TATHAM ENGINEERING

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Summit View Residential Subdivision, Phase 3

FUNCTIONAL SERVICING REPORT

Poplar Developments I Inc.

File 118039 | May 4, 2023

Document Control

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Date:

May 4, 2023

Prepared by:

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	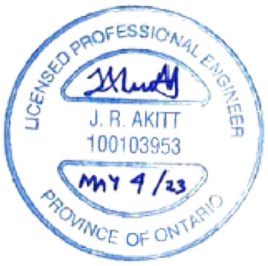
Evan Lundquist, B.Eng., EIT. Engineering Intern	Jeff Akitt, B.Eng. & Mgmt., P.Eng. Director, Manager - Land Development

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Issue	Date	Description
1	May 4, 2023	Draft Plan Submission

Document Contents

Figures

Appendices

1 Introduction

Tatham Engineering Limited (Tatham) has been retained by Poplar Developments I Inc. to complete a Functional Servicing Report in support of an application for Draft Plan of Subdivision for Phase 3 of the Summit View Residential Development, in the Town of Collingwood.

1.1 PURPOSE

This servicing report summarizes the engineering review completed to date for the proposed development and provides a guide to establish the servicing requirements associated with it. More specifically, the requirements address water supply, sanitary sewage servicing, stormwater management, transportation, and utility distribution (hydro, telephone, cable TV and gas).

While the stormwater management and traffic impact components are summarized herein, more detailed assessments and reports have been prepared under separate cover by Tatham.

1.2 GUIDELINES AND BACKGROUND INFORMATION

This report was prepared recognizing the pertinent agencies/authorities as well as applicable Municipal and Provincial guidelines and reports including the following publications:

- Design Guidelines for Drinking-Water Systems, Ministry of Environment (2008);
- Design Criteria for Sanitary Sewers, Storm Sewers, and Forcemains for Alterations under Environmental Compliance Approval, Ministry of Environment, Conservation, and Parks, January 23, 2023);
- Stormwater Management Planning and Design Manual, Ministry of the Environment (March 2003);
- Corporation of the Town of Collingwood Development Standards, (July 2007, including amendment August 5, 2022);
- Town of Collingwood Staff Report PW2022-18, Uncommitted Hydraulic Reserve Capacity (September 19, 2022);
- Town of Collingwood, Watermain Hydraulic Assessment of the Proposed Developments at Summit View, C3W Water Inc. (August 29, 2018); and
- Water Supply for Public Fire Protection, Fire Underwriters Survey (FUS), (2020).

2 Proposed Site Development

2.1 SITE LOCATION AND ACCESS

The development lands consist of approximately 6.9 ha of land with frontages along Poplar Sideroad and High Street, situated northwest of the roundabout at this intersection. The legal description of the subject property is more conveniently summarized as Part of Lot 40, Concession 10, Geographic Township of Nottawasaga, Town of Collingwood, County of Simcoe.

Access to the proposed development will be provided via 3 connection points as follows:

- Street D connection to Bassett Street (Phase 1);
- Street B connection to Mitchell Avenue (Phase 2); and
- Street B to High Street.

The configuration of the proposed connection points is illustrated on the Concept Servicing and Grading Plan (Appendix B).

Figure 1 is a Site Location Plan showing the location of the subject property, herein recognized as the development lands.

2.2 EXISTING SITE CONDITIONS

The development lands are currently vacant with a portion being utilized for agricultural purposes. The northern portion of the development lands are currently being utilized temporarily for staging and stockpiling related to Phase 2 of the Summit View development.

The development lands generally convey runoff as sheet flow in a northeast direction and outlet to the existing High Street ditch and storm sewer system.

A detailed topographic survey of the development will be completed upon removal of the existing stockpiles. Geotechnical investigations and reports have been completed for the Summit View development and listed in Section 2.4 of this report. The investigations generally describe the upper soils as consisting of 125 mm to 350 mm of topsoil underlain by a native subgrade soil of sandy silt and silty sand.

2.3 LAND USES

The development lands are designated and zoned residential. A Draft Plan of Subdivision are proposed for the development lands.

The development lands are bordered by the existing Summit View Subdivision (Phases 1 and 2) to the north and west, High Street and the exiting Mountaincroft subdivision to the east, and Poplar Sideroad and Township of Clearview residential lands to the south.

2.4 SITE GEOLOGY AND HYDROGEOLOGY

Geotechnical and hydrogeological investigations and reports have been completed. At the time of preparation of this report, the following reports were available:

- Report on Geotechnical Investigation and Slope Stability Analysis Charleston Homes Residential Subdivision Development High Street and Poplar Sideroad, Collingwood, Ontario., Project No. 2103839, December 2015, SPL Consultants Limited;
- Hydrogeological Assessment Report, Summit View Phase 3, High Street and Poplar Sideroad, Town of Collingwood, May 2, 2023, Soil Engineers Limited.
- Preliminary design and layout of the proposed development have been completed in accordance with the findings and recommendations detailed in these reports. Further, a letter of opinion has been prepared by Soil Engineers Ltd. entitled:
- Letter of Opinion – Geotechnical, Proposed Residential Development, Summit View Phase 3, Poplar Sideroad and High Street, Town of Collingwood, January 18, 2023, Soil Engineers Ltd.

  This letter of opinion confirms the investigation and report prepared by SPL Consultants (December 2015) is applicable for the proposed development.

2.5 PROPOSED DEVELOPMENT PLAN

It is proposed to develop the 6.9 ha property with 38 semi-detached and 97 townhouse residential units. The proposed development is illustrated on the Draft Plan of Subdivision prepared by MHBC Planning (Appendix A).

If a household density of 2.7 persons per unit is applied for semi-detached units and 2.4 persons per unit is applied for townhouse units, the development would yield a total population of 336 persons.

All internal streets in the development will feature a 20-metre right-of-way except for the South end of Steet D parallel with Poplar Sideroad; this proposed window street will feature a 15 m right-of-way. A typical cross-section for each right-of-way section is illustrated on the Concept Servicing and Grading Plan (Appendix B) to demonstrate the feasibility of servicing the right-of-way.

All rights-of-way will be complete with municipal services in accordance with the *Corporation of the Town of Collingwood Development Standards.* The proposed servicing arrangement is illustrated on Concept Servicing and Grading Plan (Appendix B), whereas additional details on how the development will be serviced are included in the following sections.

2.6 DEVELOPMENT PHASING

The subject development lands are an extension of the existing Summit View subdivision. Servicing of Phases 1 and 2 of the Summit View subdivision was substantially performed in 2021.

3 Water Network

3.1 WATER DEMANDS

Water demands associated with the proposed development have been calculated based on the *Town of Collingwood Development Standards and the Fire Underwriters Survey (2020)*. The following design criteria have been utilized:

- Average daily domestic flow = 260 L/cap/day;
- Maximum daily demand factor = 1.77;
- Peak hourly demand = 2.70; and
- Household Density = 2.7 (Semi-Detached), 2.4 (Townhouse)

The proposed water demands utilizing a household density of 2.4 persons/unit for townhouses, and 2.7 persons/unit for semi-detached, are summarized as follows:

- Design Population (Residential) 336 people
- Average Day Demand (ADD) 87.4 m^3/day (1.0 L/s)
- Maximum Day Demand (MDD) 154.6 m^3/day (1.8 L/s)
- Peak Hour Demand (PHD) 235.9 m^3/day (2.7 L/s)
- Fire Flow Demand 133 L/s
- Maximum Day Plus Fire Flow 134.8 L/s (1.8 L/s + 133 L/s) for 2 hours

Detailed water demand calculations are included in Appendix C.

Per the Town of Collingwood Development Standards, watermains shall be designed to carry the maximum day demand plus fire flows based on the latest publication of the Fire Underwritters Survey, or peak hourly flow, whichever is greater. The design flow for the proposed development is 134.8 L/s.

3.2 WATER SUPPLY

Water supply for the development will be provided by connecting to the existing municipal water distribution system.

Upon review of the *Town of Collingwood Staff Report PW2022-18 (September 19, 2022)* (Appendix E), the rated capacity of the Town of Collingwood water treatment plant is 31,140 m^3/day (summer) and 24,019 m^3/day (winter). The uncommitted hydraulic reserve capacity is 1,830 m^3/day during summer months and 1,263 m^3/day during winter months. There exists

capacity to service the proposed development. Detailed assessment of the hydraulic reserve capacity is included in Appendix C.

3.3 WATER DISTRIBUTION

The distribution system is proposed to consist of a combination of 150 mm and 200 mm diameter watermains as illustrated on the Concept Servicing and Grading Plan (Appendix B). Individual 25 mm diameter water services will be provided to each dwelling unit.

Connection to the existing municipal system is proposed by extending the existing 200 mm diameter watermain stubbed on High Street, south of the intersection of Plewes Drive and Findlay Drive. The 200mm diameter watermain will be extended through the High Street entrance along Street B and extend south along Street D to Poplar Sideroad where it will be stubbed for future extension.

All other watermain in the proposed development will be 150 mm diameter looped through Streets A, B, C and D. The watermain, services, connections, fittings, and fire hydrants will be installed as specified by the Town of Collingwood Development Standards.

The proposed servicing strategy is consistent with the recommended 'Alternative A' outlined in the Report prepared by 3CW (Appendix E) entitled *Town of Collingwood, Watermain Hydraulic Assessment of the Proposed Developments at Summit View (August 29, 2018).* Based on the modelling completed to date, it is expected that the future available flow in the water distribution system will be approximately 211 L/s (Pg. 7, Table 2.1, 3CW) upon implementation of 'Alternative A'. The future available flow is sufficient to service the proposed development.

It is noted that the 200 mm diameter watermain extension along Poplar Sideroad to Rowland Street has not been included in the proposed servicing strategy. We request the Town's modelling consultant include this scenario in their modelling exercise as an interim condition to ensure adequate fire flows will be available.

3.4 FIRE PROTECTION FLOW

The required fire flow was determined based on the worst case obtained from either the Town of Collingwood recommended value of 57 L/s (Residential Single-Family Streets) or as determined using the Fire Underwriters Survey, Water Supply for Fire Protection (2020) (FUS).

Applying the FUS guidelines to the proposed building types (Semi-Detached and Townhouse) the following fire protection flow rates were determined:

- Semi-Detached = 100 L/s
- Townhouse = 133 L/s

The maximum fire flow for the proposed development is taken as 133 L/s. The fire flow calculations are based on assumptions related to dwelling size, and construction offered in phases 1 and 2 of the Summit View subdivision. Based on the report prepared by 3CW, sufficient future flow will be available to service the proposed development (211 L/s, Table 2.1, 3CW) upon implementation of 'Alternative A'.

It is noted that the 200 mm diameter watermain extension on Poplar Sideroad has not been included in the proposed servicing strategy. We request the Town's modelling consultant include this scenario in their modelling exercise as an interim condition to ensure adequate fire flows will be available.

4 Sanitary Sewer Network

4.1 SEWAGE DEMANDS

As noted previously, the proposed 135-unit development is expected to yield a total population of 336 persons. Based on the Town of Collingwood Development Standards, the following design criteria have been utilized:

- Average flow = 260 L/cap/day;
- Peaking Factor = 4.06 (Harmon); and
- Infiltration = 0.23 L/ha/s

The peak sewage demand generated by Phase 3 of the development is 5.7 L/s. Detailed calculations are included in Appendix D.

4.2 EXTERNAL SEWAGE TREATMENT PLANT

As per *Town of Collingwood Staff Report PW2022-18* (Appendix E), the average maximum daily flow of sewage into the wastewater treatment plant is 17,706 m^3/day. The wastewater treatment plant was designed for an average daily flow of 24,548 m^3/day, this equates to the plant operating at 72.1% of its capacity.

The capacity assessment notes that there are 1,085 m^3/day of previously committed flows. Additionally, 1,227 m^3/day is allocated for a 5% factor of safety. The remaining uncommitted capacity at the wastewater treatment plant is 4,427 m^3/day. The proposed development will generate an average daily flow of 87.4 m^3/day.

Based on the review of the current uncommitted capacity of the wastewater treatment plant, there exists capacity to service the proposed development. Refer to Appendix D for detailed calculations.

4.3 PROPOSED SEWER NETWORK

The internal sanitary sewers will include minimum 200 mm diameter pipes located within the proposed right-of-way. Each lot and townhouse unit will have its own 125 mm diameter sanitary service connection.

The sewage generated will be conveyed to a connection at Bassett Street (Phase 1) and eventually into the existing municipal system on High Street. A flow split at the intersection of Plewes Drive and High Street exists where a 200 mm diameter sanitary sewer coneys flow north on High Street and a 300 mm sanitary sewer travels into the Mountaincroft Development on the

east side of High Street. The proposed sanitary servicing strategy is illustrated on the Concept Servicing and Grading Plan (Appendix B). A detailed design sheet and sanitary catchment plan is included in Appendix D demonstrating sufficient capacity is available in the existing collection system. We trust the information provided is sufficient for the Towns consultant to initiate their analysis of the downstream collection system.

5 Stormwater Management

A stormwater management assessment and report has been prepared entitled *Stormwater Management Report Summit View Residential Development, Phase 3, Tatham Engineering, 2022* and should be referred to for details regarding the stormwater management (SWM) plan for the proposed development. Key findings/conclusions of the SMW report are detailed below:

- The stormwater management plan developed for the subject lands is in accordance with the criteria set forth by the *Corporation of the Town of Collingwood Development Standards, (as amended 2022)*, the *Ministry of the Environment Stormwater Management Planning and Design Manual (March 2003) and the Nottawasaga Valley Conservation Authority Stormwater Technical Guide (2013)*;
- When implemented, the stormwater management plan will allow the development to proceed without negatively impacting the local drainage systems;
- The majority of the impervious developed area will be conveyed to the existing Summit View SWM facility. Runoff will be conveyed to the facility via a combination of storm sewer (minor system) and overland flow routes (major system);
- Water quality treatment to an Enhanced Level with 80% total suspended solids removal and extended detention for the purpose of erosion control will be provided by the existing Summit View SWM facility;
- A portion of the east side of the proposed development will continue to drain to High Street as under pre-development conditions. The minor system will be collected by a proposed storm sewer system connected to the High Street/Mountaincroft system. Quality control for this runoff will be provided by the existing Mountaincroft SWM facility; and
- Siltation and erosion controls will be implemented for all constructions activities, including topsoil stripping, material stockpiling, road construction and grading operations.

5.1 STORM SEWER NETWORK

An internal storm sewer network will service the proposed development. The storm sewer network will be sized to collect and convey the 1:5 year event with no ponding per the Town of Collingwood Engineering Development Standards. Individual 100 mm diameter storm service connections will be provided for each unit within the proposed development.

6 Transportation Network

Traffic and Transportation issues related to the development must be addressed to accommodate the development and surrounding land use. A standalone Traffic Impact Study (TIS) has been prepared for the proposed development entitled:

Summit View Residential Subdivision, Phase 3, Traffic Impact Study, Tatham, April 13, 2023.

A summary of the findings and recommendations of the report are as follows:

- This study has addressed the transportation impacts associated with the Summit View - Phase 3 residential development. Upon completion, the development is expected to generate 65 trips during the AM peak hour and 77 trips during the PM peak hour.
- The intersection of High Street with Plewes Drive/Findlay Drive will experience poor operations (LOS F) in 2040 under background conditions. While traffic signals area not warranted based on traffic signal justification criteria, such are nonetheless recommended to address the poor operating conditions, which result largely due to the increased volumes on High Street. Recognizing the benefits that signalization of this intersection will provide to both the future background and future total traffic volumes, and understanding that such is recommended to serve the future background volumes (i.e. without the Phase 3 development), the associated costs should be addressed in conjunction with the widening of High Street through the Town's development charges.
- The need for exclusive right and left turn lanes on High Street at Street B were reviewed in context of MTO warrant criteria. Based on the project volumes on High Street and the turning volumes accessing the site, exclusive turn lanes are not warranted.
- The available sight lines along High Street at Street B were reviewed and are considered acceptable in consideration of TAC design guidelines for minimum stopping and intersection sight distances.

6.1 SITE ACCESS

Access to the development will be provided via Street B connection to High Street. While the proposed separation between the new access and Plewes Drive satisfies the TAC guidelines, the separation between the access and the roundabout at Poplar Sideroad does not satisfy the recommended 200 m separation.

Given that the site access will serve relatively low volumes (particularly northbound left turns), and further noting the roundabout configuration at High Street and Poplar Sideroad, back-to-

back left turn storage is not a concern. In this respect, the proposed 180 m separation is considered acceptable.

Additional site access points are provided by Phases 1 and 2 of the existing Summit View Subdivision as follows:

- Street D connection to Bassett Street (Phase 1); and
- Street B connection to Mitchell Avenue (Phase 2).

6.2 INTERNAL ROAD NETWORK

A 20.0m wide urban road cross-section is proposed for the development with the exception of one 15.0m wide window street (Street D). The right-of-way would be municipally owned. Daylighting triangles will be incorporated, and minimum sightline requirements are satisfied for major entrances and intersections associated with the development. Additional details are illustrated on the included Draft Plan (Appendix A).

7 Utility Network

Utilities servicing for the proposed development will be installed in accordance with the municipal engineering standards. Utility servicing design will be provided during the detailed engineering submission stage and include connection strategies and any required external upgrades to service the proposed development. The following sections outline our preliminary assessment of the existing utility networks associated with the subject property.

7.1 NATURAL GAS

There are existing Enbridge gas mains on the east side of High Street, Bassett Street (Phase 1) and Mitchell Avenue (Phase 2). It is expected that a connection will be made to the existing mains to service the proposed development. Enbridge has been contacted to comment on their immediate capacity and/or any external upgrades that will be required to service the proposed development. Detailed connection strategies will be provided during detailed design.

7.2 HYDRO

Based on information provided by Epcor, it is anticipated that a connection will be made to the existing Epcor overhead hydro lines on High Street and transition to an underground service for the proposed development. Epcor has been contacted to comment on their immediate capacity and has indicated minor external upgrades will be required to service the proposed development. Detailed connection strategies will be provided during detailed design.

7.3 COMMUNICATIONS

Bell and Rogers have existing infrastructure in the vicinity of the proposed development. It is anticipated that the communication utility service providers will connect and/or extend their existing infrastructure from Phases 1 and 2 to service the proposed development. The local utility providers have been contacted have indicated there is capacity to service the proposed development. Detailed connection strategies will be provided during detailed design.

8 Summary

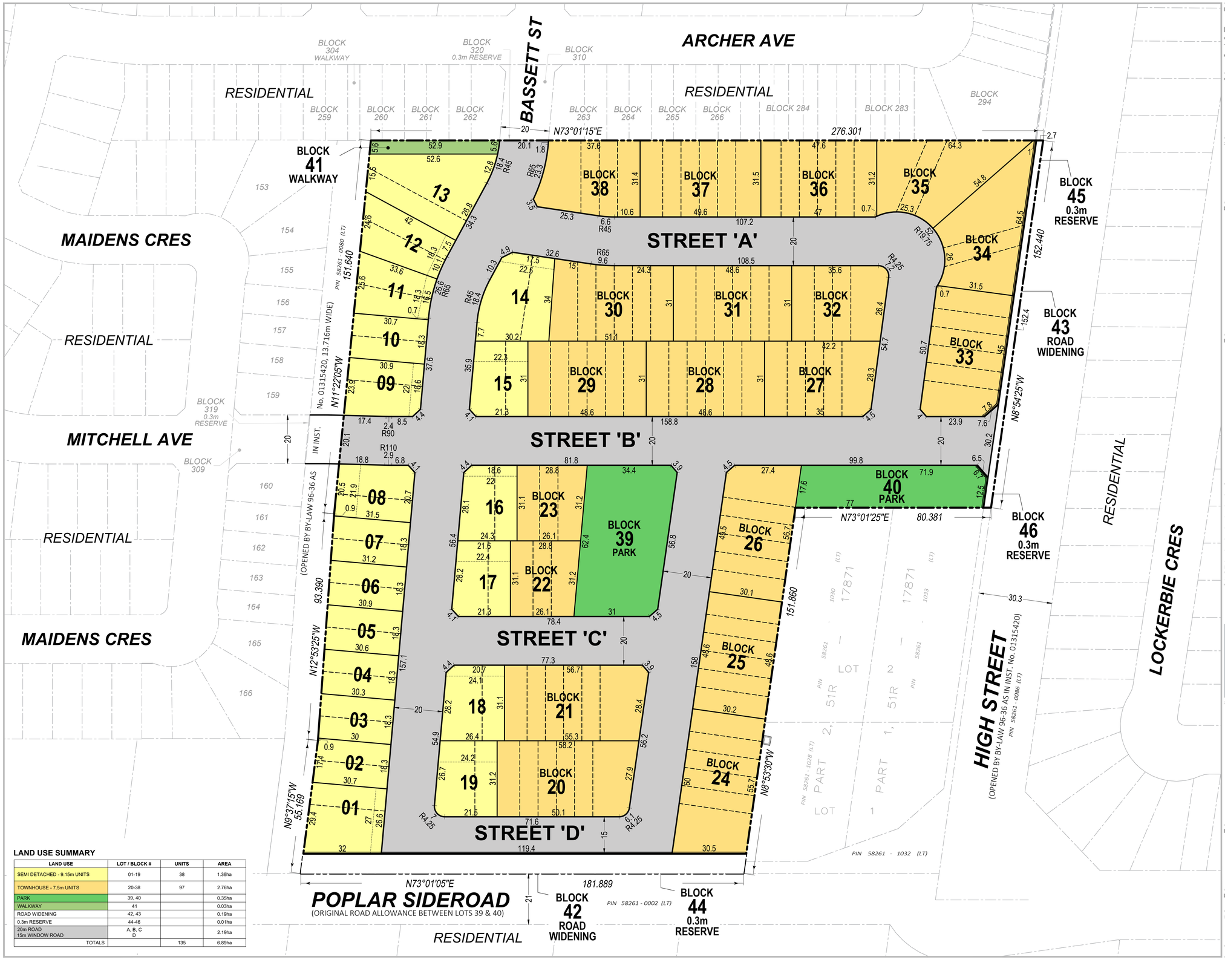
Based on the preceding analysis, the proposed development can be appropriately serviced. A summary of the findings and recommendations are as follows:

1. An internal water distribution system can be constructed to service the proposed development. Connection to the existing Town water distribution system will be provided via an extension of the existing 200mm diameter watermain on High Street and connection to the exiting 150mm diameter watermain on Mitchell Avenue. There is capacity in the existing municipal water treatment system to service the proposed development.
2. An internal sanitary sewer can be constructed and will convey the sewage via gravity to the existing sanitary sewer system via Phase 1 of the Summit View Development. There is capacity within the existing wastewater treatment plant to service the proposed subdivision.
3. An internal storm sewer system to collect and convey surface water runoff for the development will be constructed. The majority of runoff will be discharged to an existing stormwater management facility located in the Summit View development. The existing Summit View SWM pond will provide quality treatment and extended detention for erosion control. A small portion of runoff will be directed to High Street and be conveyed through the High Street/Mountaincroft system to the existing SWM facility.
4. The proposed internal roadway network will consist of 20m wide urban road cross-section. One window street (Street D) will feature a 15m wide urban road cross-section.
5. The development is expected to generate 65 trips during the AM peak hour and 77 trips during the PM peak hour.
6. Although, the traffic signals at the High Street and Plewes/Findlay Drive intersection are not warranted due to low volumes, they are recommended to better the operations. It is noted that this requirement is the result of background growth.
7. The available sight lines along High Street at Street B were reviewed and are considered acceptable in consideration of TAC design guidelines for minimum stopping and intersection sight distances.
8. Existing utilities are available in the immediate vicinity and provide feasible connection opportunities for the proposed development. Existing utility providers have been contacted to comment on their immediate capacity and/or any external upgrades required to service the proposed development. Connection and servicing strategies will be provided during the detailed design phase.

SUMMIT VIEW RESIDENTIAL DEVELOPMENT

Figure 1: Site Location Plan

Appendix A: Draft Plan



LAND USE SUMMARY

LAND USE	LOT / BLOCK #	UNITS	AREA
SEMI DETACHED - 9.15m UNITS	01-19	38	1.36ha
TOWNHOUSE - 7.5m UNITS	20-38	97	2.76ha
PARK	39, 40		0.35ha
WALKWAY	41		0.03ha
ROAD WIDENING	42, 43		0.19ha
0.3m RESERVE	44-46		0.01ha
20m ROAD 15m WINDOW ROAD	A, B, C D		2.19ha
TOTALS		135	6.89ha

LEGAL DESCRIPTION

PART OF LOT 40, CONCESSION 10
GEOGRAPHIC TOWNSHIP OF NOTTAWASAGA
TOWN OF COLLINGWOOD
COUNTY OF SIMCOE

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

DATE: _____

CHARLIE KUIKEN - PRESIDENT
POPLAR DEVELOPMENTS I INC.

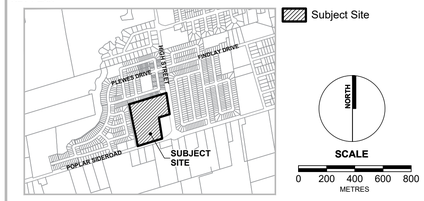
SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____

JAMES M. LAWS - O.L.S.
VAN HARTEN SURVEYING INC.

KEY PLAN



LEGEND

- BOUNDARY LINE
- RIGHT OF WAY LINE
- BLOCK LINE
- UNIT LINE
- PARCEL FABRIC

REVISION No.	DATE	ISSUED / REVISION	BY

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED

A. AS SHOWN
B. AS SHOWN
C. AS SHOWN
D. AS SHOWN
E. AS SHOWN
F. AS SHOWN
G. AS SHOWN
H. MUNICIPAL WATER SUPPLY
I. SANDY SILT
J. AS SHOWN
K. ALL SERVICES AS REQUIRED
L. AS SHOWN

113 COLLIER STREET
BARRIE, ON, L4M 1H2
P: 705 728 0045 F: 705 728 2010
WWW.MHBCPLAN.COM
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE
MHBC PLANNING

STAMP

DATE	DEC. 21, 2022
FILE No.	Y219I
SCALE	1:700 (ARCH D)
DRAWN BY	M.M. & R.K.
CHECKED BY	
OTHER	

PROJECT

SUMMITVIEW PHASE 3
POPLAR DEVELOPMENTS I INC.
5-167 JOLLIFFE AVENUE
P.O. BOX 760
ROCKWOOD, ON N0B 2K0

NORTH

FILE NAME DRAFT PLAN OF SUBDIVISION

DWG No. 1 of 1

SCALE BAR

0 5 10 15 20 25 37.5 50

MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

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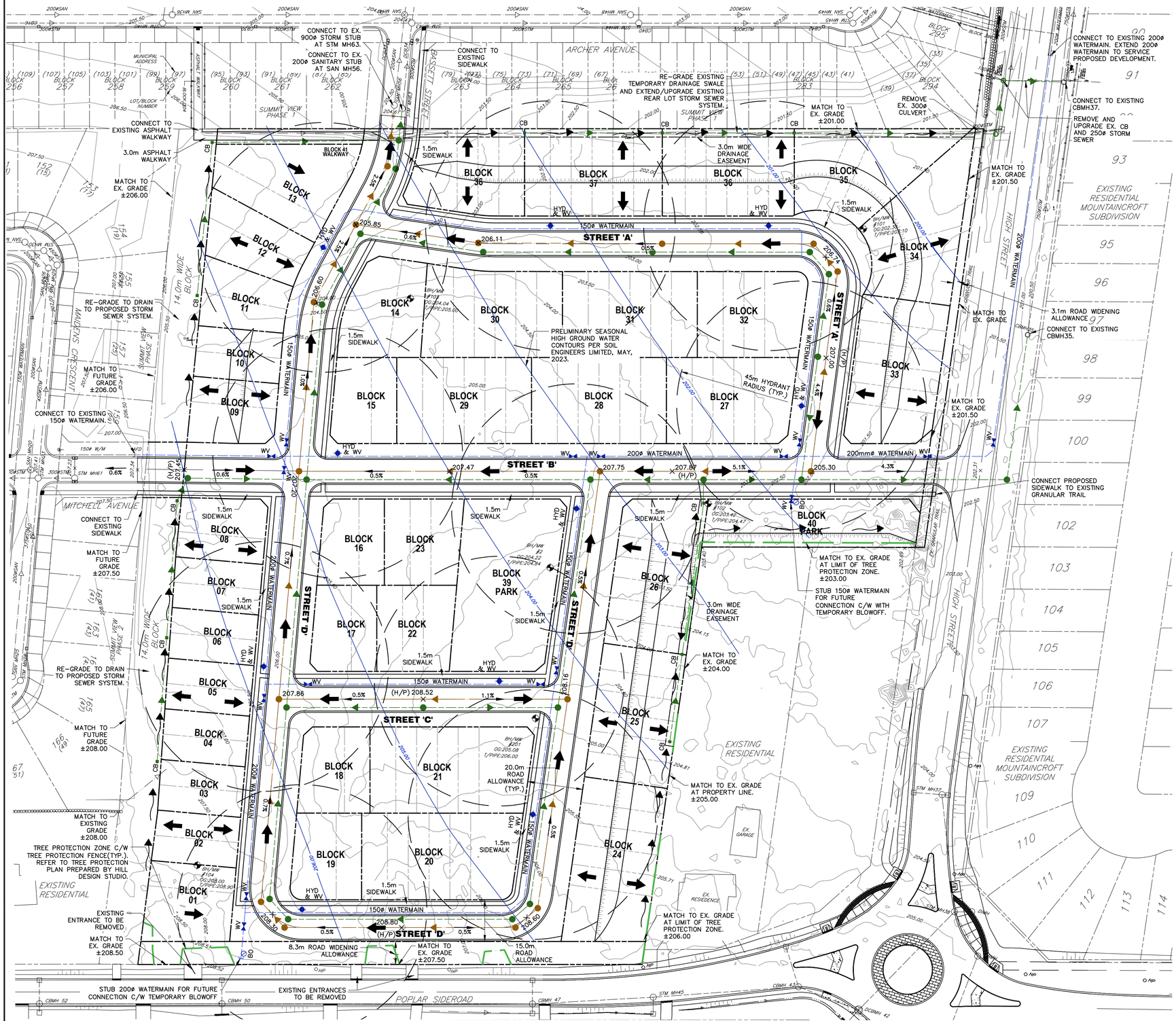
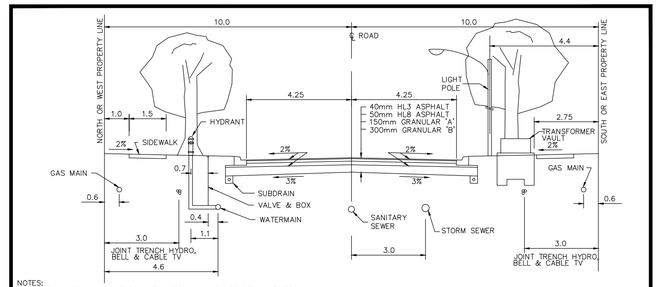
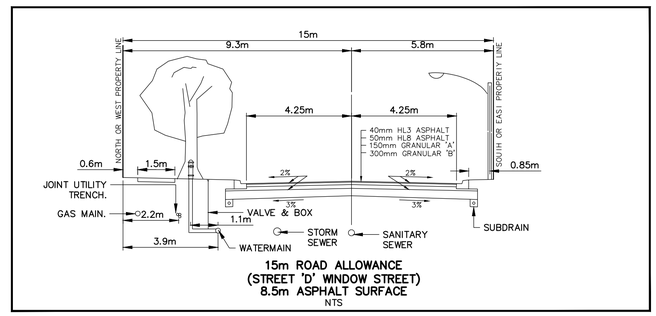
Appendix B: Concept Servicing and Grading Plan





NO.	REVISION	APR'D	DATE	TOWN OF COLLINGWOOD	APR'D: EDH	DATE: JAN/03
				URBAN – LOCAL RESIDENTIAL 20.0m ROAD ALLOWANCE 8.5m ASPHALT SURFACE	DRAWN:	SCALE: NTS
					STD. No.	201



15m ROAD ALLOWANCE (STREET 'D' WINDOW STREET) 8.5m ASPHALT SURFACE
NTS

LEGEND

- OVERLAND FLOW DIRECTION
- SWALE
- EXISTING CONTOUR LINE — 100.00
- EXISTING ELEVTION × 100.00
- PROPOSED ELEVATION ×100.00
- SANITARY SEWER
- SANITARY MAINTENANCE HOLE — SAN MH
- STORM MAINTENANCE HOLE — STM MH
- STORM CATCHBASIN MAINTENANCE HOLE — CBMH
- STORM CATCHBASIN — CB
- STORM SEWER
- WATERMAIN
- HYDRANT & VALVE SET — HYD & WV
- WATER VALVE — WV
- BLOWOFF — BO
- PROPOSED BANK AND SLOPE
- EXISTING BOREHOLE/MONITORING WELL — BH/MW #101
- TREE PROTECTION FENCE

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DRAWING REFERENCES

LEGAL SURVEY INFORMATION SHOWN ON THIS PLAN PREPARED BY VAN HARTEN SURVEY INC., PLAN OF SUBDIVISION, DATED SEPTEMBER 26, 2019.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN BASED ON LAND INFORMATION ONTARIO BASE MAPPING.

RIGHT-OF-WAY AND LOT FABRIC SHOWN ON THIS PLAN HAVE BEEN TAKEN FROM SUMMIT VIEW PHASE 3 DRAFT PLAN OF SUBDIVISION, PREPARED BY MHBC PLANNING, DATED DEC 21, 2022.

BENCHMARKS

No.	REVISION DESCRIPTION	DATE

ENGINEER STAMP

DRAFT PLAN SUBMISSION
MAY/23

SUMMIT VIEW - PHASE 3
RESIDENTIAL DEVELOPMENT
TOWN OF COLLINGWOOD

CONCEPT SERVICING AND GRADING PLAN

TATHAM ENGINEERING

DESIGN: EL	FILE: 118039	DWG:	
DRAWN: KRL	DATE: DEC 2022	**CSG-1**	
CHECK: JRA	SCALE: 1:750		

Drawing Name: 118039 – CSG01.dwg, Plotted: May 04, 2023

Appendix C:
Water Demand Calculations

WATER SUPPLY

1.1 Residential Design Flows

Residential Units (Townhouse)	=	97	Draft Plan by MHBC Planning
Residential Units (Semi Detached)	=	38	Draft Plan by MHBC Planning
Population per Unit (Townhouse)	=	2.4	Collingwood Development Standards
Population per Unit (Semi Detached)	=	2.7	Collingwood Development Standards
Population	=	336	

Average Daily per capita Flow = 260 L/cap/day Collingwood Development Standards

Average Daily Flow = 336 x (260 L/cap/day/1000)
= 87.4 m^3/day
= 1.0 L/s

Design Factors

Residential Population = 336

Residential Max. Day Factor = 1.77 Collingwood Development Standards
Residential Peak Hour Factor = 2.70 Collingwood Development Standards

Design Flows

Max. Daily Flow = 1.0 x 1.8
= 1.8 L/s 154.6 m^3/day

Peak Hour Flow = 1.0 x 2.7
= 2.7 L/s 235.9 m^3/day

Fire Flow = 133 L/s Fire Flow Demand Calculations

Max. Day + Fire Flow = 133 + 1.8
= 134.8 L/s

1.2 Uncommitted Hydraulic Reserve Capacity (Winter)

System Capacity	=	24,019	m^3/day
Current Utilization	=	9,707	m^3/day
Municipal Commitments	=	10,750	m^3/day
Planning Commitments	=	59	m^3/day
Committed to Development	=	1039.0	m^3/day
Factor of Safety (5%)	=	1201.0	m^3/day
Uncommitted Hydraulic Reserve	**=**	**1263.0**	**m^3/day**
Proposed Development (Max Day)	=	154.6	m^3/day

$$\text{\% Utilization Ultimate Conditon} = \frac{\text{MDF + Committed Flows + Proposed Development (135 Units)}}{\text{System Capacity}}$$

$$= \frac{22{,}911}{24019} = \mathbf{95.4\%} \quad <100\%$$

Note:

Hydraulic reserve capacity based on Town of Collingwood Staff Report PW2022-18, September 19, 2022

TATHAM ENGINEERING	Project: Summit View Phase 3	Date:	March 17, 2023
	File No.: 118039	Designed:	KRL
	Subject: Fire Flow Demand Calculations	Checked	EL
	Revisions:		

Fire Flow Demands prepared for standard semi-detached home

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)	
1	Frame Use for Construction of Unit	**Framing Material**							
		Coefficient related to type of construction (C)	Wood Frame	1.5	Ordinary Construction	**1**	-	N/A	
			Ordinary Construction	1					
			Non-combustible construction	0.8					
			Fire resistive construction (< 2 hrs)	0.7					
			Fire resistive construction (> 2 hrs)	0.6					
2	Type of Housing (if Townhouse, enter number of units per TH block)	**Floor Space Area**							
		Type of Housing	Single Family	1		**0**	Units	N/A	
			Townhouse / Apartment- inform # of units	1		**2**			
			Other (Comm. Ind., etc.)	1					
			2 hour Fire Separation Between Units	1	No	**2**			
2.1	Number of Storeys	Number of Floors / Storeys in the unit (do not include basement)				**2**	Storeys	N/A	
3	Floor Area (exclude basements, per unit for townhouses, per single family dwelling or per building for apartments, commercial or institutional)	Ground Floor Area (assume fire stop separation is being provided per unit)				**81**	Square Metres (m2)	N/A	
		Total Floor Area - One Storey of Townhouse/Apartment Block				**161**			
		Total Floor Area - All Storeys				**323**			
		Does the building have fire-resistive design?			No	**323**			
		Are vertical openings/communications properly protected (1 hour rating)?			No	**323**			
		Total Floor Area (A) - for all storeys excluding basement - Semi-Detached				**323**			
		Measurement Unis	Square Feet (ft^2)	0.093		**323**	m^2		
			Square Metres (m^2)	1					
			Hectares (ha)	10000					
4	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (FF= 220 x C x $A^{0.5}$)					L/min	4,000	
5	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**							
5.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	(600)	3,400
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
5.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	Fully supervised system	-0.5	None	0.0	N/A	-	3,400
			Water supply system/hose connections	-0.4					
			Automatic sprinkler protection	-0.3					
			None	0					
5.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side	30.1 to 45.0 m	0.05	0.7	%	2,380	5,780
			East Side	0 to 3.0 m	0.25				
			South Side	10.1 to 20.0 m	0.15				
			West Side	0 to 3.0 m	0.25				
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:									6,000
6	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:							100
		Required Duration of Fire Flow of 6,000 L/min (hrs):							2
		Required volume for Fire Flow of 6,000 L/min (m^3):							720

TATHAM ENGINEERING	Project: Summit View Phase 3	Date:	March 17, 2023
	File No.: 118039	Designed:	KRL
	Subject: Fire Flow Demand Calculations	Checked	EL
	Revisions:		

Fire Flow Demands prepared for standard townhouse block

Calculation Based on 2020 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)	
1	Frame Use for Construction of Unit	**Framing Material**							
		Coefficient related to type of construction (C)	Wood Frame	1.5	Ordinary Construction	**1**	-	N/A	
			Ordinary Construction	1					
			Non-combustible construction	0.8					
			Fire resistive construction (< 2 hrs)	0.7					
			Fire resistive construction (> 2 hrs)	0.6					
2	Type of Housing (if Townhouse, enter number of units per TH block)	**Floor Space Area**							
		Type of Housing	Single Family	1		**0**	Units	N/A	
			Townhouse / Apartment- inform # of units	1		**6**			
			Other (Comm. Ind., etc.)	1					
			2 hour Fire Separation Between Units	1	No	**6**			
2.1	Number of Storeys	Number of Floors / Storeys in the unit (do not include basement)				**2**	Storeys	N/A	
3	Floor Area (exclude basements, per unit for townhouses, per single family dwelling or per building for apartments, commercial or institutional)	Ground Floor Area (assume fire stop separation is being provided per unit)				**70**	Square Metres (m2)	N/A	
		Total Floor Area - One Storey of Townhouse/Apartment Block				**420**			
		Total Floor Area - All Storeys				**840**			
		Does the building have fire-resistive design?			No	**840**			
		Are vertical openings/communications properly protected (1 hour rating)?			No	**840**			
		Total Floor Area (A) - for all storeys excluding basement - Single Family				**840**			
		Measurement Unis	Square Feet (ft^2)	0.093		**840**	m^2		
			Square Metres (m^2)	1					
			Hectares (ha)	10000					
4	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (FF= 220 x C x $A^{0.5}$)					L/min	6,000	
5	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**							
5.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	(900)	5,100
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
5.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	Fully supervised system	-0.5	None	0.0	N/A	-	5,100
			Water supply system/hose connections	-0.4					
			Automatic sprinkler protection	-0.3					
			None	0					
5.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side	30.1 to 45.0 m	0.00	0.55	%	2,805	7,905
			East Side	3.1 to 10.0 m	0.20				
			South Side	10.1 to 20.0 m	0.15				
			West Side	3.1 to 10.0 m	0.20				
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:							8,000
6	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:							133
		Required Duration of Fire Flow of 8,000 L/min (hrs):							2
		Required volume for Fire Flow of 8,000 L/min (m^3):							960

Appendix D:
Wastewater Calculations

TATHAM ENGINEERING

PROJECT	Summitview Phase 3	FILE	118039
		DATE	March 17, 2023
SUBJECT	Wastewater Calculations	NAME	KRL
		PAGE	1 OF 2

Design Criteria

Residential Units (Townhouse)	=	97	Per Draft Plan by MHBC Planning
Residential Units (Semi Detached)	=	38	Per Draft Plan by MHBC Planning
Population per Unit (Townhouse)	=	2.4	(Collingwood Design Standards)
Population per Unit (Semi Detached)	=	2.7	(Collingwood Design Standards)
Population	=	336	
Harmon Peaking Factor	=	4.06	(MECP design guidelines)
Average Daily per capita Flow	=	260 L/cap/day	(Collingwood Design Standards)

Average Daily Flow	=	336	x (260 L/cap/day/1000)
	=	87.4	m3/day
	=	1.0	L/s

Sewage Flows

Average Daily Flow	=	87,360.0	L/day	87.4	m^3/day
	=	1.0	L/s		

Peak Sewage Flow = Avg Daily Flow x Peaking Factor

	=	4.1	L/s	354.4194	m^3/day

Infiltration Flows

Per Hectare Flow	=	0.23	L/s	(MECP design guidelines)
Development Area	=	6.90		
Infiltration Flow	=	1.6	L/s	

Peak Flow = Peak Sewage Flow + Infiltration

=	5.7	L/s	
=	491.5	m^3/day	

TATHAM ENGINEERING

PROJECT	Summitview Phase 3	FILE	118039
		DATE	March 17, 2023
SUBJECT	Wastewater Calculations	NAME	KRL
		PAGE	2 OF 2

Sewage Treatment Capacity

System Capacity	=	24,548	m^3/day
Current Utilization	=	17,706	m^3/day
Committed to Development	=	1085.0	m^3/day
Factor of Safety (5%)	=	1227.0	m^3/day
Uncommitted Hydraulic Reserve	=	4530.0	m^3/day
Proposed Development (Max Day)	=	86.1	m^3/day

$$\text{Ultimate Conditon} = \frac{\text{ADF + Committed Flows + Proposed Development (134 Units)}}{\text{System Capacity}}$$

$$= \frac{20{,}104}{24548} = 81.9\% \quad <100\%$$

Note:

Hydraulic reserve capacity based on Town of Collingwood Staff Report PW2022-18, September 19, 2022

LEGEND

- SANITARY CATCHMENT BOUNDARY
- AREA IDENTIFICATION NUMBER — A2
- AREA IN HECTARES (Ha) — 336 | 6.90

POPULATION BASED ON
2.4 PERSONS PER UNIT
(TOWNHOUSE UNITS)
2.7 PERSONS PER UNIT
(SEMI-DETACHED UNITS)

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

DRAWING REFERENCES

LEGAL SURVEY INFORMATION SHOWN ON THIS PLAN PREPARED BY VAN HARTEN SURVEY INC., PLAN OF SUBDIVISION, DATED SEPTEMBER 26, 2019.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN BASED ON LAND INFORMATION ONTARIO BASE MAPPING.

RIGHT-OF-WAY AND LOT FABRIC SHOWN ON THIS PLAN HAVE BEEN TAKEN FROM SUMMIT VIEW PHASE 3 DRAFT PLAN OF SUBDIVISION, PREPARED BY MHBC PLANNING, DATED DEC 21, 2022.

BENCHMARKS

No.	REVISION DESCRIPTION	DATE
1.	DRAFT PLAN SUBMISSION	MAY/23

ENGINEER STAMP

SUMMIT VIEW - PHASE 3
RESIDENTIAL DEVELOPMENT
TOWN OF COLLINGWOOD

TATHAM ENGINEERING

SANITARY DRAINAGE PLAN

DESIGN: EL	FILE: 118039	DWG:	
DRAWN: KRL	DATE: MAR./23	**SAN-1**	
CHECK: JRA	SCALE: 1:2,000		

Drawing Name: 118039 – SAN01.dwg, Plotted: Apr 30, 2023

TATHAM ENGINEERING

Sanitary Sewer Design Sheet

Version Number: 1 **Version Date:** March 3, 2023

Project Information

Summitview Phase 3	118039

Drawing Reference

118039 - SAN01	March 03/23

Prepared By

Kyle Latter	February 22/23

Reviewed By

Evan Lundquist	February 27/23

Municipality

Town of Collingwood

Population Density

Capita per Unit	Low	Medium	High
	2.40	2.70	2.90

Infiltration

Infiltration (L/s/ha)	0.23

Flow

Development Type	Average (L/cap/day)	Peaking Factor
Residential	260	Harmon
Development Type	**Average (L/ha/day)**	**Peaking Factor**
Institution	-	-
Commercial	-	-
Industrial High Intensity	-	-
Industrial Low Intensity	-	-

Manning's Coefficient

Pipe Material	Value
Concrete	0.013
PVC	0.013
Applied	0.013

Engineer Stamp

Street Name	Area Label/ID	Upstream Maintenance Hole	Downstream Maintenance Hole	Development Type	Population Density	Number of Units	Population (cap)	Accumulated Population (cap)	Peaking Factor	Area (ha)	Cumulative Area (ha)	Average Flow (L/s)			Peak Flow (L/s)			Proposed Sanitary Sewer						
												Development	Infiltration	Total	Development	Infiltration	Total	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
Plewes Drive	A1	-	SAN MH40	Residential	Low	239	573.6	573.6	3.94	15.35	15.35	1.73	3.53	5.26	6.81	3.53	10.34	83.7	0.4%	200	0.66	20.74	0.63	154	49.8%
Phase 3	A2	-	SAN MH56	Residential	Low	140	336.0	336.0	4.06	6.90	6.90	1.01	1.59	2.60	4.10	1.59	5.69	8.6	0.3%	200	0.57	17.96	0.48	130	31.7%
Bassett Street	A3	SAN MH56	SAN MH41	Residential	Low	0	0.0	336.0	4.06	0.07	6.97	1.01	1.60	2.61	4.10	1.60	5.71	32.8	0.4%	200	0.66	20.74	0.54	123	27.5%
Archer Avenue	A4	-	SAN MH41	Residential	Low	25	60.0	60.0	4.30	1.20	1.20	0.18	0.28	0.46	0.78	0.28	1.05	83.7	0.4%	200	0.66	20.74	0.34	65	5.1%
Basssett Street	A5	SAN MH41	SAN MH42	Residential	Low	8	20.0	416.0	4.01	0.70	8.87	1.25	2.04	3.29	5.12	2.04	7.16	66.8	2.0%	200	1.48	46.38	1.03	99	15.4%
Bassett Street	A6	SAN MH42	SAN MH40	Residential	Low	8	20.0	436.0	4.00	0.74	9.61	1.31	2.21	3.52	5.36	2.21	7.57	66.8	0.7%	200	0.87	27.44	0.71	123	27.6%
Plewes Drive	A7	SAN MH40	SAN MH43	Residential	Low	9	22.0	1031.6	3.79	0.46	25.42	3.10	5.85	8.95	12.42	5.85	18.26	90.7	0.4%	250	0.77	37.61	0.72	191	48.6%
Plewes Drive	A8	SAN MH43	SAN MH44	Residential	Low	6	15.0	1046.6	3.79	0.28	25.70	3.15	5.91	9.06	12.59	5.91	18.50	76.8	0.4%	250	0.77	37.61	0.73	192	49.2%
Archer Avenue	A9	-	SAN MH44	Residential	Low	53	128.0	128.0	4.21	2.47	2.47	0.39	0.57	0.95	1.62	0.57	2.19	63.3	1.0%	200	1.04	32.80	0.58	72	6.7%
Foley Crescent	A10	-	SAN MH44	Residential	Low	57	137.0	137.0	4.20	2.54	2.54	0.41	0.58	1.00	1.73	0.58	2.32	74.9	0.4%	200	0.66	20.74	0.42	88	11.2%
Plewes Drive	A11	SAN MH44	SAN MH52	Residential	Low	0	0.0	1311.6	3.72	0.08	30.79	3.95	7.08	11.03	15.94	7.08	23.03	59.1	0.4%	250	0.77	37.61	0.77	208	61.2%
FLOW SPLIT																									
Findlay Drive		SANMH52	MCROFT	Residential	Low	273	655.8	655.8	3.91	0.00	0.00	1.97		1.97	7.72		7.72	3.5	5.1%	250	2.74	134.30	1.45	86	5.7%
High Street		SANMH52	SAN MH54	Residential	Low	273	655.8	655.8	3.91	0.00	0.00	1.97		1.97	7.72		7.72	111.1	0.4%	250	0.77	37.61	0.57	138	20.5%

TATHAM ENGINEERING

Sanitary Sewer Design Sheet

Version Number: 1 **Version Date:** March 3, 2023

Project Information

Summitview Phase 3	118039

Drawing Reference

118039 - SAN01	March 03/23

Prepared By

Kyle Latter	February 22/23

Reviewed By

Evan Lundquist	February 27/23

Municipality

Town of Collingwood

Population Density

Capita per Unit	Low	Medium	High
	2.40	2.70	2.90

Infiltration

Infiltration (L/s/ha)	0.23

Flow

Development Type	Average (L/cap/day)	Peaking Factor
Residential	260	Harmon
Development Type	**Average (L/ha/day)**	**Peaking Factor**
Institution	-	-
Commercial	-	-
Industrial High Intensity	-	-
Industrial Low Intensity	-	-

Manning's Coefficient

Pipe Material	Value
Concrete	0.013
PVC	0.013
Applied	0.013

Engineer Stamp

Street Name	Area Label/ID	Upstream Maintenance Hole	Downstream Maintenance Hole	Development Type	Population Density	Number of Units	Population (cap)	Accumulated Population (cap)	Peaking Factor	Area (ha)	Cumulative Area (ha)	Average Flow (L/s)			Peak Flow (L/s)			Proposed Sanitary Sewer							
												Development	Infiltration	Total	Development	Infiltration	Total	Sewer Length (m)	Sewer Slope (%)	Actual Sewer Diameter (mm)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Actual Velocity (m/s)	Calculated Sewer Diameter (mm)	Percentage of Full Flow Capacity (%)
High Street	A13	SAN MH54	SAN MH55	Residential	Low	0	0.0	655.8	3.91	0.19	0.19	1.97	0.04	2.02	7.72	0.04	7.76	79.2	0.4%	250	0.77	37.61	0.58	138	20.6%
High Street	A14	SAN MH55	X. SAN MH	Residential	Low	0	0.0	655.8	3.91	0.17	0.36	1.97	0.08	2.06	7.72	0.08	7.80	79.3	0.4%	250	0.77	37.61	0.58	139	20.7%

Appendix E:
Background Documents

STAFF REPORT PW2022-18
Standing Committee 9/12/2022
Council 9/19/2022
Amendments: No

Submitted to:	Development and Operations Standing Committee | Council
Submitted by:	Peggy Slama, Director of Public Works, Engineering & Environmental Services
Subject:	Semi-Annual Water and Wastewater Uncommitted Hydraulic Reserve Capacity Update

PURPOSE

The purpose of this report is to fulfill the requirement to present semi-annual updates to Council and the public of the remaining hydraulic reserve capacity at the drinking water and wastewater treatment plants, in accordance with the Town's Servicing Capacity Allocation Policy (SCAP).

RECOMMENDATION

THAT the Development and Operations Committee receive Staff Report PW2022-18 regarding the Semi-Annual Water and Wastewater Uncommitted Hydraulic Reserve Capacity Update;

AND FURTHER THAT Staff Report PW2022-18 be expedited to the September 19, 2022 meeting of Council.

AMENDMENTS

None

1. BACKGROUND

On April 26, 2021, the Town of Collingwood Council received report PW2021-09 regarding the status of available drinking water and wastewater treatment capacity and report P2021-12 regarding the justification and rationale for implementing an Interim Control By-Law while the Town completed a Land Use Planning Study (the "Study") to ensure the Town had the tools in place to manage allocation of water and wastewater servicing capacity for development. The

Town proceeded with passing Interim Control By-Law 2021-024 (the "ICBL") at this Council meeting, and implemented an exemption program for projects that supported continued development of a complete community within Collingwood's servicing capacity.

The Town subsequently advanced the Land Use Policy Planning Study (the "Study") to examine the appropriate land use planning response to both immediate and the projected longer-term water and wastewater system capacity constraints on the Town's overall planning regime.

Report P2021-35 outlined the preliminary Study results including recommended draft Official Plan policies, Zoning By-law provisions and a Servicing Capacity Allocation Policy collectively referred to as the "Draft Land Use Planning Policy Study Recommendation Documents", which would collectively represent the implementation products of the Study.

On December 20, 2021, Council endorsed the recommended next steps to implement the completed Study and move toward the finalization of a servicing capacity allocation framework for the Town of Collingwood prior to the expiry of the ICBL, as amended (Report P2021-38).

Following extensive reviews of industry best practice and public consultation completed as part of the Study, the Town approved a Servicing Capacity Allocation Policy (SCAP) at the March 28, 2022, meeting (report P2022-08). Subsequently, on May 16, 2022 Council passed a by-law to set the effective date for the Town's SCAP as May 17, 2022 (Report CAO2022-08). A key requirement of the SCAP are semi-annual updates to Council on the uncommitted hydraulic reserve capacity for both the drinking water and wastewater treatment plants. This report is the first semi-annual update.

2. INPUT FROM OTHER SOURCES

Environmental Services staff consulted with Planning and Building staff to verify the status of development applications and building permits.

Department Heads reviewed this report at their regular meeting on September 7, 2022 and the report was recommended to proceed to the Development and Operations Standing Committee meeting.

3. APPLICABLE POLICY OR LEGISLATION

- Safe Drinking Water Act
- Planning Act
- Provincial Policy Statement
- Town of Collingwood Servicing Capacity Allocation Policy

4. ANALYSIS

The Town's SCAP defines the water and wastewater hydraulic reserve capacity and uncommitted hydraulic reserve capacity as follows:

Water Hydraulic Reserve Capacity – Design capacity of the Raymond A. Barker Water Treatment Plant (WTP) minus the existing recorded maximum day demand and any capacity reserved to service municipalities outside the Town of Collingwood

Wastewater Hydraulic Reserve Capacity – Design capacity of the Collingwood Wastewater Treatment Plant (WWTP) minus the existing recorded annual average day wastewater flow

Uncommitted Hydraulic Reserve Capacity – Obtained by subtracting any committed water and wastewater allocation, including through draft approved and registered plans of subdivision and condominium plans (where the conditions of any individual approval commits capacity and this approval has not expired), site plan approvals, any capacity reserved for government projects, projects that do not require a Planning Act application or the treatment of hauled sewage if applicable, plus a safety factor, from the existing hydraulic reserve capacity

To help determine the remaining servicing capacity available for allocation for future development applications, the uncommitted hydraulic reserve capacity can be converted to a Single Dwelling Unit equivalent (SDU) based on the Town's Development Standards and 2019 Water and Wastewater Master Servicing Plan (Table 1).

Table 1 SDU Conversion Factors

	Drinking Water - Summer	Drinking Water - Winter	Wastewater
People Per Single Detached Dwelling	2.9	2.9	2.9
Servicing Requirements (L/cap/day)	260	260	260
Maximum Day Factor	1.77	1.13[a]	n/a
Extraneous Flows (L/cap/d)	n/a	n/a	90
One SDU Equivalent (m^3/d)	**1.33**	**0.85**	**1.02**

Notes:

a Based on the 3-year average maximum day winter flows and maximum day summer flows in Collingwood from 2019 through 2021

Hydraulic Reserve Capacity Calculations

The water hydraulic reserve capacity has been calculated using the average maximum day demand in Collingwood between 2019 and 2021, and considering the commitments to provide drinking water to the Town of the Blue Mountains (TBM) and the Town of New Tecumseth (NT). Recognizing that the WTP has limitations on its winter treatment capacity that result in a reduced design capacity under cold water conditions, a second winter water hydraulic reserve capacity has also been calculated using the average winter maximum day demand in Collingwood between 2019 and 2021. The wastewater hydraulic reserve capacity has been calculated using the average daily influent flows at the WWTP between 2019 and 2021. Results of these calculations are provided in Table 2.

Table 2 Hydraulic Reserve Capacity Calculations

	Units	Drinking Water - Summer	Drinking Water - Winter	Wastewater
Treatment Plant Rated Capacity	m^3/d	31,140	24,019	24,548
Average Maximum Day Demand (2019-2021)	m^3/d	15,279	9,707	-
Average Maximum Day Flow (2019-2022)	m^3/d	-	-	17,706
Municipal Commitments (TBM, NT)	m^3/d	10,750	10,750	-
Hydraulic Reserve Capacity	**m^3/d**	**5,111**	**3,562**	**6,842**
	SDUs	**3,829**	**4,201**	**6,741**

Through consultation with staff in the Planning and Building Divisions, the committed drinking water and wastewater servicing capacity allocation is calculated based on:

- Existing approved Site Plans,
- Other approved developments with no further Planning approvals required (e.g. Registered Plans of Subdivision that do not require further Site Plan approvals),
- Existing approved Building Permits, and
- Existing ICBL exemptions.

Properties where no Planning application would be required also need to be considered when determining the uncommitted hydraulic reserve capacity. The estimated servicing capacity associated with these properties is determined by considering the number of unconnected lots with access to existing municipal services.

On August 18, 2022 (PW2022-16), Council endorsed an update to the Town's Development Standards to reduce the residential water and sanitary demand/flow design criteria to align with the per capita consumption determined through the 2019 Water and Wastewater Master Servicing Plan. For units that have not yet been built (and thus are not yet reflected in actual water production and wastewater flow data), staff re-calculated the anticipated servicing requirements for these developments in accordance with the updated Development Standards. These calculations enabled a modest amount of additional water and wastewater servicing capacity to be made available to Council for allocation to developments that meet the SCAP criteria.

With these commitments and adjustments made, the uncommitted hydraulic reserve capacity for the drinking water system is currently 1,830 m^3/d (1,376 SDUs) in the summer or 1,263 m^3/d (1,486 SDUs) in the winter, and the uncommitted hydraulic reserve capacity for the wastewater system is currently 4,427 m^3/d (4,530 SDUs), as shown in Table 3.

Table 3 Uncommitted Hydraulic Reserve Capacity Calculations

	Units	Drinking Water - Summer	Drinking Water - Winter	Wastewater
Hydraulic Reserve Capacity	m^3/d	5,111	3,562	6,842
No Planning Application Required	m^3/d	93	59	0
Committed Servicing Capacity Allocation (SCAP and/or ICBL Exemption)	m^3/d	1,631	1,039	1,085
Factor of Safety (5% of Rated Capacity)	m^3/d	1,557	1,201	1,227
Uncommitted Hydraulic Reserve Capacity	**m^3/d**	**1,830**	**1,263**	**4,427**
	SDUs	**1,376**	**1,486**	**4,530**

By using this refined SCAP analysis as well as the average of the maximum winter and summer water demands over the past three years, summer operating conditions are currently the limiting factor for servicing new development, as shown by the SDU conversions. Therefore, staff will refer to the summer uncommitted hydraulic reserve capacity of 1,830 m^3/d, or 1,376 SDUs, when considering servicing allocations for new development as part of this updated assessment. While the transition to the summer uncommitted hydraulic reserve capacity reduces the urgency of commissioning the UV disinfection upgrades at the WTP prior to winter 2022/2023, the need for this upgraded disinfection is not eliminated. The per capita winter demands are expected to start increasing again now that COVID-19 restrictions are lifted across the province and the augmentation of UV disinfection will eliminate the need to increase chlorine dosing rates as the WTP approaches its full rated capacity.

On March 28, 2022, Council received report P2022-08 which identified the remaining uncommitted hydraulic reserve capacity based on pre-SCAP interpretations to servicing allocation. This hydraulic reserve capacity calculation for drinking water indicated that 1,282 SDUs remained available to allocate to development. Recognizing that that 248 SDUs have been allocated to development since that assessment was completed, this updated calculation indicates an additional 342 SDUs are available.

Report P2022-08 also outlined a proposed framework for allocating the remaining uncommitted water hydraulic reserve capacity until the expansion of the water treatment plant is completed. Through this report Council endorsed the recommendation to allocate 430 SDUs of water capacity in 2022. A slight modification to this approach to the remaining uncommitted hydraulic reserve capacity is being proposed for the remainder of 2022 through to 2026 based on the results of these revised calculations (Table 4), which will enable a few more units to receive servicing in each year. As stated in report P2022-08, staff continue to recommend the 5% factor of safety remain untapped until at least 2025 when there is more confidence around the commissioning timelines for the expanded water treatment plant.

Table 4 Recommended Annual Allotment of Water Uncommitted Hydraulic Reserve Capacity

Year	Recommended Water Servicing Capacity Allotment (SDUs)
Remainder of 2022	205
2023	450
2024	450
Total	**1,105**

The annual water capacity allocation thresholds will continue to be re-evaluated and adjusted as needed through the semi-annual monitoring and reporting on the Uncommitted Hydraulic Reserve Capacity. This review will continue to take into consideration the average maximum daily demands (which will change as development is occupied) if the previous annual allocation is not fully committed or if developments do not proceed (based on performance requirements) and some allocation is withdrawn. The regular monitoring and review will provide for flexibility in setting the next year's allocation allotment.

With the current uncommitted hydraulic reserve capacity available until the completion of the WTP expansion as the development threshold, the available uncommitted hydraulic reserve capacity related to the WWTP is sufficient for all development that will be approved through the SCAP. It is industry practice to initiate treatment capacity expansions when usage (maximum day demand or average day flows) reach 80% of the facility rated capacity. The initiation of a Class Environmental Assessment (EA) for expansion of the WWTP has been included in the 10-year capital plan. The current calculations suggest the Class EA could commence in 2024, but this will continue to be re-evaluated annually. New development and the implementation of an Inflow and Infiltration program may impact the timing of this project.

5. EFFECT ON TOWN FINANCES

Not applicable.

6. CONSIDERATIONS

Community Based Strategic Plan: ☐ N/A or ☒ Explain: Consistent with CBSP
Climate Change / Sustainability: ☒ N/A or ☐ Explain: Choose an item.
Accessibility: ☒ N/A or ☐ Explain: Choose an item.
Communication / Engagement: ☒ N/A or ☐ Explain: Choose an item.
Accountability / Transparency: ☐ N/A or ☒ Explain: Enhances Accountability and Transparency

7. APPENDICES & OTHER RESOURCES

Appendix A	Hydraulic Reserve Capacity Data Assumptions – Water & Wastewater
Appendix B	Committed Hydraulic Reserve Capacity Calculations – Water & Wastewater
Appendix C	Developments with Committed Water and Wastewater Servicing Capacity and/or an ICBL Exemption

SIGNATURES

Prepared by:		Department Head:
Heather McGinnity, P.Eng. *Manager of Environmental Services*		*Peggy Slama, P.Eng.* *Director of Public Works, Engineering & Environmental Services*
Town of Collingwood		Town of Collingwood

Appendix A
Hydraulic Reserve Capacity Data Assumptions - Water

Reference or Calculation
User Input/ Variable

Data Assumptions:

Collingwood WTP MDD Capacity Summer (m3/d):	31,140	Current Available Capacity Summer (m3/d)	5,111
Collingwood WTP MDD Capacity Winter (m3/d):	24,019	Current Available Capacity Winter (m3/d)	3,562
Collingwood WTP MDD Capacity Future Upgrades (m3/d):	59,000	% Available Capacity Summer	16.41%
2019 Collingwood MDD	15,630	Available SDU-Es Summer	3,829
2020 Collingwood MDD	15,089	% Available Capacity Winter	14.83%
2021 Collingwood MDD	15,119	Available SDU-Es Winter	4,201
3-year Average MDD (m3/d):	15,279		
2019 Collingwood Winter MDD	9,939.00		
2020 Collingwood Winter MDD	8,966.00		
2021 Collingwood Winter MDD	10,216.00	5% Factor of Safety - Summer (m3/d)	1,557
3-year Average Winter MDD (m3/d):	9,707.00	5% Factor of Safety - Winter (m3/d)	1,201
Summer/Winter MDD Conversion Factor	1.57		
Town of Blue Mountains Supply Commitment (m3/d)	1,250		
Town of New Tecumseth Supply Commitment (m3/d)	9,500		
External Supply MDD Commitments (m3/d):	10,750		

Assumptions:

ADD/ Capita Consumption (L/day):	260
Residential Peaking Factor (ADD:MDD Ratio):	1.77
ICI Peaking Factor (ADD:MDD Ratio):	2.5
Commercial Area ADD (m3/ha/day)	28
Industrial Area ADD (m3/ha/day)	35
Institutional Area ADD (m3/ha/day)	28

Residential Types Legend	MDD (m3/d)	Residential Types Legend	SDU-E
Residential - Single Detached Home (2.9 ppl/unit)	1.33	Residential - Single Detached Home (2.9 ppl/un	1.00
Residential - Semi Detached (2.7 ppl/unit)	1.24	Residential - Semi Detached (2.7 ppl/unit)	0.93
Residential - Townhouse/ Row-House (2.4 ppl/unit)	1.10	Residential - Townhouse/ Row-House (2.4 ppl/u	0.83
Residential - Condo/ Apartment (1.9 ppl/unit)	0.87	Residential - Condo/ Apartment (1.9 ppl/unit)	0.66

Appendix A
Hydraulic Reserve Capacity Data Assumptions - Wastewater

Reference or Calculation
User Input/ Variable

Data Assumptions:

Collingwood WWTP Capacity (m3/d):	24,548	Current Available Capacity (m3/d)	6,842
2019 Collingwood ADF	16,202	% Available Capacity	28%
2020 Collingwood ADF	18,854	Available SDU-Es	6,741
2021 Collingwood ADF	18,063		
3-year Average ADF (m3/d):	17,706	5% Factor of Safety (m3/d)	1,227

Assumptions:

ADF/ Capita Consumption (L/day):	260
Commercial Area Flow (m3/ha/day)	28
Industrial Area Flow (m3/ha/day)	35
Institutional Area Flow (m3/ha/day)	28
Extraneous Flow (m3/ha/day)	20
Extraneous Flow (L/cap/day)	90

Residential Types Legend	ADF (m3/d)		SDU-E
Residential - Single Detached Home (2.9 ppl/unit)	1.02	Residential - Single Detached Home (2.9 ppl/unit)	1.00
Residential - Semi Detached (2.7 ppl/unit)	0.95	Residential - Semi Detached (2.7 ppl/unit)	0.93
Residential - Townhouse/ Row-House (2.4 ppl/unit)	0.84	Residential - Townhouse/ Row-House (2.4 ppl/unit)	0.83
Residential - Condo/ Apartment (1.9 ppl/unit)	0.67	Residential - Condo/ Apartment (1.9 ppl/unit)	0.66

Appendix B
Committed Hydraulic Reserve Servicing Capacity Calculations - Water & Wastewater

	Water		Wastewater	
	MDD (m3/d)	SDUs-W	ADF (m3/d)	SDUs-WW
Committed Servicing Capacity	**1724**	**1292**	**1085**	**1069**
A. Existing Development - Unconnected	**93**	**70**	**0**	**0**
B. Development with Capacity Allocation	**1631**	**1222**	**1085**	**1069**
B.1 Development with Capacity Allocation - Planning Approval Not Required & Building Permit Issued	23	17	13	13
B.2 Development with Capacity Allocation - Planning Approvals Obtained & Building Permit Issued	718	538	480	473
B.3 Development with Capacity Allocation - Planning Approvals Obtained & No Building Permit Issued	825	618	556	548
B.4.A ICBL Exemption - Planning Approval Not Required & No Building Permit Issued	16	12	9	9
B.4.B ICBL Exemption - Planning Approval Not Obtained & No Building Permit Issued	49	37	28	27
Uncommitted Servicing Capacity	**6821**	**5111**	**6873**	**6772**
C. Conditionally Approved Development	**4349**	**3259**	**4806**	**4735**
C.1 Conditionally Approved Development - Registered Subdivision & Active Site Plan Application	566	424	518	511
C.2 Conditionally Approved Development - Registered Subdivision & Site Plan Application Pending	125	93	98	97
C.3 Conditionally Approved Development - Draft Plan of Subdivision	3658	2741	4190	4128
D. Unapproved Development	**2472**	**1852**	**2067**	**2036**
Grand Total	**8545**	**6403**	**7959**	**7841**

Appendix C – Development with Committed Water and Wastewater Servicing Capacity and/or an ICBL Exemption

1. **Building Permit Issued**
   112 Glenlake Blvd
   115 Hurontario St
   12 Niagara St
   122 Collins Street
   146 Hurontario St
   172, 174 Hurontario Street (Dorchester Hotel)
   18 Hickory St
   185 Ninth St
   2624 Sixth Line
   268 Robinson St
   269 Sixth St
   275 First St
   29 Hamilton St
   30 Ninth St
   35 Seventh St
   37 Silver Creek Dr
   385 Walnut St
   395 Raglan St
   475 Sixth St
   50 Courtice Cres
   551 Spruce St
   67 First St
   699 Sixth St
   795843 Grey Road 19
   82 Findlay Dr
   86 Findlay Dr
   90 Findlay Dr
   98 Rodney St
   120 Hume St
   Monaco (1 Hume St)
   Waterstone Townhomes (31, 39 Dawson Dr; 11299, 11313, 11317 Hwy 26)
   93/95 Sandford Fleming - 1 Pad
   Awen Splash Pad
   Balmoral Block 2
   Memory Care Facility (92 Raglan)
   Summit View Phase 2A
   Summit View Phase 2B

2. **Planning Approvals Obtained & No Building Permit Issued**
   121 Hume St
   19 Keith Ave
   40 Sandford Fleming
   500 Hume Street
   510 Hume St
   65 First St (1 of 2 buildings remaining)
   84 Hurontario St
   93/95 Sandford Fleming Dr -Collingwood Business Park (2 of 4 pads remaining)

Georgian Bay Biomedical
Shipyards Block 11 - Harbour House (31 Huron St)
Summit View Phase 3A
Summit View Phase 3B

3. **ICBL Exemption – No Planning Approvals and/or Building Permit**
   1 Huron St
   13 Cherry Ln
   14 Bush Street
   148 Bartlett Blvd
   15 Silver Creek Dr
   19 Cameron Street (Hope Chapel)
   22 Woodcrest Avenue
   2935 Concession 10
   37 Broadview St
   461 Birch St
   58 Hurontario St
   61 Slalom Gate Road
   65 Simcoe St
   80 Fifth St
   9 Holly Ct
   9 Reid Cres
   26 Elm St
   380 First St
   72-76 Hurontario Street

TECHNICAL MEMORANDUM

To:	**Peggy Slama, P.Eng.**	Company:	**Town of Collingwood**
	Manager, Environmental Services		
From:	**Sam Ziemann, P.Eng.**	Our File:	**75-41-171235**
Cc:		Date:	**August 29, 2018**
Subject:	**Watermain Hydraulic Assessment of the Proposed Developments at Summit View**		

TOWN OF COLLINGWOOD

Watermain Hydraulic Assessment of the Proposed Developments at Summit View

C3 WATER INC.

August 29, 2018

VERSION	DATE	DESCRIPTION OF REVISIONS	REVISED BY	REVIEWED BY
1	June 8, 2018	Draft 1	Kelsey Shaw Emma Thompson	Sam Ziemann Peggy Slama
2	June 22, 2018	Draft 2	Emma Thompson	Sam Ziemann Peggy Slama
3	August 10, 2018	Draft 3	Emma Thompson	Sam Ziemann Peggy Slama
4	August 29, 2018	Final	Emma Thompson	Sam Ziemann

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List of Appendices

1.0 INTRODUCTION AND BACKGROUND

The proposed development at Summit View (formerly Charleston Homes) includes the construction of new residential buildings with a total of 367 units. The site was originally zoned as agricultural land with a portion encompassing the Black Ash Creek water corridor. The site has a total area of 31.4 hectares with a developable portion of 25.6 ha. The residential portions will consist of single detached homes and street townhomes. C3 Water (C3W) has been asked to conduct a watermain hydraulic assessment of the proposed development and its impacts on the existing distribution system. Figure 1-1 below provides an overview of the proposed development area. A detailed site plan with proposed watermains, roads and lot types are included in Appendix A.

The Town is supplied by the R.A.B. Water Treatment Plant (WTP), where the pumps operate based on water levels at the Collingwood Water Tower and are triggered when levels in the tower drop due to high demand in the network. The Carmichael Pumping Station (PS) located in the north-west part of Town is also operated based on water tower levels, and the pumps are triggered to assist the WTP. Figure 1-2 shows the relative location of the Summit View development to the Town's existing infrastructure, as well as current watermain diameters.

The Summit View development is proposed to be located in Pressure Zone 2, which operates at a hydraulic grade line (HGL) of 250m or slightly less depending on system operation and demands. Pressures in this portion of Zone 2 are maintained by the Bob Davey Pumping Station (PS), which receives water from the Regional Pipeline connected to RAB Water Treatment Plant. Typically, there is one pump operating continuously at Bob Davey, and pump flows change to maintain constant downstream pressures through a variable frequency drive. Additional pumping capacity is available from other pumps for large demand events such as fires, and the pump station's firm capacity is 170 L/s (Table 1.1).

Existing water distribution infrastructure near the Summit View site consists of a 450mm diameter main at the intersection of Findlay Drive and High Street. The new development is proposed to be serviced by a 150mm single connection to the 450mm on Findlay Drive. Each lot will be serviced via a local watermain following the alignment of the internal roads. C3W has proposed several additional connection locations for different development scenarios, as shown Figure 1-1. These connections have been included in the modeling results and are discussed in further detail in Section 2.0.

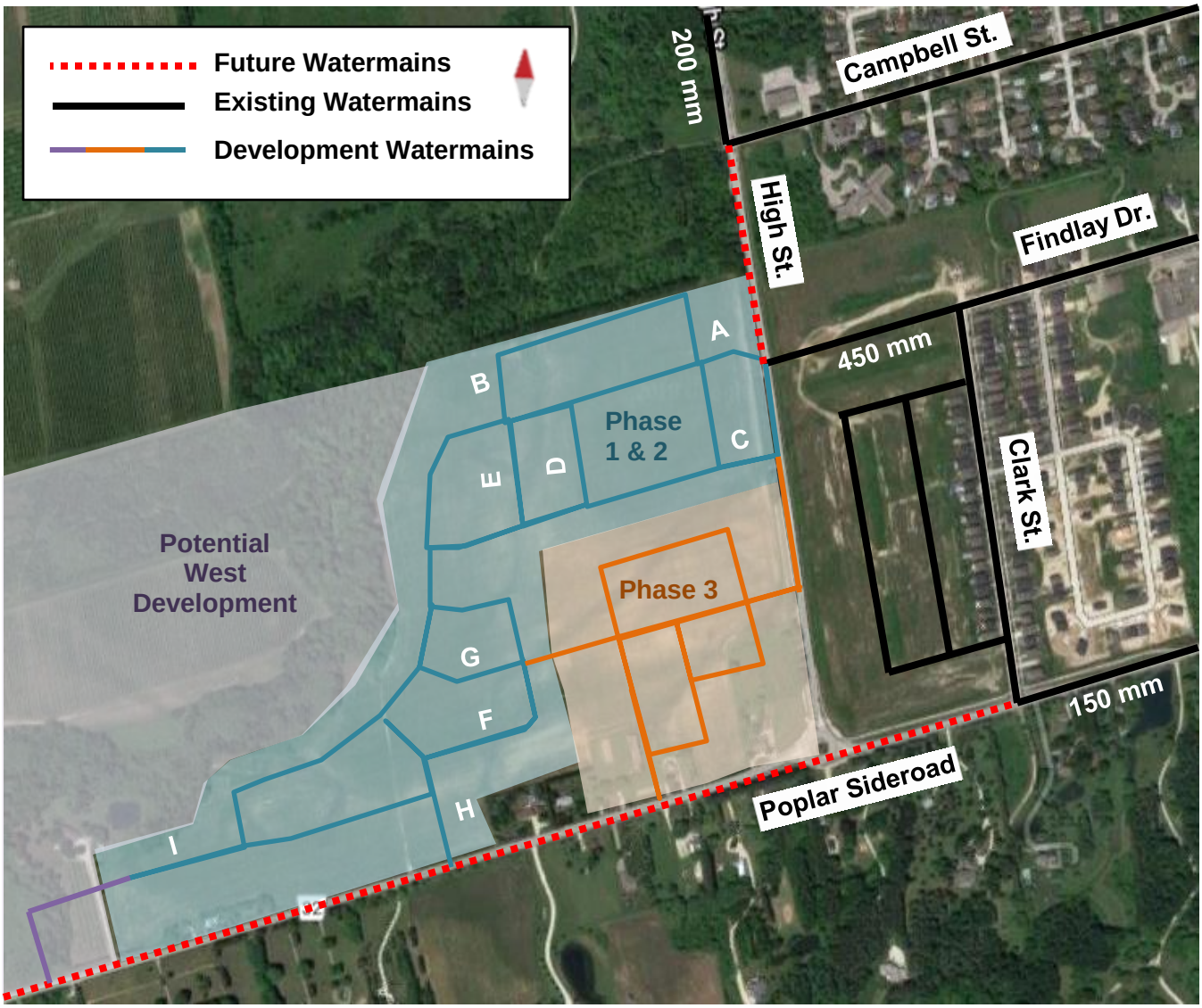


Figure 1-1: Proposed Development Area Site Overview (NTS)

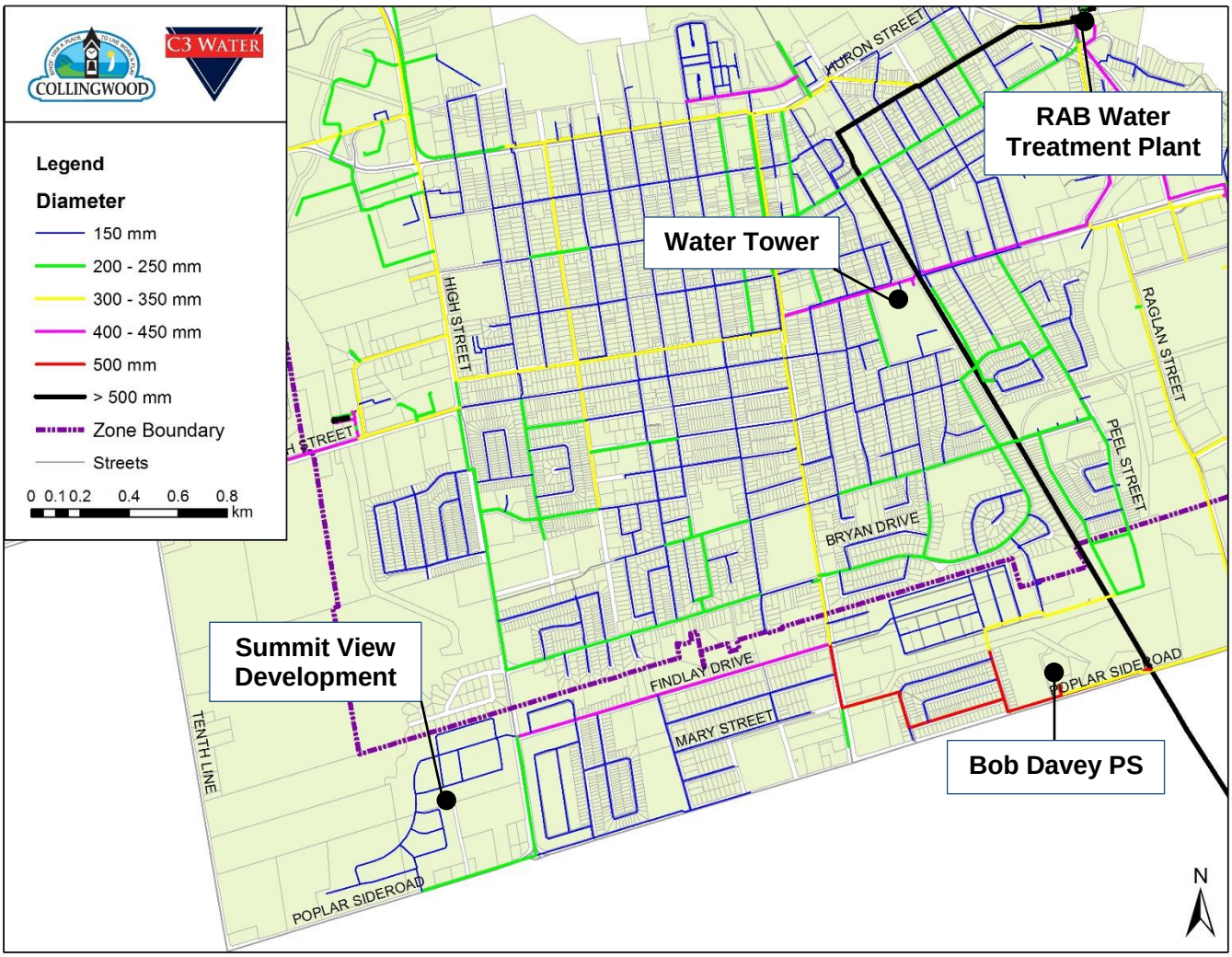


Figure 1-2: Watermain Diameters

Table 1.1: Bob Davey Pump Station Capacity

# Units	Pump Type	Rated Flow (L/s)	Firm Capacity (L/s)	Rated Head (m)	HGL (m)	Drive Type
1	vertical high lift turbine	25	172	60	250	variable speed
1	vertical high lift turbine	55		60		constant speed
2	vertical high lift turbine	92		60		constant speed

1.1 Design Standards

The Town of Collingwood Development Standards provide design criteria for assessing the impact of proposed developments. The standards recommend that watermains be designed to provide maximum day demands plus fire flows according to the land use type. The standards also outline minimum pressure requirements, as shown in Table 1.2 below.

Table 1.2 Town of Collingwood Design Standards

	Minimum	Preferred
Fire Flow Requirements		
Single-Family Residential	57 L/s	76 L/s
Industrial/Commercial Subdivisions	136 L/s	154 L/s
Downtown Commercial	136 L/s	189 L/s
Pressure Requirements		
Maximum Day Demands + Fire Flows	20 psi	
Standard Operating Conditions	40 psi (Peak Hour)	50 - 80 psi

1.2 Demand and Fire Flow Calculations

C.C. Tatham & Associates (CCTA) completed calculations for the anticipated water demands for the buildings in the development, but were modified by C3W based on CCTA's updated site plan. The calculations are based on recommended values from the Ontario Ministry of the Environment (MOE) and the Town Standards. The Max Day Demands (MDD) and Peak Hour Demands (PHD) were calculated based on the average flows, and recommended peaking factors of 2.0 for MDD and 4.5 for PHD as per MOE Design of Water Works 3.4.2 and Town Standards.

Fire Flow calculations were also completed by CCTA. Their methods included adding MDD to the Town minimum standard of 57.0 L/s for single family homes based on a period of 2 hours. The Town recommends using the preferred fire flow of 76 L/s in the absence of FUS fire flow information, resulting in a total fire flow of 87.14 L/s. This required fire flow is recommended for single family homes, but may be low for semi-detached and townhouses compared to typical FUS calculations. The fire flow and domestic demands for the proposed development are summarized in Table 1.3 below and provided in Appendix B.

Table 1.3 Fire Flow and Demand Calculated Values

	Detached Homes	Semi-Detached	Townhouse Units
Number of Units (Phase 1 & 2)	233	86	87
Average Day Demand (ADD) (CCTA, Appendix B)	5.57 L/s		
Maximum Day Demand (MDD)	11.14 L/s		
Peak Hour Demand (PHD)	25.1 L/s		
MDD and Fire Flow (FF) Phase 1 & 2	MDD = 11.14 L/s; FF = 87.14 L/s		
MDD and Fire Flow (FF) Phase 3	MDD = 5.71 L/s; FF = 92.85 L/s		
MDD and Fire Flow (FF) Potential West Development	MDD = 15 L/s; FF = 107.85 L/s		

2.0 MODELLING RESULTS

C3W has reviewed the Town's existing water model as part of the Town's ongoing water and wastewater master planning project, and made updates based on information from GIS and current operating conditions.

The proposed development area was assessed using the model's existing 2016 Maximum Day Demand (MDD) + Fire Flow conditions. New watermains were added to represent the proposed watermains through the Summit View development. A 200mm watermain was also added along Poplar Sideroad and High Street to connect the south and east ends of development in the Future West Development Scenario. The model also included the proposed watermains and demands for the Eden Oaks and Pretty River Village Developments since these are expected to be completed in the near future and will impact the Summit View development. Modelling was conducted using a steady-state analysis of available fire flows at a residual pressure of 20psi for a 2-hour fire flow scenario at 12:00pm under MDD conditions.

2.1 Pressures

The range of elevations in the Summit View development is approximately 199 - 212 mASL, which aligns with preferred Zone 2 elevations of 192 – 215 m. Based on the Zone 2 HGL of approximately 250m, it is expected that static pressures would be 38 – 51m of head, or 54 - 72 psi.

The average operating condition with Maximum Day Demands was found to be in the range of 56 – 73 psi for Phase 1 and 2 of the Summit View development, and 62 - 73 psi in Phase 3. The pressures in the Summit View development meet the Town's preferred operating criteria of 50 – 80 psi. The ground elevations in the Potential Development to the West are expected to be higher than in Summit View, resulting in pressures of 52 - 61 psi. The model results showed that up to three pumps were required at Bob Davey to meet MDD and PHD demands with a pumping rate of 20 - 140 L/s.

2.2 Fire Flows

The operation of the Bob Davey pumping station was maintained constant for all fire flow scenarios, with up to three pumps operating to the maximum firm capacity of 170L/s. The results from the fire flow modelling are provided in Table 2-1 for the following development phases:

1. Summit View Phase 1 & 2

   Proposed
   - 450mm along High Street from Findlay to Street C
   - 150mm throughout Summit View Development
   - Existing Zone Boundary

   Alternative A
   - 400mm extended into Summit View, 150mm throughout Summit View Development
   - 200mm along High Street to Street C
   - Existing Zone Boundary

2. Summit View Phase 3:

   Proposed
   - 450mm along High Street from Findlay to Phase 3
   - 150mm throughout Summit View Development and Phase 3.
   - Existing Zone Boundary

Alternative A
- 400mm extended into Summit View, 150mm throughout Summit View Development
- 200mm along High Street, through Phase 3 to Poplar Sideroad
- Existing Zone Boundary

3. Future West Development

Alternative A
- 200 mm along High Street
- 400mm extended into Summit View
- 200mm along High Street, through Phase 3 to Poplar Sideroad
- 450 mm connection from Poplar Sideroad to Potential West Development
- Modified Zone Boundary

Alternative B
- 200 mm along High Street
- 450mm extended into Summit View
- 200mm along High Street, through Phase 3 to Poplar Sideroad
- 450 mm connection from Poplar Sideroad to Potential West Development
- Modified Zone Boundary

The fire flows results predicted by the model are representative of the amount of water available in a watermain and not the extent of flow available from a hydrant. Several hydrants may need to be operated to provide the desired fire flows. For modelling purposes, it was assumed that fires would not occur at multiple locations simultaneously, and therefore the results demonstrate the available flow at each location when run independently. The available fire flows were determined when three pumps were operating at Bob Davey PS with a total pumping rate near the firm capacity.

The modelling results indicated that the required fire flow of 87.14 L/s calculated by CCTA could not be met with the proposed 150 mm watermains for the Phase 1, 2 and 3 development scenarios (see Table 2.1, Figures 2-1 and 2-2).

Two sizing alternatives were tested in the model to determine the impact of building a 400mm or 450mm extension through the development under the final development scenario (Figure 2-5 and 2-6). Under both alternatives, the available fire flows increased to over 200 L/s in many locations in Summit View, and a higher fire flow of 209 - 215 L/s was available at the location of potential future development. This scenario also incorporated the future zone boundary change that will connect separate areas of Pressure Zone 2 along High Street.

Alternative A was also tested under Phase 1, 2 and 3 to determine the short-term impact of the increased main sizes on the extremities of the development, and the results are shown in Figure 2-3 and 2-4. The 400mm provided improved fire flow at the Dead End on Street I in the initial phases, with a fire flow of approximately 82 L/s. This dead-end location does not meet the Phase 1, 2 & 3 required fire flows, however; the other location all exceed the required fire flow by almost 50 L/s. Although this alternative sizing resulted in higher fire flows, larger watermain sizes may impact residency times and water quality, which was investigated in the following section.

Alternative A provides the continuation of the large 400mm or 450mm watermain in Zone 2. The purpose of the 400mm or 450mm watermain on Poplar Sideroad is to provide a strong loop for the future integration of Zone 2 between the Bob Davey PS and the Stewart Rd PS from Poplar Side Road, along the Tenth Line, to Sixth Street. Both watermain diameters was tested in the model to determine appropriate sizing based on high level master planning information. The model was used to estimate the flow that could be transported between the two parts of Zone 2 under the scenario with developments up to the Built Boundary.

Based on available information, it is possible that the watermain would carry 90 – 150 L/s under various conditions including MDD, ADD, and an emergency such as Stewart Road PS being out of service.

Typical feedermain capacity can be calculated for different pipe sizes based on head loss criteria, C-factors and other hydraulic parameters. At a head loss of 2.0m/km and C-factor of 130, the approximate capacity of watermains are shown in Table 2.1. Based on the expected flows in the Future Built Boundary Scenario and the feedermain capacity below, it is recommended that the watermain on Poplar Sideroad be 450mm in diameter to avoid head losses above 2.0m/km.

Table 2.1 Feedermain Capacity

Pipe Diameter (mm)	Capacity (L/s)
150	18
200	33
300	53
400	113
450	155
500	204
600	329

Table 2.1 Fire Flow Model Results MDD Scenario

Description		Pressures (psi)		Fire Flows (L/s)			
		All scenarios		Phase 1 & 2	Phase 3	Potential West Development	
Location	Node ID	Min (psi)	Max (psi)	Proposed Design (150mm)		Alternative A (400 mm)	Alternative B (450mm)
Street B	6900	73	76	146	159	170	170
Street I (Dead End)	6912	56	62	61	69	133	134
Street C	6913	70	73	172	209	205	205
Street A	6947	66	70	88	162	225	227
Phase 3	6924	70	73	-	202	211	212
Potential Development	6914	52	61	-	-	210	215

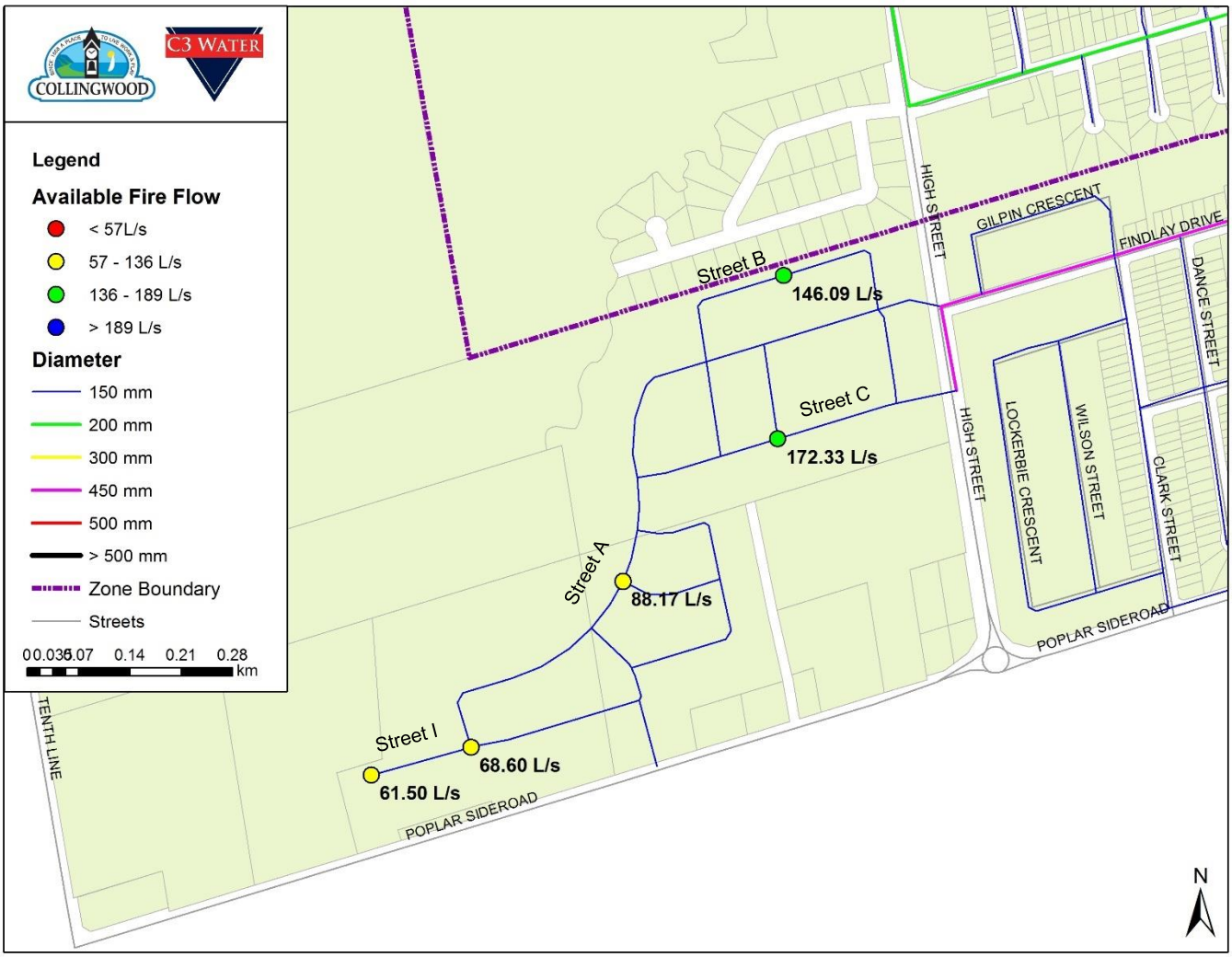


Figure 2-1 Available Fire Flows – Phase 1 & 2 Proposed (150 mm)

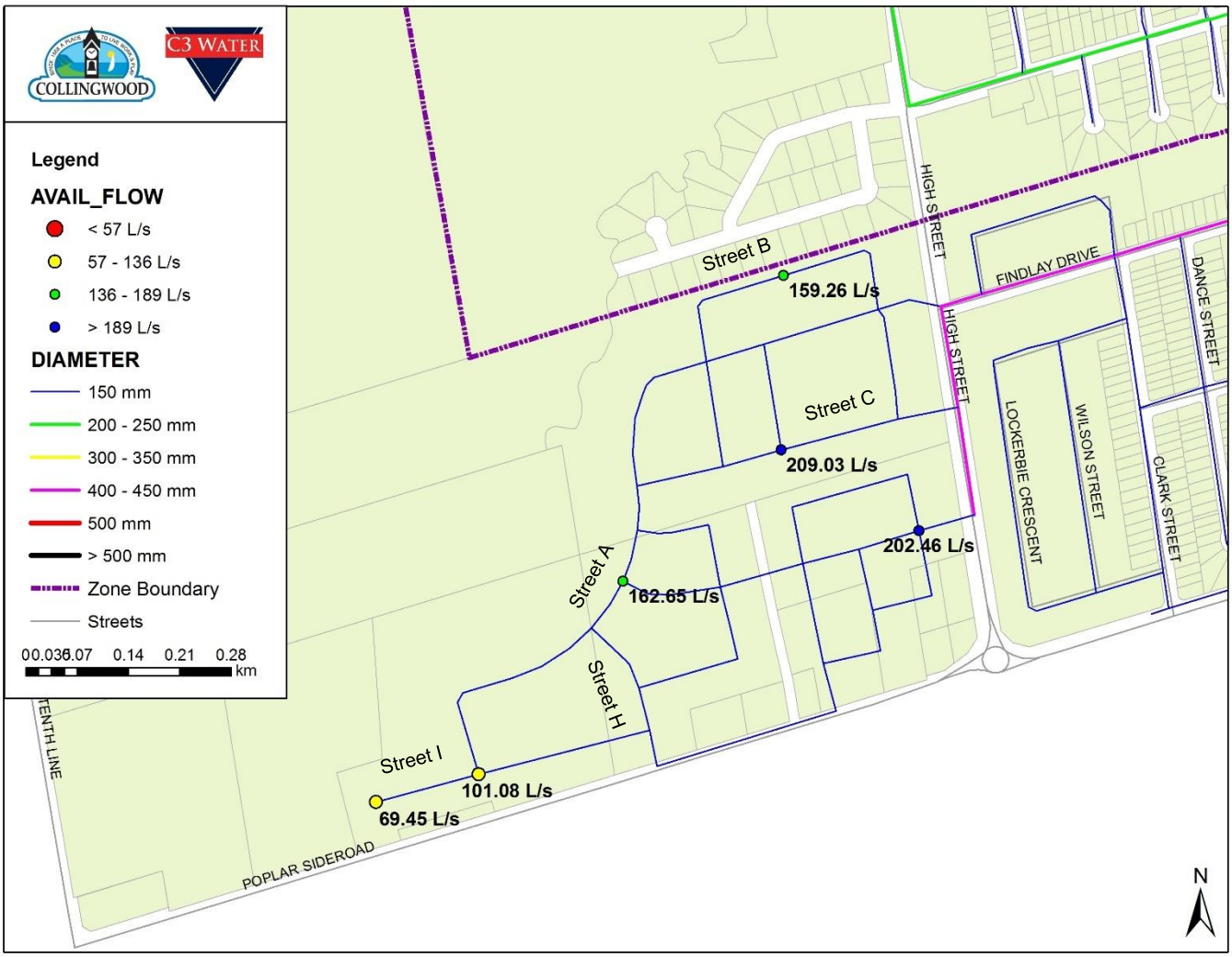


Figure 2-2 Available Fire Flows – Phase 3 Proposed (150 mm)

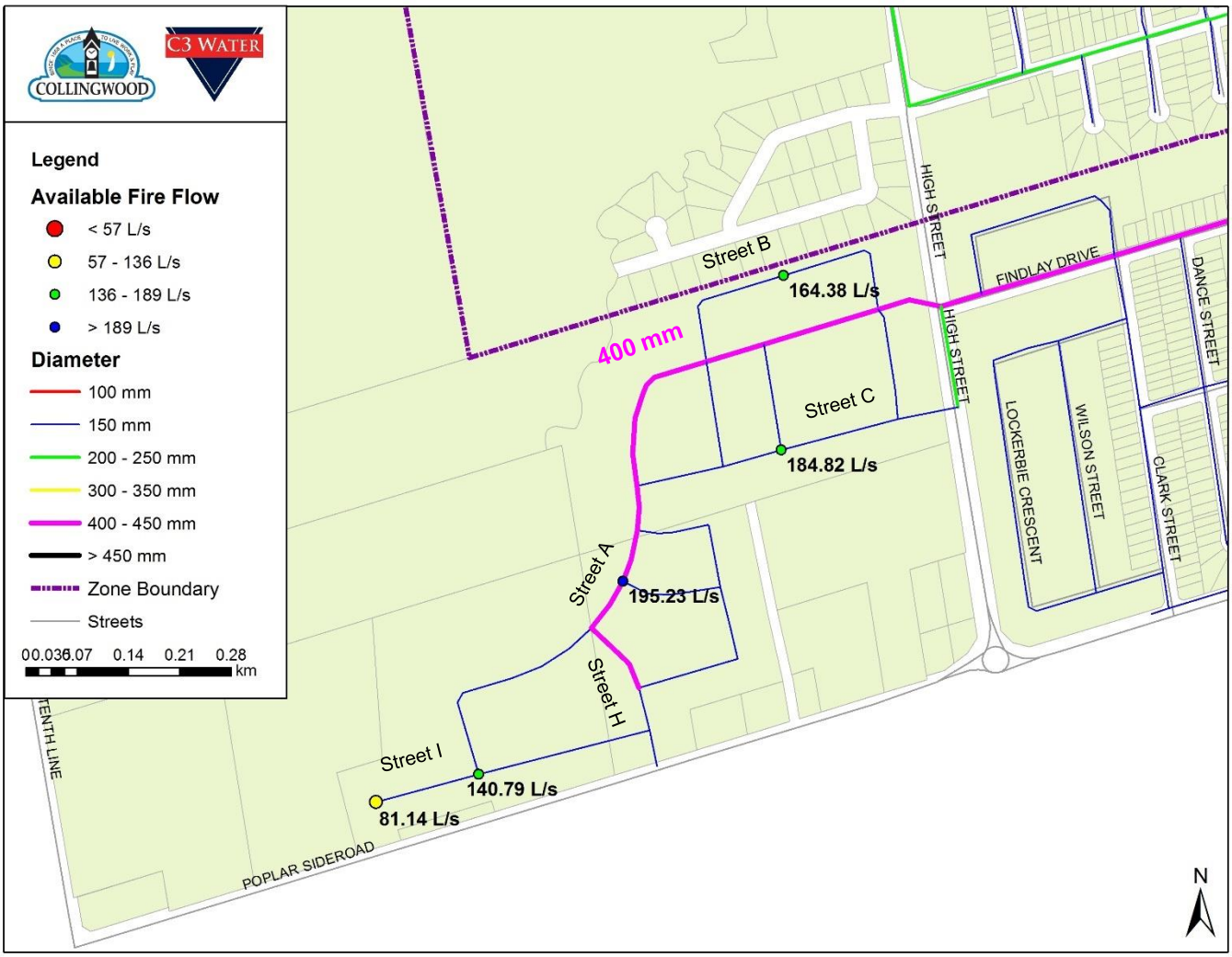


Figure 2-3 Available Fire Flows – Phase 1 & 2 Alternative A (400 mm)

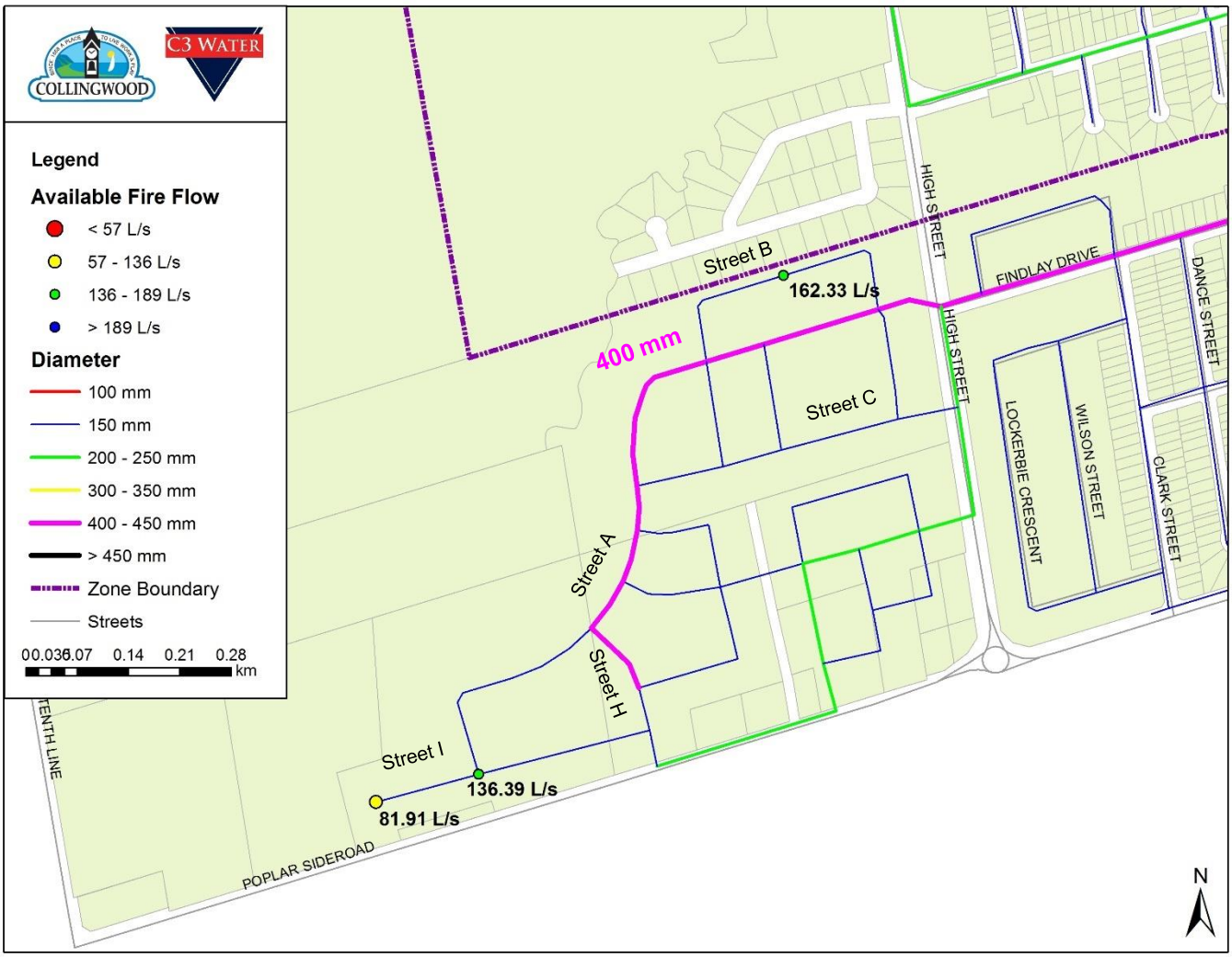


Figure 2-4 Available Fire Flows – Phase 3 Alternative A (400mm)

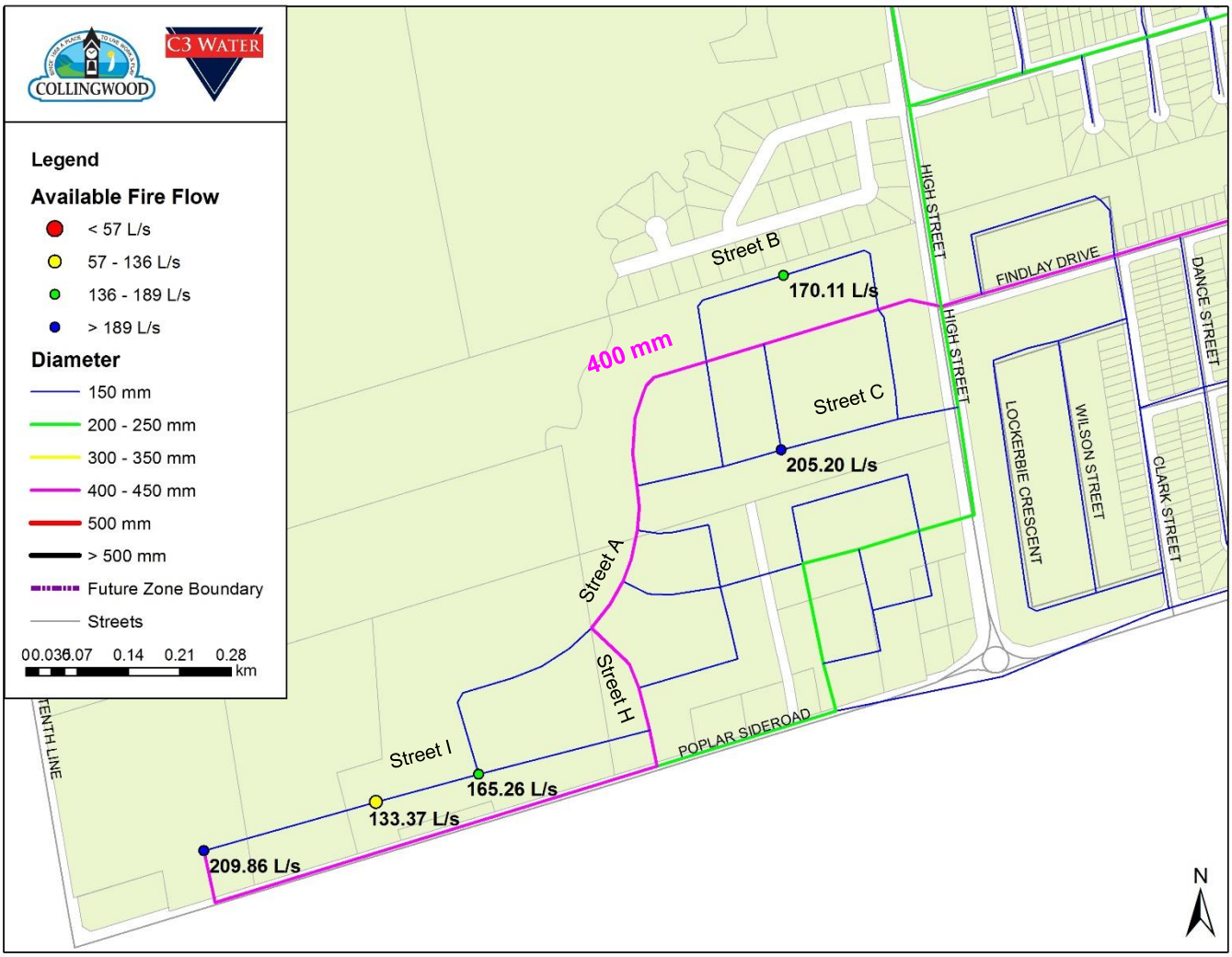


Figure 2-5 Available Fire Flows – Alternative A (400 mm)

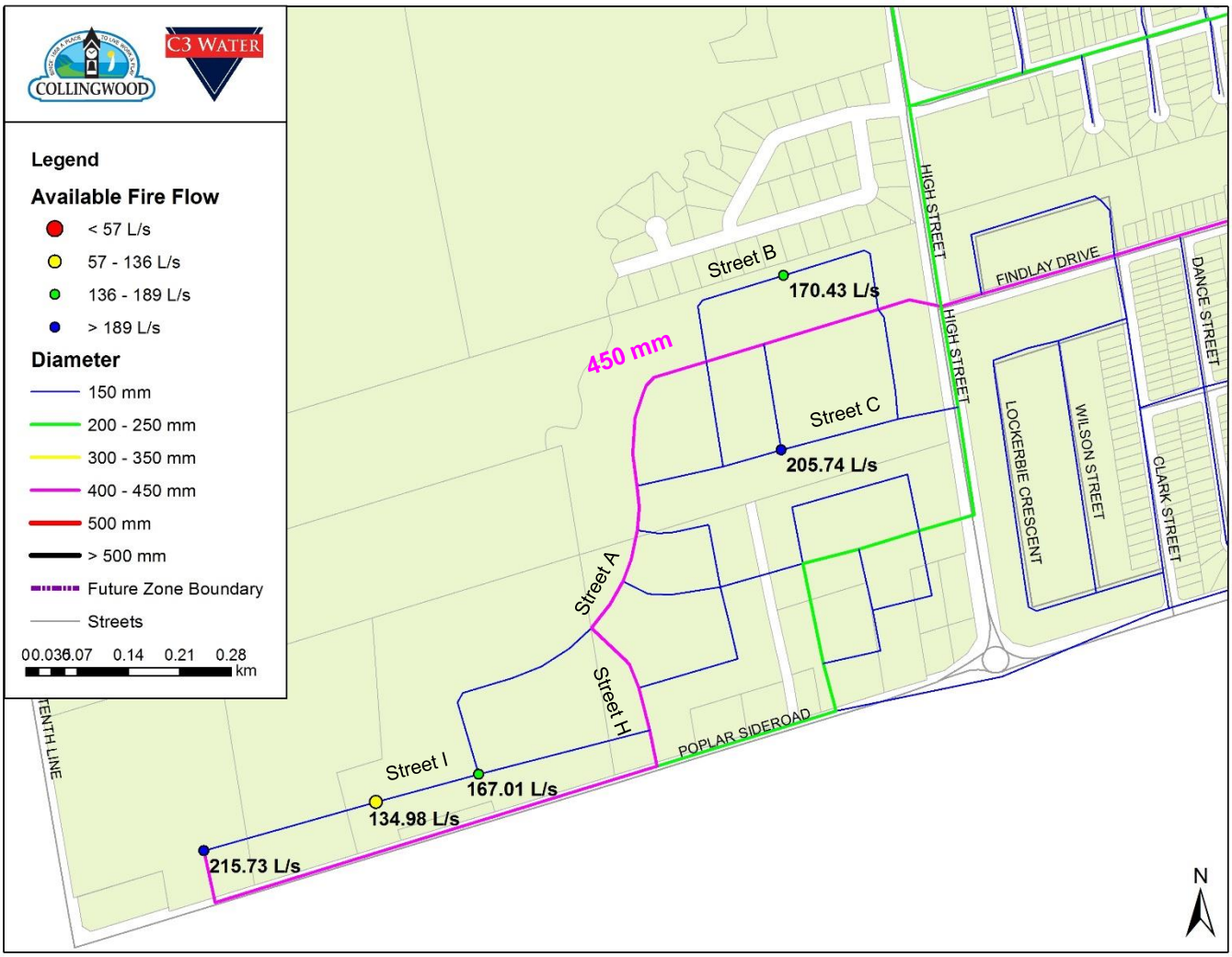


Figure 2-6 Available Fire Flows – Alternative B (450 mm)

2.3 Water Age

Using the hydraulic model, it was possible to approximate the residency times of water in the distribution system based on water age over an extended period simulation. Since the intitial water age in the model is "zero", the simulation was run for 8 days to allow the results to stabilize. Water age is calculated from the surface water source at the Water Treatment Plant, and does not consider that water is refreshed with chlorine at pressure boosting stations. High water age results are therefore not a direct indication of low chlorine residuals but provide an approximation of residency times. It should also be noted that the decay of chlorine residual does not occur linearly over time and may accelerate at low residuals.

The average water age from the last 24 hours of the 8 day simulation were recorded for the different sizing options and are provided in Table 2.2. The relative water age at the Bob Davey Discharge and Findlay Drive are provided for comparison. A 400mm and 450mm diameter pipe were tested on Street A in the initial Phase 1 & 2 development. The model results showed that the alternate sizing options had little impact on the water age at the extremities of the development. The smaller size improved average water age by less than approximatley 3 hrs at both locations on Street I and H.

Table 2.2 Water Age Model Results

Location	Node ID	450 mm	400 mm
Bob Davey Discharge	2074	42.5	
Findlay Dr. & High St.	2429-B	60.36	
Street H & Street I	6936	75.17	72.75
Street I (Dead End)	6912	79.75	77.61

3.0 MODEL FINDINGS

1. Pressures in this development will be controlled by the Bob Davey Pumping Station to maintain a Zone 2 HGL of 250mASL under standard operating conditions. The watermain sizing has minimal impact on available water pressure, which are more dependent on ground elevation and looped connections. Under all alternatives, the pressures were found to meet Town guidelines.
2. The required fire flow of 87.14 L/s cannot be achieved at all locations in the Summit View development with the proposed 150mm watermain design for Phase 1 & 2. The sizing recommended in Alternative A provided increased fire flow to 81 L/s at the dead end on Street I, and over 140 L/s at all other locations.
3. The required fire flow of 92.85 L/s cannot be achieved at all locations in the Summit View development with the proposed 150mm watermain design for Phase 3. The sizing recommended in Alternative A provided increased fire flow to 82 L/s at the dead end on Street I, and over 136 L/s at all other locations.
4. The required fire flow of 107.85 L/s can be met at all locations under Alternative A with the extension of a 400mm and 200 mm watermains to service Summit View and potential development to the West.
5. Alternative A extends the 400mm into the Summit View development, increasing available fire flows during the initial phases before looped connections are installed along High Street and Poplar Sideroad. This option also avoids dead ending a large diameter watermain and potential water quality issues, while providing a strong connection for potential future development to the West.
6. The results of the water age analysis showed that increasing the watermain to 450mm had minimal impact on water age. Increasing the small section on Street H from a 150mm to 200mm also had minimal impact on water age.
7. The results of the future built boundary scenario indicated that a 450mm watermain is recommended on Poplar Sideroad.
8. The recommended sizing of all watermains is shown in Figure 3.1 below.

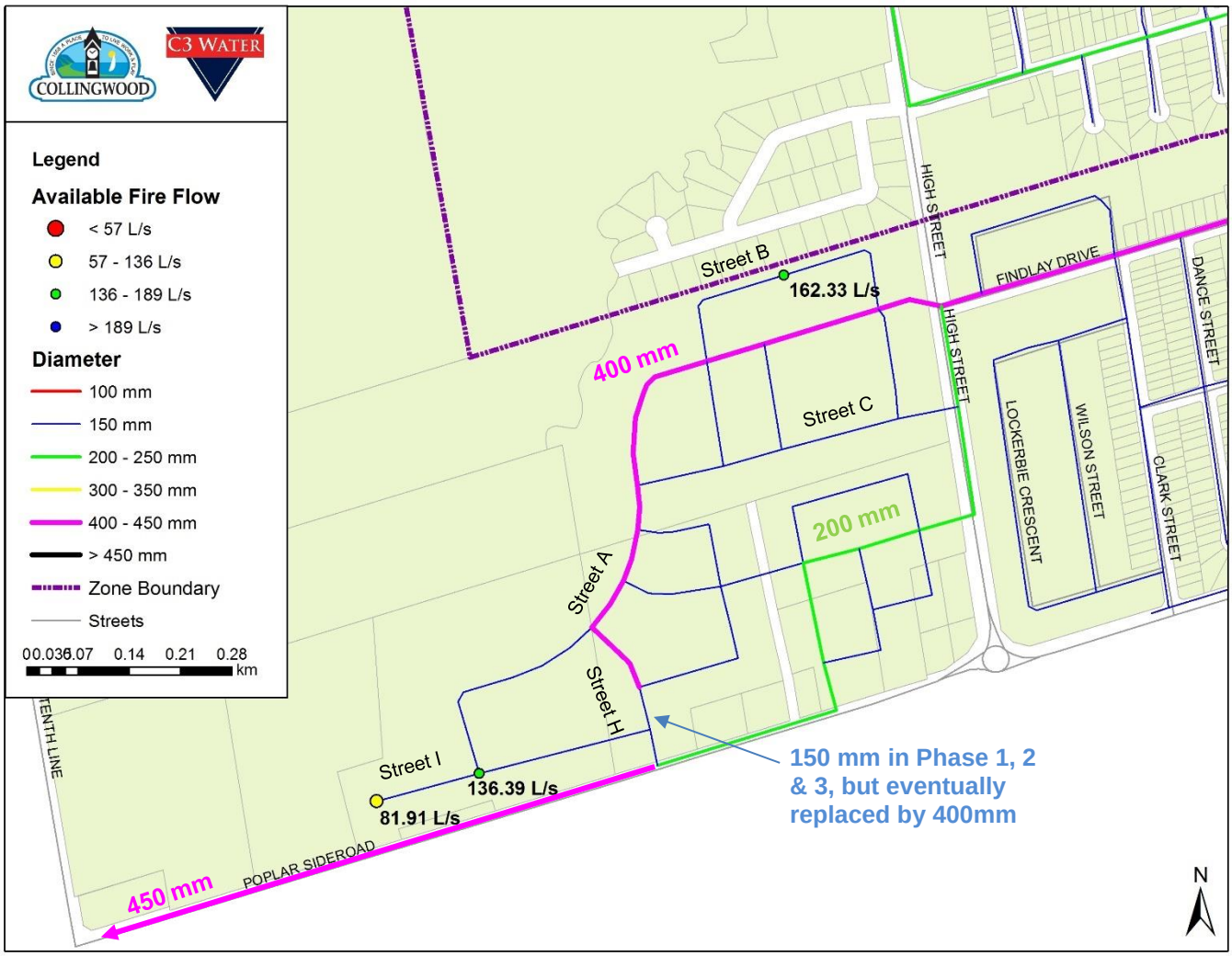
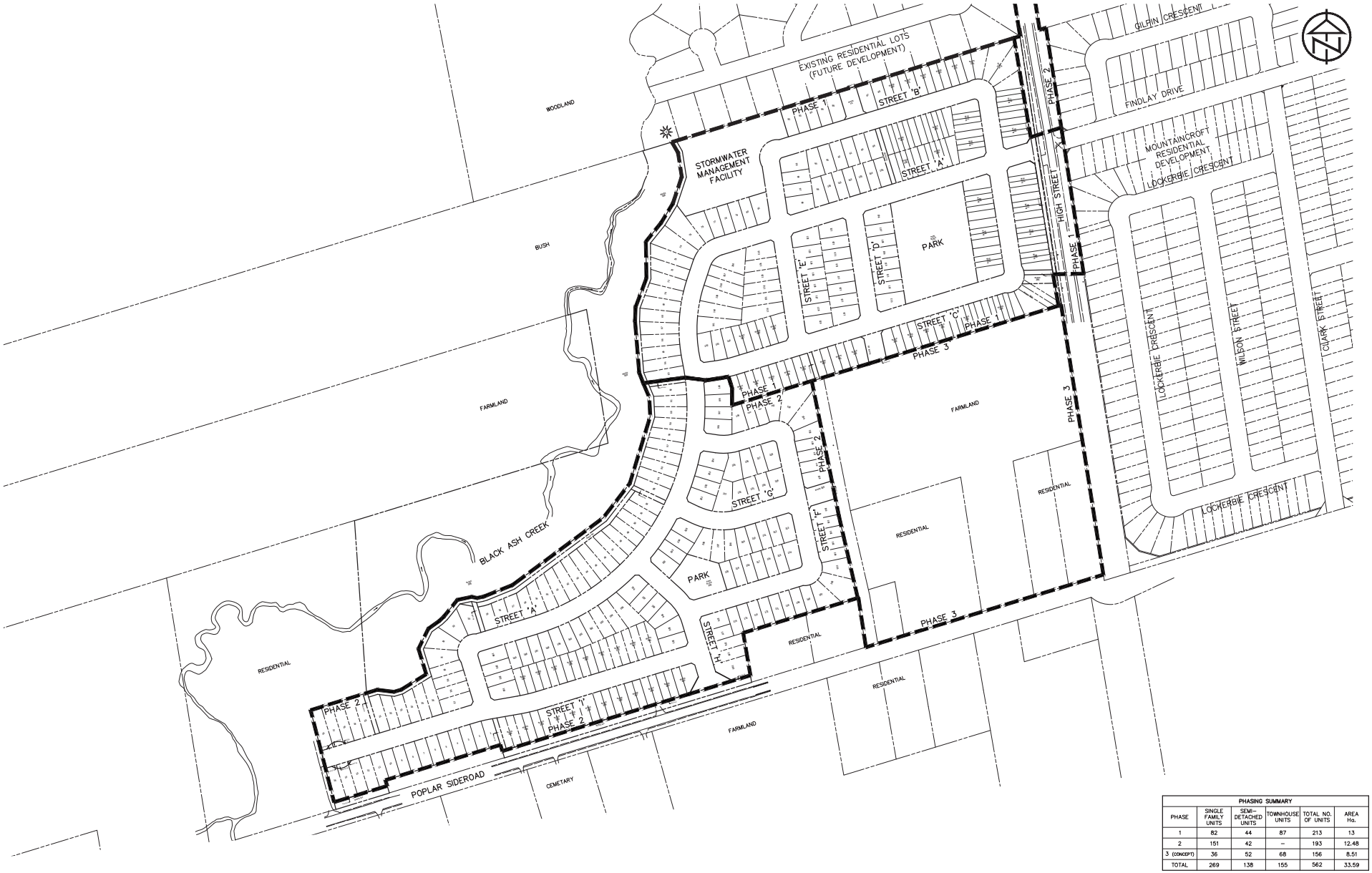


Figure 3-1 Recommended Watermain Sizing

APPENDIX A - *Site Layout*



PHASING SUMMARY					
PHASE	SINGLE FAMILY UNITS	SEMI-DETACHED UNITS	TOWNHOUSE UNITS	TOTAL NO. OF UNITS	AREA Ha.
1	82	44	87	213	13
2	151	42	–	193	12.48
3 (CONCEPT)	36	52	68	156	8.51
TOTAL	269	138	155	562	33.59

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

DRAWING REFERENCES

LEGAL SURVEY INFORMATION SHOWN ON THIS PLAN PREPARED BY VAN HARTEN SURVEY INC., PLAN 51R-35424, DATED JULY 7, 2017.

TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN BASED ON FIELD SURVEY COMPLETED BY C.C. TATHAM & ASSOCIATES LTD. ON SEPTEMBER 8, 2015.

SERVICING AND GRADING INFORMATION SHOWN FOR GRANDVIEW/MOUNTAINCROFT SUBDIVISION BASED ON ACCEPTED FOR CONSTRUCTION DRAWINGS PREPARED BY C.C. TATHAM & ASSOCIATES LTD., DATED APRIL 4, 2016.

BENCHMARKS

TBM#1 ELEV. 200.704 m
NAIL & WASHER IN HYDRO POLE ON EAST SIDE OF HIGH STREET, 6TH HYDRO POLE NORTH OF POPLAR SIDEROAD ROUNDABOUT.

TBM#2 ELEV. 199.103 m
NAIL & WASHER IN HYDRO POLE ON EAST SIDE OF HIGH STREET, 11TH HYDRO POLE NORTH OF POPLAR SIDEROAD ROUNDABOUT.

NO.	REVISIONS	DATE	INITIAL
2.	SECOND ENGINEERING SUBMISSION	APR. 12/18	JRA
1.	FIRST ENGINEERING SUBMISSION	OCT. 30/17	JRA

APPROVED

LICENSED PROFESSIONAL ENGINEER J. R. AKITT 100102093 PROVINCE OF ONTARIO

SUMMIT VIEW RESIDENTIAL DEVELOPMENT TOWN OF COLLINGWOOD

PHASING PLAN

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie Ottawa

SCALE: 1:2,000 | JOB NO. 114056
DESIGN: LC | CHECKED: JRA
DRAWN: LC | DATE: SEPT. 2017
DWG. **PH-1**

APPENDIX B – *Demand and Fire Flow Calculations*

re: Updated Phasing Plan Sept. 2017

C.C. Tatham & Associates Ltd. Consulting Engineers (Collingwood Bracebridge Orillia Barrie Ottawa)	Project:	Charleston Homes - Residential Development	Date: 04-Nov-15
	File No.:	114056	Designed: CFM
	Subject:	Water Distribution Calculations	Checked JRA

WATER SUPPLY

1.1 Single Family Units

Single Lots (Units) =	~~281~~ 233					(Per Draft Plan)
Population per Unit =	2.43					(Per County of Simcoe's Land Budget for Town of Collingwood)
Population =	~~281~~ 233	x	2.43	=	~~683~~ 566	
Average daily per capita flow =	450	L/cap/day				(Per Town of Collingwood Development Standards, July 2007)
Average Daily Flow =	~~683~~ 566	x	450	/1000		
=	~~307.4~~	m³/day	255 m³/d			
=	~~3.56~~	L/s	2.95 L/s			

1.2 Townhouse Units

Townhouse Lots (Units) =	~~86~~ 87					(Per Draft Plan)
Population per Unit =	2.18					(Per County of Simcoe's Land Budget for Town of Collingwood)
Population =	86	x	2.18	=	~~188~~ 190	
Average daily per capita flow =	450	L/cap/day				
Average Daily Flow =	190 ~~188~~	x	450	/1000		
=	84.6	m³/day	85.3 m³/d			
=	0.98	L/s	0.99 L/s			

1.3 Total Residential Design Flows

Total Average Daily Flow = Single Family + Townhouse + Semi-detached

= 3.56 + 0.98 + 1.03

= ~~4.54~~ 5.57 L/s (392.3 m³/day)

Design Factors

Residential Population =	871	
Residential Max. Day Factor =	2.00	(Per Town of Collingwood Development Standards, July 2007)
Residential Peak Hour Factor =	4.50	

Design Flows

Max. Daily Flow =	5.57 ~~4.54~~	x	2.00		
=	~~9.08~~ 11.14	L/s	(784.5 m³/day)		
Peak Hour Flow =	~~4.54~~	x	4.50		
=	~~20.43~~	L/s	25.1 L/s		
Fire Flow =	57.00	L/s			(Per Town of Collingwood Development Standards, July 2007)
Max. Day plus Fire =	11.14 ~~9.08~~	+	57.0		
=	~~66.08~~ 68.14 L/s	L/s	(5,709 m³/day)		

Semi - detached

Units = 86

Pop / unit = 2.3

Pop = 198

Avg. flow = 450 L/cap/d

Avg. Daily flow = 198 x 450 / 1000

= 89.1 m³/d

= 1.03 L/s

Phase 3 (Concept)

Population = Single family + Semi + Townhouse

= (36 x 2.43) + (52 x 2.3) + (156 x 2.18)

= 548

ADD = 548 x 450 L/cap/d / 1000

= 246.6 m³/d

= 2.85 L/s

MDD = 5.71 L/s