel criteria. The full modelling results are presented in **Appendix C**.

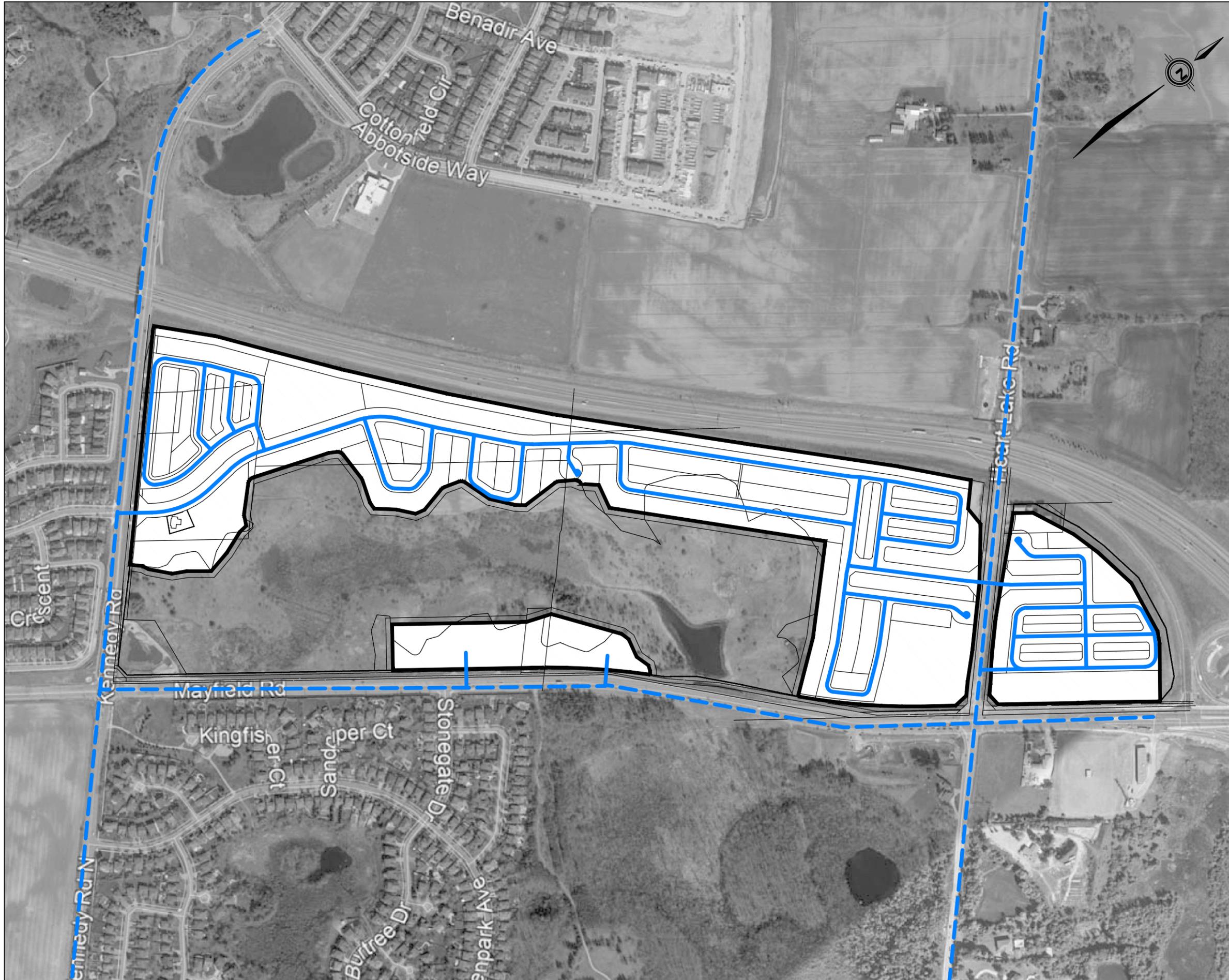
## 1.7.2 Fire Flow Results

Fire flow simulations showed that the required single-family house, townhouse, medium-high-density areas, and commercial area requirements are achieved at each node. Full modelling results are presented in **Appendix C**.

At this moment, there are no detailed designs for the medium density and medium-high density areas, therefore a Fire Underwriters Survey (FUS) fire protection calculation cannot be completed to get the fire flows specifically for the townhouse Blocks. In the detailed design stage, the FUS calculation will be performed and specific flows will be calculated.

## 1.8 Turnover Rate

Turnover rate for the residential areas has been calculated to ensure sufficient renewal of the potable water. Assuming the watermain size of 200mm in the residential areas, 25% occupancy and minimum consumption the ultimate buildout will turnover every 1.71 days. Typically, the requirement for turnover is every 3 to 5 days, therefore, the development at full build out satisfies water age requirements.



SNELL'S HOLLOW SECONDARY PLAN  
TOWN OF CALEDON

LEGEND

-  DEVELOPMENT BOUNDARY
-  PROPOSED WATERMAIN
-  EXISTING WATERMAIN

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FIGURE 1.3  
WATER SUPPLY SERVICING PLAN

## 2.0 SUMMARY AND CLOSING REMARKS

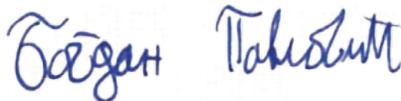
This report provides Town of Caledon with the necessary water supply analysis to support the design of water supply network for the Snell's Hollow Secondary Plan Area. Water supply to the development will be provided by the Pressure Zone 7 Central with the Mayfield West Elevated Tank and North Brampton Pumping Station. Subject site will connect to the existing watermains on Heart Lake Road, Mayfield Road and Kennedy Road. All of the water supply demands and fire flow requirements are satisfied.

Two hydrant tests were completed in October 2020 and are supporting the water supply analysis findings.

We trust that you will find the contents of this report satisfactory. Please contact the undersigned if you have any questions or concerns.

Respectfully Submitted,

**SCHAEFFER & ASSOCIATES LTD.**



Bogdan Pavlovic, MEng, E.I.T,  
Water Resources Analyst



Koryun Shahbikian, LLM, M.Eng., P.Eng.  
Partner

# **APPENDIX A**

## **Water Supply Background Information**



**LEGEND**

- SECONDARY PLAN AREA
- DETACHED / SEMI-DETACHED / ST. TOWNHOUSES
- DUAL-FRONTAGE TOWNHOUSES
- BACK-TO-BACK TOWNHOUSES
- MEDIUM-HIGH DENSITY RESIDENTIAL
- COMMERCIAL
- SWM POND
- PARK
- OPEN SPACE / BUFFERS
- NATURAL HERITAGE SYSTEM

**UNIT ESTIMATES**

- DETACHED / SEMI-DETACHED / ST. TOWNHOUSES:  
10.39ha x 35 UPHA = 364 UNITS
- DUAL-FRONTAGE TOWNHOUSES:  
2.18ha x 55 UPHA = 120 UNITS
- BACK-TO-BACK TOWNHOUSES:  
2.25ha x 100 UPHA = 225 UNITS
- MEDIUM-HIGH DENSITY RESIDENTIAL:  
2.52ha x 150 UPHA = 378 UNITS

APPROXIMATE TOTAL UNITS: 1,087 UNITS

**POPULATION ESTIMATES**

LAND USE	TOTAL NUMBER OF UNITS	PERSONS PER UNIT*	POPULATION
LOW DENSITY (DETACHED, SEMI-DETACHED & ST. TOWNHOUSES)	364	3.43	1249
MEDIUM DENSITY (TOWNHOUSES)	345	2.92	1007
MEDIUM-HIGH DENSITY (TOWNHOUSES, APARTMENTS)	378	2.23	843
<b>TOTALS</b>	<b>1,087</b>		<b>3,099</b>

\* PERSONS PER UNIT RATE PROVIDED BY REGION OF PEEL

**JOB ESTIMATES**

LAND USE	NUMBER OF JOBS
COMMERCIAL (43 JOBS / ha)	93
WORK FROM HOME & NO FIXED EMPLOYMENT (4% OF TOTAL POPULATION)	124
<b>TOTALS</b>	<b>217</b>

**PARKLAND DEDICATION**

LAND USE	REQUIRED PARKLAND (ha)
RESIDENTIAL AREAS (5% NDA) - 33.46 X 5%	1.67
COMMERCIAL AREAS (2% NDA) - 1.47 X 2%	0.03
<b>TOTALS</b>	<b>1.70</b>

**PEOPLE & JOBS DENSITY**

TOTAL PEOPLE & JOBS	TOTAL AREA (ha)	TOTAL PEOPLE & JOBS PER HECTARE
3316	39.09	84.83

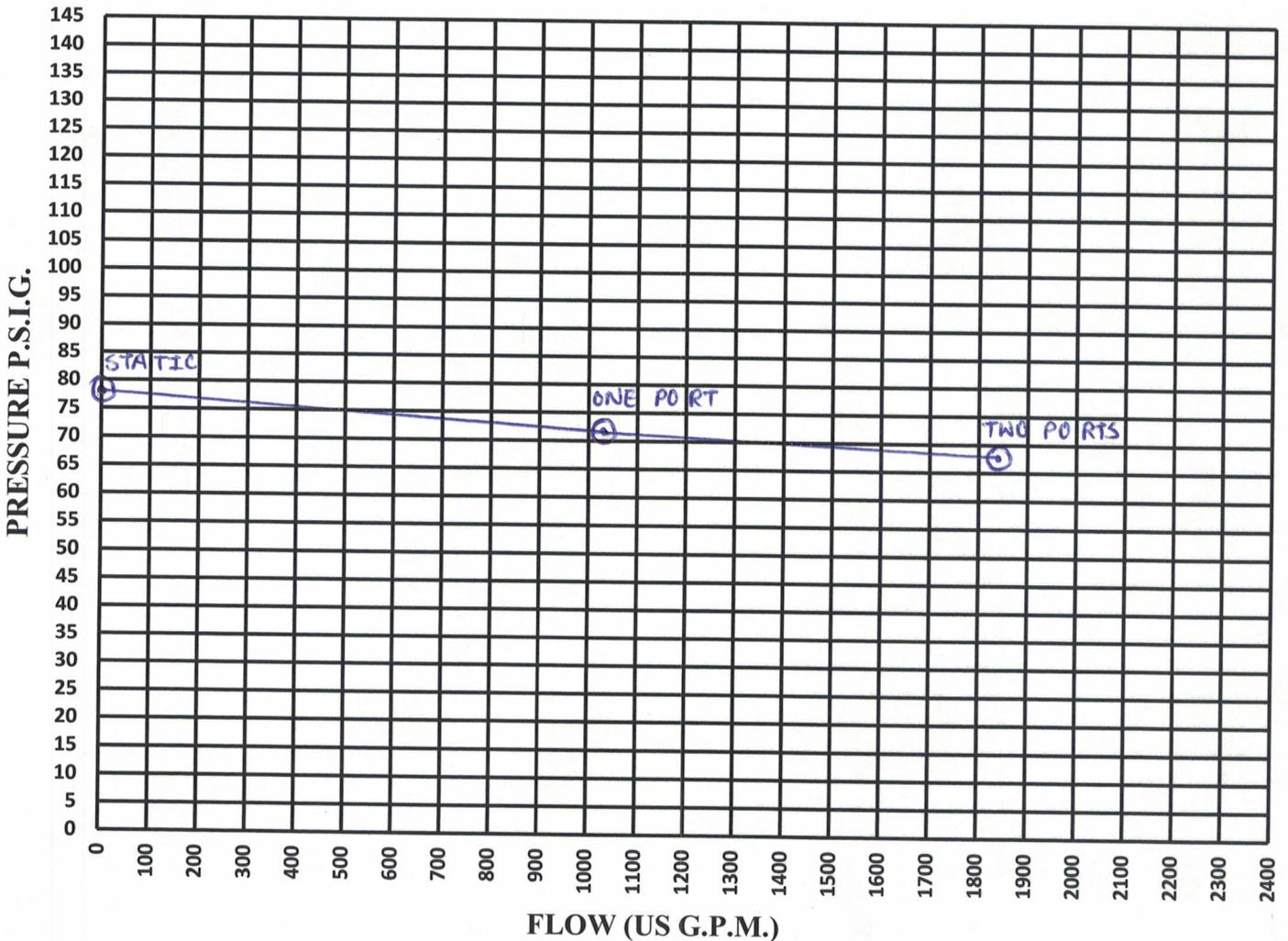


5-200 Connie Cres. Concord ON L4K 1M1 Phone 416-883-9777 Fax 905-303-6977

**FLOW TEST REPORT**

LOCATION OF RESIDUAL HYDRANT N of Kennedy Rd. & Snellview Blvd.  
 LOCATION OF FLOW HYDRANT S of Kennedy Rd. & Snellview Blvd.  
 TIME OF TEST 1:53 PM WATERMAIN SIZE 300 mm STATIC PRESSURE 78 psi

NUMBER OF OUTLETS	PITOT PRESSURE	FLOW (US G.P.M.)	RESIDUAL PRESSURE
One 2 1/2" hydrant port	37 psi	1020	72 psi
Two 2 1/2" hydrant port	30 psi	1830	68 psi



PROJECT LOCATION Kennedy Rd. & Snellview Blvd.  
 COMPANY NAME Glen Schnarr & Associates Inc.  
(PRINT NAME)

DATE 14<sup>th</sup> Oct. 2020  
 AQUAZITION EMPLOYEE Raj Rathod  
(PRINT NAME)



5-200 Connie Cres. Concord ON L4K 1M1 Phone 416-883-9777 Fax 905-303-6977

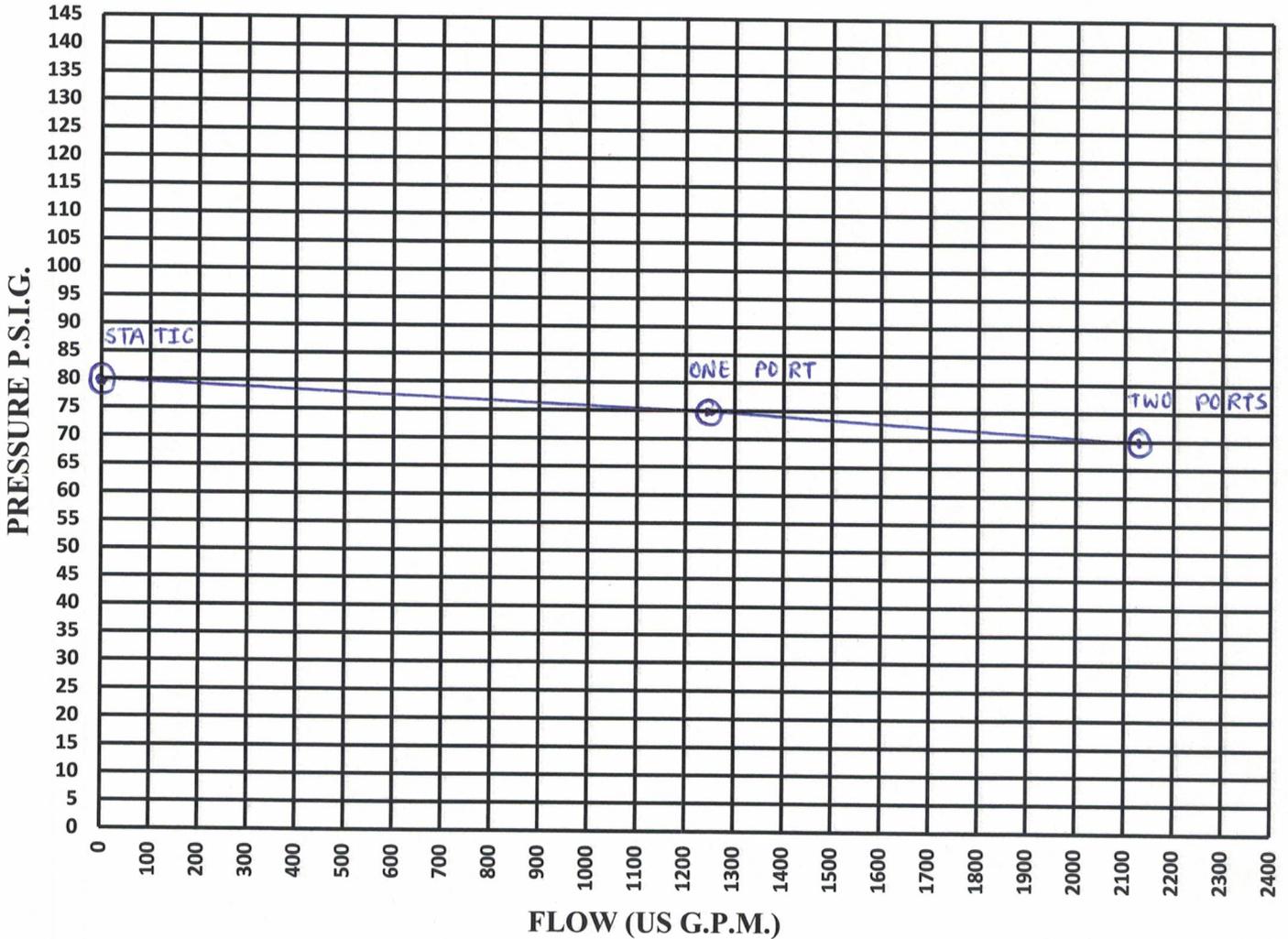
### FLOW TEST REPORT

LOCATION OF RESIDUAL HYDRANT NW corner of Heart lake Rd. & Mayfield Rd.

LOCATION OF FLOW HYDRANT NW on Heart lake Rd.

TIME OF TEST 1:20 PM WATERMAIN SIZE 400 mm STATIC PRESSURE 80 psi

NUMBER OF OUTLETS	PITOT PRESSURE	FLOW (US G.P.M.)	RESIDUAL PRESSURE
One 2 1/2" hydrant port	55 psi	1240	75 psi
Two 2 1/2" hydrant port	40 psi	2120	70 psi



PROJECT LOCATION Mayfield Rd. & Heart lake Rd.

DATE 14<sup>th</sup> Oct. 2020

COMPANY NAME Glen Schnarr & Associates Inc.  
(PRINT NAME)

AQUAZITION EMPLOYEE Raj Rathod  
(PRINT NAME)

## Snell's Hollow

Project No. 4851

### Test 1 - AQUAZITION

Flow Test Results of October 14 2020

Location: Residual: NW Corner of Heart Lake Road & Mayfield Road  
 Flow: NW on Heart Lake Road

Test Results			
Flow US. GPM	Residual Pressure psi	Flow L/s	Residual Presure kPa
0	80	0	552
1240	75	78	518
2120	70	134	483

For a total required flow demand of **233 L/s**  
 the equivalent residual pressure is

**375 kPa**

**54 psi**

For a residual pressure of **20 psi**  
 or **140 kPa** the equivalent flow is

**351 L/s**

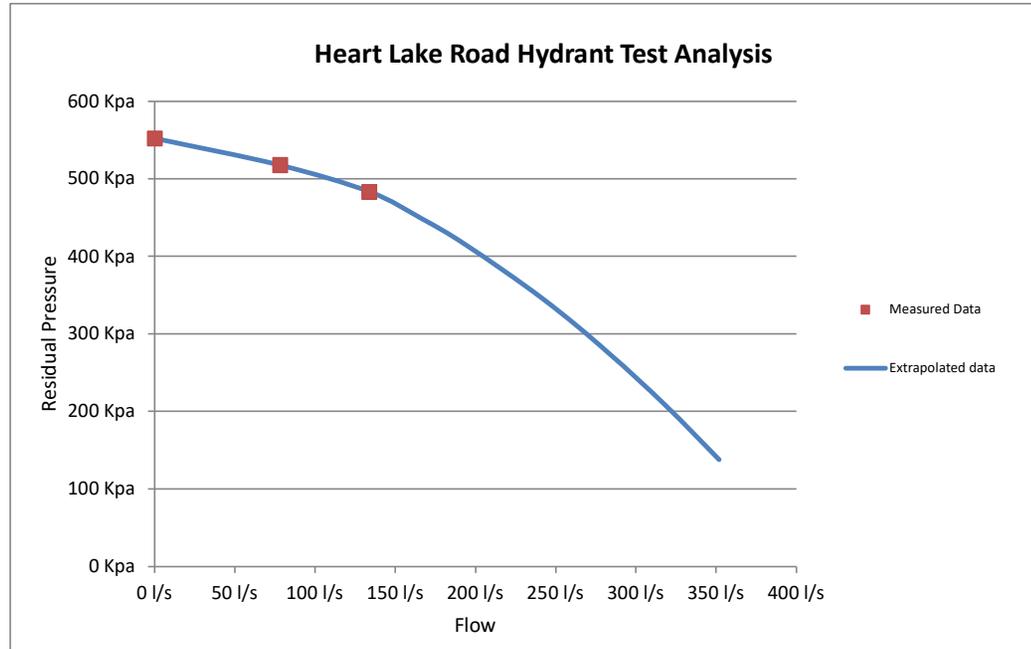
**5564 USGPM**

**4633 IGPM**

1 USG = 3.785 litres

1 IG = 4.546 litres

1 psi = 6.9 kpa



## Snell's Hollow

Project No. 4851

### Test 2 - AQUAZITION

Flow Test Results of October 14 2020

Location: Residual: North of Kennedy Road & Snellview Blvd  
 Flow: South of Kennedy Road & Snellview Blvd

Test Results			
Flow US. GPM	Residual Pressure psi	Flow L/s	Residual Presure kPa
0	78	0	538
1020	72	64	497
1830	68	115	469

For a total required flow demand of **233 L/s**  
 the equivalent residual pressure is

**375 kPa**

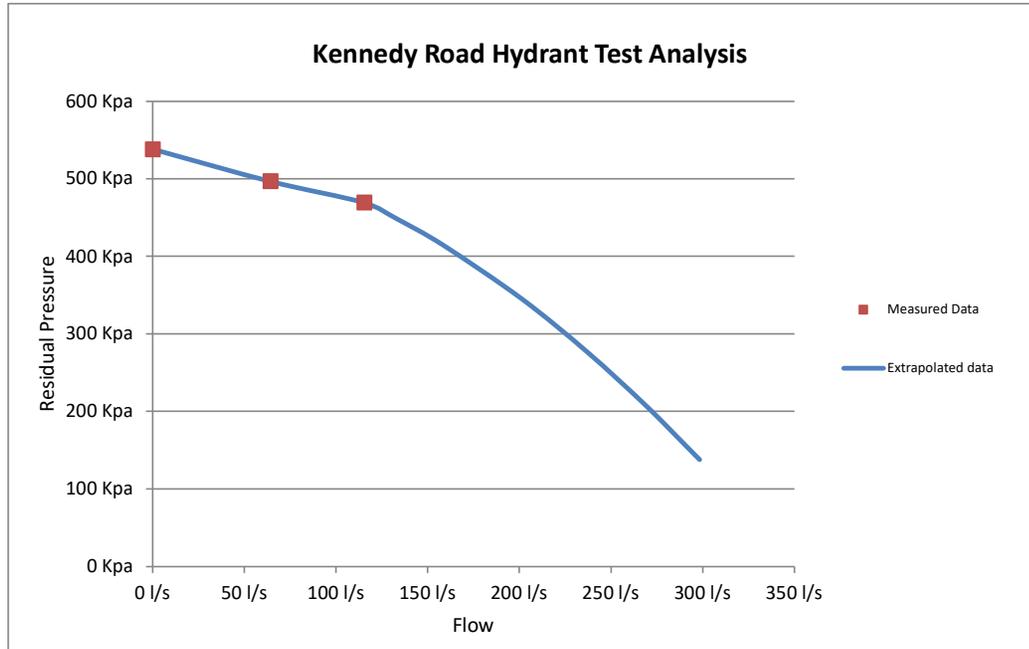
**54 psi**

For a residual pressure of **20 psi**  
 or **140 kPa** the equivalent flow is

**298 L/s**

**4724 USGPM**

**3933 IGPM**



1 USG = 3.785 litres

1 IG = 4.546 litres

1 psi = 6.9 kpa

## **APPENDIX B**

### **Water Demands and Turnover Calculation**

**Project:** 2019-4851  
**Snell's Hollow**  
**Town of Caledon**  
**Region of Peel**



**Population Calculation**

**Proposed Residential Development**

**Unit Calculation Per Land-Use**

Density	Units/ha	Area (ha)	Units
Detached/Semi-Detached/Street Townhouses	35	10.39	364
Dual-frontage Townhouses	55	2.18	120
Back-to-Back Townhouses	100	2.25	225
Medium-High Density Residential	150	2.52	378
Total			1087

**Population Estimates Per Land Use**

Density	Pop/unit*	# of Units	Population
Low Density	3.43	364	1249
Medium Density	2.92	345	1007
Medium-High Density	2.23	378	843
Total			3099

**Job Estimates**

**Job Estimate Calculation Per Land-Use**

Density	Criteria	Number of Jobs
Commercial	63 Jobs/ha (1.47 ha)	93
Work From Home & No Fixed Employment	4% of Total Population	124
Total		217

*Note: Based on the Snell's Hollow Preliminary Development Concept Plan*

*\* Per GSAI, persons per unit rate provided by Region of Peel*

**Project: 2019-4851**  
**Snell's Hollow**  
**Town of Caledon**  
**Region of Peel**



### Water Supply Calculation

Average Residential Daily Demand: 280 L/capita/day  
 Industrial, Commercial or Industrial 300 L/employee/day

**Number of WaterCAD Junctions 40**

**Average Daily Demand per Junction 0.27 l/s**

**Average Daily Demand**

Land Use	Population	Average Daily Demand (l/s)
Residential	3099	<b>10.04</b>
Commercial, WFH	217	<b>0.75</b>
Total		<b>10.80</b>

**Max Daily Demand**

Land Use	Population	Peaking Factor	Maximum Daily Demand (L/s)
Residential	3099	2.0	<b>20.09</b>
Commercial, WFH	217	1.4	<b>1.05</b>
Total			<b>21.14</b>

**Max Daily Demand per Junction 0.53 l/s**

**Peak Hour Demand**

Land Use	Population	Peaking Factor	Peak Hour Demand (L/s)
Residential	3099	3.0	<b>30.13</b>
Commercial, WFH	217	3.0	<b>2.26</b>
Total			<b>32.39</b>

**Peak Hourly Demand per Junction 0.81 l/s**

**Minimum Hour Factor per MOE 0.5**

**Minimum Hour Demand per Junction 0.14 l/s**

Project: 2019-4851  
 Snell's Hollow  
 Town of Caledon  
 Region of Peel



**Turnover Rate Calculation**

Minimum Consumption 0.14 m<sup>3</sup>/day

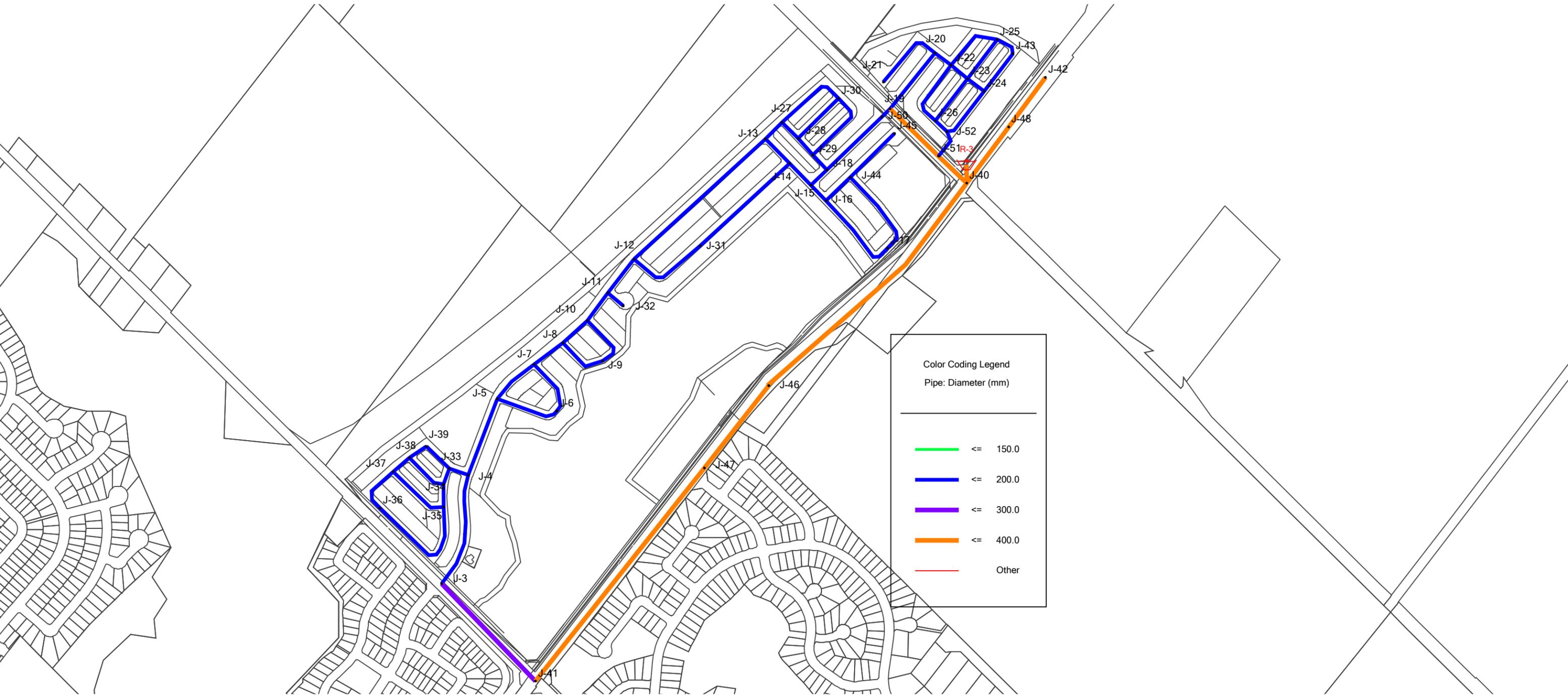
**Turnover Rate Calculation**

Stage	Length	Diameter	Area	Volume	25% Population	Current Consumption	Day/Turnover
	(m)	(mm)	(m <sup>2</sup> )	(m <sup>3</sup> )	(-)	(m <sup>3</sup> /day)	(Day)
Ultimate Buildout	5895	200.00	0.03	185.197	775	108.5	1.71

## **APPENDIX C**

### **WaterCAD Digital Output**

# Scenario: Max Day + Fire Flow



**Scenario: Average Day**  
**Current Time Step: 0.000 h**  
**FlexTable: Junction Table**

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)	Pressure Head (m)
121	J-41	257.00	0.00	317.25	590	60.25
125	J-42	260.00	0.00	317.26	560	57.26
157	J-48	260.47	0.00	317.26	556	56.79
120	J-40	261.00	0.00	317.26	551	56.26
33	J-3	263.05	0.00	317.25	530	54.20
173	J-51	263.24	0.00	317.26	529	54.01
34	J-4	264.13	0.27	317.22	520	53.09
78	J-26	264.19	0.27	317.25	519	53.06
176	J-52	264.41	0.00	317.26	517	52.84
104	J-34	264.46	0.27	317.22	516	52.76
102	J-33	264.48	0.27	317.22	516	52.74
106	J-35	264.69	0.27	317.22	514	52.53
60	J-17	264.75	0.27	317.22	513	52.47
36	J-5	264.98	0.27	317.21	511	52.23
74	J-24	265.22	0.27	317.25	509	52.03
72	J-23	265.23	0.27	317.25	509	52.02
70	J-22	265.45	0.27	317.25	507	51.80
38	J-6	265.46	0.27	317.21	507	51.75
95	J-31	265.49	0.27	317.21	506	51.72
40	J-7	265.50	0.27	317.21	506	51.71
66	J-20	265.66	0.27	317.25	505	51.59
134	J-45	265.75	0.27	317.22	504	51.47
131	J-44	265.85	0.27	317.22	503	51.37
42	J-8	265.86	0.27	317.21	503	51.35
139	J-47	266.00	0.27	317.26	502	51.26
116	J-39	266.02	0.27	317.22	501	51.20
76	J-25	266.03	0.27	317.25	501	51.22
127	J-43	266.17	0.27	317.25	500	51.08
44	J-9	266.24	0.27	317.21	499	50.97
113	J-38	266.25	0.27	317.22	499	50.97
110	J-37	266.64	0.27	317.22	495	50.58
58	J-16	266.73	0.27	317.22	494	50.49
136	J-46	267.00	0.27	317.26	492	50.26
64	J-19	267.14	0.00	317.26	490	50.12
169	J-50	267.14	0.00	317.25	490	50.11
56	J-15	267.15	0.27	317.22	490	50.07
62	J-18	267.17	0.27	317.22	490	50.05
88	J-29	267.29	0.27	317.22	489	49.93
68	J-21	267.30	0.27	317.25	489	49.95
108	J-36	267.38	0.27	317.22	488	49.84
46	J-10	267.58	0.27	317.21	486	49.63
91	J-30	267.88	0.27	317.22	483	49.34
86	J-28	267.89	0.27	317.22	483	49.33
98	J-32	268.44	0.27	317.21	477	48.77
54	J-14	268.45	0.27	317.22	477	48.77
84	J-27	268.68	0.27	317.22	475	48.54
52	J-13	268.92	0.27	317.22	473	48.30
48	J-11	269.85	0.27	317.21	464	47.36
50	J-12	270.78	0.27	317.21	454	46.43

W:\4800's\4851 - Snells Hollow\WaterCAD\2020-10-26-4851-WaterCAD Water Supply Model.wtg

**Scenario: Max Day + Fire Flow**  
**Current Time Step: 0.000 h**  
**FlexTable: Junction Table**

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)	Pressure Head (m)
121	J-41	257.00	0.00	317.24	590	60.24
125	J-42	260.00	0.00	317.26	560	57.26
157	J-48	260.47	0.00	317.26	556	56.79
120	J-40	261.00	0.00	317.26	551	56.26
33	J-3	263.05	0.00	317.22	530	54.17
173	J-51	263.24	0.00	317.25	529	54.01
34	J-4	264.13	0.53	317.11	519	52.98
78	J-26	264.19	0.53	317.24	519	53.05
176	J-52	264.41	0.00	317.24	517	52.83
104	J-34	264.46	0.53	317.10	515	52.64
102	J-33	264.48	0.53	317.11	515	52.63
106	J-35	264.69	0.53	317.10	513	52.41
60	J-17	264.75	0.53	317.10	512	52.35
36	J-5	264.98	0.53	317.10	510	52.12
74	J-24	265.22	0.53	317.24	509	52.02
72	J-23	265.23	0.53	317.24	509	52.01
70	J-22	265.45	0.53	317.24	507	51.79
38	J-6	265.46	0.53	317.10	505	51.64
95	J-31	265.49	0.53	317.10	505	51.61
40	J-7	265.50	0.53	317.10	505	51.60
66	J-20	265.66	0.53	317.24	505	51.58
134	J-45	265.75	0.53	317.10	503	51.35
131	J-44	265.85	0.53	317.10	502	51.25
42	J-8	265.86	0.53	317.10	501	51.24
139	J-47	266.00	0.53	317.24	502	51.24
116	J-39	266.02	0.53	317.10	500	51.08
76	J-25	266.03	0.53	317.24	501	51.21
127	J-43	266.17	0.53	317.24	500	51.07
44	J-9	266.24	0.53	317.10	498	50.86
113	J-38	266.25	0.53	317.10	498	50.85
110	J-37	266.64	0.53	317.10	494	50.46
58	J-16	266.73	0.53	317.11	493	50.38
136	J-46	267.00	0.53	317.25	492	50.25
64	J-19	267.14	0.00	317.25	490	50.11
169	J-50	267.14	0.00	317.23	490	50.09
56	J-15	267.15	0.53	317.11	489	49.96
62	J-18	267.17	0.53	317.12	489	49.95
88	J-29	267.29	0.53	317.11	488	49.82
68	J-21	267.30	0.53	317.24	489	49.94
108	J-36	267.38	0.53	317.10	487	49.72
46	J-10	267.58	0.53	317.10	485	49.52
91	J-30	267.88	0.53	317.11	482	49.23
86	J-28	267.89	0.53	317.11	482	49.22
98	J-32	268.44	0.53	317.10	476	48.66
54	J-14	268.45	0.53	317.10	476	48.65
84	J-27	268.68	0.53	317.11	474	48.43
52	J-13	268.92	0.53	317.10	472	48.18
48	J-11	269.85	0.53	317.10	462	47.25
50	J-12	270.78	0.53	317.10	453	46.32

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**Scenario: Max Day + Fire Flow**  
**Current Time Step: 0.000 h**  
**Fire Flow Node FlexTable: Fire Flow Report**

Label	Is Fire Flow Run Balanced?	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/s)	Fire Flow (Available) (L/s)	Flow (Total Needed) (L/s)	Flow (Total Available) (L/s)	Pressure (Calculated Residual @ Total Flow Needed) (kPa)	Pressure (Calculated Residual) (kPa)	Pipe w/ Maximum Velocity	Velocity of Maximum Pipe (m/s)
J-5	True	True	117.00	118.00	117.53	118.53	365	363	P-2	2.22
J-6	True	True	117.00	118.00	117.53	118.53	336	333	P-2	2.19
J-7	True	True	117.00	118.00	117.53	118.53	358	356	P-2	2.15
J-8	True	True	117.00	118.00	117.53	118.53	355	352	P-17(1)	2.24
J-9	True	True	117.00	118.00	117.53	118.53	329	327	P-17(1)	2.27
J-10	True	True	117.00	118.00	117.53	118.53	339	337	P-17(1)	2.29
J-11	True	True	117.00	118.00	117.53	118.53	322	320	P-17(1)	2.42
J-12	True	True	117.00	118.00	117.53	118.53	324	322	P-17(1)	2.58
J-17	True	True	117.00	118.00	117.53	118.53	313	309	P-14	3.82
J-19	True	True	117.00	118.00	117.00	118.00	484	484	P-60	1.11
J-21	True	True	117.00	118.00	117.53	118.53	313	310	P-19	3.77
J-31	True	True	117.00	118.00	117.53	118.53	351	349	P-17(1)	2.71
J-32	True	True	117.00	118.00	117.53	118.53	300	298	P-38	3.77
J-36	True	True	117.00	118.00	117.53	118.53	265	262	P-41	3.87
J-40	True	True	117.00	118.00	117.00	118.00	549	549	P-60	1.11
J-41	True	True	117.00	118.00	117.00	118.00	561	560	P-60	1.11
J-42	True	True	117.00	118.00	117.00	118.00	553	552	P-60	1.11
J-45	True	True	117.00	118.00	117.53	118.53	214	210	P-14	3.82
J-50	True	True	117.00	118.00	117.00	118.00	467	466	P-17(2)	3.57
J-51	True	True	117.00	118.00	117.00	118.00	525	525	P-60	1.11
J-52	True	True	117.00	118.00	117.00	118.00	466	466	P-64	3.60
J-3	True	True	150.00	151.00	150.00	151.00	458	457	P-54	1.81
J-4	True	True	150.00	151.00	150.53	151.53	326	324	P-2	3.19
J-13	True	True	150.00	151.00	150.53	151.53	299	297	P-17(1)	3.53
J-14	True	True	150.00	151.00	150.53	151.53	305	303	P-17(1)	3.53
J-15	True	True	150.00	151.00	150.53	151.53	319	317	P-17(1)	3.60
J-16	True	True	150.00	151.00	150.53	151.53	263	260	P-14	4.87
J-18	True	True	150.00	151.00	150.53	151.53	341	339	P-17(1)	3.64
J-20	True	True	150.00	151.00	150.53	151.53	428	427	P-64	3.74
J-22	True	True	150.00	151.00	150.53	151.53	426	425	P-64	4.21
J-23	True	True	150.00	151.00	150.53	151.53	423	422	P-64	4.33
J-24	True	True	150.00	151.00	150.53	151.53	415	414	P-64	4.38
J-25	True	True	150.00	151.00	150.53	151.53	400	398	P-64	4.30
J-26	True	True	150.00	151.00	150.53	151.53	432	431	P-64	4.43
J-27	True	True	150.00	151.00	150.53	151.53	297	295	P-17(1)	3.57
J-28	True	True	150.00	151.00	150.53	151.53	303	301	P-17(1)	3.59
J-29	True	True	150.00	151.00	150.53	151.53	317	315	P-17(1)	3.61
J-30	True	True	150.00	151.00	150.53	151.53	289	287	P-17(1)	3.59
J-33	True	True	150.00	151.00	150.53	151.53	266	263	P-41	4.92
J-34	True	True	150.00	151.00	150.53	151.53	243	240	P-41	4.92
J-35	True	True	150.00	151.00	150.53	151.53	218	215	P-41	4.92
J-37	True	True	150.00	151.00	150.53	151.53	198	194	P-41	4.92
J-38	True	True	150.00	151.00	150.53	151.53	217	214	P-41	4.92
J-39	True	True	150.00	151.00	150.53	151.53	220	217	P-41	4.92
J-43	True	True	150.00	151.00	150.53	151.53	386	384	P-64	4.33
J-44	True	True	150.00	151.00	150.53	151.53	222	219	P-14	4.87
J-46	True	True	317.00	318.00	317.53	318.53	407	407	P-60	2.70
J-48	True	True	317.00	318.00	317.00	318.00	527	527	P-60	2.70
J-47	True	True	417.00	418.00	417.53	418.53	321	320	P-60	3.50

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**Scenario: Peak Hour**  
**Current Time Step: 0.000 h**  
**FlexTable: Junction Table**

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)	Pressure Head (m)
121	J-41	257.00	0.00	317.21	589	60.21
125	J-42	260.00	0.00	317.25	560	57.25
157	J-48	260.47	0.00	317.25	556	56.78
120	J-40	261.00	0.00	317.25	551	56.25
33	J-3	263.05	0.00	317.17	530	54.12
173	J-51	263.24	0.00	317.24	528	54.00
34	J-4	264.13	0.81	316.93	517	52.80
78	J-26	264.19	0.81	317.22	519	53.03
176	J-52	264.41	0.00	317.22	517	52.81
104	J-34	264.46	0.81	316.92	513	52.46
102	J-33	264.48	0.81	316.92	513	52.44
106	J-35	264.69	0.81	316.92	511	52.23
60	J-17	264.75	0.81	316.92	511	52.17
36	J-5	264.98	0.81	316.91	508	51.93
74	J-24	265.22	0.81	317.22	509	52.00
72	J-23	265.23	0.81	317.22	509	51.99
70	J-22	265.45	0.81	317.22	507	51.77
38	J-6	265.46	0.81	316.90	503	51.44
95	J-31	265.49	0.81	316.91	503	51.42
40	J-7	265.50	0.81	316.90	503	51.40
66	J-20	265.66	0.81	317.22	505	51.56
134	J-45	265.75	0.81	316.92	501	51.17
131	J-44	265.85	0.81	316.92	500	51.07
42	J-8	265.86	0.81	316.90	500	51.04
139	J-47	266.00	0.81	317.22	501	51.22
116	J-39	266.02	0.81	316.92	498	50.90
76	J-25	266.03	0.81	317.22	501	51.19
127	J-43	266.17	0.81	317.22	500	51.05
44	J-9	266.24	0.81	316.90	496	50.66
113	J-38	266.25	0.81	316.92	496	50.67
110	J-37	266.64	0.81	316.92	492	50.28
58	J-16	266.73	0.81	316.92	491	50.19
136	J-46	267.00	0.81	317.23	492	50.23
64	J-19	267.14	0.00	317.23	490	50.09
169	J-50	267.14	0.00	317.20	490	50.05
56	J-15	267.15	0.81	316.93	487	49.78
62	J-18	267.17	0.81	316.95	487	49.78
88	J-29	267.29	0.81	316.93	486	49.64
68	J-21	267.30	0.81	317.22	489	49.92
108	J-36	267.38	0.81	316.92	485	49.54
46	J-10	267.58	0.81	316.90	483	49.32
91	J-30	267.88	0.81	316.93	480	49.05
86	J-28	267.89	0.81	316.93	480	49.04
98	J-32	268.44	0.81	316.90	474	48.46
54	J-14	268.45	0.81	316.92	474	48.47
84	J-27	268.68	0.81	316.92	472	48.24
52	J-13	268.92	0.81	316.92	470	48.00
48	J-11	269.85	0.81	316.90	460	47.05
50	J-12	270.78	0.81	316.90	451	46.12

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**Scenario: Minimum Hour**  
**Current Time Step: 0.000 h**  
**FlexTable: Junction Table**

ID	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)	Pressure Head (m)
121	J-41	257.00	0.00	327.70	692	70.70
125	J-42	260.00	0.00	327.70	663	67.70
157	J-48	260.47	0.00	327.70	658	67.23
120	J-40	261.00	0.00	327.70	653	66.70
33	J-3	263.05	0.00	327.70	633	64.65
173	J-51	263.24	0.00	327.70	631	64.46
34	J-4	264.13	0.13	327.69	622	63.56
78	J-26	264.19	0.13	327.70	622	63.51
176	J-52	264.41	0.00	327.70	619	63.28
104	J-34	264.46	0.13	327.69	619	63.23
102	J-33	264.48	0.13	327.69	619	63.21
106	J-35	264.69	0.13	327.69	617	63.00
60	J-17	264.75	0.13	327.69	616	62.94
36	J-5	264.98	0.13	327.69	614	62.71
74	J-24	265.22	0.13	327.70	611	62.48
72	J-23	265.23	0.13	327.70	611	62.47
70	J-22	265.45	0.13	327.70	609	62.25
38	J-6	265.46	0.13	327.69	609	62.23
95	J-31	265.49	0.13	327.69	609	62.20
40	J-7	265.50	0.13	327.69	609	62.19
66	J-20	265.66	0.13	327.70	607	62.04
134	J-45	266.10	0.13	327.69	603	61.59
131	J-44	265.85	0.13	327.69	605	61.84
42	J-8	265.86	0.13	327.69	605	61.83
139	J-47	266.00	0.13	327.70	604	61.70
116	J-39	266.02	0.13	327.69	604	61.67
76	J-25	266.03	0.13	327.70	604	61.67
127	J-43	266.17	0.13	327.70	602	61.53
44	J-9	266.24	0.13	327.69	601	61.45
113	J-38	266.25	0.13	327.69	601	61.44
110	J-37	266.64	0.13	327.69	597	61.05
58	J-16	266.73	0.13	327.69	597	60.96
136	J-46	267.00	0.13	327.70	594	60.70
64	J-19	267.14	0.00	327.70	593	60.56
169	J-50	267.14	0.00	327.70	593	60.55
56	J-15	267.15	0.13	327.69	592	60.54
62	J-18	267.17	0.13	327.69	592	60.52
88	J-29	267.29	0.13	327.69	591	60.40
68	J-21	267.30	0.13	327.70	591	60.40
108	J-36	267.38	0.13	327.69	590	60.31
46	J-10	267.58	0.13	327.69	588	60.11
91	J-30	267.88	0.13	327.69	585	59.81
86	J-28	267.89	0.13	327.69	585	59.80
98	J-32	268.44	0.13	327.69	580	59.25
54	J-14	268.45	0.13	327.69	580	59.24
84	J-27	268.68	0.13	327.69	578	59.01
52	J-13	268.92	0.13	327.69	575	58.77
48	J-11	269.85	0.13	327.69	566	57.84
50	J-12	270.78	0.13	327.69	557	56.91

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