

Town of Collingwood

DRAFT MASTER PLAN

Collingwood Water and Sanitary Sewer Systems

APPENDICES



COLE

COLE ENGINEERING GROUP LTD.

HEAD OFFICE

70 Valleywood Drive, Markham, ON Canada L3R 4T5

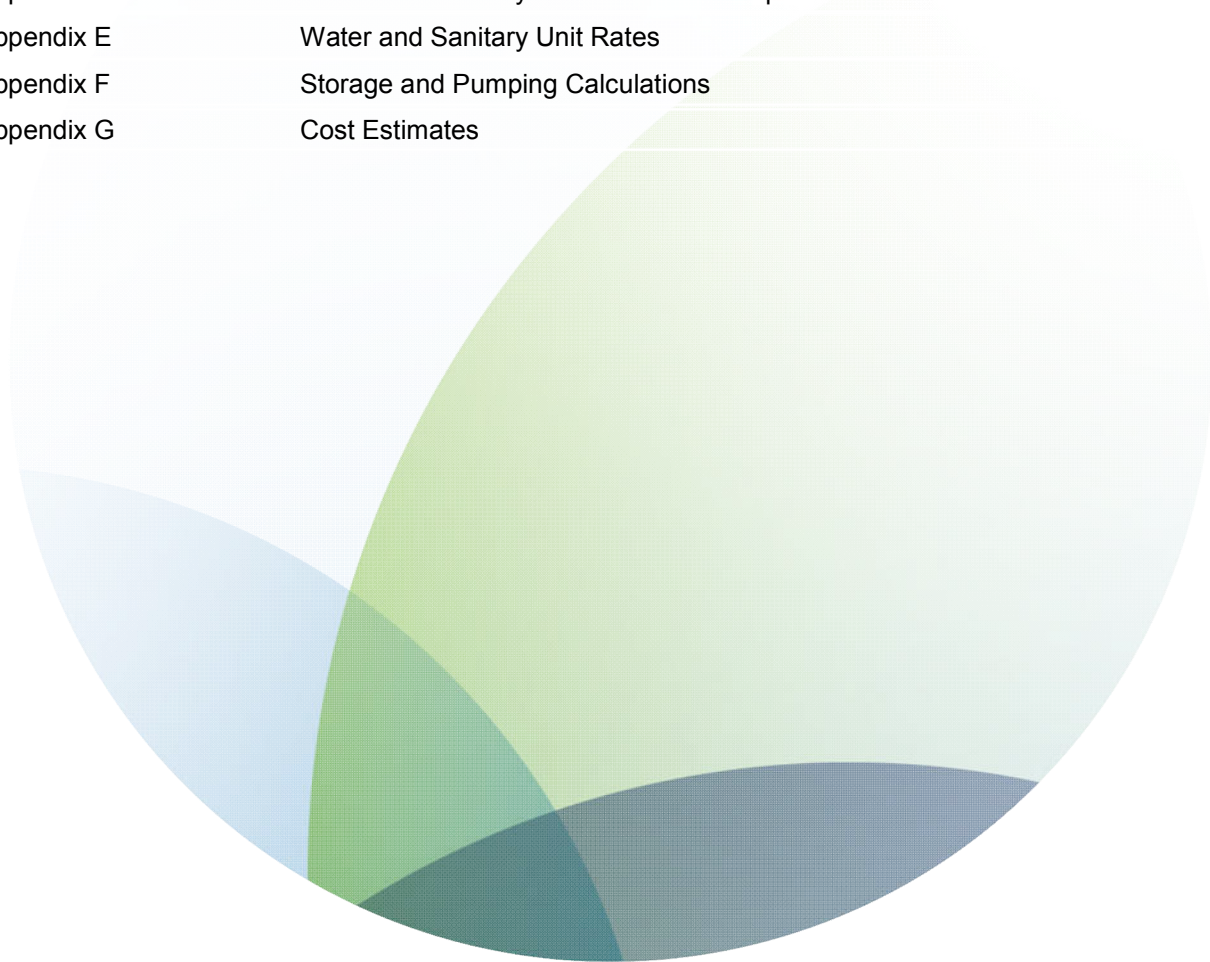
T. 905 940 6161 | 416 987 6161 F. 905 940 2064

www.coleengineering.ca

SEPTEMBER 2019

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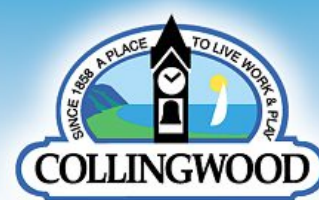


APPENDIX A

Public Consultation Material



Town of Collingwood Weekly Town Page



Friday, November 3, 2017

Notice of Study Commencement

Town of Collingwood Water and Sanitary Sewer System Master Servicing Plan

THE STUDY

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town, through their consultants, Cole Engineering and C3 Water, has started the process to develop a comprehensive and flexible Master Servicing Plan that identifies the water and wastewater infrastructure projects required to service growth to the year 2031 and beyond.

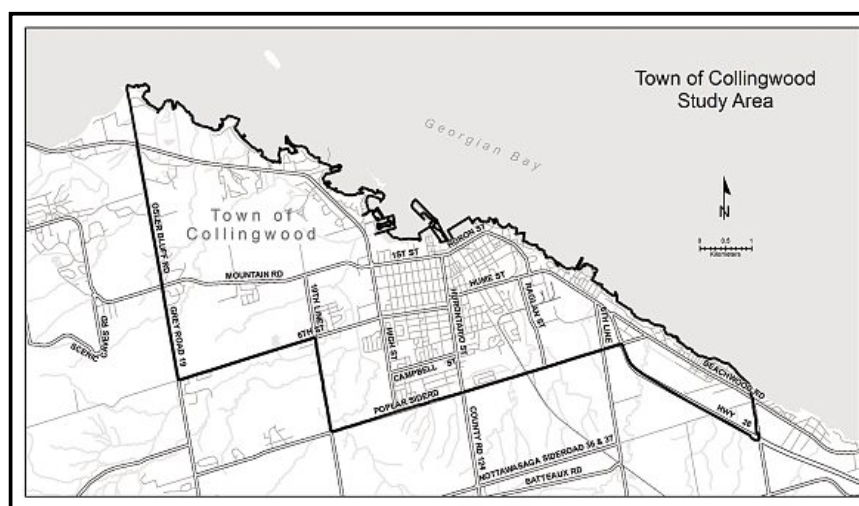
The Master Servicing Plan will be flexible and innovative with servicing strategies that can be scalable to fit future needs. To support the Plan, the project team will develop:

- Predictive modelling tools,
- An Inflow and Infiltration Reduction Program,
- Recommendations updates to the Official Plan, and,
- Recommendations for updates to the 2014 Development Charges Study.

THE PROCESS

The study will follow what's known as Approach 1 of the Municipal Engineers Association Class Environmental Assessment process for Master Plans, which involves broad assessment of the problem/opportunity, identification and evaluation of alternative solutions and selection of the preferred approach. Small projects (known as Schedule A and A+ projects) may proceed after the Plan is approved, while larger projects (known as Schedule B and C projects) will require additional site specific analysis in the future.

Public involvement is important to achieving a good outcome. During this process, public input is welcome from initiation to conclusion. An advertised Public Meeting will be held after some preliminary work has been done. If you have questions or concerns in advance of or following the meeting, please get in touch with the project team at any time.



COMMENTS AND QUESTIONS

Christine Hill, M. Eng., Project Manager
Cole Engineering Group Ltd.
2620 Bristol Circle, Suite 300,
Oakville, ON L6H 6Z7
Tel: 877 825-9870
Fax: 905.829.8890
chill@coleengineering.ca

John Velick, P.Eng.
Manager, Engineering Services
Town of Collingwood
PO Box 157
545 Tenth Line Road
Collingwood, ON L9Y 3Z5
Tel: 705-445-1292 Ext. 4209
jvelick@collingwood.ca

This Notice issued: November 3, 2017

Notices

NOTICE OF PUBLIC MEETING AND COMPLETE APPLICATION CONCERNING A PROPOSED OFFICIAL PLAN AND ZONING BY-LAW AMENDMENT

TAKE NOTICE that the Council of the Corporation of the Town of Collingwood will hold a public meeting on **Monday November 27th, 2017 at 5:00 p.m.** in the Council Chambers, 97 Hurontario Street, Collingwood, to consider a proposed Official Plan Amendment and Zoning By-law Amendment under Sections 17, 22 and 34 of the Planning Act, R.S.O. 1990, c. P. 13, as amended. This application is deemed to be a complete submission under Sections 22(6.1) and 34(10.4) of the Planning Act.

The proposed Official Plan Amendment and Zoning By-law Amendment have been submitted for the Shipyards "Condominium E" and "Side Launch 2" lands. These lands are legally described as Part of Block 4, Plan 51M-926, Town of Collingwood, County of Simcoe. The "Condominium E" lands are located at the northeast corner of Side Launch Way and North Pine Street. The "Side Launch 2" lands are located on the north side of Side Launch Way abutting the Town's Promenade.

THE PURPOSE AND EFFECT of the proposed Official Plan Amendment and Zoning By-law Amendment are: 1) to re-designate the south portions of both the Shipyards "Condominium E" and the "Side Launch 2" lands; and 2) to rezone the whole of the "Side Launch 2" lands.

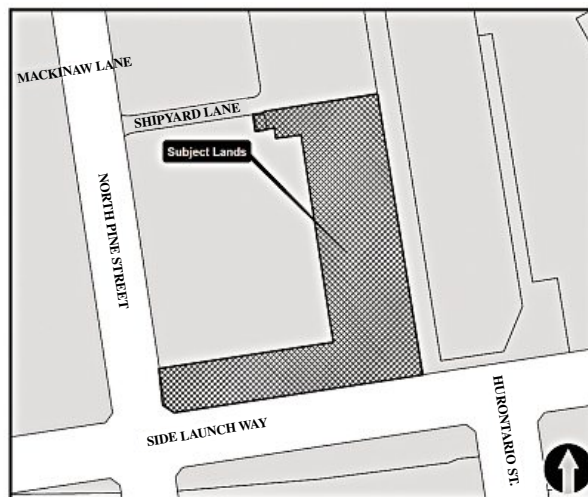
The proposed Official Plan Amendment would delete the Shipyards Live/Work Residential policies in their entirety from the Town's Official Plan. It will also re-designate the south portion of the "Condominium E" lands from Live/Work Residential to Medium Density Residential, and the south portion of the "Side Launch 2" lands from Commercial to Medium Density Residential.

The proposed Zoning By-law Amendment would rezone the "Side Launch 2" lands from the Downtown Core Commercial Exception Five (C1-5) zone and Residential Third Density Exception Twenty-five (R3-25) zone to a Residential Third Density Exception (R3-E) zone. This R3-E zone will have site-specific zone provisions so that the "Side Launch 2" lands may be developed for eleven (11) townhouse dwellings.

ANY PERSON may attend the public meeting and/or make written or verbal representation either in support of or in opposition to the proposed Official Plan Amendment and Zoning By-law Amendment.

If a person or public body does not make oral submissions at a public meeting or make written submissions to the Town of Collingwood before the proposed Official Plan Amendment is adopted, the person or public body is not entitled to appeal the decision of the Council of the Town of Collingwood to the Ontario Municipal Board.

If a person or public body does not make oral submissions at a public meeting or make written submissions to the Town of Collingwood before the proposed Official Plan Amendment is adopted, the person or public body may not be added as a party to the hearing of an appeal before the Ontario Municipal Board unless, in the opinion of the Board, there are reasonable grounds to add the person or public body as a party.



If you wish to be notified of the decision of the County of Simcoe on the proposed Official Plan Amendment you must make a written request to Mr. John Daly, Clerk, County of Simcoe, 1110 Highway 26, Administration Centre, Midhurst, Ontario L9X 1N6.

If a person or public body does not make oral submissions at a public meeting or make written submissions to the Town of Collingwood before the Zoning By-law Amendment is passed, the person or public body is not entitled to

appeal the decision of the Council for the Town of Collingwood to the Ontario Municipal Board.

If a person or a public body does not make oral submissions at a public meeting or make written submissions to the Town of Collingwood before the by-law is passed, the person or public body may not be added as a party to the hearing of an appeal before the Ontario Municipal Board unless, in the opinion of the Board, there are reasonable grounds to do so.

If you wish to be notified of the decision of the Council of the Town of Collingwood on the proposed zoning by-law you must make a written request to Ms. Sara Almas, Clerk, Town of Collingwood, P.O. Box 157, 97 Hurontario Street, Collingwood, Ontario L9Y 3Z5.

ADDITIONAL INFORMATION about this matter, including a draft of the Official Plan Amendment or information about preserving your appeal rights, please contact Planning Services, 55 Ste. Marie Street, Collingwood, Monday to Friday between the hours of 8:30 a.m. and 4:30 p.m. at telephone number (705) 445-1290.

DATED at the Town of Collingwood this 3rd day of November, 2017.

(signed)

Sara Almas, Clerk

Town File No. D084217

Notice Sale of Surplus Items and Equipment

The Town of Collingwood is providing notice regarding the

Sale of Surplus Items and Equipment

These items include:

- 2004 Chevrolet Express 2500 AWD Cargo Van, 5.3L V8
- 2005 Ford F-150 FX4 4WD Regular Cab Pickup 2-DR, 4.6L V8
- 2005 Chevrolet Silverado 1500 Ext. Cab Short Bed 4WD
- No-Till Disc Seeder BLEC DS-1400 (56" Width)
- 1998 JDJ Tandem Axel Dump Trailer
- 1 lot of mismatched office furniture in various states of repair

More information on these items may be found by visiting www.govdeals.ca/collingwood

These items are sold "as is" "where is" and the suitability for the intended purpose may not be guaranteed.

For more information on this process contact:

Dave McNalty
Fleet and Facility Manager
(705) 445-1292 ext. 4208
dmcnalty@collingwood.ca

Temporary Road Closure

November 11th from 9:00 a.m. to 12:00 p.m. St. Paul Street from Ontario Street to Huron Street will be closed for **Remembrance Day parade and ceremony.**

For information on the Remembrance Day Parade and ceremony please call the Legion at 705-445-3780.

Watch for your battery bag in the mail



Battery Collection Week
Nov. 6 to 10, 2017 ONLY



Please include:

- Dry cell batteries and button batteries
- Single-use AA, AAA, C, D and 9-Volt batteries

Place acceptable batteries inside the bag and seal. Then walk your dead batteries to the curb, place bag **BESIDE** your recycling bin on your regular collection day during the week of **NOVEMBER 6, 2017.**

Paid for by the battery Stewards of Ontario.
Does not apply to residents of Orillia.

705-739-4219 | BARRIE.CA
705-735-6901 | SIMCOE.CA



97 Hurontario Street,
Collingwood
705-445-1030

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Town of Collingwood Weekly Town Page



Friday, November 10, 2017

Collingwood Downtown

CHRISTMAS

Starts In
COLLINGWOOD
November 18



Santa Claus Parade
NORTH ALONG HURONTARIO ST FROM HUME TO FIRST ST. AT 5PM



Christmas Magic on Simcoe Street
SIMCOE ST, BETWEEN TREMONT AND COLLINGWOOD LIBRARY
FROM 10AM - 5PM



HO HO Holiday Run 5km
2ND & PINE STREET PARKING LOT AT 10AM



'Nutmeg' Dancers bring Storefronts to life
AT PARTICIPATING STORES FROM 3PM - 5PM



Tree Lighting & Fireworks
STARTS AFTER THE PARADE AT THE FEDERAL BUILDING,
JUST SOUTH OF LOBLAW



Visit with Santa's Reindeer-In-Training!
BESIDE TOWNHALL

❄️ You can also visit Santa & his reindeer beside Town Hall every Saturday from 12:30p.m. to 3:30p.m. until December 23rd

www.CollingwoodDowntown.com




Please be advised due to the Santa Claus Parade November 18th, there will be road closures affecting Hurontario Street between 1st and Hume Street, Hume Street between Hurontario and Ste. Marie Street, Ste. Marie Street from 1st Street to Hume Street. The parade begins at 5:00 p.m. however some barricades will be in place from 3:00 p.m. to approximately 7:00 p.m.

Heritage Collingwood

ACO Collingwood and ACO Meaford present a heritage speaker series

OUR ARCHITECTURE: Shaping Lives for 150 Years



How to Build a Successful Heritage District, Challenges, Rewards and Looking Forward

Ron Martin, Heritage Consultant

Kandas Bondrachuk, Resource to the Heritage Committee

Learn about one of Ontario's largest and most successful heritage conservation districts. It's background, how it works and where the heritage conservation movement is going.

Tuesday, November 14, 2017, 7 pm at Simcoe Street Theatre

Tickets \$10 at the box office, at the door or call 705-446-8087 to reserve



Annette Snowden
& Douglas Bean



"We shape our buildings; thereafter they shape us." W.S. Churchill

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Town of Collingwood Water and Sanitary Sewer System Master Servicing Plan

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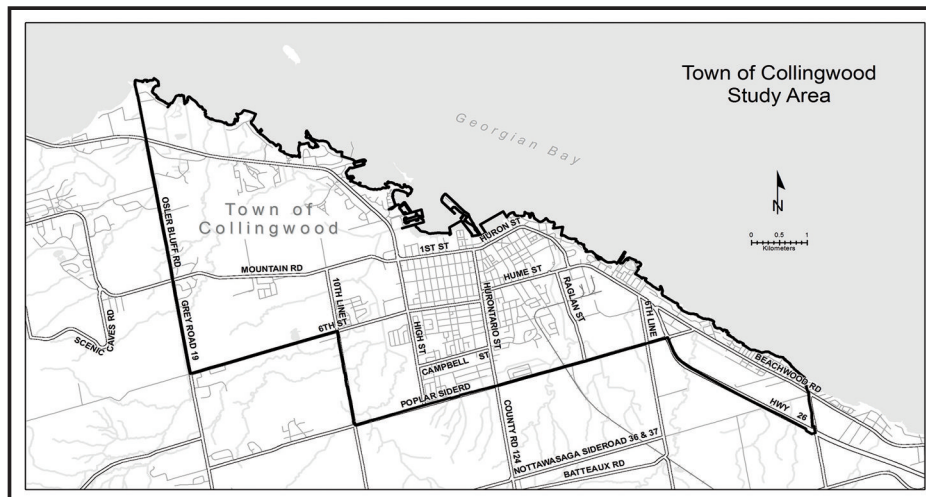
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dmcnalty@collingwood.ca

Bid Opportunities

- FIN2017-056PQ, Prequalification of General Contractors for Sewage Pumping Stations Construction Upgrades, closing November 24, 2017

Town of Collingwood competitive bid opportunities can be found at www.Bidding.com/Collingwood (a fee may apply). Documents can also be picked up in person from the Tax Department, 97 Hurontario Street during business hours Monday to Friday 8:30 a.m. to 4:30 p.m.

Fall Bi-Weekly Yard Waste Collection

Place your materials at curbside by 7 a.m. on Monday of your collection week. To determine your yard waste collection week visit simcoe.ca/wastereminder or consult the waste management calendar. **Collection may not coincide with your garbage day.**

Utilize paper yard waste bags, cardboard boxes, compostable bags or open-ended rigid containers.



2 m (6.5 ft)
12 cm (5 in) x 30 cm (12 in)
Bundle Securely

County of Simcoe Customer Service
1-800-263-3199

Grant Program for Heritage Properties



The Town of Collingwood Council and the Heritage Advisory Committee are pleased to announce a Heritage Grant Program for 2018.

Eligibility criteria and application process are outlined in the Collingwood Heritage Advisory Committee Grant Guidelines. Grant Guidelines and application forms are available from the Town of Collingwood, Building Services, 55 Ste. Marie St., Unit 301 (3rd Floor), Collingwood or at <http://www.heritagecollingwood.com>

Applications will be accepted at Town of Collingwood Building Services, 55 Ste. Marie St., Unit 301 (Third Floor) Collingwood, ON L9Y 0W6 beginning October 2, 2017 until December 15, 2017 at 4:00 p.m.



Town of Collingwood Weekly Town Page



Thursday, December 19, 2019

Notice

NOTICE OF COMPLETION OF MASTER SERVICING PLAN

Town of Collingwood Water and Sanitary Sewer System Master Servicing Plan

The Town of Collingwood has completed a Water and Sanitary Sewer System Master Plan to develop a comprehensive and flexible Master Servicing Plan that identifies the water and sanitary infrastructure projects necessary to service growth to the year 2031 and beyond.

The study followed the Municipal Engineers Association (MEA) Class Environmental Assessment process Approach #1, as identified in the MEA Class EA (October 2000, as amended October 2007, 2011 and 2015) document. The Master Servicing Plan carried out the requirements for Schedule A, A+ and B projects, and set the stage for future Schedule C projects. The study defined existing problems and opportunities, considered and evaluated alternative solutions and ultimately identified the preferred water and sanitary servicing requirements.

Preferred Servicing Alternatives

WATER		
Treatment	– Expansion of the R. A. Baker Water Treatment Plant	Schedule C
Storage Facilities	– Zone 1 Elevated Storage Tank – Stewart Road Reservoir Phase 2 and Phase 3 Upgrades	Schedule B Schedule A
Pumping Stations	– Carmichael Booster Pumping Station Upgrade – Georgian Meadows Booster Pumping Station Decommissioning – Stewart Road Booster Pumping Station Upgrades	Schedule B Schedule A Schedule A
Watermains	– Trunk and Local Watermain Improvements and System Valves	Schedule A
SANITARY		
Treatment	– Expansion of Collingwood Wastewater Treatment Plant	Schedule C
Pumping Stations	– New Black Ash Pumping Station forcemain	Schedule A+
Sanitary Sewers	– Trunk and local sewer improvements and replacements	Schedule A+

Public Review Period

The Master Servicing Plan is available for review on the Town of Collingwood's website at www.collingwood.ca and at the following location:

Town of Collingwood Public Library
55 Ste. Marie Street, Collingwood, ON
Monday to Thursday: 10:00 am to 9:00 pm • Friday: 10:00 am to 8:00 pm
Saturday: 10:00 am to 5:00 pm • Sunday: 1:00 pm to 4:00 pm

Interested persons should provide written comments by January 20, 2020 to one of the following:

Ms. Christine Hill, M.Eng., P.Eng.
Consultant Project Manager
Cole Engineering Group Ltd.
2620 Bristol Circle, Suite 300
Oakville, ON L6H 6Z7
Email: chill@coleengineering.ca

Mr. John Velick, P.Eng.
Manager, Engineering Services
Town of Collingwood
P.O. Box 157, 545 Tenth Line North
Collingwood, ON, ON L9Y 3Z5
Email: jvelick@collingwood.ca

If concerns arise regarding Schedule B projects identified in the Master Plan, which cannot be resolved in discussion with the proponent, a person or party may request that the Minister of the Environment, Conservation and Parks (MECP) order a change in the project status and require a higher level of assessment under an Individual Environmental Assessment process (referred to as a Part II Order). Part II Orders cannot be submitted in respect of the Master Plan itself, but must be made in respect to individual Schedule B projects listed in this Notice. Reasons must be provided for the request. Requests must be submitted using a Part II Order Request Form provided by MECP (www.ontario.ca/page/class-environmental-assessments-part-ii-order). Copies of the Request Form **must** be sent to **each** of the following:

Minister
Ministry of the Environment, Conservation and Parks
77 Wellesley Street West
11th Floor, Ferguson Block
Toronto, ON M7A 2T5
Minister.mecp@ontario.ca

Director
Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, ON M4V 1P5
enviropemissions@ontario.ca

Ms. Christine Hill
Consultant Project Manager
Cole Engineering Group Ltd.
2620 Bristol Circle, Suite 300
Oakville, ON L6H 6Z7
chill@coleengineering.ca

If no requests are received by **January 20, 2020**, the Town of Collingwood plans to proceed to implementation of the Schedule A, A+ and B projects identified in the Master Servicing Plan. Schedule C projects will require further study.

Comments and information regarding this project are being collected in accordance with the requirements of the Environmental Assessment Act. With the exception of personal information, all other information received may be included in project documentation and become part of the public record.

This notice first issued December 19, 2019.



97 Hurontario Street,
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705-445-1030

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Town of Collingwood Weekly Town Page



Thursday, December 26, 2019

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Preferred Servicing Alternatives

WATER		
Treatment	– Expansion of the R. A. Baker Water Treatment Plant	Schedule C
Storage Facilities	– Zone 1 Elevated Storage Tank – Stewart Road Reservoir Phase 2 and Phase 3 Upgrades	Schedule B Schedule A
Pumping Stations	– Carmichael Booster Pumping Station Upgrade – Georgian Meadows Booster Pumping Station Decommissioning – Stewart Road Booster Pumping Station Upgrades	Schedule B Schedule A Schedule A
Watermains	– Trunk and Local Watermain Improvements and System Valves	Schedule A
SANITARY		
Treatment	– Expansion of Collingwood Wastewater Treatment Plant	Schedule C
Pumping Stations	– New Black Ash Pumping Station forcemain	Schedule A+
Sanitary Sewers	– Trunk and local sewer improvements and replacements	Schedule A+

Public Review Period

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If no requests are received by **January 20, 2020**, the Town of Collingwood plans to proceed to implementation of the Schedule A, A+ and B projects identified in the Master Servicing Plan. Schedule C projects will require further study.

Comments and information regarding this project are being collected in accordance with the requirements of the Environmental Assessment Act. With the exception of personal information, all other information received may be included in project documentation and become part of the public record.

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Town of Collingwood Weekly Town Page



Thursday, January 9, 2020

Notice

NOTICE OF COMPLETION OF MASTER SERVICING PLAN

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Preferred Servicing Alternatives

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Pumping Stations	– Carmichael Booster Pumping Station Upgrade – Georgian Meadows Booster Pumping Station Decommissioning – Stewart Road Booster Pumping Station Upgrades	Schedule B Schedule A Schedule A
Watermains	– Trunk and Local Watermain Improvements and System Valves	Schedule A
SANITARY		
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Sanitary Sewers	– Trunk and local sewer improvements and replacements	Schedule A+

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chill@coleengineering.ca

If no requests are received by **January 20, 2020**, the Town of Collingwood plans to proceed to implementation of the Schedule A, A+ and B projects identified in the Master Servicing Plan. Schedule C projects will require further study.

Comments and information regarding this project are being collected in accordance with the requirements of the Environmental Assessment Act. With the exception of personal information, all other information received may be included in project documentation and become part of the public record.

This notice first issued December 19, 2019.



97 Hurontario Street,
Collingwood
705-445-1030

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John Velick

From: Lee Bull <lbull@nvca.on.ca>
Sent: January 17, 2020 3:10 PM
To: 'Christine Hill'; John Velick
Cc: Mark Hartley
Subject: Town of Collingwood Water and Sanitary Sewer System Master Servicing Plan - NVCA ID # 38824

EXTERNAL EMAIL: This email originated outside of the Town's email system. Do not click any links or open any attachments unless you trust the sender and know the content is safe. If in doubt, please contact the helpdesk at x4357.

Good afternoon Christine

Nottawasaga Valley Conservation Authority [NVCA] staff is pleased to provide comments on the Master Servicing Plan for the Collingwood Water and Sanitary Sewer Systems.

NVCA staff has reviewed the following:

- Cole Engineering Group Ltd., "Final Master Plan" Collingwood Water and Sanitary Sewer Systems, Town of Collingwood dated December 2019.

It is our understanding that the preferred alternatives are as follows:

Preferred Servicing Alternatives - Water

Treatment	Expansion of the R. A. Baker Water Treatment Plant	Sched C
Storage Facilities	Zone 1 Elevated Storage Tank Stewart Road Reservoir Phase 2 and Phase 3 Upgrades	Sched B Sched A
Pumping Stations	-Carmichael Booster Pumping Station Upgrade -Georgian Meadows Booster Pumping Station Decommissioning -Stewart Road Booster Pumping Station	Sched B Sched A Sched A
Watermains	-Trunk and Local Watermain Improvements and System Valves	Sched A

Preferred Servicing Alternatives - Sanitary

Treatment	Expansion of Collingwood Wastewater Treatment Plant	Sched C
Pumping Stations	New Black Ash Pumping Station forcemain	Sched A+

Upon completion of our review, we offer the following comments:

1. NVCA staff acknowledge that the Master Servicing Plan was completed in accordance with the Municipal Class Environment Assessment document (MCEA, October 2000 as

amended in 2007/2011/2015) and, more specifically, documents the completion of Phases 1 and 2 to satisfy the requirements of the MCEA Master Plan.

2. NVCA staff are supportive of the Master Servicing Plan and have no comments with the Plan.
3. NVCA staff will require additional information during the detailed design stage of the projects listed in the table above.
4. Projects associated with this Master Servicing Plan that are located within an area regulated by the NVCA will require a permit from the NVCA prior to construction or site alteration.

We trust the foregoing comments are of assistance to you. Please feel free to contact the undersigned should you wish to discuss this matter further.

Sincerely,

Lee J. Bull, MCIP, RPP | Manager, Planning Services

Nottawasaga Valley Conservation Authority

8195 8th Line, Utopia, ON L0M 1T0

T 705-424-1479 ext. 231 | **F** 705-424-2115

lbull@nvca.on.ca | nvca.on.ca

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E-Mail to: John Velick, P. Eng., Manager Engineering Services, Town of Collingwood
Christine Hill, M. Eng., P.Eng., Project Manager, Cole Engineering
From: George Powell BMWT Watershed Action Committee
Date: January 9, 2020

Re: Collingwood Water and Sanitary Sewer System Master Servicing Plan

Background

The notice of completion of the Collingwood Water and Sanitary Sewer System Master Servicing Plan (CWSMP) was posted December 26, 2019 in the Collingwood Connection. The consultant was Cole Engineering Group Ltd. The document comprises 188 pages of technical information setting out future requirements for servicing. It is on Collingwood's web site at www.collingwood.ca Written comments need to be submitted by January 20, 2020.

Concerns

The following are the Blue Mountain Watershed Trust (BMWT) comments.

The study followed the Municipal Engineers Association Class Environmental Assessment Process (MCEA) and sets out the proposed schedules of MCEA. Both the water and sewage treatment facilities are proposed to be carried out as Schedule "C" MCEAs and will provide for public engagement and comment. The schedules proposed are acceptable to the BMWT.

Based on our perusal of the report BMWT concerns are follows:

1. Higher levels of treatment for the water treatment plant are not indicated to be required as the water treatment plant presently employs a very high level of treatment involving the Ultrafiltration Process and raw water quality is excellent based on the 2018 annual report. We note, however, Inorganic and organic chemical testing should be updated as top pesticides used in the area not tested for. Frazzle ice impact on intake capacity is a concern.
2. Higher levels of treatment for the sewage treatment plant could be required such as removal of nitrogen, lower phosphorus levels, other pollutants of concern such

as endocrine disruptors, micro fibres, might be required, solids stabilization and disposal process requirements need to be reviewed.

3. The rationale for establishing future flows seems to use best case scenarios and not those indicated in the design manual. With the high Georgian Bay water levels is increased infiltration an issue?
4. The sites for expansion of the water and sewage treatment plants are limited and the need for additional property at the two sites should be addressed. Is additional off-site sludge storage and sludge treatment required?
5. Buffers from the sewage treatment plant do not meet MECP recommendations and covering of the aeration and final tanks should be addressed. Should odour control of sewage treatment off gases be considered.
6. The Outfall is a shore discharge and does meet MECP recommendations with respect to dilution. Public use of the Harbour in future will increase raising Harbour water quality concerns. Effluent pumping out of the harbour to improve effluent diffusion should it be looked at?
7. Impact of sewage by-passes to the Harbour needs to be addressed.
8. The water plant services areas outside of Collingwood's official boundary. This could impact the timing of future plant expansions that are not required by Collingwood, if not serving outside the official boundary along with the site constraints this is an issue that needs to be addressed.

We note that Townline Creek is not considered a major watershed in the report. Based on 10 years of monitoring involving NVCA, GSCA and BMWT it is a watercourse that does not meet MECP and EC guidelines. Should it not be considered a major watercourse? As well, major municipal drains in Collingwood need to be addressed as they impact Harbour water quality

Please acknowledge receipt of this e-mail and we will be pleased to meet with you to discuss our concerns.

Submitted by G. Powell



January 30, 2020
Our Ref: 2017-1013

Lee Bull, MCIP, RPP
Manager, Planning Services
Nottawasaga Valley Conservation Authority
8195 8th Line,
Utopia, Ontario
L0M 1T0

Attention: Lee Bull, MCIP, RPP
Manager, Planning Services

Re: Town of Collingwood Water and Sanitary Sewer System Master Servicing Plan

We thank you for your comments on the above noted report, received on January 17, 2020 and will include this correspondence in the Project File Report. As per your comments, we note the following:

1. The Town of Collingwood will provide additional information to NVCA during the detailed design stage of the projects contained in the preferred alternatives for providing water and sanitary servicing.
2. We acknowledge that projects arising from this Master Plan which are located within an area regulated by the NVCA will require an NVCA permit prior to construction or site alternation.

We trust the above meets the needs of NVCA. Should you have any additional questions or concerns, please do not hesitate to contact the undersigned.

Yours sincerely,
COLE ENGINEERING GROUP LTD.

Christine Hill, M.Eng., P.Eng.
Director, Water Facilities

c.c.: John Velick, P.Eng., Town of Collingwood

COLE ENGINEERING GROUP LTD.

HEAD OFFICE

70 Valleywood Drive, Markham, ON Canada L3R 4T5

T. 905 940 6161 | 416 987 6161 F. 905 940 2064

www.coleengineering.ca





January 30, 2020
Our Ref: 2017-1013

George Powell
BMWT Watershed Action Committee
Manager, Planning Services

Attention: George Powell
Re: Town of Collingwood Water and Sanitary Sewer System Master Servicing Plan

We thank you for your comments on the above noted report, received on January 9, 2020 and will include this correspondence in the Project File Report. As per your comments, we note the following:

1. We note that the expansion of the Town's R. A. Baker Water Treatment Plant is included in the preferred alternative. This identified project is subject to the requirements of Schedule C of the Municipal Class Environmental Assessment process. As part of this subsequent study, methods of implementing the preferred alternative will be evaluated and water quality requirements and the intake capacity will be reviewed.
2. We note that the expansion of the Town's Collingwood Wastewater Treatment is included in the preferred alternative. This identified project is subject to the requirements of Schedule C of the Municipal Class Environmental Assessment process. As part of this subsequent study, methods of implementing the preferred alternative will be evaluated and the level of treatment required will be reviewed. Solids stabilization and disposal process requirements will also be addressed.
3. To project water and sanitary needs in the future, a comprehensive analysis of existing water use and sanitary flow generation was completed. This analysis is included in Appendix E of the Master Servicing Plan document. The analysis identified that existing water use and sanitary flow generation rates are consistently lower than the Town's design allowances. Furthermore, the analysis also showed a downward trend has been observed in water use and sanitary flow generation over a number of years. In accordance with the findings of the analysis, unit water and sanitary generation demands were developed for master planning. In terms of infiltration and inflow, it is not anticipated that inflow and infiltration rates will rise if lake levels rise over time. This is because the majority of the sanitary sewer system is above the high water lake level.
4. The location of upgrades to the R.A. Baker Water Treatment Plant and the Collingwood Wastewater Treatment Plant will be examined through the Schedule C Class Environmental Studies which will be undertaken by the Town. Biosolids storage and treatment needs will also

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be considered as part of the Schedule C Class Environmental Assessment Study for the Collingwood Wastewater Treatment Plant.

5. Buffer requirements for the expansion of the Collingwood Wastewater Treatment Plant will be considered as part of the Schedule C Class Environmental Assessment Study for the Collingwood Wastewater Treatment Plant. The need for odour control will be confirmed through the study.
6. It is agreed that the existing outfall for the Collingwood Wastewater Treatment Plant outfall improvements are needed. The Master Servicing Plan includes an extension to the existing outfall (Project WW-2). Further details of the outfall improvement will be developed through an update to the Assimilative Capacity Assessment and Schedule C Class Environmental Assessment Study.
7. The Schedule C Class Environmental Assessment Study for the expansion of the Collingwood Wastewater Treatment Plant will consider the risk of bypass to the Harbour. The impact of any sewage by-passes on receiving waters is outside the scope of the Master Servicing Plan Study.
8. The Master Servicing Plan has recommended projects to provide water servicing to residents and industrial/ commercial and institutional lands within the Town of Collingwood. The Master Servicing Plan has also recognized that the Town of Collingwood currently provides water to other municipalities. The Schedule C Class Environmental Assessment Study for the expansion of the R.A. Baker Water Treatment Plant will refine expansion requirements and timing. It is noted a Town Council decision is required to approve provision of servicing to any neighbouring municipality. This Master Servicing Plan provides information on the technical feasibility of providing servicing to these areas.
9. The Master Servicing Plan addresses water and sanitary servicing issues. The Town has plans to undertake a Master Servicing Plan for Stormwater Management. Issues of watershed creek and municipal drains are outside the scope of this Master Servicing Plan.

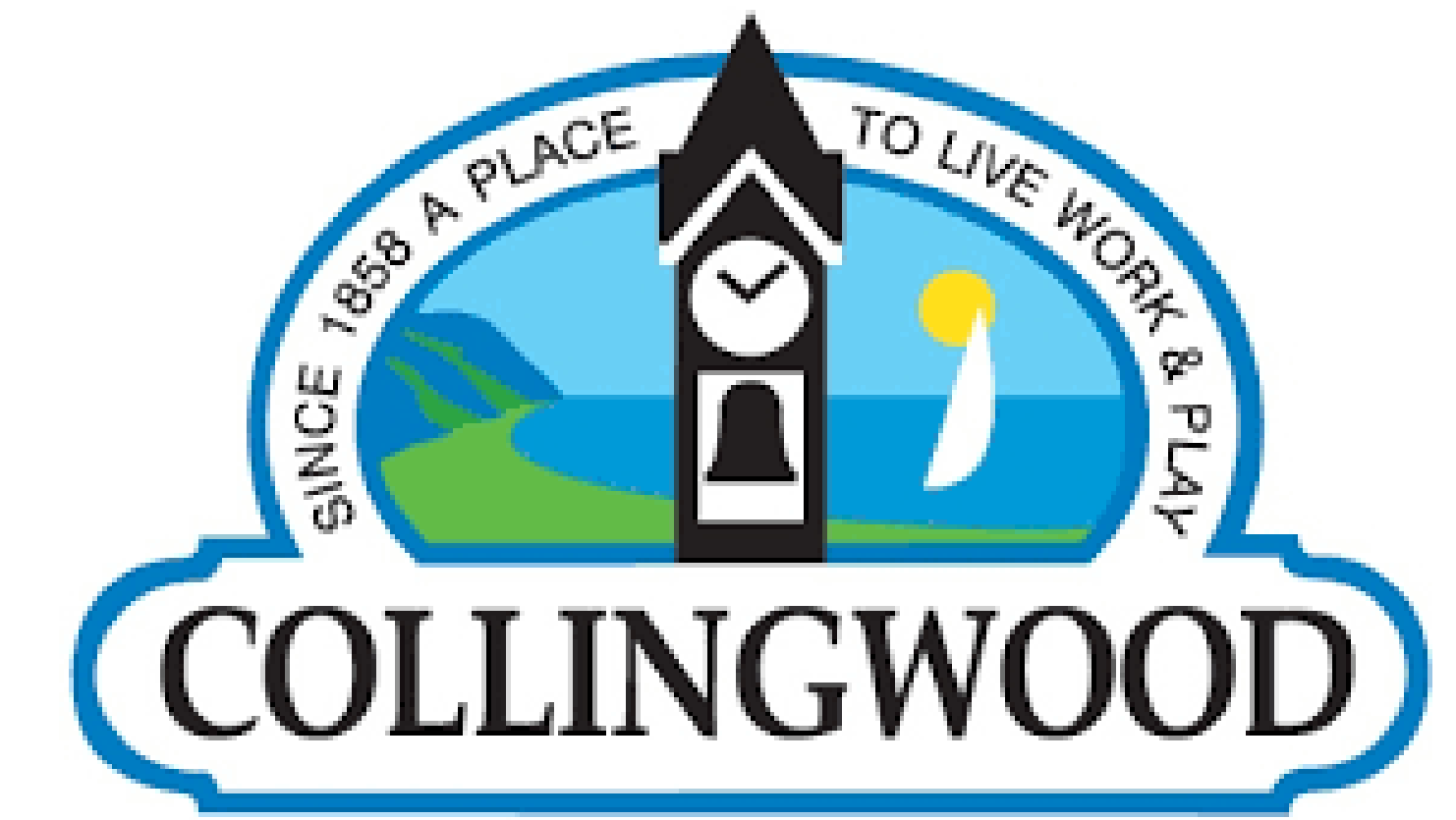
We trust the above meets your needs. Should you have any additional questions or concerns, please do not hesitate to contact the undersigned.

Yours sincerely,
COLE ENGINEERING GROUP LTD.



Christine Hill, M.Eng., P.Eng.
Director, Water Facilities

c.c.: John Velick, P.Eng., Town of Collingwood



Public Information Centre

Town of Collingwood Master Servicing Plan for Sanitary and Water Systems

March 27, 2019

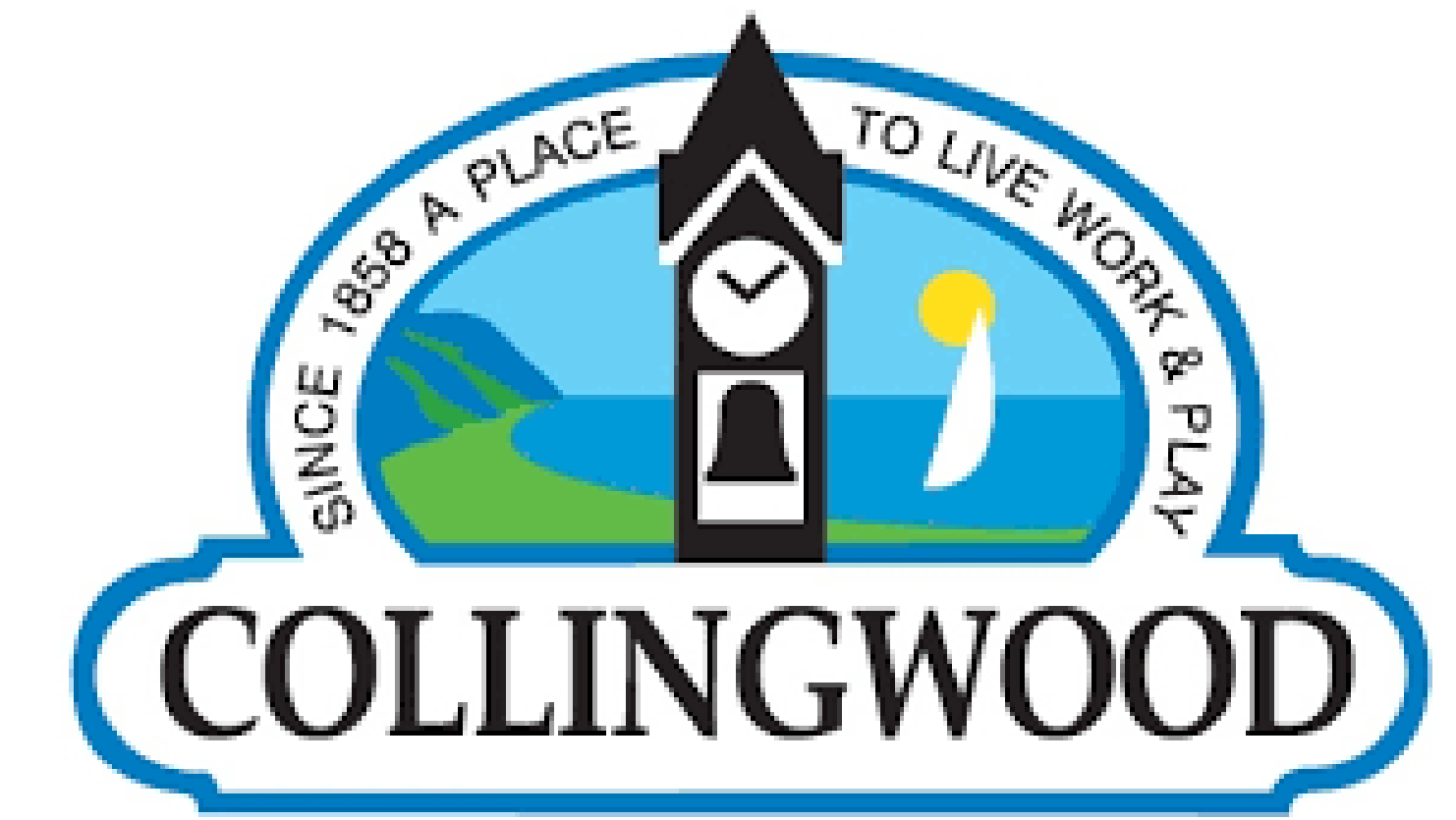
Welcome!

1. Our Display is on the 3rd Floor, Community Room B and C.
2. Feel free to review the boards.
3. Complete a comment sheet.
4. We are available to answer questions.



COLE





Public Information Centre

Town of Collingwood Master Servicing Plan for Sanitary and Water Systems

March 27, 2019

Welcome!

1. Our Display is on the 3rd Floor, Community Room B and C.
2. Feel free to review the boards.
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COLE



PROJECT INTRODUCTION



Purpose of the Project

The Town of Collingwood has undertaken an update to the Master Servicing Plan for Water and Sanitary Servicing to identify projects required to service existing residents that are already serviced and future growth to the year 2031.

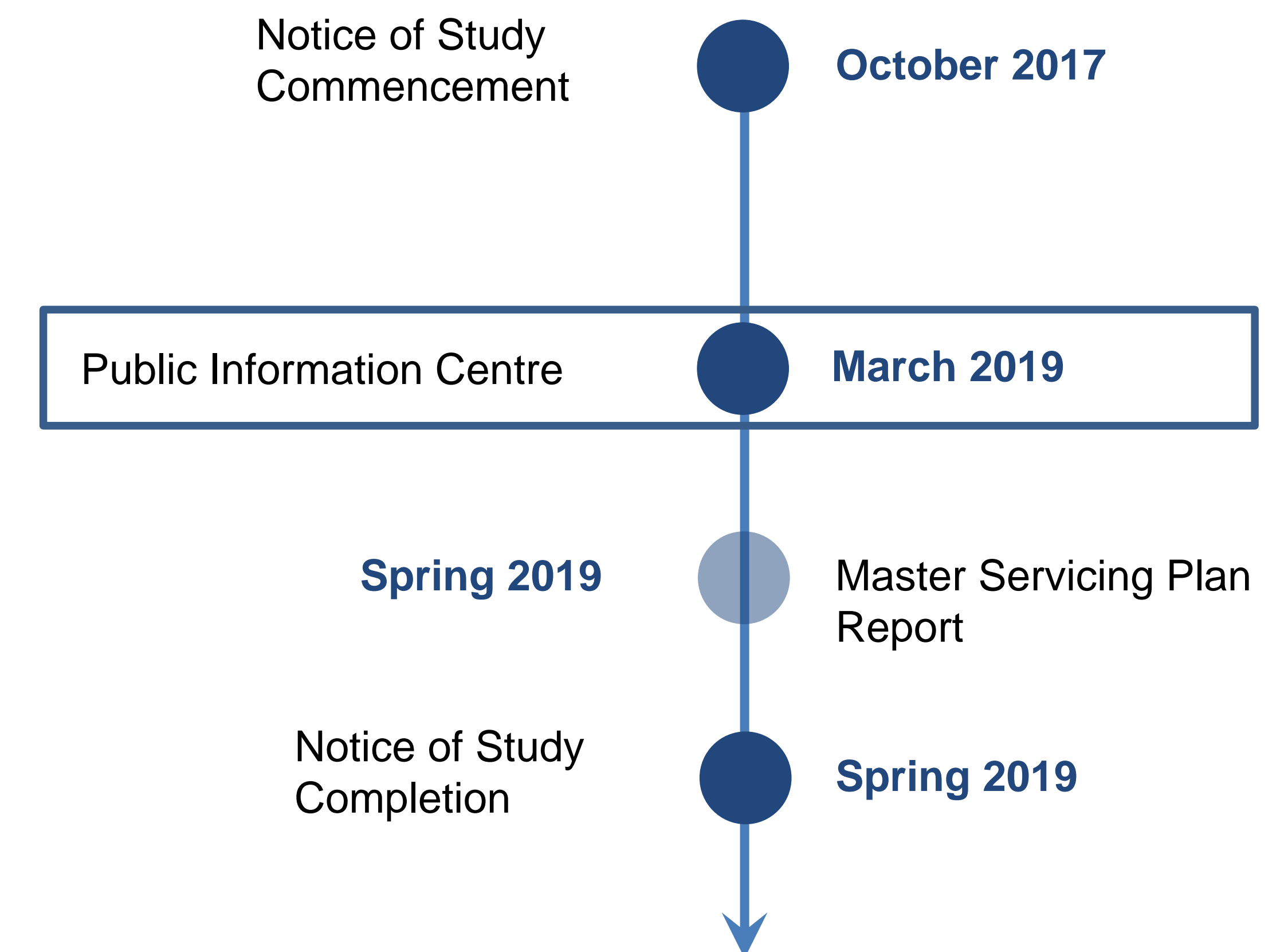
This Master Servicing Plan is following Approach #1 in the Class EA process and will meet the requirements for Schedule A, A+ and B projects and set the stage for future Schedule C projects. This study will define existing problems and opportunities and consider and evaluate solutions and recommend a preferred water and sanitary servicing strategy.

Purpose of this Event

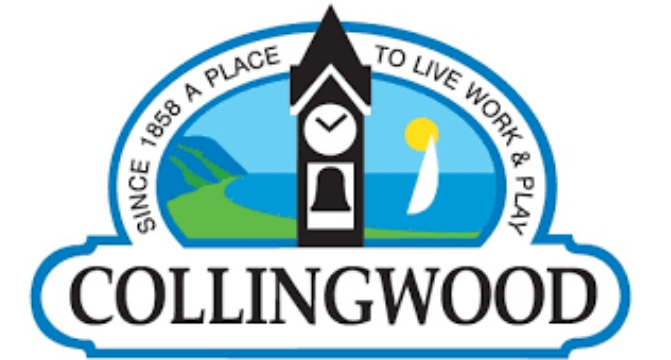
The purpose of this Public Information Centre is to provide an opportunity to gain public input and feedback on the water and sanitary alternatives and recommended preferred alternative.

Following this Public Information Centre, the Study Team will address the public input and feedback received and incorporate it into the final Master Servicing Plan Report.

Study Timeline



MUNICIPAL CLASS EA PROCESS



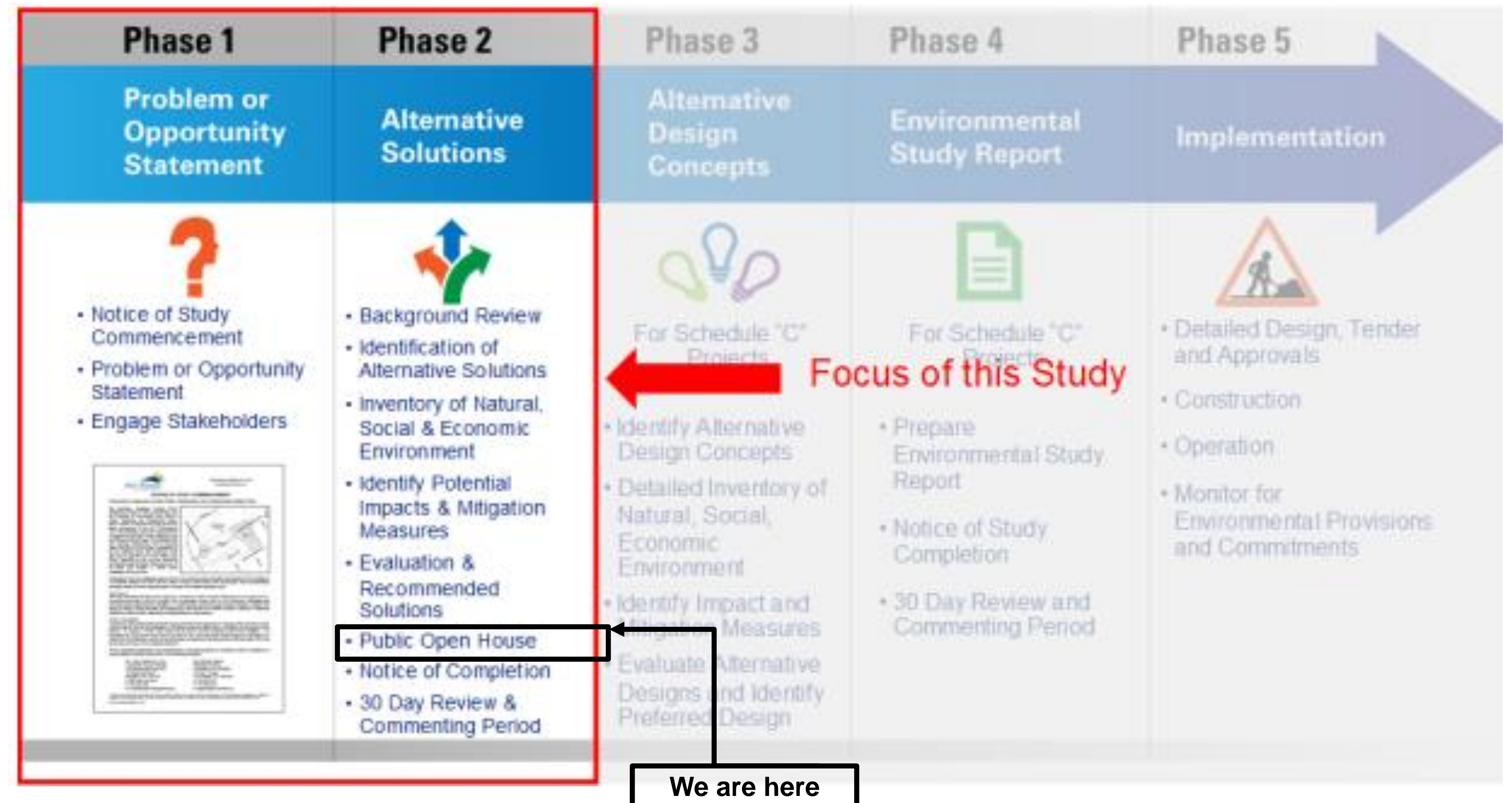
EA Project Schedules

Projects undertaken as a result of this Master Plan are assigned to various project 'Schedules' according to their anticipated level of environmental impact.

Schedule A projects are limited in scale and have minimum adverse environmental effects. Examples of Schedule A projects include watermain repairs or installation of new service connections. These projects are pre-approved and do not require any planning or public consultation under the Class EA process.

Schedule A+ projects are also pre-approved and do not require any planning under the Class EA process, however, the public is to be advised prior to project implementation. Examples of Schedule A+ projects include watermain or sewer extensions within an existing road right of way.

Schedule B projects have the potential for some adverse environmental effects and require the proponent to proceed through Phases 1 and 2 of the Class EA process. Examples of Schedule B projects include expansions or improvements to existing facilities. At the end of the Class EA process, a Project File is prepared to document the planning process and made available for public and agency review for 30 calendar days.



Schedule C projects have the potential for significant environmental effects and must proceed through Class EA Phases 1 to 4. Examples of Schedule C projects include a new facility or a major expansion to an existing facility.

EVALUATION CRITERIA



Natural Environment

- Potential effects on terrestrial features
- Potential effects on designated natural areas
- Potential effects on water resources and hydrogeology
- Potential effects on species at risk
- Potential effects on air quality

Social/ Cultural Environment

- Potential effects on heritage resources
- Potential effects on residents and businesses
- Compatibility with proposed land uses
- Potential effects to property
- Nuisance and traffic impacts

Technical Considerations

- Potential impacts from soil and groundwater conditions
- Ease of construction
- Potential traffic management issues and/or opportunities
- Potential constructability issues

Economic Considerations

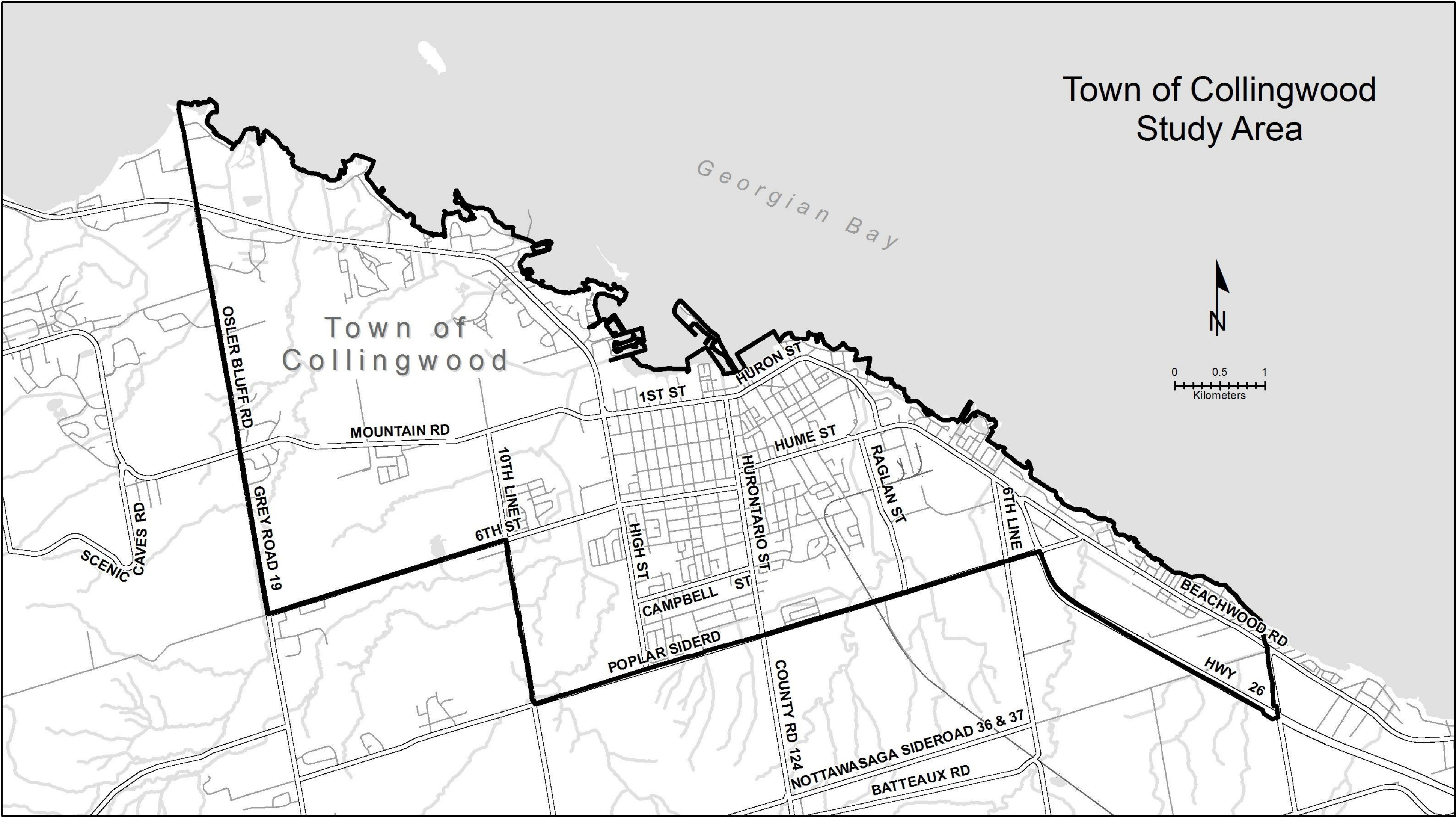
- Capital costs
- Operating and maintenance costs
- Land acquisition costs

STUDY AREA AND FUTURE GROWTH



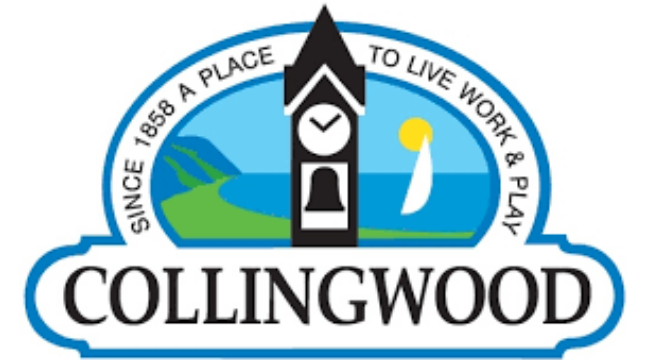
The Study Area is within the Built Boundary of the Town of Collingwood.

By 2031, the Town of Collingwood is projected to have a residential population of 33,400 persons. This growth will occur in a number of already planned developments, potential properties that could be developed and growth within the Town’s built boundary.



Planning Phase	New Residents	Timeline
Planned Developments	12,366	2031
Planned and Potential Developments	21,997	Beyond 2031

EXISTING WATER SYSTEM



Key Infrastructure

Raymond A Baker (RAB) Water Treatment Plant (WTP) treats water from Georgian Bay and supplies the Town of Collingwood, Town New Tecumseth and Town of Blue Mountains.

Collingwood Water Tower stores water in the system and provides fire protection.

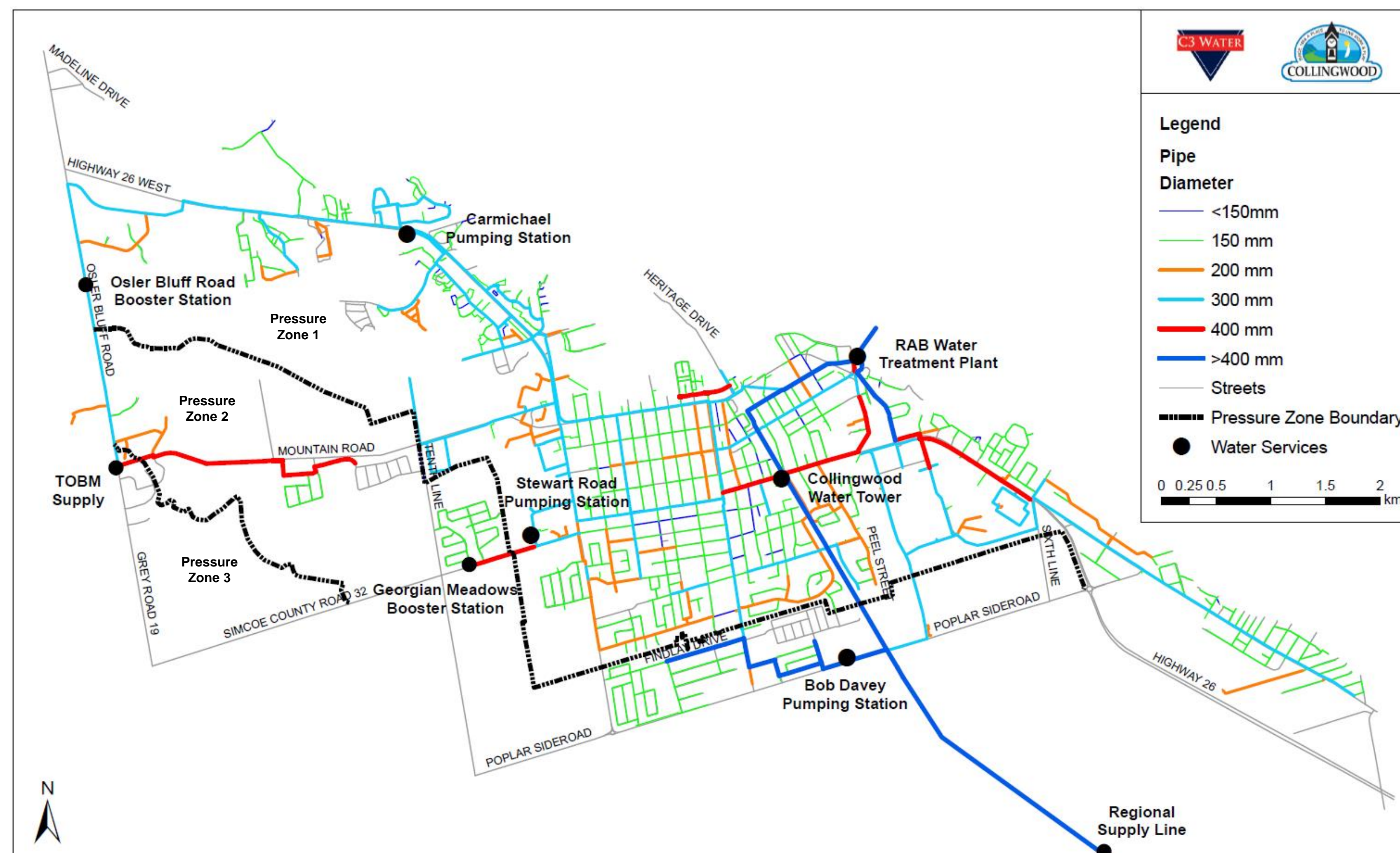
Carmichael Reservoir and Pumping Station (PS) stores water in Pressure Zone 1. Provides pumping capacity to maintain levels in the Water Tower and fire protection.

Bob Davey Reservoir and Pumping Station provides storage and pumping capacity for Pressure Zone 2.

Georgian Meadows Booster Pumping Station (BPS) increases water pressure to supply the Georgian Meadows area in Zone 2.

Osler Bluff Booster Pumping Station increases water pressure to supply the West end of the system in Zone 2.

Stewart Road Reservoir and Pumping Station – Future is planned to store water for Zone 2 and to provide pumping capacity for the Georgian Meadows and West end of the system.



EXISTING SANITARY SYSTEM



Key Infrastructure

Sanitary Sewers: trunk and local sewers ranging in diameter from 150mm to 1050mm.

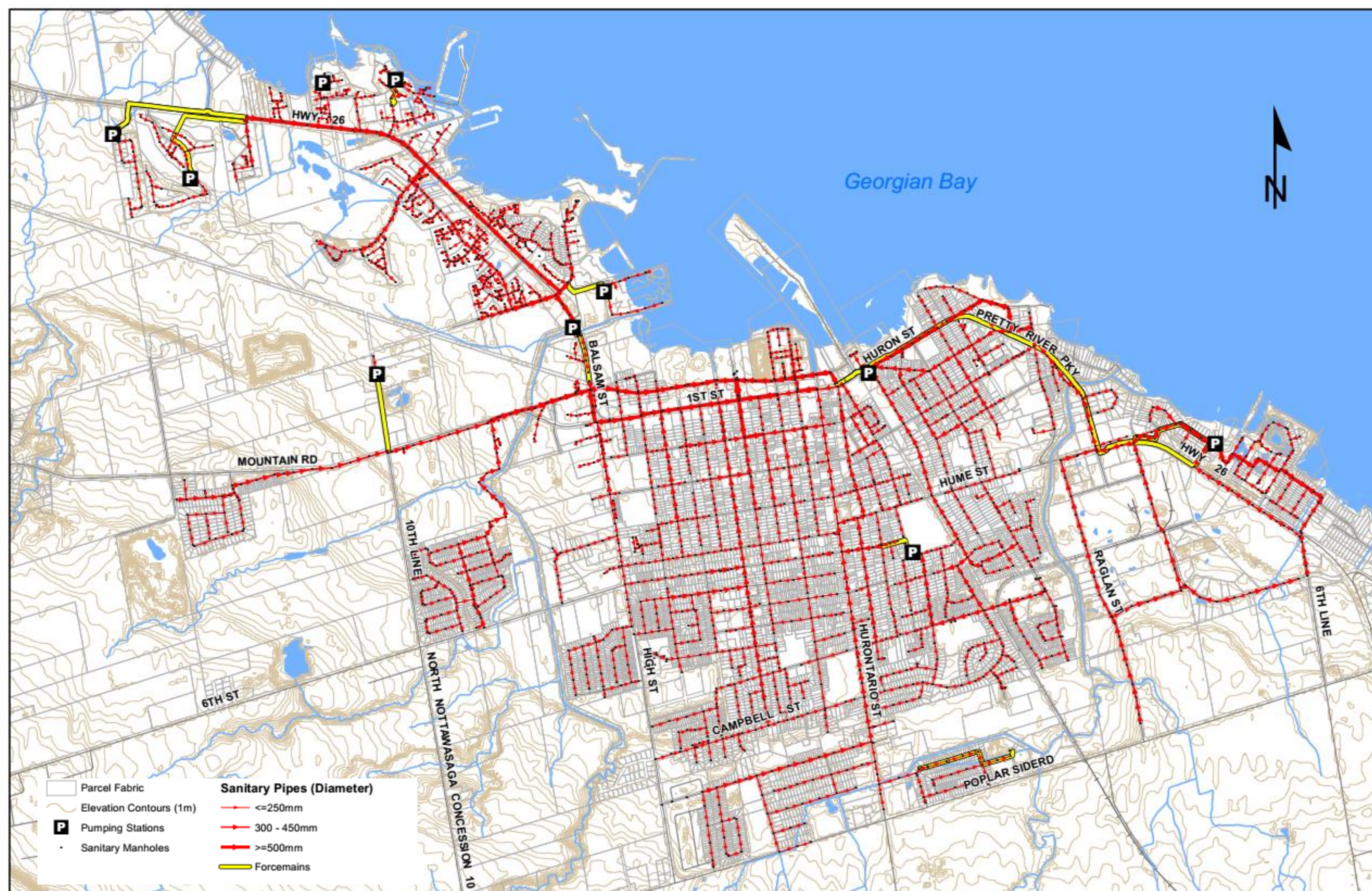
Existing Siphons: Siphons on Spruce and Hickory Street which convey sanitary flow from a small number of houses north of First Street..

Black Ash Sewage Pumping Station (SPS) pumps sanitary flow generated from the north west part of Collingwood. The Town is currently upgrading this station.

Minnesota SPS pumps sanitary flow generated from the area east of Hurontario Street. The Town is currently upgrading this station.

Patterson SPS, Pretty River SPS, Silver Glen Preserve SPS and St. Clair SPS pump sanitary flow generated in upstream areas.

Collingwood WWTP provides wastewater treatment for sanitary flows generated in the Town. Located on Birch Street, the plant provides preliminary, primary, secondary treatment and disinfection for a peak flow up to 60,900 m³/d.



WATER SYSTEM DEFICIENCIES



Existing Deficiencies

- Water usage is approaching the capacity of the treatment plant.
- The Collingwood Water Tower is aging and has operational challenges related to elevation, size and location.
- Watermain capacity is restricted by a lack of large watermain looping in the distribution system.
- Old and small diameter watermains create some local fire flow limitations.

Future Deficiencies

- Future growth is expected to exceed the capacity of the treatment plant.
- Additional storage is required to facilitate growth throughout the system.
- Additional pumping is required to facilitate growth throughout the system.
- New pressure zone is required with storage and pumping to facilitate growth.
- Additional watermain capacity is required to convey water from the treatment plant throughout the system to facilitate growth.



SANITARY SYSTEM DEFICIENCIES

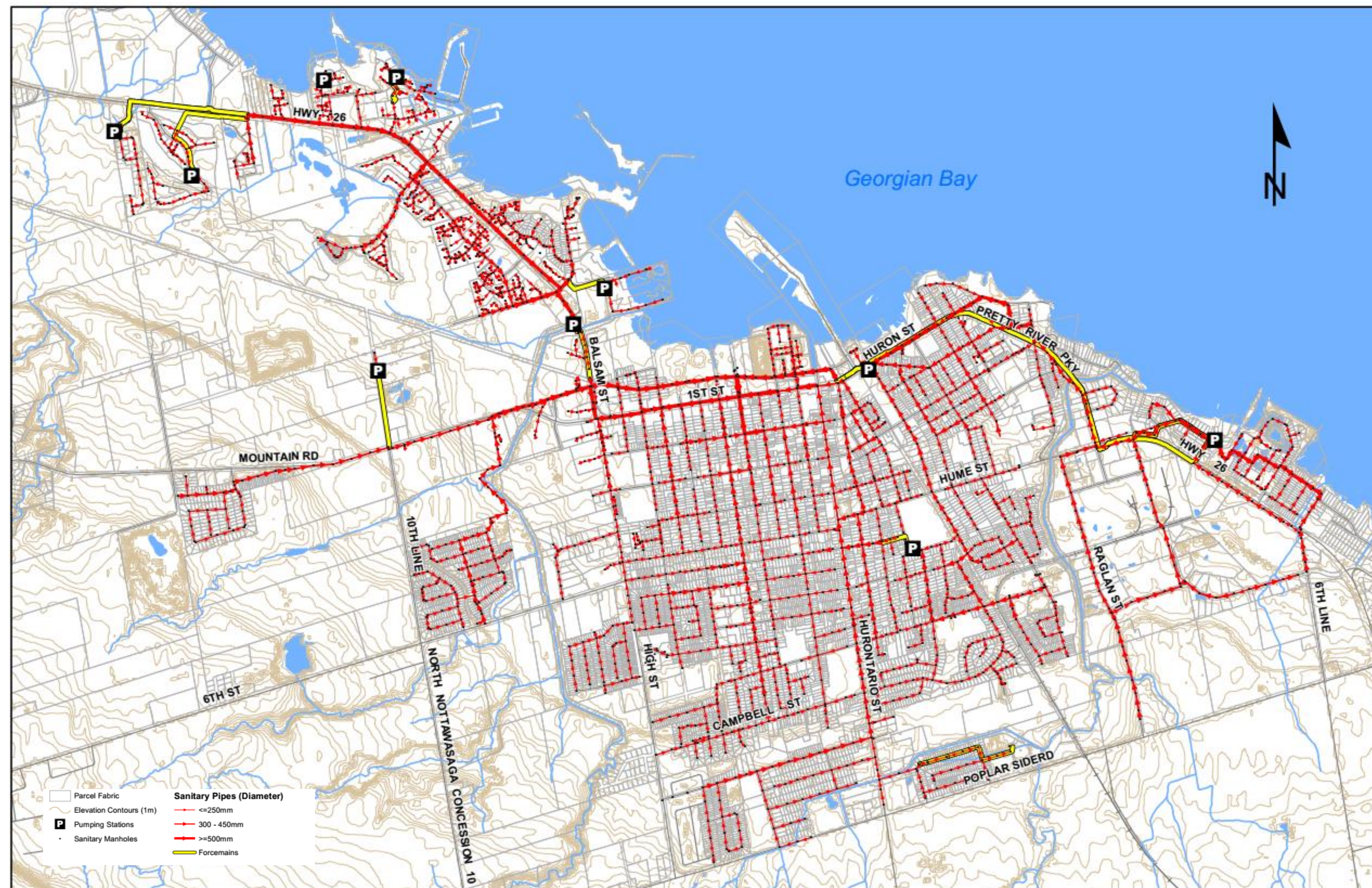


Existing Deficiencies

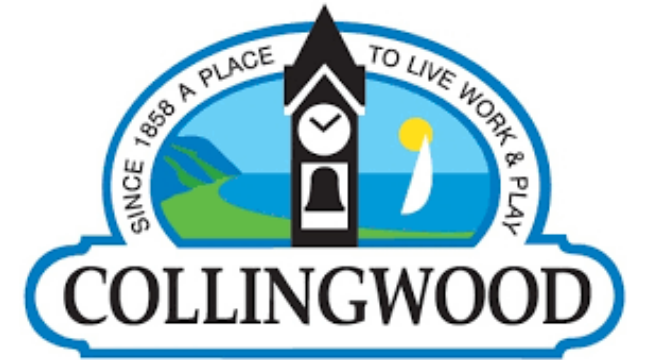
- Approximately 8% of existing sanitary sewers are near or at capacity. High inflow and infiltration does occur in some areas.
- The operation of the existing siphons on Spruce Street and Hickory Street can result in surcharge conditions in upstream sanitary sewers.

Future Deficiencies

- Approximately 10% of existing sanitary sewers do not have sufficient capacity for future flows.
- Some trunk sewers do not have sufficient capacity to provide servicing for future growth. These include the First Street Trunk Sewer, Birch Street Trunk Sewer and the Lakefront Trunk Sewer.
- The Mountain Road sanitary sewer does not have sufficient capacity to provide servicing for future growth.
- The Collingwood WWTP does not have adequate capacity to provide wastewater treatment for future growth flows. The limited capacity of the Collingwood WWTP restricts the capacity of the trunk sewer system.



WATER SYSTEM ALTERNATIVES



Supply & Treatment

- Do Nothing
- Limit Growth
- Enhanced Water Efficiency and Conservation
- Water Treatment Plant Expansion and Improvements

Alternatives were developed for each category based on existing and planned water services in each zone.

Alternatives were evaluated according to the stated criteria.

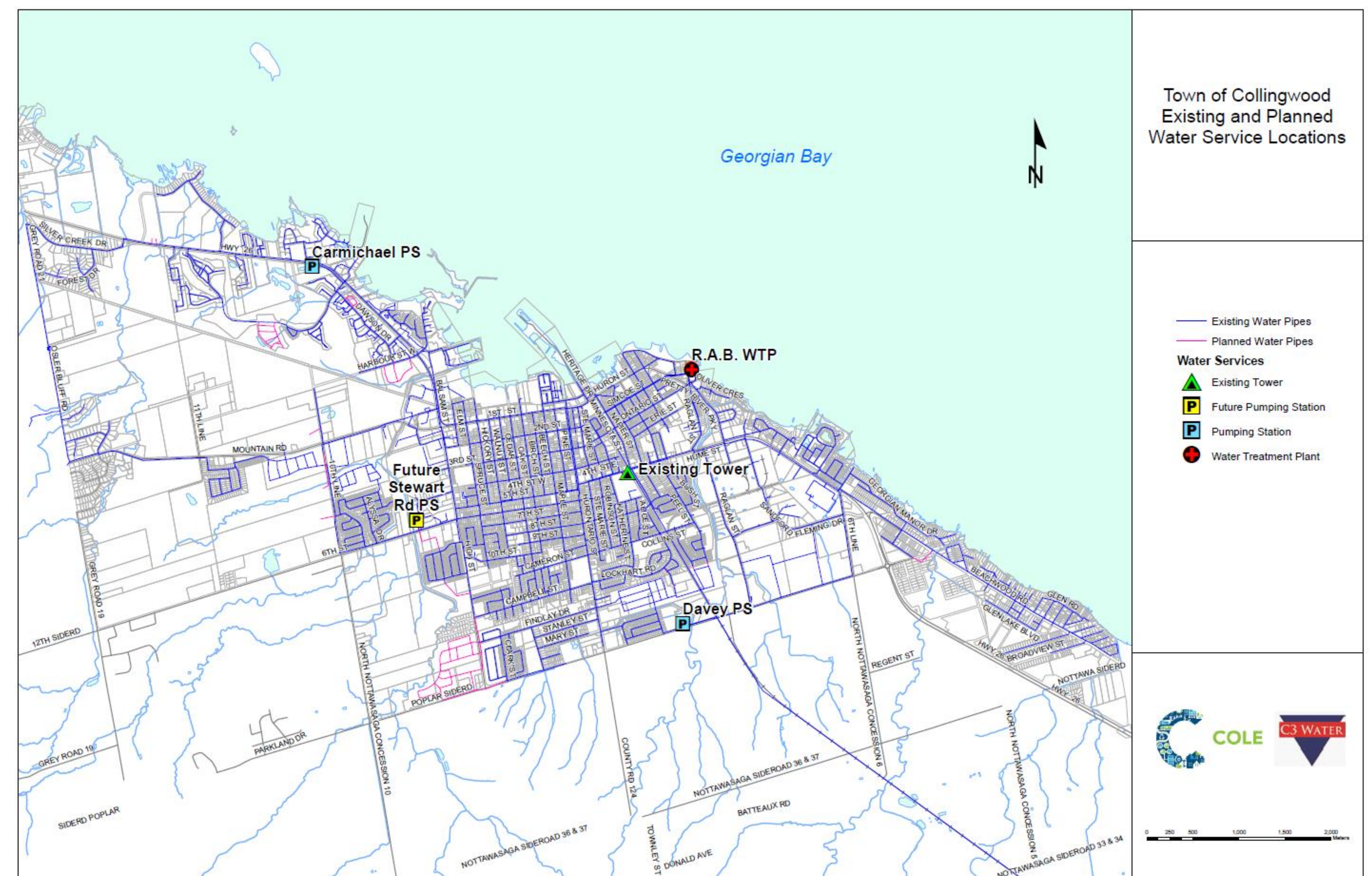
Additional projects for watermain and valve improvements were developed to support the recommended alternatives.

Storage

- New Elevated Storage
- Expand Planned In-ground Storage
- Expand Existing In-ground Storage

Pumping

- Upgrade Planned Pump Station
- Upgrade Existing Pump Stations



SANITARY SYSTEM ALTERNATIVES



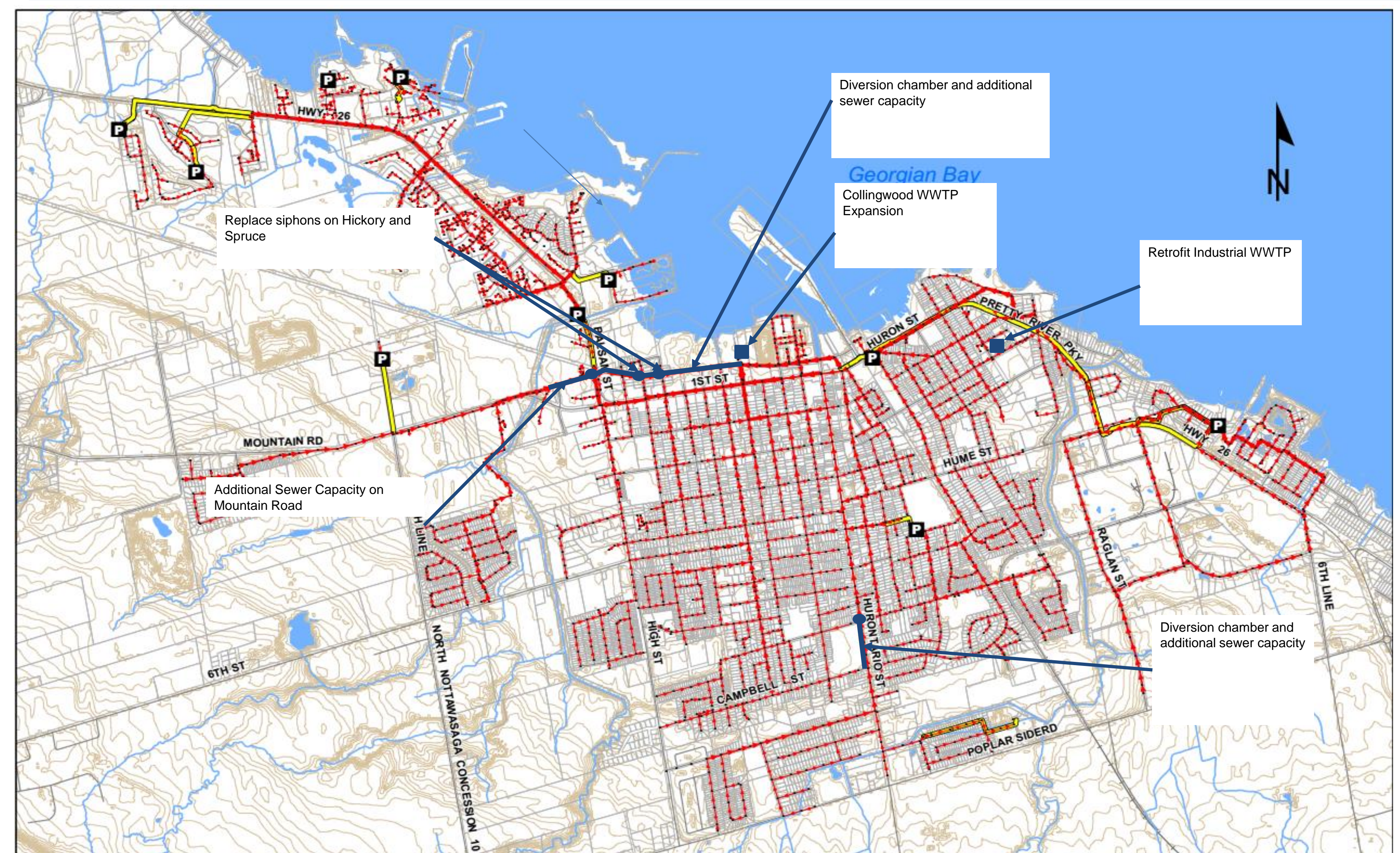
Total System

- Do Nothing
- Limit Growth
- Enhanced Water Conservation and Inflow and Infiltration Reduction
- Expand Treatment Capacity at Two Facilities:
 - Expand an existing industrial site WWTF and the Collingwood WWTP,
 - construct new trunk sewers to convey wastewater to treatment.
- Expand Treatment Capacity at Collingwood WWTP:
 - Expand the Collingwood WWTP,
 - construct a new forcemain and trunk sewers to convey wastewater to treatment. Options:
 - New local pumping stations and forcemains and elimination of siphons on Spruce and Hickory Streets
 - New local pumping stations and local sewers on Hickory Street and Spruce Street to enable the replacement of the siphons.

All alternatives were considered to meet the Town's Level of Service Requirements

Both expansion alternatives considered maximizing diversions with the sanitary sewer system.

Enhanced Water Conservation and Inflow and Infiltration Reduction would be achieved through programs to reduce water use and daily wastewater flows combined with repairs to reduce water entering through cracks in sewers and maintenance holes.



WATER ALTERNATIVES EVALUATION



				Alternative Evaluation Criteria								
Area	Alternative #	Description	Meets Quantity Requirements ?	Natural Environment		Social / Heritage Environment		Technical Environment		Financial Environment		Overall Score
Water Treatment & Supply												
Total System Supply	W-R-1	Do Nothing	no	No impact.	1	No construction impacts. No impact on land uses.	1	No construction required.	1	No capital costs. Expected increased lifecycle costs due to system aging and replacement/emergency needs.	1	4
	W-R-2	Limit Future Growth	yes	No impact.	2	No construction impacts. No impact on land uses. Does not meet Town's Official Plan.	5	Limited construction required.	3	Limited capital costs. Expected increased lifecycle costs due to system aging and replacement/emergency needs. Reduced revenue from DC and taxes.	3	13
	W-R-3	Water Efficiency Measures	partially	Lesson the impact on water resources. Decrease in wastewater production. Increase WW Concentrations	2	Delay major construction projects. May have opposition from public to implement efficiency upgrades. Long term affects on the system thru education	3	Delay the need for infrastructure	3	Limited implementation costs, depending on the programs put in place.	3	11
	W-R-4	WTP Upgrade	yes	Increase water taking. Construction related impacts. Footprint is limited.	3	Construction at existing site. May impact nearby community. Expect work to be limited to the site.	3	Major construction at existing plant. Design requiring approval. Potential for supply impacts during construction.	4	Major capital costs. Reduce increase in lifecycle costs due to upgraded plant infrastructure. Cost sharing with other municipalities.	5	15
Storage												
Zone 1 Storage	W-S1-1	New Z1 Water Tower	yes	Requires new site with potential impact on natural environment. Small footprint.	4	Aesthetics Impacts. Potential location in industrial area.	3	Moderate construction at new site. Design requiring approval. Improved system performance and protection.	1	High capital cost, minimal life cycle cost. Improved system efficiency and flexibility.	4	12
	W-S1-2	Carmichael Reservoir Expansion	yes	Existing site, minimal impact on environment. Small footprint.	3	Construction at existing site. Limited impact on community.	2	Limited space on existing site for expansion. Less redundant as pumping required.	5	Moderate capital cost, increased life cycle cost.	3	13
	W-S1-3	WTP Storage and PS	yes	Existing site, minimal impact on environment. Small footprint. Near lake and lake impacts.	3	Construction at existing site. Limited impact on community.	2	Limited space on existing site for expansion. Less redundant as pumping required.	5	Moderate capital cost, significant life cycle cost.	3	13



Preferred Alternatives for Planned & Potential Growth

Note: Preferred alternative is the alternative with the lowest overall score that meets quantity requirements



WATER ALTERNATIVES EVALUATION



				Alternative Evaluation Criteria								
Area	Alternative #	Description	Meets Requirements?	Natural Environment		Social / Heritage Environment		Technical Environment		Financial Environment		Overall Score
Storage												
Zone 2 Storage	W-S2-1	Stewart Rd Phase 1 and Phase 2 Reservoir Expansion	yes	Pre-planned site, minimal impact on environment. Small footprint	3	Construction at pre-planned site. Will not impact community or other land uses following initial planned construction.	2	Located between areas of Zone 2 growth. Does not protect system from pressure spikes.	4	Moderate capital cost, significant life cycle cost.	3	12
	W-S2-2											
	W-S2-3	Bob Davey Reservoir Expansion	yes	Existing site, minimal impact on environment. Small footprint	3	Construction at existing site. Will not impact community or other land uses.	2	Limited space on existing site for expansion. Located far from some Zone 2 growth. Does not protect system from pressure spikes.	5	Moderate capital cost, significant life cycle cost.	3	13
Pumping												
Zone 2 Pumping	W-P2-1	Stewart Road Ultimate Pump Station Capacity	yes	Limited impact. Upgrade pumps within planned constructions.	1	Limited impact.	1	Minimal construction required following initial planned construction	2	Minor capital cost, moderate life cycle cost.	2	6
	W-P2-2	Bob Davey Additional Pumping	yes	Limited impact. Upgrade pumps within existing constructions.	1	Limited impact.	1	Minimal construction required in existing construction. Located far from some Zone 2 growth.	3	Minor capital cost, moderate life cycle cost.	2	7
	W-P2-3	Retrofit Osler BPS	yes	Existing restricted site. Small footprint, may need a building.	3	Construction at existing site. Potential impact on community.	4	Moderate construction required. Design requiring potential approval.	4	Moderate capital cost, moderate life cycle cost.	3	14



Preferred Alternatives for Planned & Potential Growth

Note: Preferred alternative is the alternative with the lowest overall score that meets quantity requirements



SANITARY ALTERNATIVES EVALUATION



				Alternative Evaluation Criteria								
Area	Alternative #	Description	Meets Requirements?	Natural Environment		Social / Heritage Environment		Technical Environment		Financial Environment		Overall Score
First Street												
North West	S-F1	New Harbourfront Trunk Sewer	yes	In existing utility/ trail corridor, minimal impact	3	Construction on utility/ trail corridor, will impact on users of trail	4	Little space for new trunk sewer, can decommission siphons	5	High capital cost, minimal additional operating costs.	3	15
	S-F2	New Forcemain from Black Ash SPS to WWTP	yes	Located in existing utility/ trail corridor, minimal impact. Will require crossing of Black Ash Creek	4	Construction on utility/ trail corridor, will impact on users of trail	4	Forcemain installation requires less space within existing easement. Alternative requires small pumping stations to eliminate siphons at Spruce and Hickory	3	Moderate capital cost, significant life cycle cost.	2	13
Treatment												
Town Wide	S-T1	Expansion of Collingwood WWTP and Retrofit Existing Industrial Facility	yes	Additional treated wastewater will be discharged to Georgian Bay. An assimilative capacity assessment will be required to set discharge objectives and limits at both facilities	2	Retrofit and use of existing industrial facility will have nuisance impacts (odours, noise and increased traffic) on area residents and businesses	5	Significant additional study will be required to confirm state of current facility. Condition assessment of industrial facilities indicates that significant retrofit and replacement of existing equipment and tankage will be required due to condition	5	High capital cost, significant increase in life cycle cost due to operation of two wastewater treatment facilities.	5	17
	S-T2	Expand Collingwood WWTP	yes	Additional treated wastewater will be discharged to Georgian Bay. An assimilative capacity assessment will be required to set discharge objectives and limits for an expansion of the Collingwood WWTP	2	Expansion of Collingwood WWTP will results in minimal additional nuisance impacts	2	Expansion of Collingwood WWTP will require selection of treatment technology suitable to meet effluent objectives and limits on existing property	3	High capital cost, increase in life cycle cost due to higher flow that requires treatment	3	10

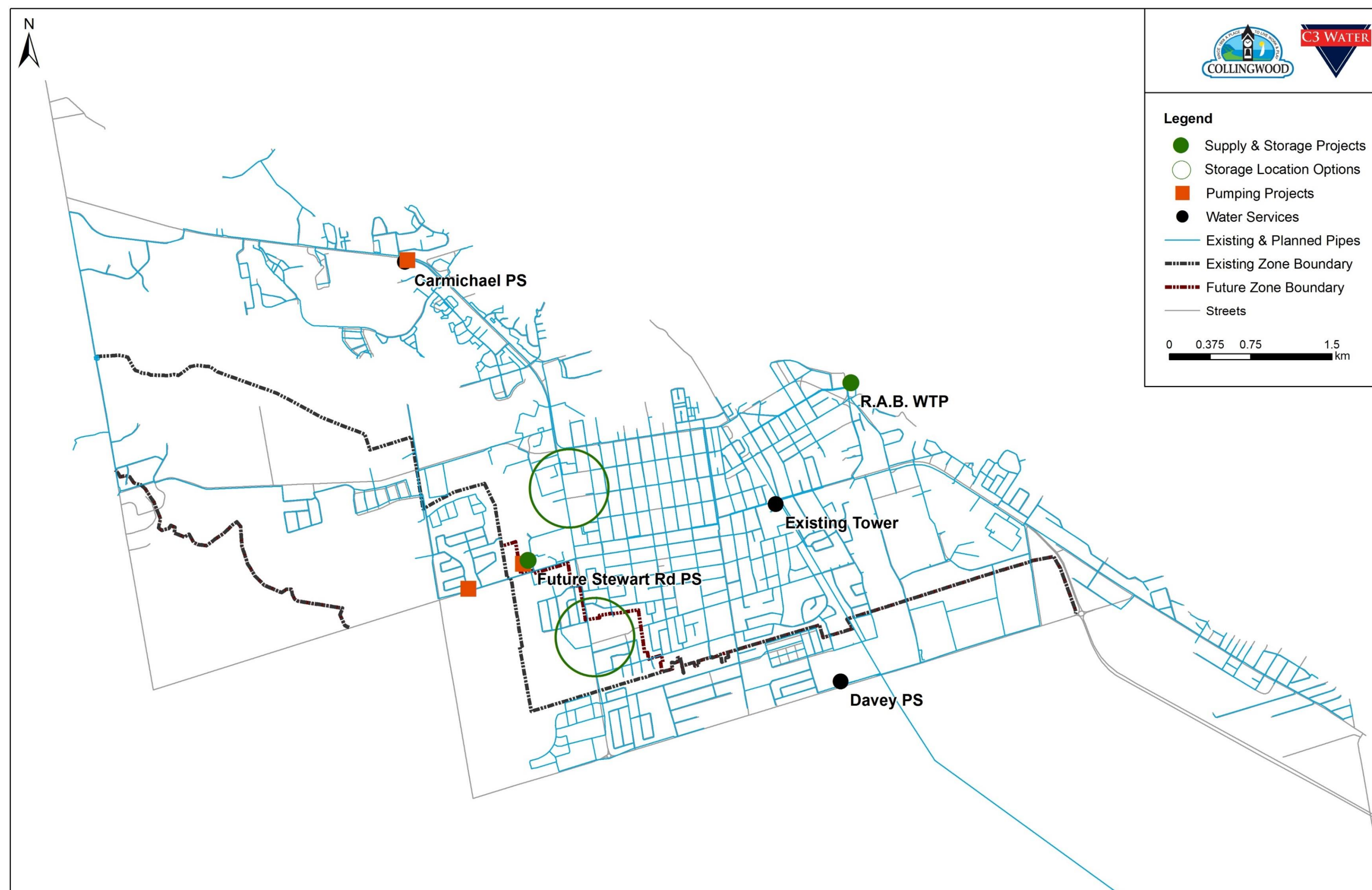


Preferred Alternatives for Planned & Potential Growth

Note: Preferred alternative is the alternative with the lowest overall score that meets requirements

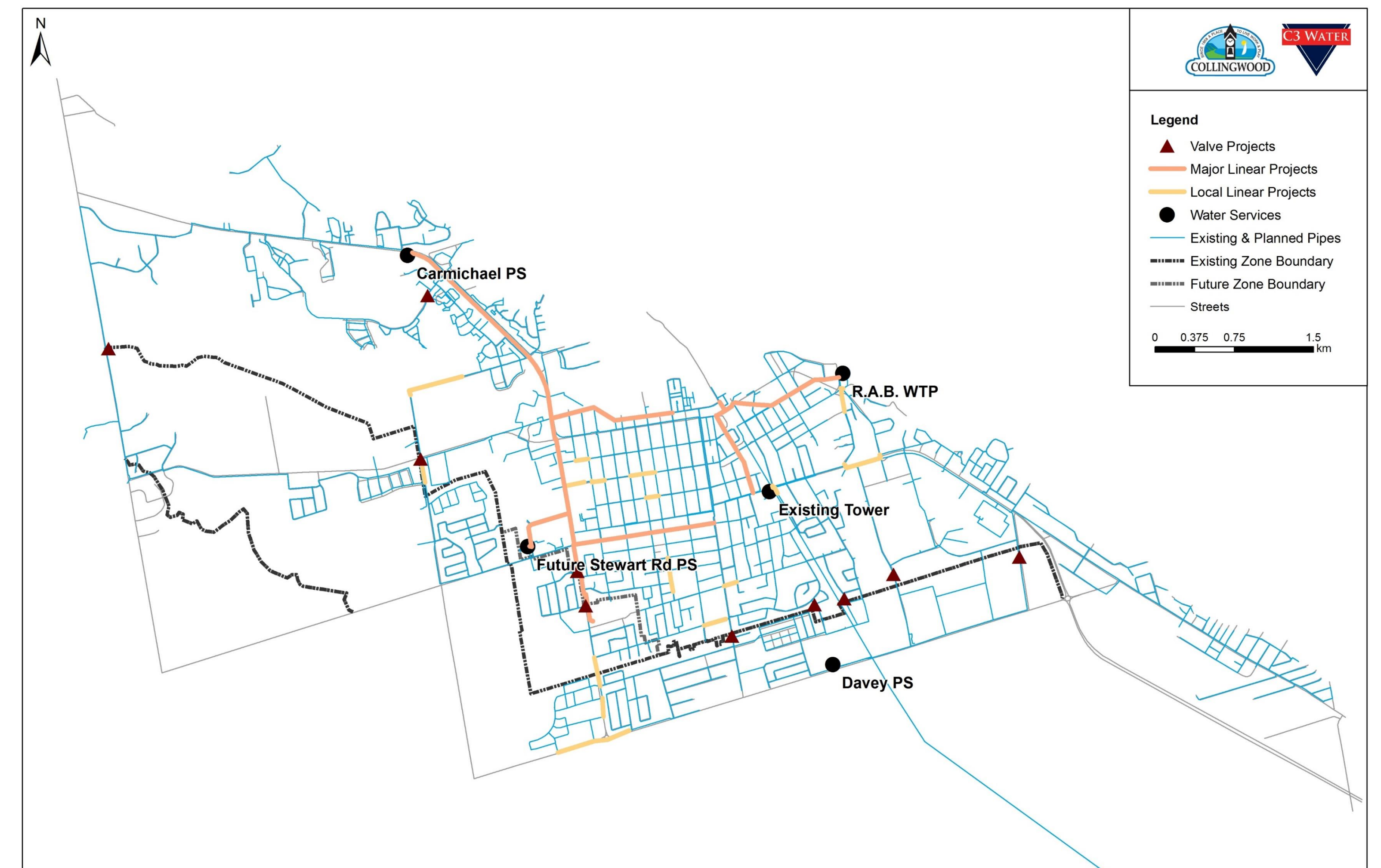


WATER RECOMMENDED PROJECTS



Supply, Storage & Pumping Projects

- Two location options have been considered for the recommended new Zone 1 Water Tower.
- Storage and Pumping solutions to meet the growing demands of Zone 2 are located at the Future Stewart Rd Pumping Station.
- Upgrading the Carmichael PS and decommissioning the Georgian Meadows BPS are recommended.



Linear Infrastructure & Valve Projects

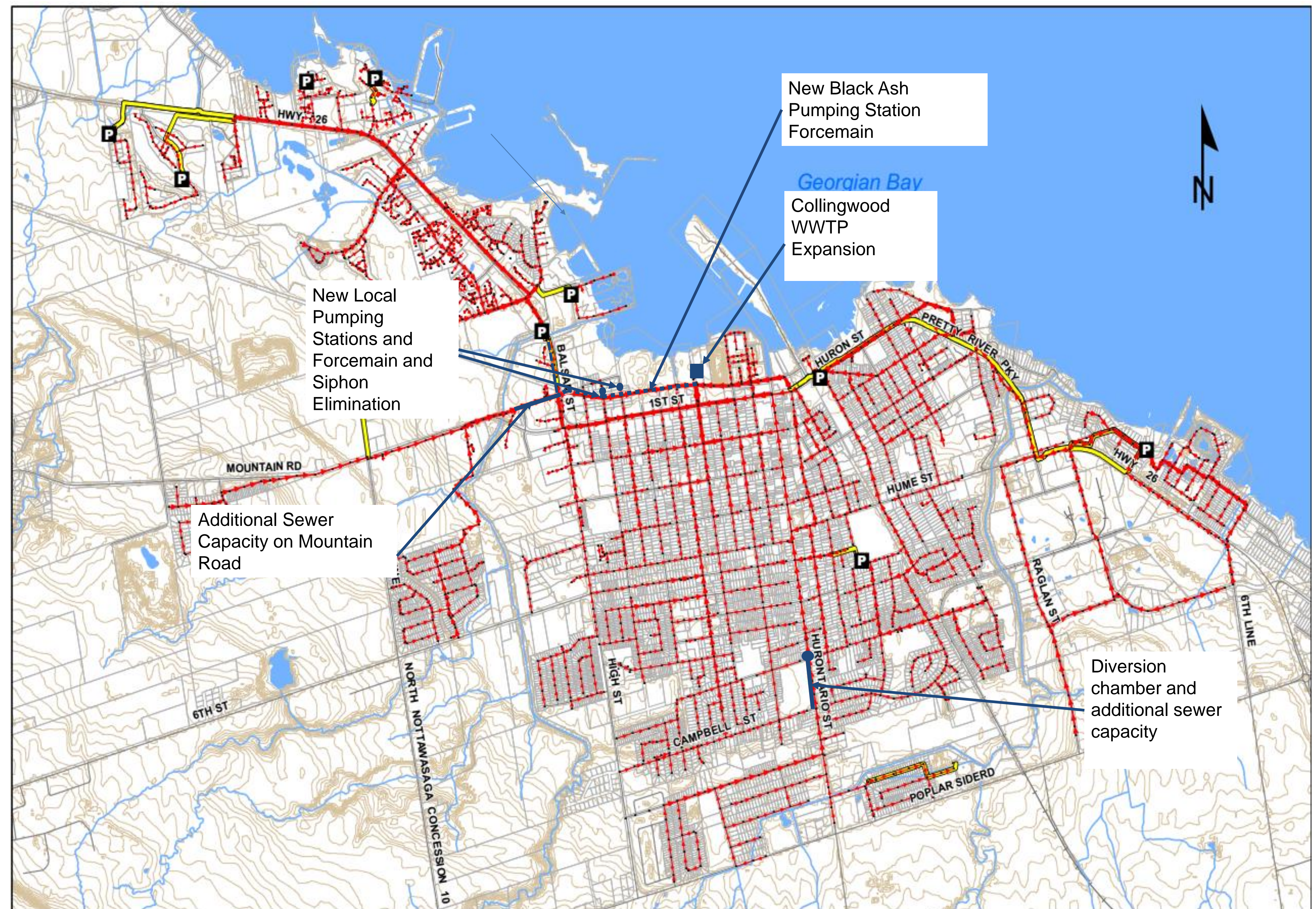
- Major Linear projects are recommended to create a large diameter watermain loop in the Town to support proposed storage and pumping projects.
- Local linear projects are recommended to improve fire flow and connectivity issues.
- Valve projects are recommended to adjust for the future zone boundary change.

SANITARY RECOMMENDED PROJECTS

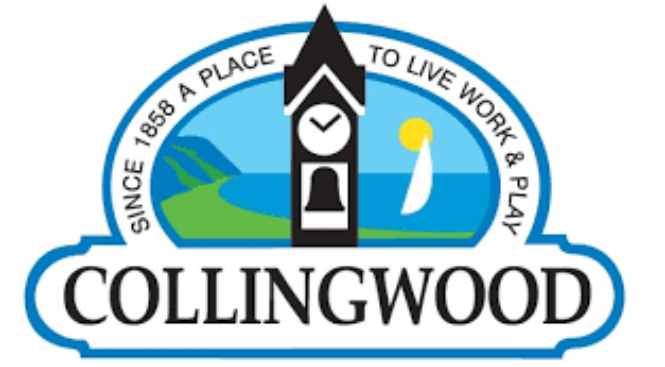


System Projects:

- Wastewater treatment capacity would be provided through an expansion of the Collingwood WWTP.
- Modifications to an existing diversion chamber on Hurontario Street to divert flow to the Collins Street sanitary sewer and upgrade of the sanitary sewer on Hurontario between Lockhart and Collins.
- New forcemain from the Black Ash Pumping Station to the Collingwood WWTP in an existing utility corridor from High Street to Birch Street.
- New local pumping stations and forcemains and elimination of siphons on Spruce and Hickory Streets



NEXT STEPS



- The Master Servicing Plan identifies preferred water and sanitary projects needed to service Collingwood in the future.
- These projects include projects that can proceed to design and construction as well as projects that will require a Schedule C Class Environmental Study.

Next Steps

Spring 2019 – Master Plan Report

- These documents will summarize the overall EA process and will be available for public review and comment. People who have expressed an interest to be kept informed of the project will be notified directly.

Spring 2019 – Master Plan Approval

- A Notice of Completion will be advertised and copies of the Master Plan will be made available for review by members of the public. The public will have a minimum of 30 days to file a Part 2 order with the Ministry of the Environment, Conservation and Parks.

Contact Information

Christine Hill, M.Eng., P.Eng.

Consultant Project Manager

COLE Engineering

2620 Bristol Circle, Suite 300

Oakville Ontario

chill@coleengineering.ca

John Velick, P.Eng.

Town of Collingwood Project Manager

P.O. Box 157, 545 Tenth Line North

Collingwood, Ontario

L9Y 3Z5

jvelick@collingwood.ca





SIGN-IN SHEET

Public Information Centre – January 23, 2019

Horseshoe Centre
1101 Horseshoe Valley Road, 6 to 8pm

Name (Please Print)	Address	Email	Phone Number
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SIGN-IN SHEET

Public Information Centre – January 23, 2019

Horseshoe Centre
1101 Horseshoe Valley Road, 6 to 8pm

Name (Please Print)	Address	Email	Phone Number	Would you like to be added to the project mailing list?



Comment Sheet
Public Information Centre – March 27, 2019

The Town of Collingwood is undertaking a Master Servicing Plan Water and Sanitary Sewer to identify a long-term servicing plan for the future.

We are interested in your comments and suggestions regarding this project. Please take a few minutes to complete this comment sheet.

1. Why are you interested in this project? Are your interests related to water or sanitary?

Sanitary. Property corner Beachwood Rd
Lakeview. Property on town water +
septic tank.

2. Do you have any comments/questions or concerns you would like to raise about the water or sanitary recommended alternatives?

Understand it is extremely unlikely
that my area will be served by sewers
in near future (is)

3. Do you have any additional comments or require further information about the project?

Understand the limitations of
the geography (+ geology).

Unless a supplementary treatment
plant springs up in East End
we will continue on septic.

4. Would you like to be added to the project mailing list? ☐ Yes ☒ No

Madge



Master Servicing Plan for Sanitary and Water Systems



Please submit your written comments in the comment box provided or sent your comments to either of the following Project Team Members by April 10, 2019:

Ms. Christine Hill, M.Eng., P.Eng.
Consultant Project Manager
Cole Engineering Group Ltd.
2620 Bristol Circle, Suite 300
Oakville, ON L6H6Z7
P: 905-940-6161
F: 905-940-2064
E: chill@coleengineering.ca

John Velick, P.Eng
Manager, Engineering Services
P.O. Box 157, 545 Tenth Line North
Collingwood, Ontario L9Y3Z5
P: 705-445-1290 Ext. 4209
E: jvelick@collingwood.ca

PLEASE CLEARLY PRINT YOUR NAME AND CONTACT INFORMATION BELOW:

First Name:

Last Name:

Telephone:

E-Mail:

Street:

City:

Postal Code:

Fax:

Thank you for your comments.



Comment Sheet

Public Information Centre – March 27, 2019

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We are interested in your comments and suggestions regarding this project. Please take a few minutes to complete this comment sheet.

1. Why are you interested in this project? Are your interests related to water or sanitary?

- Interested in both water & sewer.
- I am interested because of impacts on the town physically;
- costs to the town (which is not disclosed at this time).

2. Do you have any comments/questions or concerns you would like to raise about the water or sanitary recommended alternatives?

- This project has been in progress since 2017 and will be completed Spring 2019. Since it is now Spring (March 27, 2019) I am concerned that there is no disclosure on costs.

3. Do you have any additional comments or require further information about the project? detail

The information provided today is helpful. I am sure considerable effort has been expended to get to this stage. Not being an expert in this field, the recommended approach seems to be realistic.

I believe in water conservation and practice significant measures and yet I consider Collingwood sewer/water costs very high (I lived in Nepean/Ottawa for 30 years and that is my comparison). As a pensioner there is not a bottomless purse.

4. Would you like to be added to the project mailing list? ☒ Yes ☐ No



Master Servicing Plan for Sanitary and Water Systems



Please submit your written comments in the comment box provided or sent your comments to either of the following Project Team Members by April 10, 2019:

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P: 705-445-1290 Ext. 4209
E: jvelick@collingwood.ca

PLEASE CLEARLY PRINT YOUR NAME AND CONTACT INFORMATION BELOW:

I signed in to this session

First Name:	_____	Street:	_____
Last Name:	_____	City:	_____
Telephone:	_____	Postal Code:	_____
E-Mail:	_____	Fax:	_____

Thank you for your comments.



Comment Sheet

Public Information Centre – March 27, 2019

The Town of Collingwood is undertaking a Master Servicing Plan Water and Sanitary Sewer to identify a long-term servicing plan for the future.

We are interested in your comments and suggestions regarding this project. Please take a few minutes to complete this comment sheet.

1. Why are you interested in this project? Are your interests related to water or sanitary?

The defunct Macdonald Rd. ethanol plant and treatment lagoons
were significant (and prosecuted) sources of odour affecting
enjoyment of property for nearby residents. I do not want to
experience this again or to be forced to mount another protest

2. Do you have any comments/questions or concerns you would like to raise about the water or sanitary recommended alternatives?

Odours above the Ministry prescribed levels of one odour unit
are likely if the Macdonald Rd is used for pre-treatment.

3. Do you have any additional comments or require further information about the project?

The OMB decision regarding the disposition of the Macdonald
property warrants a review. Nearby residential areas
are personally close to Ministry of the Environment restrictions
on odour causing industry

4. Would you like to be added to the project mailing list? ☒ Yes ☐ No



Please submit your written comments in the comment box provided or sent your comments to either of the following Project Team Members by April 10, 2019:

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Consultant Project Manager
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Thank you for your comments.



Comment Sheet

Public Information Centre – March 27, 2019

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We are interested in your comments and suggestions regarding this project. Please take a few minutes to complete this comment sheet.

1. Why are you interested in this project? Are your interests related to water or sanitary?

I am a resident of Blue Shores which is close to the old ethanol plant. I am concerned that property could be used as part of sanitary sewer system.

2. Do you have any comments/questions or concerns you would like to raise about the water or sanitary recommended alternatives?

I will strongly oppose any use of the old ethanol property for sewage treatment as it will produce foul odours.

3. Do you have any additional comments or require further information about the project?

Our Blue Shores community fought with the ethanol plant for years to end the foul odours and noise created by that plant. We will not tolerate a repeat of the abuse we received from the ethanol plant and aided by the Town of Collingwood.

4. Would you like to be added to the project mailing list? ☒ Yes ☐ No



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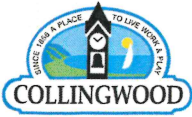
Telephone:

Postal Code:

E-Mail:

Fax:

Thank you for your comments.



Comment Sheet
Public Information Centre – March 27, 2019

The Town of Collingwood is undertaking a Master Servicing Plan Water and Sanitary Sewer to identify a long-term servicing plan for the future.

We are interested in your comments and suggestions regarding this project. Please take a few minutes to complete this comment sheet.

1. Why are you interested in this project? Are your interests related to water or sanitary?

Understanding Town's philosophy of Master Servicing Plan
STABILITIES.

PRIMARY INTERESTS IN ALLOCATION OF SEWAGE CAPACITY
FOR EXISTING UNSERVICED NEIGHBOURHOODS AND LONG TERM
SERVICING PLAN FOR SAME.

2. Do you have any comments/questions or concerns you would like to raise about the water or sanitary recommended alternatives?

EXTREME CONCERN THAT THIS MASTER SERVICING PLAN PROJECT
DOES NOT INCLUDE EXISTING UNSERVICED NEIGHBOURHOODS
ALLOCATION AND SERVICING STABILITIES FOR SAME.
SHORT SITES / PREJUDICIAL TOWARDS EXISTING RESIDENCES.

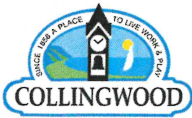
3. Do you have any additional comments or require further information about the project?

PER ABOVE CONCERNS, STUDY TERMS OF REFERENCE
ARE "INCOMPLETE" AND LESS THAN COMPREHENSIVE.

IN ADDITION, NO REFERENCE IS MADE TO PREVIOUS
STUDIES AND INFRASTRUCTURE ASSESSMENTS UNDERTAKEN
BY THE TOWN AT SIGNIFICANT COST.

NOTE: THANK YOU TO JOHN VELICK FOR HIS POSITIVE RESPONSE
TO MY CONCERNS ABOVE - SEE EMAIL MARCH 28/19. ATTACHED

4. Would you like to be added to the project mailing list? ☒ Yes ☐ No



Please submit your written comments in the comment box provided or sent your comments to either of the following Project Team Members by April 10, 2019:

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First Name:

Street:

Last Name:

City:

Telephone:

Postal Code:

E-Mail:

Fax:

Thank you for your comments.

Misc Comments:

- 1) I BELIEVE STRONGLY THAT THE PROFESSIONAL SELECTION ~~STAFF~~ ^{PROCESS} IS FLAWED. THERE ARE AT LEAST THREE CONSULTING ENGINEERING COMPANIES THAT ALL COLLINGWOOD HAVE AND ARE MORE THAN CAPABLE OF THIS UNDERTAKING. - JUST REFER TO PAST STUDIES.
- 2) PRESENTATION MAPPING INCOMPLETE, NO RECOGNITION OF UNSERVICED EXISTING NEIGHBOURHOODS
- 3) PROFESSIONALS IN ATTENDANCE COULD NOT BE

Comments and information regarding this project are being collected in accordance with the requirements of the Environmental Assessment Act. With the exception of personal information, all other information received may be included in project documentation and become part of the public record.

RECOGNIZED / NO NAME OR COMPANY I.D.

- 4) PLEASE PROVIDE YOUR WRITTEN RESPONSE

From: Larry Young
Sent: April 2, 2019 6:00 PM
To: [REDACTED]
Subject: Fwd: Collingwood Master Servicing Plan

Please print.

Sent from my iPad

Begin forwarded message:

From: John Velick <jvelick@collingwood.ca>
Date: March 28, 2019 at 6:00:04 PM EDT
To: " [REDACTED] "
Subject: Collingwood Master Servicing Plan

Hi Larry,

I wanted to circle back with you and let you know that your comments were heard last night and that we will be addressing them in our study. We will look into preserving capacity for neighbourhoods such as yours that are currently on septic.

Thank you for your feedback.

John

John Velick P.Eng.
Manager, Engineering Services

Town of Collingwood
P.O. Box 157, 545 Tenth Line North
Collingwood, ON L9Y 3Z5
705-445-1292 Ext. 4209
jvelick@collingwood.ca | www.collingwood.ca



Comment Sheet
Public Information Centre – March 27, 2019

Received

APR 03 2019

The Town of Collingwood is undertaking a Master Servicing Plan Water and Sanitary Sewer to identify a long-term servicing plan for the future.

We are interested in your comments and suggestions regarding this project. Please take a few minutes to complete this comment sheet.

**Engineering Services
Town of Collingwood**

1. Why are you interested in this project? Are your interests related to water or sanitary?

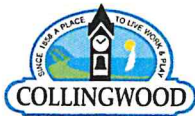
NOTTAWA NEEDS WATER & SANITARY

2. Do you have any comments/questions or concerns you would like to raise about the water or sanitary recommended alternatives?

MAKE SURE THERE IS CAPACITY
FOR CLEARVIEW NOTTAWA & BRITTON

3. Do you have any additional comments or require further information about the project?

4. Would you like to be added to the project mailing list? ☒ Yes ☐ No



Master Servicing Plan for Sanitary and Water Systems



Please submit your written comments in the comment box provided or sent your comments to either of the following Project Team Members by April 10, 2019:

Ms. Christine Hill, M.Eng., P.Eng.
Consultant Project Manager
Cole Engineering Group Ltd.
2620 Bristol Circle, Suite 300
Oakville, ON L6H6Z7
P: 905-940-6161
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P: 705-445-1290 Ext. 4209
E: jvelick@collingwood.ca

PLEASE CLEARLY PRINT YOUR NAME AND CONTACT INFORMATION BELOW:

First Name:

Last Name:

Telephone:

E-Mail:

Street:

City:

Postal Code:

Fax:

Thank you for your comments.

Christine Hill

From: Peggy Slama
Sent: August 1, 2019 9:47 AM
To: Ken Kaden
Subject: FW: capacity

Peggy Slama P.Eng.
Manager, Environmental Services
705-445-1581, Ext. 3301 | pslama@collingwood.ca

From: Mike Rawn [<mailto:mrawn@clearview.ca>]
Sent: Wednesday, January 09, 2019 12:32 PM
To: Peggy Slama
Cc: Mara Burton; DON MCNALT
Subject: RE: capacity

Hi Peggy

For Nottawa water and sewer needs, I found the following e-mail in my files that as sent back in July. It includes both sewer and water.

I copied Don and Mara because we were discussing the topic at a meeting this morning and want them to know I found it and it has been resent.

From: Don McNalty <Don.McNalty@rjburnside.com>
Sent: July 11, 2017 9:42 AM
To: John Velick <jvelick@collingwood.ca>
Cc: Mara Burton <mburton@clearview.ca>; Mike Rawn <mrawn@clearview.ca>; Steve Sage <ssage@clearview.ca>
Subject: Clearview/ Nottawa Servicing

John:

As discussed we have reviewed the previous MCEA numbers for water and sewage for the community of Nottawa which were prepared several years ago and with additional input from Clearview's planning department. It has been determined that the expected demands could be reduced to reflect a more realistic development scenario for the community. The revised numbers have been based on the Province's past and anticipated density expectations for Nottawa which is 32 persons per hectare. Clearview has also taken into account portions of the designated areas shown in the OP which are EP or Hazard areas which has reduced the overall potential development area.

Sewage:

On this basis it is anticipated that there will be an additional 3500 persons in Nottawa at full build out. There are currently 960 residents in Nottawa which are not serviced with a sewage system so the total number for sewage is 4460 persons. There will be some additional flow from a small industrial designation and from commercial/institutional designations. The resulting flows from Nottawa are an ADF of 2800 m³/d and a project PF of 8820 m³/d

Water:

As above the additional new population is projected to be 3500 persons. There are 960 existing residents. 335 have water services in McKean subdivision. This leaves 625 existing residents which do not have water service. The total projected population requiring water supply is 4125 persons. The resulting demands is an ADD of 2244 m3/d and a MDD of 4854 m3/d.

If you have any questions please call me.
We can formalize this into a letter report as well

Don



R.J. Burnside & Associates Limited
3 Ronell Crescent, Collingwood, Ontario L9Y 4J6
Office: 800-265-9662 Direct: 705-797-4262
www.rjburnside.com

Thanks,

Mike Rawn, C.E.T.
General Manager Environmental Services
Township of Clearview
705-428-6230 ext.243
www.clearview.ca

From: Peggy Slama <pslama@collingwood.ca>
Sent: January 8, 2019 3:33 PM
To: Mike Rawn <mrawn@clearview.ca>
Subject: RE: capacity

Mike, we are still working on the MSP. We hope to have our public meeting in February and this would be a good time for Clearview confirm their interest. In the meantime, we have included Clearview on the wastewater side, but not the water. We have included New Tecumseth and TBM for water. Do you have an idea on what capacity you would be looking for, for Nottawa?

We will be determining costs for these other muni to buy water through our MSP. We could do the same for Nottawa in particular. What will be key is having an idea on what volume of water you would like and a time frame. We know we need to do an expansion, so we are trying to determine how big that expansion needs to be at different points in the future, so our expansion can be phased by need (as the expansion at this point will be big – double our capacity) So the more our users can define when they will need certain volumes, that will help.

Peggy

From: Mike Rawn [<mailto:mrawn@clearview.ca>]
Sent: Tuesday, January 08, 2019 3:02 PM
To: Peggy Slama
Subject: capacity

Hi Peggy

Has Collingwood completed the water and sewer capacity assessments? Do you know when the study will be complete?

Our EAs for Nottawa basically say Collingwood would be the preferred solution to service Nottawa with water and sewer. We have a new councillor that wants to know cost to service Nottawa. I will have to update our estimates and will explain that there would be some political discussion before that could happen.

Thanks,

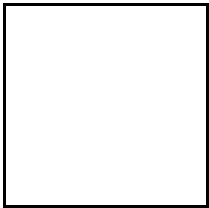
Mike Rawn, C.E.T.

General Manager Environmental Services

Township of Clearview

705-428-6230 ext.243

www.clearview.ca



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Christine Hill

From: Reg Russwurm <rrusswurm@thebluemountains.ca>
Sent: April 2, 2019 12:51 PM
To: Christine Hill
Cc: Peggy Slama; John Velick; Brian Worsley; Allison Kershaw; Brent Bouteiller; Jane Wilson
Subject: RE: Collingwood Water and Sanitary Servicing Master Plan

Christine,

Thank you for the opportunity to attend the PIC for the above project.

As you are aware the Town of The Blue Mountains (ToBM) is undergoing our own Water Distribution Master Plan EA. We expect to complete it over the summer.

One of the key issues arising from the ToBM's study is supplying water to the east side of ToBM. We currently have an agreement with Collingwood to provide up to 1250m³/day with the abilities to take up to 4000m³/day if agreed to by Collingwood. The connection is mutually beneficial because the ToBM has supplied water to Collingwood on an as needed basis and expects to continue to be able to offer any backup supply Collingwood may need.

With respect to the water supply and distribution needs on the east side of ToBM's (Craigleith and Blue Mountain Village area), the Master Plan is settling on commencing a Schedule C EA to evaluate three primary options: i) new trunk watermain from Thornbury; ii) additional supply from Collingwood, and iii) construction of a new water treatment plant likely at the north end of Long Point Road. I hope to get started on the Schedule C EA later this year and to know which will be the preferred option in the summer / fall of 2020.

From an email I sent in July 2018, the ToBM may require a total of 16,400 m³/day from Collingwood to supply the ultimate built-out water demand, however this figure can't be finalised until the Schedule C is underway. The ToBM's ask of Collingwood is to consider the supply and distribution implications that providing upwards of 16,400 m³/day at the Mountain Road may have on Collingwood's system. There will be flexibility in the volume required from Collingwood should there be a capacity limitation where additional supply comes with a higher per unit capital cost. ToBM can look at increasing supply in the existing system from Thornbury and/or over-sizing of storage.

Thank you again for inviting ToBM to comment on Collingwood's Water and Sanitary Servicing Master Plan. We wish to be actively involved in future discussions concerning Collingwood's water system and be notified at key points in the Master Plan process.

Please do not hesitate to contact me if you have any questions or concerns.

Reg Russwurm, MBA, P.Eng.
Director of Infrastructure and Public Works
Town of The Blue Mountains
32 Mill Street, Box 310
N0H 2H0
Tel: (519) 599-3131x260
Fax: (519) 599-7723
rrusswurm@thebluemountains.ca
www.thebluemountains.ca

From: Christine Hill [mailto:chill@coleengineering.ca]
Sent: Wednesday, March 20, 2019 5:36 PM
To: Reg Russwurm <rrusswurm@thebluemountains.ca>
Subject: Collingwood Water and Sanitary Servicing Master Plan

Reg:

I have attached a notice of Public Information Centre for our upcoming PIC for the above noted project. If you require additional information, please contact me.

Thanks
Christine

Christine Hill, M.Eng., P.Eng.
Business Development Leader – Infrastructure Planning

Cole Engineering Group Ltd.
2620 Bristol Circle Suite 300, Oakville, ON L6H 6Z7
T: 905-940-6161 F: 905-829-8890
C: 416-606-8762
Email: chill@coleengineering.ca
Website: www.coleengineering.ca

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Christine Hill

From: [REDACTED]
Sent: May 15, 2019 1:05 PM
To: John Velick
Cc: Peggy Slama
Subject: Re: Princeton Shores / Bartlett Sewer Servicing.

Thanks John.
Appreciate your attention to my inquiry.
Regards
Larry

Sent from my iPhone

> On May 15, 2019, at 10:23 AM, John Velick <jvelick@collingwood.ca> wrote:
>
> Hi Larry,
>
> I had discussed your inquiry with Cole and they will be looking at options to servicing the Princeton Shores area (and other areas on septic). We just received the draft report, but I have not yet had a chance to review it to see what they are proposing.
>
> Thank you,
>
> John
>
> John Velick P.Eng.
> Manager, Engineering Services
>
> Town of Collingwood
> P.O. Box 157, 545 Tenth Line North
> Collingwood, ON L9Y 3Z5
> 705-445-1292 Ext. 4209
> jvelick@collingwood.ca | www.collingwood.ca
>
>
> -----Original Message-----
> From: [REDACTED]
> Sent: May-13-19 10:15 AM
> To: Peggy Slama <pslama@collingwood.ca>
> Cc: John Velick <jvelick@collingwood.ca>
> Subject: Re: Princeton Shores / Bartlett Sewer Servicing.
>
> Hi Peggy/John.
> Just thought I would check in to see if there is anything further regarding my inquiry below.
> I'm sure it's still a "Work in Progress", but wanted to keep it on your radar.
> I did meet with Natasha Birch with questions specific to the Bridgewater Development proposal, but she did not mention anything related to the ultimate sewer servicing of the Princeton area.
> Thanks for your consideration.

> Regards
> Larry
>
> Sent from my iPad
>
>> On Mar 21, 2019, at 8:01 AM, Peggy Slama <pslama@collingwood.ca> wrote:
>>
>> Hi Larry,
>>
>> I have passed this on to John Velick and noted that you will likely attend the MSP session next week. I also chatted with Natasha from Engineering, who assists John in the review of developments and asked her to remind me what was proposed for The Preserve. Conveniently Natasha mentioned that she is working on the local improvement procedure.
>>
>> So, between Engineering and myself, we will get back to you on our thoughts on servicing for Princeton Shores.
>>
>> Peggy
>>
>>
>> -----Original Message-----
>> From: [REDACTED]
>> Sent: Friday, March 15, 2019 11:00 AM
>> To: Peggy Slama
>> Subject: Princeton Shores / Bartlett Sewer Servicing.
>>
>> Hi Peggy.
>> This is further to our recent conversation regarding the future sewer servicing in my neighbourhood and opportunities to facilitate the servicing in conjunction with the neighbouring (Consulate) development proposal.
>> I also see that a Public Meeting is scheduled 4-7 PM on Wednesday March 27th to discuss a Master Servicing Plan for the Town.
>> In the meantime, would you mind sharing your thoughts on how sewer servicing of our neighbourhood could be accomplished.
>> And confirming that there is available capacity for the collection and treatment of same.
>> Many thanks.
>> Larry
>>
>> P.S. Any thoughts and comments you have, I may share with some of my neighbours.
>>
>> Sent from my iPhone
>>
>>
>

AGENCIES MAILING LIST

Title	First Name	Last Name	Title	Agency	Department	Address 1	Address 2	City, Prov.	Postal Code	Email
Mr	Reg	Russwurm	Director of Infrastructure and Public Works	The Town of the Blue Mountains	Infrastructure and Public Works	32 Mill Street	PO Box 310	Thornbury, ON	N0H 2P0	rrusswurm@thebluemountains.ca
Mr	Steve	Sage	CAO	Clearview Township		217 Gideon St.		Stayner, ON	L0M 1S0	ssage@clearview.ca
Mr.	Mark	Aitken	CAO	County of Simcoe	Administration Centre	1110 Highway #26		Midhurst, ON	L0L 1X0	mark.aitken@simcoe.ca
Mr.	John	Daly	Clerk	County of Simcoe	Administration Centre	1110 Highway #26		Midhurst, ON	L0L 1X0	john.daly@simcoe.ca
Mr.	Charles	O'Hara	Manager of Growth Policy	Ministry of Infrastructure	Ontario Growth Secretariat	777 Bay Street	4th floor, Suite 425	Toronto, ON	M5G 2E5	charles.ohara@ontario.ca
Ms.	Chunmei	Lui	EA Coordinator	Ministry of Environment - Central Region		5775 Yonge St. 9th Fl.		Toronto, ON	M2M 4J1	Chunmei.lui@ontario.ca
Mr.	Colin	Bonnell		Bell Canada		136 Bayfield Street	Floor 12	Barrie, ON	L4M 3B1	colin.bonnell@bell.ca
Ms.	Maureen	Marshall		Bell Canada		444 Millard Ave.		Newmarket, ON	L3Y 2A3	maureen.marshall@bell.ca
Mr.	Dave	Parks	Director of Planning, Development and Tourism	County of Simcoe	Administration Centre	1110 Highway #26		Midhurst, ON	L0L 1X0	david.parks@simcoe.ca
Mr.	Andrew	Sorensen	Environmental Planning Coordinator	Grey Sauble Conservation Authority		237897 Inglis Falls Rd.	R.R. #4	Owen Sound, ON	N4K 5N6	asorensen@greysauble.on.ca
Mr.	Lee	Bull	Manager of Planning Services	Nottawasaga Conservation Authority						

Email Mail

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PUBLIC INTEREST MAILING LIST

Title	First Name	Last Name	Address 1	Address 2	City, Prov.	Postal Code	Email
Mr.							
Mr.							

Email	Letter
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x

FIRST NATIONS MAILING LIST

Title	First Name	Last Name	Title	Agency	Department	Address 1	Address 2	City, Prov.	Postal Code	Email
Chief	James	R. Marsden		Alderville First Nations		11696 Second Line	Box 46	Roseneath, ON	K0K 2X0	
Chief	Roly	Monague, Jr.		Beausoleil First Nations		1-O-Gema Street		Christian Island, ON	L0K 1C0	
				Chiefs of Ontario	Administrative Office	111 Peter Street	Suite 804	Toronto, ON	M5V 2H1	
Chief	Donna	Big Canoe		Chippewas of Georgina Island		RR#2	Box 12	Sutton West, ON	L0E 1R0	dbigcanoe@georginaisland.com
Chief	Scott	Lee		Chippewas of Nawash First Nation		R.R. 5		Warton, ON	N0H2T0	
Chief	Keith	Knott		Curve Lake First Nation						dutytoconsult@curvelakefn.ca
Mr.	Jonathan	Allen	Team Leader	Ministry of Indigenous Affairs		1430-25 Eddy St.		Gatineau, QC	K1A 0H4	
Mr.	Kevin	Clement	A/Director	Ministry of Indigenous Affairs		10 Wellington St.		Gatineau, QC	K1A 0H4	
Mr.	Marc-Andre	Millaire	Litigation Team Leader for Ont	Ministry of Indigenous Affairs		10 Wellington St.		Gatineau, QC	K1A 0H4	
Mr.	Guy	Morin	Policy Analysis	Ministry of Indigenous Affairs		10 Wellington St.	8th Floor	Gatineau, QC	K1A 0H4	
Mr.	Don	Boswell	Senior Claims Analyst	Ministry of Indigenous Affairs		10 Wellington St.	Rm 1310	Gatineau, QC	K1A 0H4	
Mr.	Glenn	Gilbert	Manager, Environmental Unit	Ministry of Aboriginal Affairs		25 St. Clair Ave. East	8th Floor	Toronto, ON	M4T 1M2	
Mr.	Allan	Vallee	President	Georgian Bay Metis Council		355 Cranston Crescent	Box 4	Midland, ON	L4R 4K6	
Chief	Laurie	Carr		Hiawatha First Nations		123 Paudash Street	R.R. #2	Keene, ON	K0L 2G0	lcarr@hiawathafn.ca
Mrs.	Heather	Bastien		Huron Wendat Council		255, Place Michel Laveau		Wendake, QC	G0A 4V0	
Mr.	Luc	La ne		Huron Wendat Council		255, Place Michel Laveau		Wendake, QC	G0A 4V0	
Mr.	Daniel	Johnson	Environmental Officer	Ministry of Aboriginal Affairs		25 St. Clair Ave. East	8th Floor	Toronto, ON	M4T 1M2	
Mr.	Sean	Darcy	Manager, Assessment & Histor	Ministry of Indigenous Affairs		10 Wellington St.		Gatineau, QC	K1A 0H4	
Mr.	James W.	Wagar	Consultation Assessment Coord	Metis Nation of Ontario	Lands, Resources and Consultation	75 Sherbourne St.	Unit 222	Toronto, ON	M5A 2P9	
			Metis Consultation Unit	Metis Nation of Ontario - Head Office		500 Old St. Patrick St.	Unit D	Ottawa, ON	K1N 9G4	
Mr.	Francois	Lachance	Senior Policy Advisor	Ministry of Indigenous Affairs		720 Bay Street	4th Floor	Toronto, ON	M5G 2K1	
Ms.	Heather	Levecque	Manager, Consultation Unit	Ministry of Aboriginal Affairs	Aboriginal and Ministry Relationships Branch	160 Bloor St. E.	9th Floor	Toronto, ON	M7A 2E6	
Mr.	Martin	Rukavina	Advisor	Ministry of Aboriginal Affairs	Aboriginal and Ministry Relationships Branch	160 Bloor St. E.	9th Floor	Toronto, ON	M7A 2E6	
Ms.	Pam	Wheaton	Director	Ministry of Aboriginal Affairs	Aboriginal and Ministry Relationships Branch	160 Bloor St. E.	9th Floor	Toronto, ON	M7A 2E6	
Ms.	Shelley	Gray	Consultation Coordinator	Mississaugas of Alderville First Nation		P.O. Box 4		Roseneath, ON	K0K 2X0	
Chief	Tracy	Gauthier		Mississaugas of Scugog Island		22521 Island Road	R.R.#5	Port Perry, ON	L9L 1B6	Tgauthier@scugogfirstnation.com
				Moose Deer Point First Nation		P.O. Box 119		Mactier, ON	P0C 1H0	
Mr.	Richard	Saunders	Director	Native Affairs Secretariat	Corporate Policy and Management Branch, Ontario	720 Bay Street	4th Floor	Toronto, ON	M5G 2K1	
Mr.	Chris	Hibberd	Director, Planning Services	Notawasaga Valley Conservation Authority		8195 8th Line		Utopia, ON	L0M 1T0	
Mr.	Jeffrey	Betker	Senior Policy Analyst Aborigina	Office of the Federal Interlocutor for Metis and non-status Indians		66 Slater Street	Rm 1225	Ottawa, ON	K1A 0H4	
Ms.	Wanda	McGonigle		Ojibways of Hiawatha First Nation		RR#2		Keene, ON	K0L 2G0	
Chief	Sharon	Stinson Henry		Rama First Nation						chief@ramafirstnation.ca
Chief	Randal	Kahgee		Saugeen (First Nation)		R.R. 1		Southampton, ON	N0H2L0	
				Scugog First Nations						tkozlinsky@scugogfirstnation.com
				Wahta Mohawk		P.O. Box 327		Bala, ON	P0C 1A0	
Chief	Robert	Tabbandung Sr.	Chief	Wasauksing First Nation		P.O. Box 250		Parry Sound, ON	P2A 2X4	
Ms.	Karry	Sandy-McKenzie	Coordinator	Williams Treaties First Nations		8 Creswick Court		Barrie, ON	L4M 2J7	

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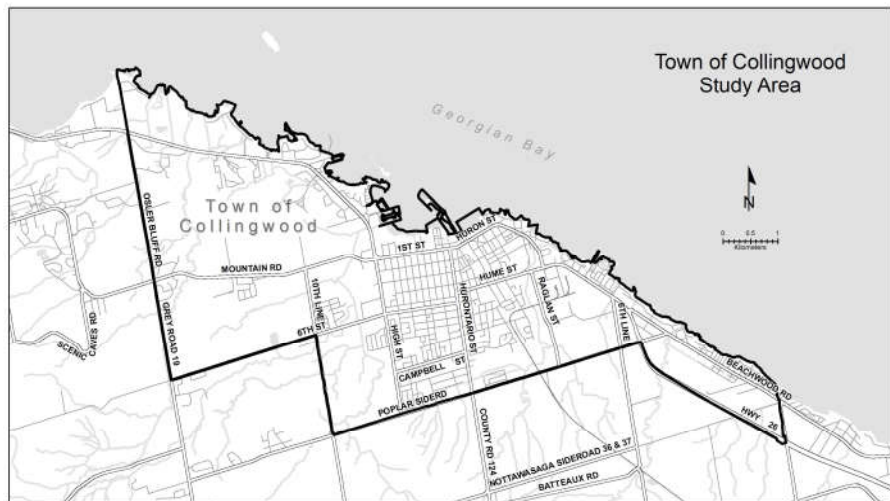
NOTICE OF PUBLIC INFORMATION CENTRE
Town of Collingwood Water and Sanitary Sewer System Master Servicing Plan

THE STUDY

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town, through their consultants, Cole Engineering and C3 Water, has been developing a comprehensive and flexible Master Servicing Plan to identify the water and wastewater infrastructure projects required to service growth to the year 2031 and beyond.

The Master Servicing Plan is intended to be flexible and innovative with servicing strategies that can be scalable to fit future needs. To support the Plan, the project team has developed:

- Predictive modelling tools,
- An Inflow and Infiltration Reduction Program,
- Recommendations updates to the Official Plan, and,
- Recommendations for updates to the 2014 Development Charges Study.



THE PROCESS

The study has followed what's known as Approach 1 of the Municipal Engineers Association Class Environmental Assessment process for Master Plans, which involves broad assessment of the problem/opportunity (i.e. the need to planned service growth), identification and evaluation of alternative solutions and selection of the preferred approach. Small projects (known as Schedule A and A+ projects) may proceed after the Plan is approved, while larger projects (known as Schedule B and C projects) will require additional site specific analysis in the future.

PUBLIC CONSULTATION

Public and agency consultation is vital to the success of this study. To ensure that those interested in this project have an opportunity to provide input to and receive feedback from the study team, a Public Information Centre (PIC) will be held as per the details below. The PIC will present study background information, the various strategies considered, evaluation of the servicing strategies and selection of the recommended servicing strategies and next steps. The location and time of the PIC is shown below.

Public Information Centre
Date: March 27, 2019
Time: 4:00pm – 7:00pm
Location: Collingwood Public Library, 3rd Floor
5 Ste. Marie Street,
Collingwood, Ontario, L9Y 0W6

Following the PIC, information presented at the PIC will be posted on the Town's website at www.collingwood.ca and anyone with an interest can participate by providing comments on the study. Please contact us if you have any questions, require further information or wish to be added to the project mailing list:

Christine Hill, M. Eng., Project Manager
Cole Engineering Group Ltd.
2620 Bristol Circle, Suite 300,
Oakville, ON L6H 6Z7
Tel: 877 825-9870
Fax: 905.829.8890
chill@coleengineering.ca

John Velick, P.Eng.
Manager, Engineering Services
Town of Collingwood
PO Box 157
545 Tenth Line Road
Collingwood, ON L9Y 3Z5
Tel: 705-445-1292 Ext. 4209
jvelick@collingwood.ca

This Notice issued: March 11, 2019

www.collingwood.ca



March 18, 2019
Our Ref: 2017-1013

Georgian Bay Metis Council
355 Cranston Crescent Box 4
Midland, ON L4R 4K6

Attention: Allan Vallee, President

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

Public Information Centre

Date: March 27, 2019

Time: 4:00pm – 7:00pm

Location: Collingwood Public Library, 3rd Floor
5 Ste. Marie Street,
Collingwood, Ontario, L9Y 0W6

This study is being completed in accordance with the requirements of the Municipal Class Environmental Assessment process (October 2000, as amended in 2007 and 2011). Your input and questions are encouraged. Input and comments received from the public and agencies will be incorporated into the Master Servicing Plan. To provide the study team with input or request further information, contact Christine Hill at (416)-606-8762 or by email at chill@coleengineering.ca. We have attached a copy of the Notice of Public Information Centre for your information.

Yours sincerely,
COLE ENGINEERING GROUP LTD.

Christine Hill, M.Eng., P.Eng.
Project Manager

Enc. Notice of Commencement
c.c John V elick, Town of Collingwood

COLE ENGINEERING GROUP LTD.

HEAD OFFICE

70 Valleywood Drive, Markham, ON Canada L3R 4T5

T. 905 940 6161 | 416 987 6161 F. 905 940 2064

www.coleengineering.ca





March 18, 2019
Our Ref: 2017-1013

Grey Sauble Conservation Authority
237897 Inglis Falls Rd. R.R. #4
Owen Sound, ON N4K 5N6

Attention: Andrew Sorensen, Environmental Planning Coordinator

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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Yours sincerely,
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Christine Hill, M.Eng., P.Eng.
Project Manager

Enc. Notice of Commencement
c.c John Velick, Town of Collingwood

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70 Valleywood Drive, Markham, ON Canada L3R 4T5

T. 905 940 6161 | 416 987 6161 F. 905 940 2064

www.coleengineering.ca





March 18, 2019
Our Ref: 2017-1013

Ministry of Infrastructure
777 Bay Street
4th floor, Suite 425
Toronto, ON M5G 2E5

Attention: Charles O'Hara, Manager of Growth Policy

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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Christine Hill, M.Eng., P.Eng.
Project Manager

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c.c John Velick, Town of Collingwood

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HEAD OFFICE

70 Valleywood Drive, Markham, ON Canada L3R 4T5

T. 905 940 6161 | 416 987 6161 **F.** 905 940 2064

www.coleengineering.ca





March 18, 2019
Our Ref: 2017-1013

Notawasaga Valley Conservation Authority
8195 8th Line
Utopia, ON L0M 1T0

Attention: Chris Hibberd, Director, Planning Services

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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Yours sincerely,
COLE ENGINEERING GROUP LTD.

Christine Hill, M.Eng., P.Eng.
Project Manager

Enc. Notice of Commencement
c.c John Velick, Town of Collingwood

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HEAD OFFICE

70 Valleywood Drive, Markham, ON Canada L3R 4T5

T. 905 940 6161 | 416 987 6161 F. 905 940 2064

www.coleengineering.ca





March 18, 2019
Our Ref: 2017-1013

Ministry of Environment - Central Region
5775 Yonge St, 9th Fl.
Toronto, ON M2M 4J1

Attention: Chunmei Lui, EA Coordinator

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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Christine Hill, M.Eng., P.Eng.
Project Manager

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www.coleengineering.ca





March 18, 2019
Our Ref: 2017-1013

Bell Canada
136 Bayfield Street, Floor 12
Barrie, ON L4M 3B1

Attention: Colin Bonnell

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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Project Manager

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www.coleengineering.ca





March 18, 2019
Our Ref: 2017-1013

Ministry of Aboriginal Affairs
25 St. Clair Ave. East 8th Floor
Toronto, ON M4T 1M2

Attention: Daniel Johnson, Environmental Officer

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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Christine Hill, M.Eng., P.Eng.
Project Manager

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c.c John Velick, Town of Collingwood

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HEAD OFFICE

70 Valleywood Drive, Markham, ON Canada L3R 4T5

T. 905 940 6161 | 416 987 6161 **F.** 905 940 2064

www.coleengineering.ca





March 18, 2019
Our Ref: 2017-1013

County of Simcoe
1110 Highway #26
Midhurst, ON L0L 1X0

Attention: Dave Parks, Director of Planning, Development and Tourism

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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March 18, 2019
Our Ref: 2017-1013

Ministry of Indigenous Affairs
10 Wellington St. Rm 1310
Gatineau, QC K1A 0H4

Attention: Don Boswell, Senior Claims Analyst

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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Yours sincerely,
COLE ENGINEERING GROUP LTD.

Christine Hill, M.Eng., P.Eng.
Project Manager

Enc. Notice of Commencement
c.c John Velick, Town of Collingwood

COLE ENGINEERING GROUP LTD.

HEAD OFFICE

70 Valleywood Drive, Markham, ON Canada L3R 4T5

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March 18, 2019
Our Ref: 2017-1013

Chippewas of Georgina Island
RR#2 Box 12
Sutton West, ON L0E 1R0

Attention: Chief Donna Big Canoe

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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March 18, 2019
Our Ref: 2017-1013

Ministry of Indigenous Affairs
720 Bay Street 4th Floor
Toronto. ON M5G 2K1

Attention: Francois Lachance, Senior Policy Advisor

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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March 18, 2019
Our Ref: 2017-1013

Ministry of Aboriginal Affairs
25 St. Clair Ave. East 8th Floor
Toronto, ON M4T 1M2

Attention: Glenn Gilbert, Manager, Environmental Unit

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Attention: Gord McLean

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Ministry of Indigenous Affairs
10 Wellington St. 8th Floor
Gatineau, QC K1A 0H4

Attention: Guy Morin, Policy Analyst

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Huron Wendat Council
255, Place Michel Laveau
Wendake, QC G0A 4V0

Attention: Heather Bastien

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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March 18, 2019
Our Ref: 2017-1013

Ministry of Aboriginal Affairs
Aboriginal and Ministry Relationships Branch
160 Bloor St. E. 9th Floor
Toronto, ON M7A 2E6

Attention: Heather Levecque, Manager, Consultation Unit

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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March 18, 2019
Our Ref: 2017-1013

Alderville First Nations
11696 Second Line Box 46
Roseneath, ON K0K 2X0

Attention: Chief James R. Marsden

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Metis Nation of Ontario
75 Sherbourne St. Unit 222
Toronto, ON M5A 2P9

Attention: James W. Wagar, Consultation Assessment Coordinator

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Office of the Federal Interlocutor for Metis and non-status Indians
66 Slater Street Rm 1225
Ottawa, ON K1A 0H4

Attention: Jeffrey Betker, Senior Policy Analyst Aboriginal

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

County of Simcoe
1110 Highway #26
Midhurst, ON L0L 1X0

Attention: John Daly, Clerk

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Ministry of Indigenous Affairs
1430-25 Eddy St.
Gatineau, QC K1A 0H4

Attention: Jonathan Allen, Team Leader

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Williams Treaties First Nations
8 Creswick Court
Barrie, ON L4M 2J7

Attention: Karry Sandy-McKenzie, Coordinator

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Curve Lake First Nation

Attention: Chief Keith Knott

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Ministry of Indigenous Affairs
10 Wellington St.
Gatineau, QC K1A 0H4

Attention: Kevin Clement

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Hiawatha First Nations
123 Paudash Street R.R. #2
Keene, ON K0L 2G0

Attention: Chief Laurie Carr

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Manager of Planning Services
Nottawasaga Conservation Authority

Attention: Lee Bull

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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c.c John Velick, Town of Collingwood

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HEAD OFFICE

70 Valleywood Drive, Markham, ON Canada L3R 4T5

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March 18, 2019
Our Ref: 2017-1013

Huron Wendat Council
255, Place Michel Laveau
Wendake, QC G0A 4V0

Attention: Luc La ne

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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Yours sincerely,
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Christine Hill, M.Eng., P.Eng.
Project Manager

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c.c John Velick, Town of Collingwood

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March 18, 2019
Our Ref: 2017-1013

Ministry of Indigenous Affairs
10 Wellington St.
Gatineau, QC K1A 0H4

Attention: Marc-Andre Millaire, Litigation Team Leader for Ontario

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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March 18, 2019
Our Ref: 2017-1013

County of Simcoe
1110 Highway #26
Midhurst, ON L0L 1X0

Attention: Mark Aitken, CAO

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Ministry of Aboriginal Affairs, Aboriginal and Ministry Relationships Branch
160 Bloor St. E. 9th Floor
Toronto, ON M7A 2E6

Attention: Martin Rukavina, Advisor

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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March 18, 2019
Our Ref: 2017-1013

Bell Canada
444 Millard Ave.
Newmarket, ON L3Y 2A3

Attention: Maureen Marshall

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Metis Nation of Ontario - Head Office
500 Old St. Patrick St. Unit D
Ottawa, ON K1N 9G4

Attention: Metis Consultation Unit

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Moose Deer Point First Nation
P.O. Box 119
Mactier, ON P0C 1H0

Attention: Moose Deer Point First Nation

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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March 18, 2019
Our Ref: 2017-1013

Ministry of Aboriginal Affairs
Aboriginal and Ministry Relationships Branch
160 Bloor St. E. 9th Floor
Toronto, ON M7A 2E6

Attention: Pam Wheaton, Director

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Saugeen (First Nation)
R.R 1
Southampton, ON N0H2L0

Attention: Chief Randal Kahgee

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 19, 2019
Our Ref: 2017-1013

The Town of the Blue Mountains
32 Mill Street PO Box 310
Thornbury, ON N0H 2P0

Attention: Reg Russwurm, Director of Infrastructure and Public Works

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Native Affairs Secretariat
Corporate Policy and Management Branch, Ontario
720 Bay Street 4tg Floor
Toronto, ON M5G 2K1

Attention: Richard Saunders, Director

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Wasauksing First Nation
P.O. Box 250
Parry Sound, ON P2A 2X4

Attention: Chief Robert Tabobandung Sr.

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Beausoleil First Nations
1-O-Gema Street
Christian Island, ON L0K 1C0

Attention: Chief Roly Monague, Jr.

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Chippewas of Nawash First Nation
RR#2 Box 12
Sutton West, ON L0E 1R0

Attention: Chief Scott Lee

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Attention: Scugog First Nations

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Ministry of Indigenous Affairs
10 Wellington St.
Gatineau, QC K1A 0H4

Attention: Sean Darcy , Manager, Assessment & History

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Rama First Nation

Attention: Chief Sharon Stinson Henry

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

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March 18, 2019
Our Ref: 2017-1013

Mississaugas of Alderville First Nation P.O. Box 4
Roseneath, ON K0K 2X0

Attention: Shelley Gray, Consultation Coordinator

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

Public Information Centre

Date: March 27, 2019

Time: 4:00pm – 7:00pm

Location: Collingwood Public Library, 3rd Floor

5 Ste. Marie Street,

Collingwood, Ontario, L9Y 0W6

This study is being completed in accordance with the requirements of the Municipal Class Environmental Assessment process (October 2000, as amended in 2007 and 2011). Your input and questions are encouraged. Input and comments received from the public and agencies will be incorporated into the Master Servicing Plan. To provide the study team with input or request further information, contact Christine Hill at (416)-606-8762 or by email at chill@coleengineering.ca. We have attached a copy of the Notice of Public Information Centre for your information.

Yours sincerely,
COLE ENGINEERING GROUP LTD.

Christine Hill, M.Eng., P.Eng.
Project Manager

Enc. Notice of Commencement
c.c John Velick, Town of Collingwood

COLE ENGINEERING GROUP LTD.

HEAD OFFICE

70 Valleywood Drive, Markham, ON Canada L3R 4T5

T. 905 940 6161 | 416 987 6161 **F.** 905 940 2064

www.coleengineering.ca





March 18, 2019
Our Ref: 2017-1013

Clearview Township
217 Gideon St.
Stayner, ON L0M 1S0

Attention: Steve Sage, CAO

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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March 18, 2019
Our Ref: 2017-1013

Mississaugas of Scugog Island
22521 Island Road R.R.#5
Port Perry, ON L9L 1B6

Attention: Chief Tracey Gauthier

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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March 18, 2019
Our Ref: 2017-1013

Wahta Mohawk
P.O. Box 327
Bala, ON P0C 1A0

Attention: Wahta Mohawk

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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Christine Hill, M.Eng., P.Eng.
Project Manager

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c.c John Velick, Town of Collingwood

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www.coleengineering.ca





March 18, 2019
Our Ref: 2017-1013

Ojibways of Hiawatha First Nation
RR#2
Keene, ON K0L 2G0

Attention: Wonda McGonigle

Re: Town of Collingwood Water and Sanitary Sewer Master Servicing Plan Study

The Town of Collingwood will experience growth over the next 15 years. To ensure that adequate water and wastewater servicing can support that growth, the Town has undertaken a comprehensive Water and Wastewater Master Servicing Plan Study. This study is evaluating alternatives for providing water and wastewater servicing based on consideration of the natural, cultural, technical and economic environments. A Public Information Centre will be held on March 27, 2019 to present our recommended preferred alternatives and to gather public input at the following location:

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Christine Hill, M.Eng., P.Eng.
Project Manager

Enc. Notice of Commencement
c.c John Velick, Town of Collingwood

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APPENDIX B

Servicing of Planned and Potential Developments

APPENDIX B: Servicing of Planned and Potential Developments															
Sanitary Flows															
	Developer	Development	Development Type/		Anticipated		Residential	Residential	Residential	Residential		Estimated	Average	Infiltration	Sanitary
Designation	Number	Name	Lane Use	Address	Servicing	Area (ha)	Single Family Units	Semi Detached Units	Townhouse Units	Apartment Units	Commercial Space (m2)	Residential Population	Wastewater Flow (L/s)	Flow (L/s)	Model Node Assignment
Planned	1	Ambulance Station Expansion	Community Services		Full Services	0.147	0	0	0	0	0	0	0.048	0.034	65-002
Planned	2	Mountainview Public School Expansion	Community Services		Full Services	4.111	0	0	0	0	0	0	1.332	0.946	9-01A
Planned	3	Cranberry Inn Extension	Commercial		Full Services	2.194	0	0	0	0	0	0	0.711	0.505	H26N-17
Planned	4	75 Third Street	Commercial	75 Third Street	Full Services	0.062	0	0	0	0	0	0	0.020	0.014	9-011
Planned	5	10 Balsam-Commercial Plaza	Commercial	10 Balsam	Full Services	0.398	0	0	0	0	0	0	0.129	0.091	H26N-32A
Planned	6	Regional Commercial District	Commercial		Full Services	21.070	0	0	0	0	0	0	6.828	4.846	98-004
Planned	7	Van Dolder Subdivision	Industrial		Full Services	8.089	0	0	0	0	0	0	2.622	1.861	03-03
Planned	8	Ace Cabs	Industrial		Full Services	0.780	0	0	0	0	0	0	0.253	0.179	54-25A
Planned	9	BMC Autobody	Industrial		Full Services	2.497	0	0	0	0	0	0	0.809	0.574	147-06
Planned	10	Collingwood Service Station	Industrial		Full Services	0.380	0	0	0	0	0	0	0.123	0.087	76-14
Planned	11	Georgian Bay Bio Med	Industrial		Full Services	4.001	0	0	0	0	0	0	1.297	0.920	03-05
Planned	12	Dunn Hotel	Industrial		Full Services	0.876	0	0	0	0	0	0	0.284	0.202	54-26A
Planned	13	Isowater	Industrial		Full Services	0.415	0	0	0	0	0	0	0.134	0.095	100-04
Planned	14	360 Raglan	Industrial	360 Raglan	Full Services	0.404	0	0	0	0	0	0	0.131	0.093	54-19A
Planned	15	100 Mountain Road	Industrial	100 Mountain	Full Services	2.119	0	0	0	0	0	0	0.687	0.487	BA-48
Planned	16	Stewart Road Reservoir	Other		Full Services	0.502	0	0	0	0	0	0	0.163	0.115	29-009
Planned	17	Affordable Housing Project	Residential		Full Services	1.319	0	0	0	147	0	279	1.455	0.303	121-001
Planned	18	Silver Glen	Residential		Full Services	2.276	0	0	50	0	0	120	0.625	0.523	H26N-1A
Planned	19	Blue Fairway	Residential		Full Services	8.494	0	0	262	0	0	629	3.275	1.954	120-09
Planned	20	Pretty River Estates Phase II	Residential		Full Services	7.197	21	0	152	0	0	426	2.217	1.655	292-22A
Planned	21	Riverside Midrise	Residential		Full Services	2.848	0	0	156	0	0	374	1.950	0.655	CDO-31
Planned	22	Shipyards Condo E	Residential		Full Services	1.486	0	0	28	0	0	67	0.350	0.342	20-23
Planned	23	Mackinaw Village	Residential		Full Services	1.210	0	0	28	0	0	67	0.350	0.278	20-12
Planned	24	Balmoral	Residential		Full Services	6.958	0	54	0	309	2600	733	3.817	1.600	1-005
Planned	25	Harhay	Residential		Full Services	2.814	0	0	154	0	0	370	1.925	0.647	H26N-05
Planned	26	Wyldewood Cover	Residential		Full Services	3.671	0	0	177	0	0	425	2.213	0.844	H26N-01
Planned	27	655 Hurontario Apartments	Residential		Full Services	0.416	0	0	32	0	0	77	0.400	0.096	22-11A
Planned	28	Linksvie	Residential		Full Services	40.688	439	0	8	190	0	1653	8.611	9.358	BA-39
Planned	29	Panorama	Residential		Full Services	19.702	127	0	0	192	0	733	3.818	4.532	3-3A
Planned	30	Red Maple	Residential		Full Services	17.893	131	0	147	0	0	733	3.816	4.115	BA-40
Planned	31	Victoria Annex	Residential		Full Services	0.601	0	0	19	0	0	46	0.238	0.138	13-12A
Planned	32	Georgian Meadows	Residential		Full Services	1.015	0	0	25	0	0	60	0.313	0.234	170-25
Planned	33	The Preserve at Georgian Bay	Residential		Full Services	12.268	75	0	249	0	0	815	4.245	2.822	H26N-01
Planned	34	Huntingwood	Residential		Full Services	11.823	92	0	62	0	0	416	2.165	2.719	H26N-01
Planned	35	Helen Court Homes	Residential		Full Services	7.567	66	0	189	0	0	645	3.359	1.740	04-014
Planned	36	Riverside Townhomes	Residential		Full Services	2.540	0	0	57	0	0	137	0.713	0.584	CDO-30A
Planned	37	Eden Oak McNabb	Residential		Full Services	27.009	256	0	120	0	0	1030	5.367	6.212	209-60A, 95-004
Planned	38	Summit View	Residential		Full Services	31.584	233	0	173	0	0	1091	5.682	7.264	201-22A
Planned	39	Harmony Living	Residential		Full Services	2.450	0	0	80	0	0	192	1.000	0.563	CDO-36A
Planned	40	Monaco	Residential		Full Services	0.757	0	0	0	260	2600	494	2.573	0.174	22-007
Planned	41	Cranberry	Residential		Full Services	9.144	0	0	314	0	0	754	3.925	2.103	H26N-1A
Planned	42	Panorama North	Residential		Full Services	20.120	929	0	0	0	0	2694	14.032	4.628	3-2A
Potential	1	Braeside	Residential		Water Only	7.264	15	0	0	0	0	44	0.000	0.000	-
Potential	2	Batteaux Creek Subdivision	Residential		Water Only	15.287	20	0	0	0	0	58	0.000	0.000	-
Potential	3	2906 Sixth Line and 7026 Poplar	Light Industrial	2906 Sixth Line	Full Services	14.997	0	0	0	0	0	0	4.860	3.449	147-06
Potential	4	Eden Oak Industrial Lands	Light Industrial		Full Services	50.738	0	0	0	0	0	0	16.443	11.670	4-13A (1/3)+ 100-08 (2/3)
Potential	5	Georgian College	Light Industrial		Full Services	3.817	0	0	0	0	0	0	1.237	0.878	54-13A
Potential	6	Industrial	Light Industrial		Full Services	7.295	0	0	0	0	0	0	2.364	1.678	54-13A
Potential	7	King Property	Residential		Full Services	7.448	57	0	205	0	0	657	1.978	1.713	62-1A
Potential	8	Memory Care Facility	Hospital	92 Raglan	Full Services	0.614	0	0	30	0	0	72	0.217	0.141	54-007
Potential	9	500 Ontario	Residential	500 Ontario	Full Services	0.642	0	0	60	0	0	144	0.433	0.148	76-004
Potential	10	Legion	Med Residential		Full Services	0.441	24	0	0	0	0	70	0.212	0.101	54-003
Potential	11	Parkridge	Office		Full Services	1.403	0	0	0	0	0	0	0.455	0.323	51-007
Potential	12	Courthouse	High Residential		Full Services	0.571	0	0	68	0	0	163	0.491	0.131	51-004
Potential	13	Hospital Expansion	Hospital		Full Services	3.007	0	0	0	0	0	0	0.169	0.692	63-018
Potential	14	Duncap Waterfront Hotel	Mixed		Full Services	1.154	0	0	0	80	2280	152	0.457	0.266	245-10
Potential	15	Admirals Village	Mixed		Full Services	0.487	0	0	70	0	1100	168	0.506	0.112	36-076
Potential	16	Reinhart Warehouse	Residential		Full Services	1.189	23	0	0	0	0	68	0.204	0.273	40-002
Potential	18	Church Property	Residential		Full Services	1.163	44	0	0	0	0	128	0.384	0.27	209-63A
Potential	19	Hurontario Poplar	Commercial		Full Services	3.259	0	0	0	0	0	0	1.056	0.75	372-20A
Potential	20	Blackmoor	Residential		Full Services	1.356	34	0	0	0	0	99	0.297	0.31	22-13A
Potential	21	Findlay Property	Residential		Full Services	2.207	22	0	0	0	0	64	0.192	0.51	201-6A
Potential	22	South of St. Marys School	Residential		Full Services	4.175	74	0	0	0	0	215	0.646	0.96	135-30A
Potential	23	Old Organic Farm	Residential	50 Saunders	Full Services	4.319	76	0	0	0	0	220	0.663	0.99	238-34A
Potential	24	Collingwood Nursing Home	Residential	7650 Poplar Road	Full Services	1.414	47	0	0	0	0	136	0.410	0.33	49-001
Potential	25	Saunders	Residential	250 Campbell	Full Services	1.629	32	0	0	0	0	93	0.279	0.37	49-001
Potential	26	Garbutt (Behind Helen Court Homes)	Residential	197 Campbell	Full Services	1.842	59	0	0	0	0	171	0.515	0.42	45-01A
Potential	27	Northwest Corner of Poplar and High	Residential		Full Services	8.942	340	0	0	0	0	986	2.967	2.06	201-22A
Potential	28	Dagnews	Residential		Full Services	1.564	30	0	0	0	0	87	0.262	0.36	201-22A
Potential	29	Fumo Lands	Residential	8070 Poplar	Full Services	8.856	300	0	0	0	0	870	2.618	2.04	183-16A
Potential	30	Two Blocks	Residential		Full Services	8.427	308	0	0	0	0	893	2.688	1.94	98-013
Potential	31	115 High Street	Residential	580 Sixth	Full Services	0.207	15	0	0	0	0	44	0.131	0.05	98-024
Potential	32	121 High Street	Residential	115 high	Full Services	0.747	6	0	0	0	0	17	0.052	0.17	98-010
Potential	33	Commercial High Street	Commercial	121 High	Full Services	9.626	0	0	0	0	0	0	0.000	2.21	H26N-23
Potential	34	Living Waters	Hotel		Full Services	2.343	0	0	0	253	0	481	1.447	0.54	119-008
Potential	35	Law Property	Residential		Full Services	1.189	23	0	0	0	0	68	0.204	0.27	1-001
Potential	36	Dawson Drive East Lands	Residential	16 harbour St W	Full Services	2.468	48	0	0	0	0	141	0.423	0.57	H26N-014
Potential	37	White Street	Residential		Full Services	1.018	20	0	0	0	0	58	0.175	0.23	H26N-014
Potential	38	Gun Club Road	Residential		Full Services	0.487	10	0	0	0	0	28	0.083	0.11	H26N-012
Potential	39	Rolling	Residential		Full Services	5.572	200	0	0	0	0	580	1.745	1.28	H26N-05
Potential	40	Griffith	Residential		Full Services	1.018	30	0	0	0	0	87	0.262	0.23	H26N-05
Potential	41	Greentree	Residential		Full Services	4.933	97	0	0	0	0	281	0.846	1.13	H26N-02

APPENDIX B: Servicing of Planned and Potential Developments Sanitary Flows															
	Developer	Development	Development Type/ Lane Use		Anticipated		Residential Single Family	Residential Semi Detached	Residential Townhouse	Residential Apartment		Estimated Residential	Average Wastewater	Infiltration	Sanitary
Designation	Number	Name		Address	Servicing	Area (ha)	Units	Units	Units	Units	Commercial Space (m2)	Population	Flow (L/s)	Flow (L/s)	Model Node Assignment
Potential	42	Georgian Manor Resorts	Residential		Full Services	2.499	0	0	0	150	0	285	0.858	0.57	H26N-1A
Potential	43	Under Utilized Industrial Lands	Industrial		Full Services	24.163	0	0	0	0	0	0	7.830	5.56	03-06
Potential	44	Huronic Village	Residential		Full Services	0.000	0	0	13	0	0	31	0.094	0.00	20-07
Potential	45	Mair Mills North	Residential		Full Services	0.000	128	0	265	508	0	1972	5.935	0.00	3-4A



APPENDIX C
Water System Model Review

APPENDIX C



TECHNICAL MEMORANDUM

To: **Peggy Slama, P.Eng.**
Manager, Environmental Services

Company: **Town of Collingwood**

From: **Sam Ziemann, P.Eng.**

Our File: **75-41-161174**

Cc:

Date: **April 24, 2017**

Subject: **Review of Existing Town of Collingwood Water Model**

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TOWN OF COLLINGWOOD

Review of Existing Town of Collingwood Water Model

C3 WATER INC.

April 24, 2017



TECHNICAL MEMORANDUM

VERSION	DATE	DESCRIPTION OF REVISIONS	REVISED BY	REVIEWED BY
1	March 13, 2017	Draft 1	Nathan Valsangkar	Sam Ziemann Peggy Slama John Velick John Vail
2	April 24, 2017	Final	Nathan Valsangkar	Sam Ziemann



TECHNICAL MEMORANDUM

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1.0 INTRODUCTION AND BACKGROUND

1.1 General

The Town of Collingwood is currently in the process of developing its Water and Sanitary Sewer System Master Servicing Plan (MSP). An important component of the MSP is the use of hydraulic modelling to understand the behavior of the existing water distribution system and how it will behave under future development scenarios. The existing Collingwood Water Supply and Distribution Model, originally produced by Ainley & Associates, has been provided to C3 Water (C3W) by the Town for use during the project. This technical memorandum details the original model's development, a review of its functionality, and recommendations for updating it to better meet the needs of the MSP project.

1.2 Overview of Town of Collingwood Distribution System

The Town of Collingwood takes water from Nottawasaga Bay where it is treated at the Raymond A. Baker Water Filtration Plant (WFP) by membrane filtration and chlorine disinfection. Treated water is pumped from the WFP's clearwell to the Collingwood distribution system (Zone 1) by high lift pumps, and to the Town of New Tecumseth (ToNT) by another pump station at the WFP through a dedicated pipeline.

An elevated storage tank (ET) near the centre of the Town is fed by the Zone 1 high lift pumps and supplies storage for Zone 1. On the West side of Zone 1, the Carmichael in-ground reservoir and pump station supplies Zone 1 to the east (towards the elevated tank) and Zone 1 to the west (towards Osler booster pumping station (BPS)). The reservoir is fed or drained by a single watermain and as such cannot currently be operated as an in-and-out reservoir. However, designs are in place to upgrade the reservoir for this capability. The reservoir is currently filled at night from Zone 1 via a hydraulic flow control valve, and during the day it is operated as an "out" reservoir via its three pumps. The pumps are operated based on Zone 1 ET water levels. When not in operation, water is allowed to bypass the pump station to supply the west side of Zone 1. In the south-western portion of Zone 1, the Georgian Meadows BPS currently supplies the Georgian Meadows development (Zone 2) and is considered a temporary BPS.

At the western boundary between Zones 1 and 2, Osler BPS pumps from Zone 1 to Zone 2. In this portion of Zone 2, a watermain feeds the Mountain Road pump station which supplies and meters water to the Town of Blue Mountains (TOBM).

At the south end of Zone 1, the Bob Davey reservoir is fed from the ToNT pipeline via a flow control valve. The Bob Davey pumping station at the same location draws from the reservoir and feeds the southern portion of Zone 2. The reservoir can be bypassed so that Zone 2 is fed directly from the ToNT pipeline, however; this operation is not typical. Zone 2 can also be fed directly from Zone 1 through an in-field PRV; this operation is not typical.

An overall process flow schematic of the system is included in Appendix A.

1.3 Existing Model Development

The existing Collingwood Water Supply and Distribution model was developed in 2014 based on the Town's previous 2004 WaterCAD model. The 2014 model was updated to reflect end of 2012 conditions and has been used on a routine basis to assess new developments, performance of the existing system, and future build-out impacts. Figure 1-1 below provides an overview of the model along with parcel fabric from the Town's GIS layers.

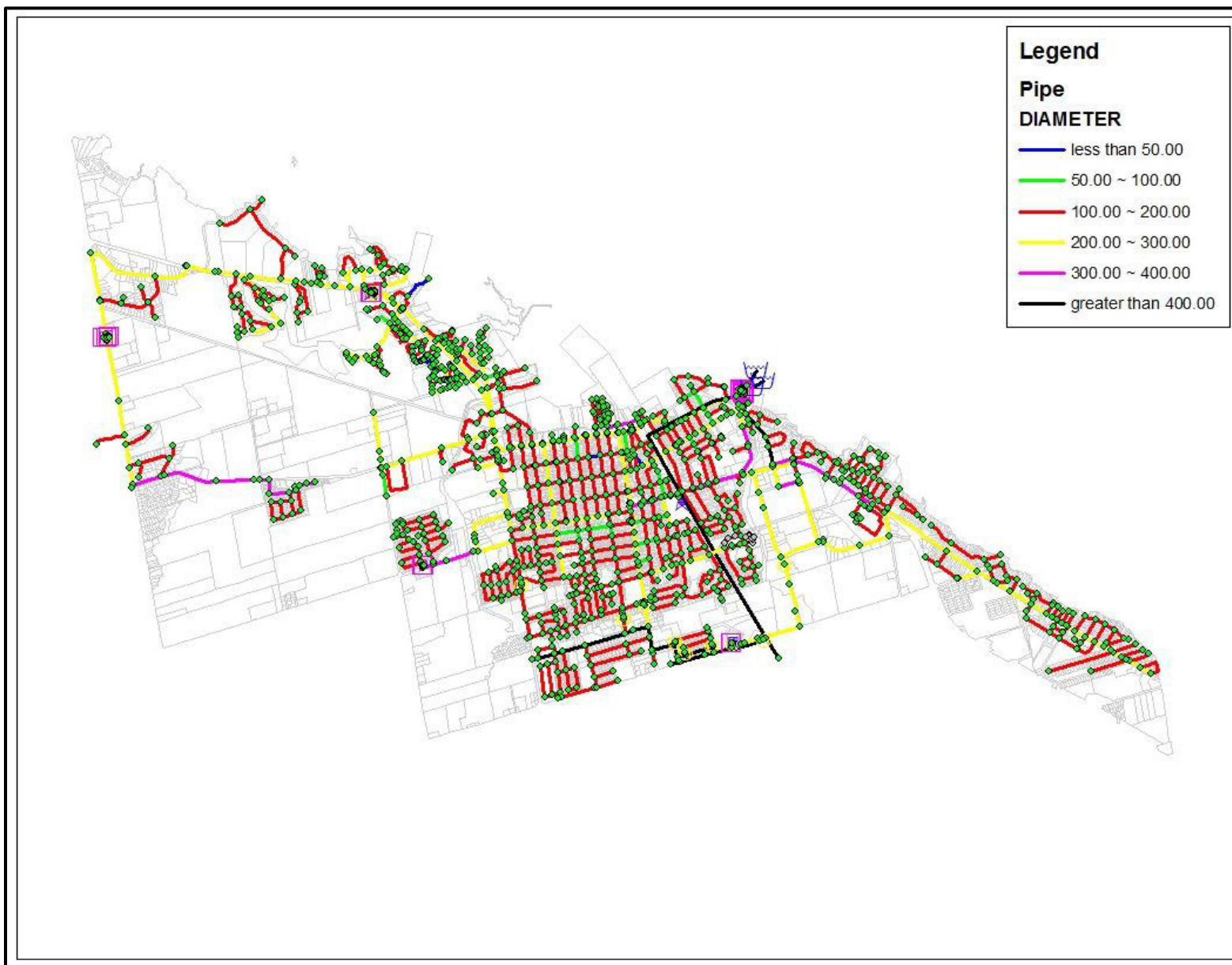


Figure 1-1: Town of Collingwood Water Model Overview

The model's development is described in detail in a March 2014 document titled "Town of Collingwood Water Supply and Distribution System Model Update", produced by Ainley & Associates.

As stated in the 2014 Model Update, the model provides the following simulation scenarios under existing, intermediate build-out, and full build-out conditions:

- Steady-State (SS) Average Day Demand (ADD)
- SS Maximum Day Demand (MDD)
- SS Peak Hour Demand (PHD)
- SS Maximum Day Demand + Fire Flow (MDD + FF)
- Extended-Period Simulation (EPS)

However, the model in as-received state only provides future conditions under the PHD scenario. Remaining future scenarios (MDD, ADD, etc.) were noted as "Superceded" in the model and do not contain demand values.

Calibration of the existing model was conducted in October 2013 based on hydrant testing of flow and pressure at select locations and Hazen-Williams C-factor testing of select watermain sections. A detailed description of existing model conditions is provided in Section 2.0.

2.0 EXISTING MODEL CONDITIONS

2.1 Watermains

The model is an all-pipe with all existing watermains included in the model. As described in the 2014 Model Update, watermains in the Town's distribution system range from 100mm to 600mm in size and are (generally) of the following materials:

- Concrete pipe for mains greater than 400mm
- Ductile iron for mains less than 400mm and built from 1973 to present
- Cast iron for mains less than 400mm and built from 1942-1970
- A mix of cast iron and ductile iron for mains less than 400mm and built from 1970-1973

As described in the 2014 Model Update, calibration of the model was conducted based on hydrant testing data and Hazen-Williams C-factor testing of select watermain sections. C-factors in the model were initially based on MOECC design guidelines and varied until the model agreed with hydrant testing results. Field-tested C-factors were not included in the model. Field testing indicated that C-factors for cast iron main sections were in the range of 47-60, while those included in the final calibrated model were typically 100. Additionally, minor loss k factors were included in approximately 700 sections of watermain and ranged from 0.2 – 32.7. Fifteen (15) section of watermain included k factors greater than 10. For reference, the minor loss k for a 90° elbow on 150mm pipe is 0.42. Figure 2-1 below provides an overview of pipe minor loss k factors in the vicinity of the Raymond A. Baker WFP.

Based on assessment of the city's GIS layers for watermains, laterals, hydrants and valves, there does not appear to be physical infrastructure meriting the addition of large minor loss coefficients for these pipe sections. It is likely that the large minor loss factors were added as calibration parameters only. In combination with modelled flow control valves on the WTP pump discharge lines (see Section 2.2) the minor loss coefficients essentially "throttle" pump discharges so that downstream system pressures can match flow testing data.

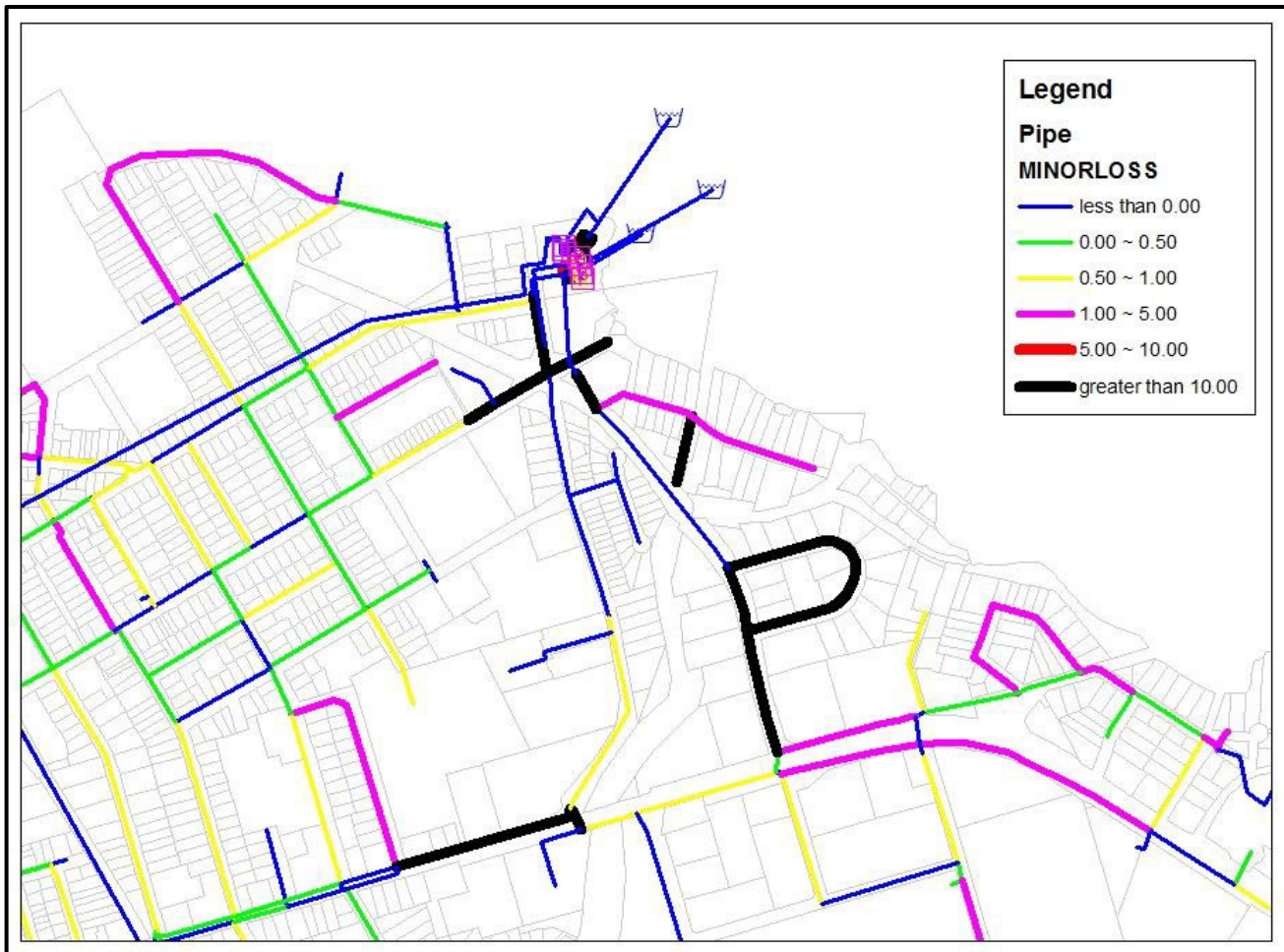


Figure 2-1: Minor Loss K Factors in Vicinity of Raymond A. Baker WFP

As part of a separate assignment for the Town, C3W conducted a watermain hydraulic assessment of the proposed Riverside Townhomes and Midrise developments. During the course of the assessment, C3W noted that the model's pipe diameters for several sections of watermain in the vicinity of the proposed developments did not match the Town's GIS watermain layer. For the purposes of the assessment, C3W modified these watermain sections to match the Town's GIS layer, however; at this time C3W has not conducted a system-wide comparison of the modeled vs GIS pipe diameters for the entire distribution system. It is not known which source of information is the correct source.

It is also likely that the existing model does not include new sections of watermain which have been added since the model's last update. Figure 2-2 below provides a comparison of the model's current watermain layout against the Town's GIS watermain layer. Watermains included in the Town's GIS layer which are not found in the existing water model are identified in red.

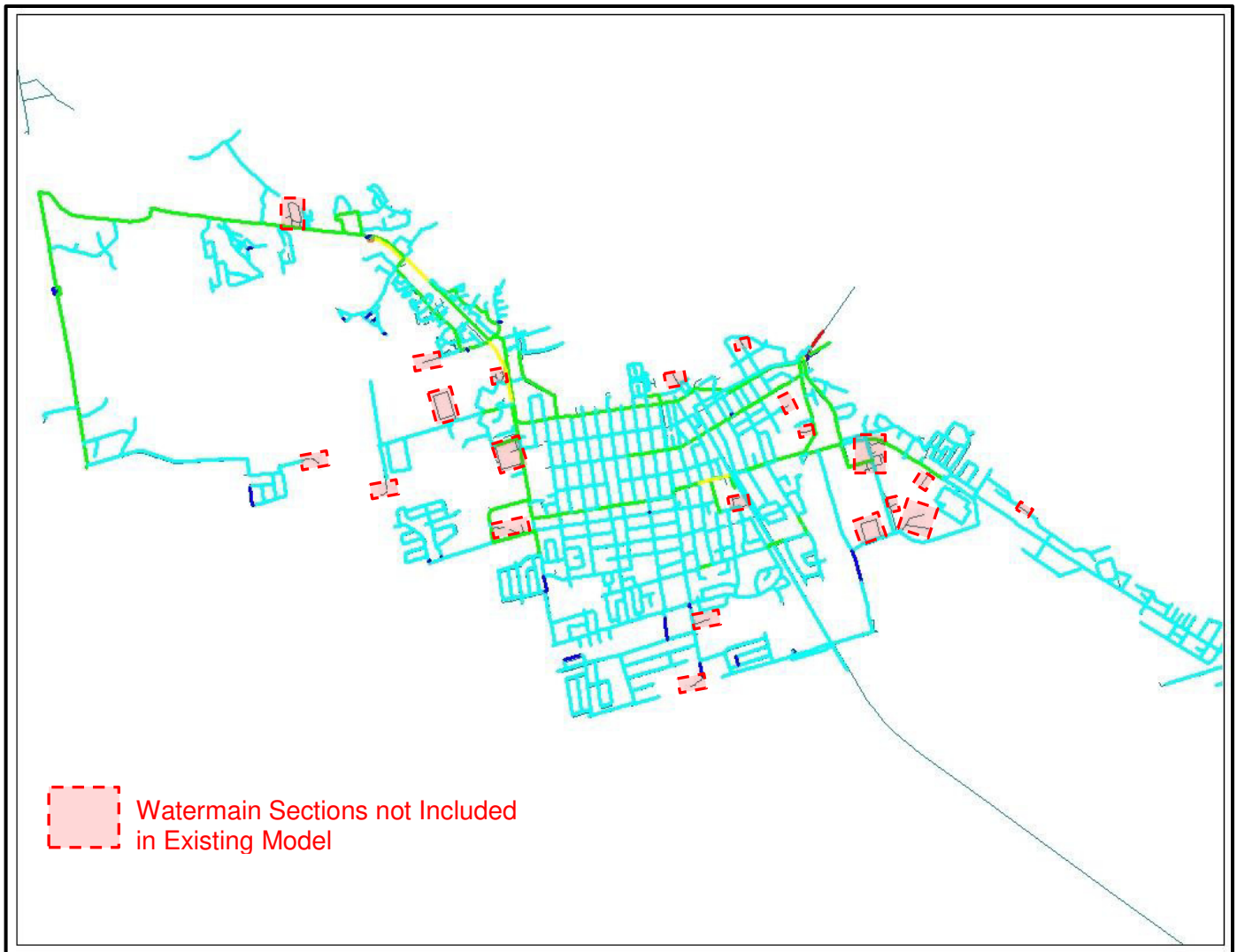


Figure 2-2: Existing Model Watermain Layout vs. Town of Collingwood GIS Watermain Layer

2.2 Pump Stations

The model contains all existing pumping stations and reservoirs. The following provides an analysis of each pumping station in Collingwood.

2.2.1 Raymond A. Baker WFP Pump Station

The pump station at Raymond A. Baker WFP is divided in two sections: pumps discharging to the ToNT pipeline and pumps discharging to Zone 1. Figure 2-3 below provides an overview of the station under the ADD scenario for existing (2012) conditions.

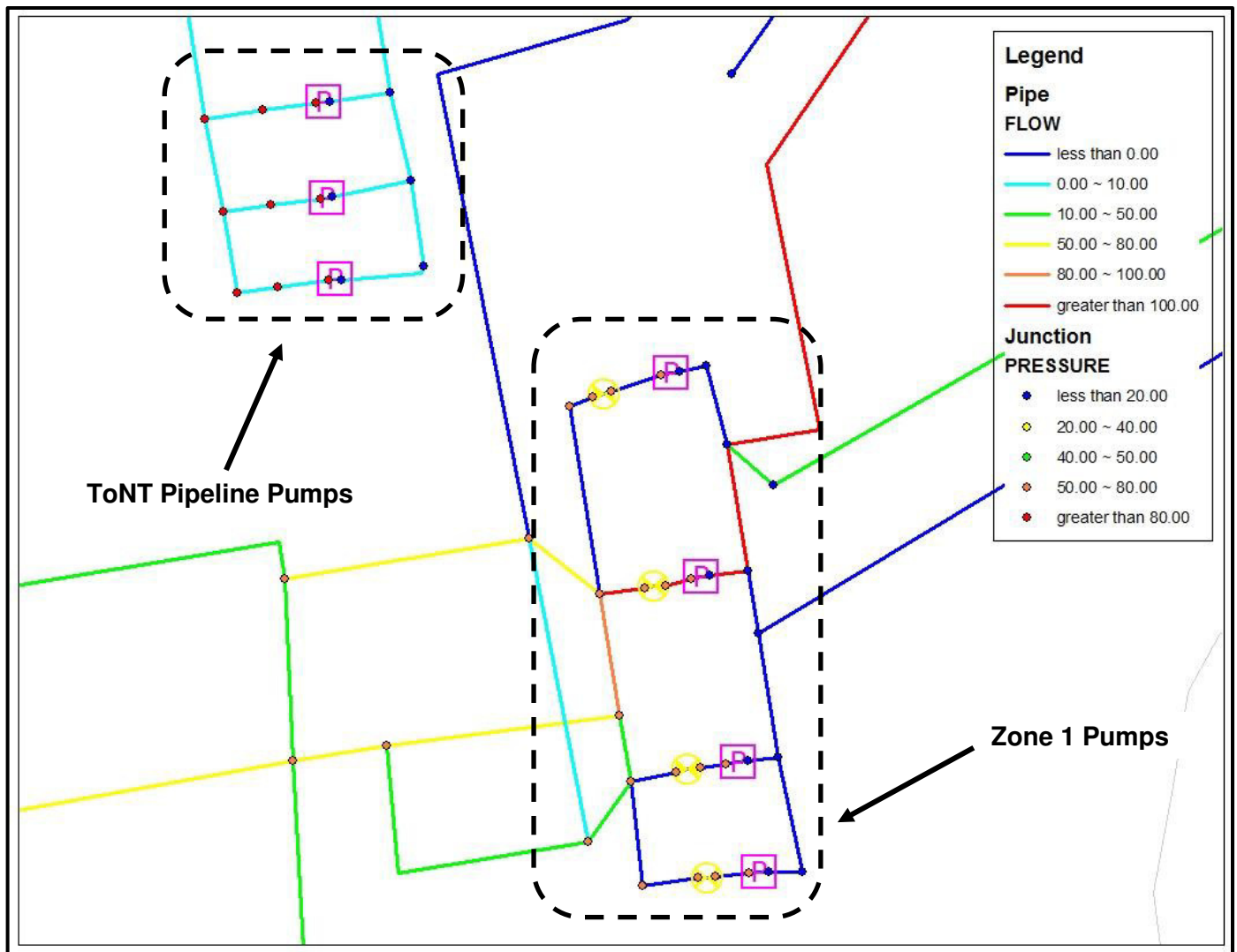


Figure 2-3: Raymond A. Baker WFP Pumping Overview ADD

The model currently includes three pumps discharging to the ToNT pipeline, all of which are modelled as single-speed pumps with design capacities of 136 L/s. These pumps do not currently have controls associated with them and are simply set as “on” or “off”. Under the existing model scenarios, two pumps are in operation. However, due to the model’s lack of demand sets for ToNT (see Section 2.3), total flow from the two pumps is less than 5 L/s under ADD and MDD scenarios. As such, these pumps are operating near their shutoff heads and do not represent real-world conditions where actual flows from ToNT are present. Actual operation of these pumps is based on level at the Parsons Road Reservoir in Alliston. No efficiency curves have been included in the model.

The model currently includes four (4) pumps discharging to Zone 1: three with design capacities of 139 L/s and one with a design capacity of 57 L/s. The model also includes a flow control valve on the discharge side of each pump. These valves set a flow rate out of the pump regardless of downstream conditions and the model’s flow settings differ between the ADD and MDD scenarios. No flow control valves of this type were observed during C3W’s site visit on March 7, 2017. The model does not currently include the Variable Frequency Drives (VFDs) used to control pumps 2 & 3.

The model’s current pump controls for ADD are based on level at the Zone 1 ET and are summarized in Table 2-1 below. However; the model is currently set to override these controls and runs a single pump at a

set flow rate using the flow control valve. Following discussions with Town staff, it is likely that these levels represent elevations from the ground surface at the base of the ET, and not the level within the ET itself which has an approximate maximum value of 6m.

Table 2-1: Raymond A. Baker WFP Pump Station Existing Controls

Pump ID	Flow Control Valve Setting (ADD)	Tank Level for Pump “on”	Tank Level for Pump “off”
2341	56.7 L/s	22.97 m	23.95 m
2340	137.47 L/s	22.31 m	23.62 m
2339	137.47 L/s	21.33 m	23.29 m
2338	137.47 L/s	18.04 m	19.69 m

Actual operation of the pumps is based on level at the ET, however, based on an assessment of SCADA data provided by the Town; the model’s set points do not match current operating conditions.

All pumps at the station draw from the WFP clearwell. The clearwell is currently modelled as a constant-head reservoir boundary, however; the model includes very long suction lines (250m) from the clearwell to the pumps. These are not representative of physical infrastructure at the plant, as all pumps are vertical impeller turbines.

2.2.2 Bob Davey (South) Reservoir and Pump Station

The Bob Davey Reservoir and Pump Station currently supply the east side of Zone 2. The model currently includes five (5) pumps with the following design capacities:

- 1 x 65 L/s
- 2 x 92 L/s
- 1 x 55 L/s
- 1 x 25 L/s

Following a site visit to the Station and discussions with Town staff, it has been verified that the 65 L/s pump does not exist. It is unclear why this pump is included in the model.

The station draws from the Bob Davey Reservoir which is fed from the ToNT pipeline. The model currently includes a flow control valve on the Bob Davey Reservoir fill line which is set to 3.0 L/s. Based on discussions with Town staff, this valve is a PRV which throttles flow into the reservoir to 10 L/s. The Reservoir is modelled as a 2.5 ML cylindrical tank with a maximum level of 6.02m, and an operating level under steady-state MDD and ADD conditions of 3.32 m. Based on an assessment of SCADA data, the reservoir is typically operated between 4.90 and 5.00 m. No storage curves for the reservoir are included in the model.

The ADD and MDD scenarios only run the 25 L/s pump and no controls are associated with any pumps in the station. The station discharge includes a pressure reducing valve which is currently set to 80 psi downstream. Real-world operation of the station includes VFDs on all four pumps which turn on sequentially to maintain a downstream pressure of 570 kPa (83 psi). There is no PRV on the station discharge.

Under low-flow conditions, the reservoir can be bypassed so that Zone 2 distribution is fed directly from the ToNT pipeline. While this is not typical operation, bypass lines are not currently included in the model. Additionally, the station discharge includes a recirculation line, equipped with PRV, which can re-feed the reservoir. While this is not typical operation, the recirculation line and PRV are not currently included in the model.

Figure 2-4 below provides a model overview of the pump station and reservoir under the ADD scenario.

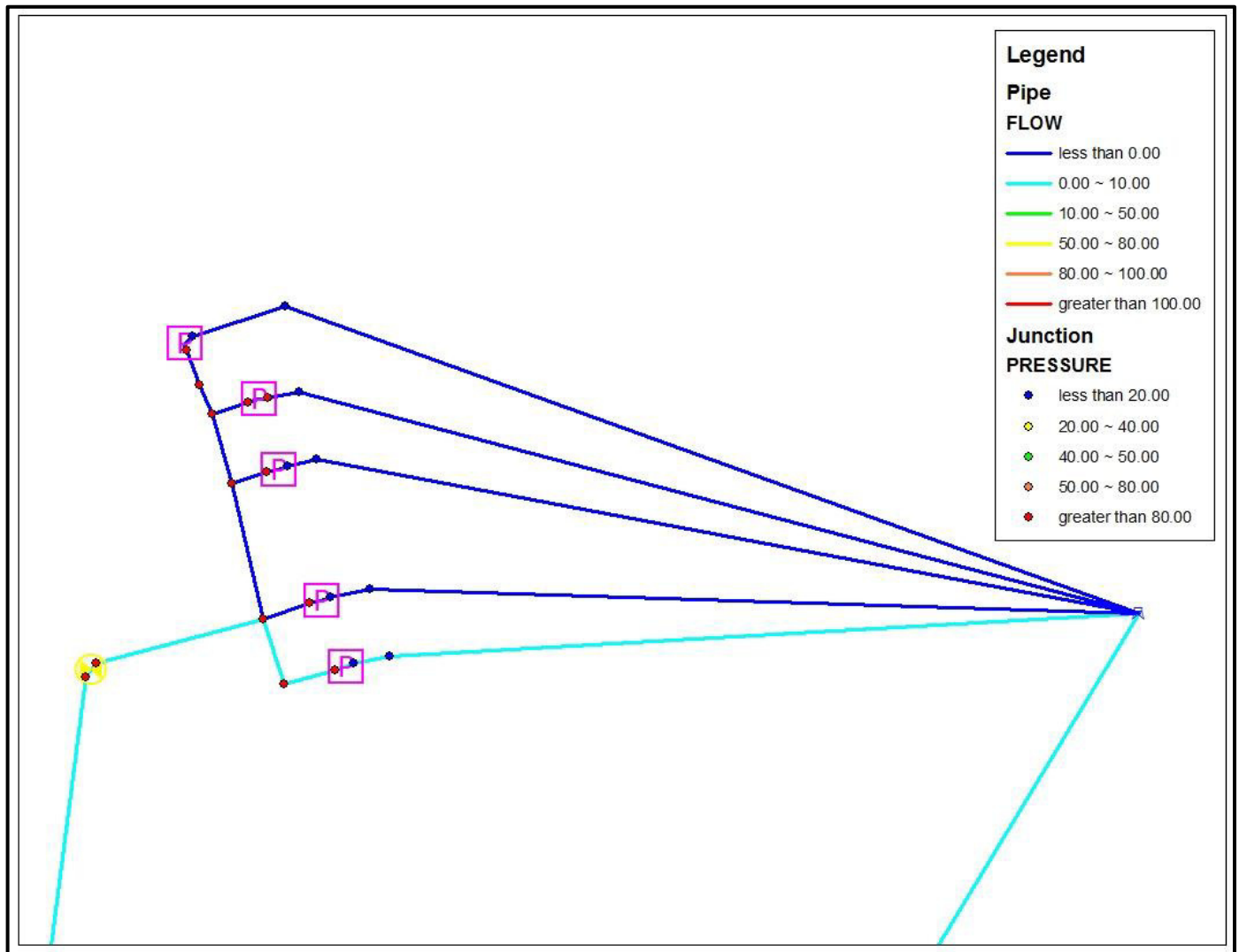


Figure 2-4: South Reservoir and Pump Station Model Overview ADD

2.2.3 Georgian Meadows Booster Pump Station

The Georgian Meadows BPS currently includes two single-speed pumps rated for approximately 2.5 L/s each based on a visual assessment of their pump curves. The model's existing control scheme assigns standby or duty to the two pumps based on upstream pressure. If upstream pressure is between 63.1 psi and 71.1 psi, a single duty pump will run. If upstream pressure drops below 63.1 psi, a second pump will turn on. If upstream pressure is above 71.1 psi, both pumps are off and the station is bypassed. The third pump at Georgian Meadows is not currently included in the model.

Following discussions with Town staff, the station contains three pumps (2 are available, 1 is obsolete) and the station is not currently run with automatic controls. Pumps are manually set to on and off from SCADA by the operators and normally only one pump out of the two available is running.

The model also includes check valves on one pipe within the station and one pipe nearby at the south end of Alyssa Drive. Following discussions with Town staff, the check valve on Alyssa Drive is a pressure relief valve which is set to 80 psi maximum upstream. The check valve within the station itself is a pump

recirculation line equipped with a PRV which runs from the station discharge header to the station suction line.

Figure 2-5 below provides a model overview of the pump station under the ADD scenario

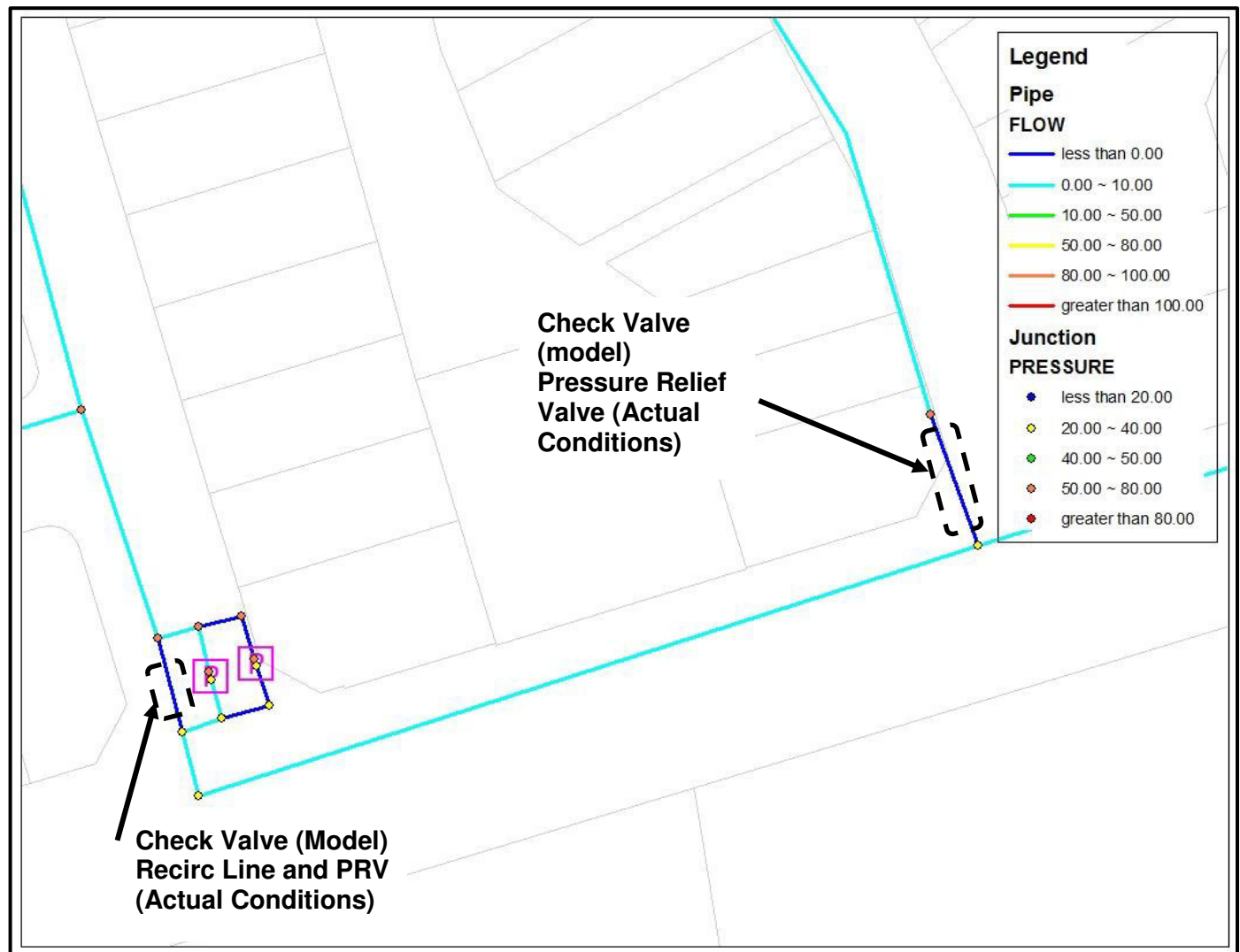


Figure 2-5: Georgian Meadows Booster Pump Station Model Overview ADD

2.2.4 Carmichael (West) Reservoir and BPS

The Carmichael BPS currently includes three single-speed pumps rated at 200 L/s (x2) and 100 L/s (x1) each based on a visual assessment of their pump curves. There are currently no control rules used to turn the pumps on and off and the model currently includes only the 100 L/s pump running.

The 100 L/s and one 200 L/s pumps have flow control valves on their discharge sides which are both set to 20 L/s. Under the ADD scenario, only the 100 L/s pump is turned on and the station discharge is therefore 20 L/s.

The pumps draw from the Carmichael Reservoir which is modelled as a 6.8 ML cylindrical tank with a maximum level of 5.22 m and steady-state operating level under the MDD and ADD scenarios of 5.12 m. The reservoir is modelled to be fed from a pressure sustaining valve which maintains upstream pressure above 50 psi. No storage curves for the reservoir are included in the model.

Actual operation of the reservoir is based on a single in or out line. Fill is accomplished at night via a hydraulic valve which fills the reservoir at approximately 20 L/s. During the day, the pumps turn on or off based on level in the elevated tank. The pumps are soft-start and discharge directly to distribution with no flow control valves. These controls are not captured in the model's control logic.

Figure 2-6 below provides a model overview of the pump station under the ADD scenario

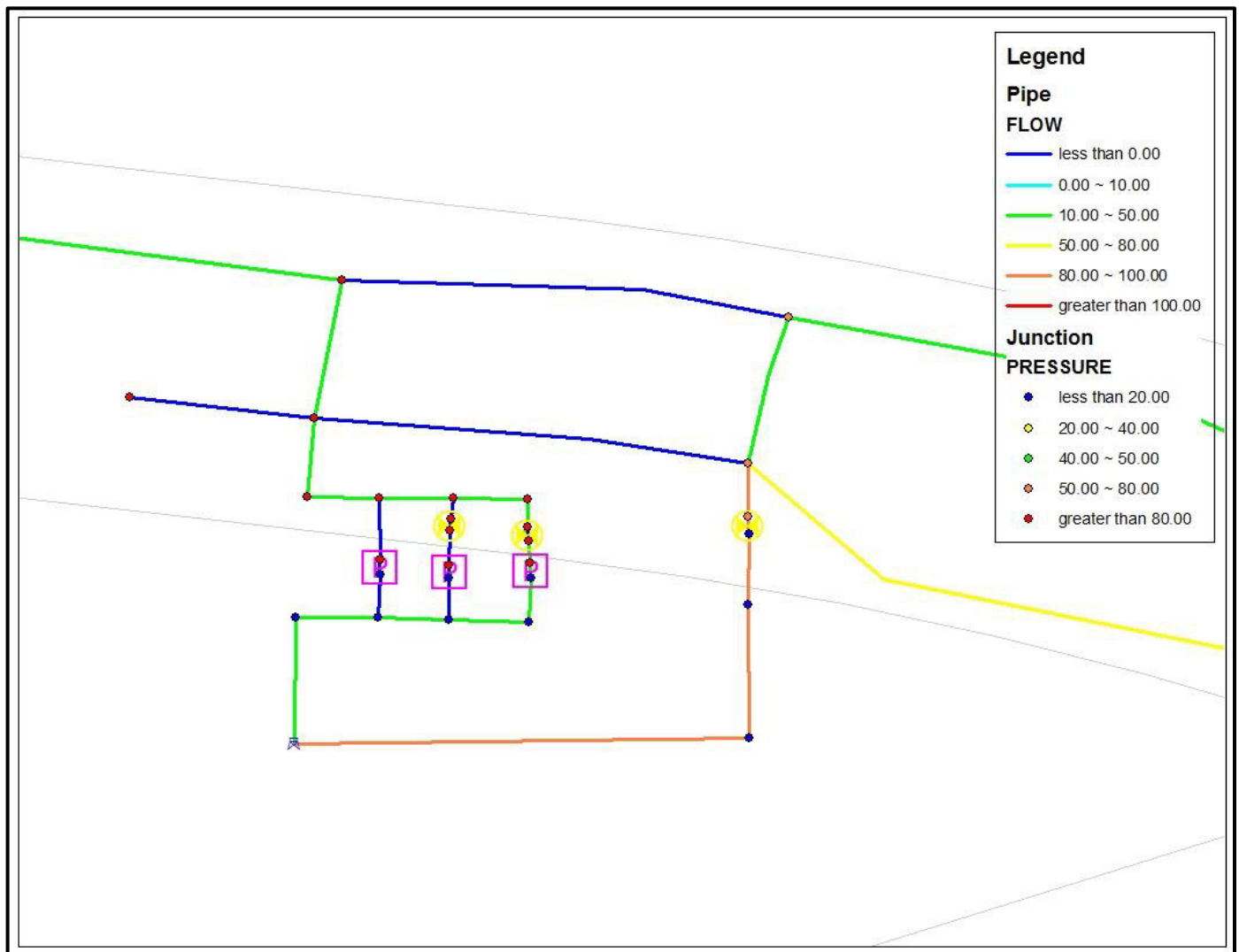


Figure 2-6: Carmichael Reservoir and Booster Pump Station Model Overview ADD

2.2.5 Osler Booster Pump Station

The Osler BPS currently includes three single-speed pumps rated for approximately 45 L/s (x2) and 8 L/s (x1) each based on a visual assessment of their pump curves. The existing control scheme assigns standby or duty to the two pumps based on upstream pressure. If upstream pressure is between 81.22 psi and 85.57 psi, a single 45 L/s pump will run. If upstream pressure is between 85.57 psi and 91.37 psi, the 8 L/s lag pump will turn on as well. If upstream pressure is between 91.37 psi and 97.18 psi, only the 8 L/s pump will run. If upstream pressure is above 97.18 psi, both pumps are turned off. The third 45 L/s pump is always set to “off” and under the ADD scenario the station runs with one 45 L/s pump only.

Based on discussions with Town staff, Osler is not currently run in automatic mode and pumps are turned on and off manually from SCADA. Currently operation includes two pumps, with the third available as standby.

The model's station discharge includes a PRV which at this time has been set to 80 psi. Following discussions with Town staff, this PRV does not exist. There is a station recirculation line from the station discharge header to the station suction header which is equipped with a PRV. This is not included in the model.

Two pipes in the station currently include check valves.

Figure 2-7 below provides a model overview of the pump station under the ADD scenario

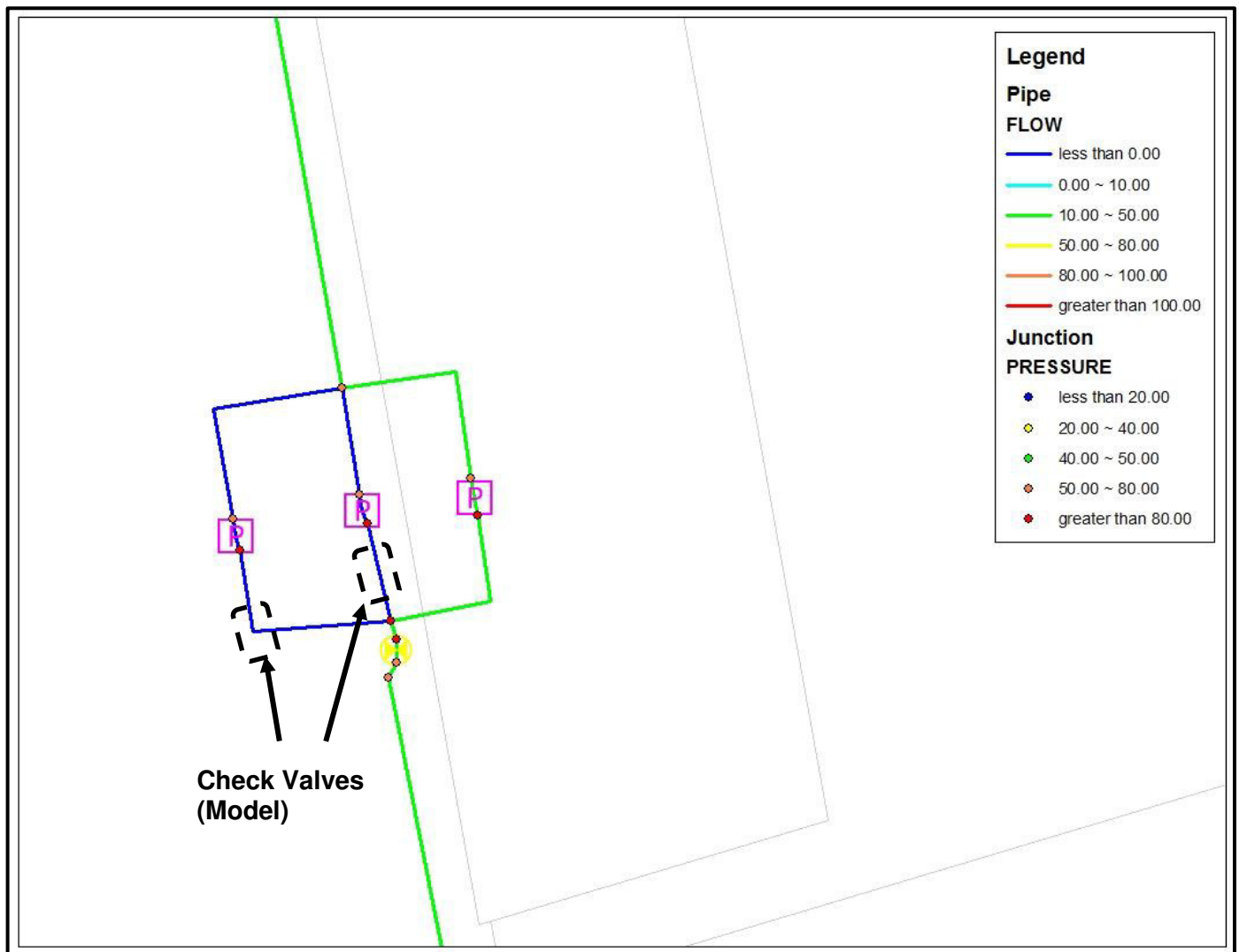


Figure 2-7: Osler Booster Pump Station Model Overview ADD

2.2.6 Mountain Road Pump Station

The Mountain Road Pump Station which provides water transfer to TOBM is not currently included in the model. A constant demand for TOBM is included in the pump station feed line and the line terminates at that point. The station itself includes three (3) pumps equipped with VFDs.

2.3 Demands

Demands included in the water model were originally based on historical water information provided by the Town for 2010 - 2012, including:

- Treated Water from the WFP
- Water distributed to the Town of Collingwood based on finance records
- Water distributed to Town of New Tecumseth
- Water distributed to Town of Blue Mountains
- Known losses
- Unaccounted for water

The Town provided meter information for 114 users with service sizes greater than 50mm. Average demands associated with these nodes was included in the ADD scenario.

Known losses, including items such as flushing and watermain breaks, were distributed evenly across the system as demand values. Unaccounted for water was also evenly distributed across the system.

Residential, Industrial, Institutional, and Commercial demands were distributed equally across lots throughout the system. No distinction was made between lot types. Demands were then assigned to nodes based on the number of adjacent lots. As a result of this method, many nodes such as dead-end watermain stubs and nodes with no nearby consumers have been assigned demand values.

Demand associated with distribution to the TOBM was placed on a node representing the Mountain Road Pump Station. No demands were associated with the ToNT because, as stated in the 2014 Model Update “The demand for the Town of New Tecumseth comes from dedicated pumps that only deliver water to the Town of New Tecumseth and the water is delivered via a dedicated watermain”. However, the Bob Davey reservoir is also fed from the ToNT pipeline under normal operating conditions.

The MDD scenario was built in a similar fashion using the largest historical MDD SCADA data from 2009-2012. The PHD scenario built on the MDD scenario using a PHD:MDD peaking factor of 1.5 from the MOECC guidelines. The actual PHD:MDD peaking factor, based on historical data, was 1.2 for the Town of Collingwood.

Separate diurnal curves have not been developed at this time for Town of Collingwood, TOBM, and ToNT, nor have separate diurnal curves been developed for each Zone of the Town of Collingwood. Figure 2-8 below provides the model’s existing diurnal curve.

The shape of the diurnal curve is unusual. Distinct morning and evening peak periods are not present and demand multipliers from 8:00 pm 11:00 pm are as high as, or higher than, the morning demand multipliers.

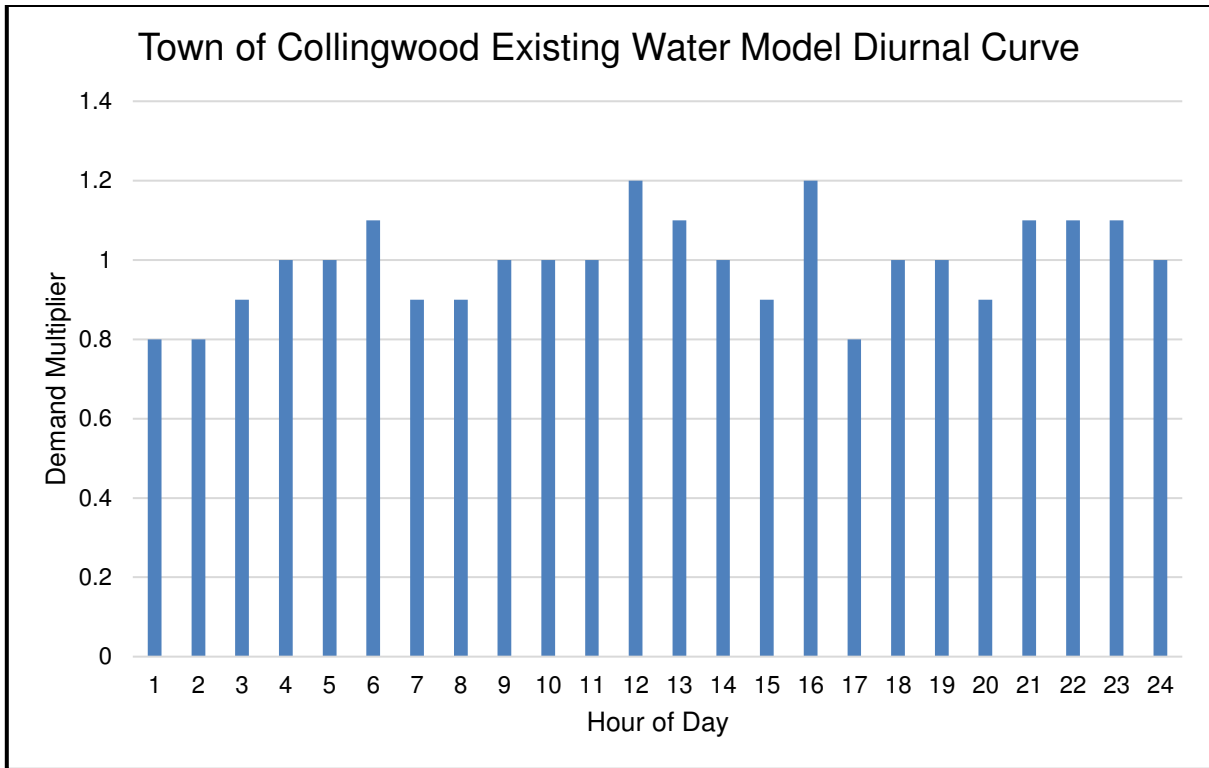


Figure 2-8: Existing Town of Collingwood Water Model Diurnal Curve

2.4 Valves and Controls

The model currently includes a number of pressure reducing valves within the distribution system. Figure 2-9 below provides an overview of their locations while Table 2-2 below provides their set points under the ADD and MDD scenarios. For Valve 2405 south of Hurontario St. at Campbell St., it is unusual that there are two different set points for the ADD and MDD scenarios. It is also unusual that Valves 2445 and 2414 (south of Raglan St. at Ron Emo Rd. and south of High St. at Tenth St, respectively) are assigned negative pressure set points.

Based on discussions with Town staff, PRVs 2436, 2437, and 2438 do not actually exist.

Based on discussions with Town staff, there are in-field PRVs not included in the model at High St. and Chamberlain, and at Cranberry Trail and Dawson. Overall model PRV settings do not match real-world settings.

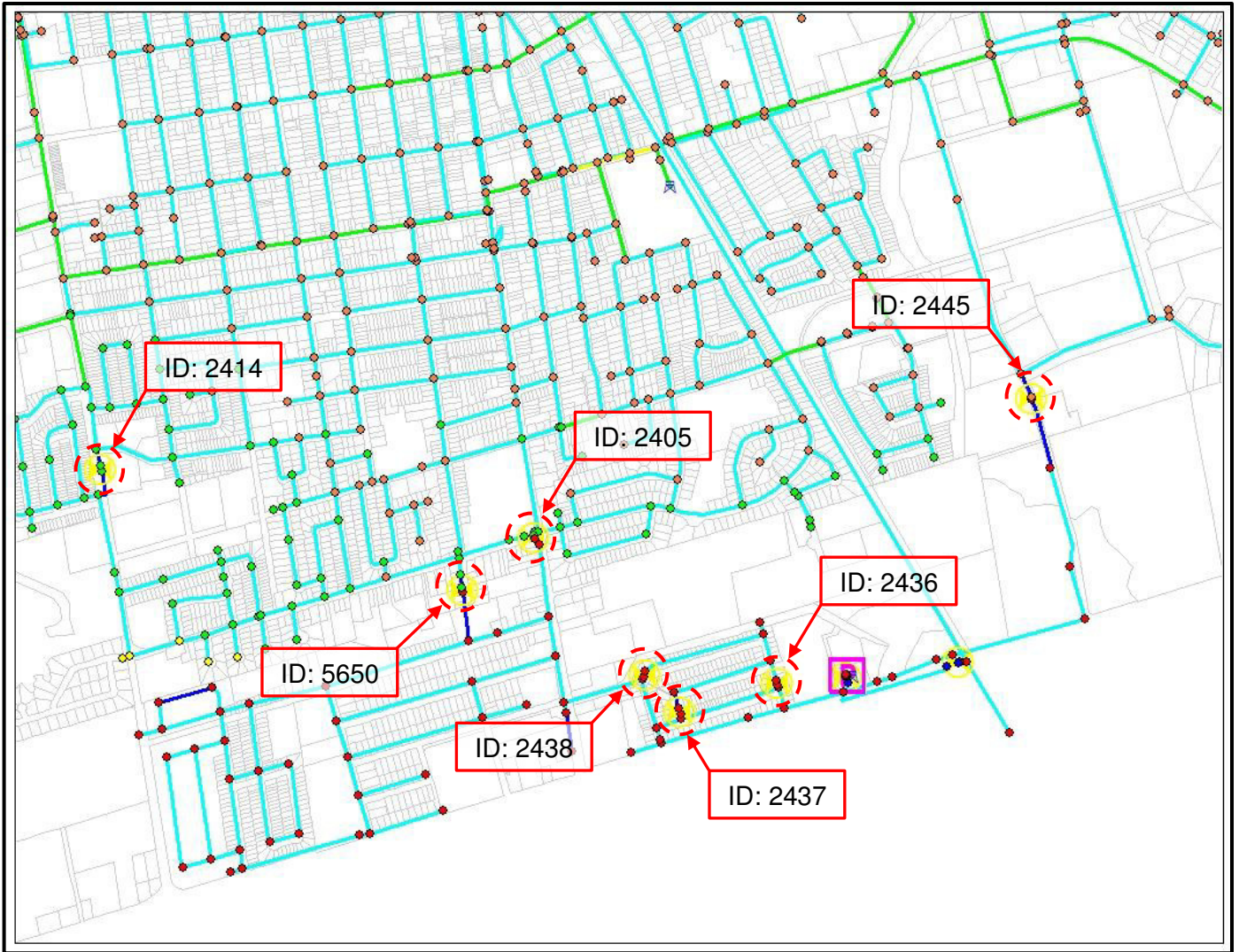


Figure 2-9: Location of Distribution System Pressure Reducing Valves

Table 2-2: Distribution System Pressure Reducing Valve Set Points

Valve ID	Description of Location	Diameter (mm)	Setting ADD	Setting MDD
2445	South of: Raglan St at Ron Emo Rd	300	-190 psi	-190 psi
2436	North of: Portland St at Robertson St	150	Fully Open	Fully Open
2437	North of: Cooper St at Robertson St	150	Fully Open	Fully Open
2438	Hughes St	150	Fully Open	Fully Open
5650	South of: Maple St at Campbell St	150	Closed	Closed
2405	South of: Hurontario St at Campbell St	300	20 psi	50 psi
2414	South of: High St at Tenth St	200	-188.92 psi	-188.92 psi

2.5 *Elevated Water Storage Tower*

The Town's elevated multi-legged storage tank is located off Hume St. between Peter St. and Minnesota St. It is modelled as a 2.25 ML cylindrical tank with a maximum water level of 7.62 m and a steady-state level under ADD conditions of 5.48 m. The MDD scenario sets its steady-state level at 6.56 m. Flow into and out of the tank is through a single 400mm watermain and no valving is included in the model at this time. The elevated tank is actually elliptical in profile and not a cylindrical tank. No storage curve for the tank is included in the model.

3.0 RECOMMENDATIONS FOR MODEL UPDATE

The Town's existing model is an all-pipe model that includes all pump stations and storage assets. Based on the results of Section 2.0, the existing model contains a number of areas that require improvement to provide a master plan that the team is confident in. C3W recommends that the model be updated as follows;

3.1 *Watermains*

- A system-wide assessment of GIS layer pipe diameters, materials, and lengths should be conducted. This should be compared against existing conditions in the model so that any discrepancies can be corrected and any new piping not included in the existing model can be added. Watermain IDs should be updated in the model to match the GIS database for reference purposes and for ease of future model updates. It is also recommended that Town staff have a full review of the information to ensure accuracy.

3.2 *Pump Stations*

- The capacities and curves of pumps included in the model should be verified.
- Control valves should be updated to better reflect real-world conditions.
- Pump controls, including VFDs, should be updated to better reflect real-world conditions.
- Bypass lines and other infrastructure not included in the model should be added.
- The WFP clearwell should be added to the model as a storage element.
- Storage curves for reservoirs, the ET, and clearwell should be developed.

3.3 *Demands*

- Demands should be updated to reflect the most recent metering data.
- Allocation of demands should be conducted with the use of meter records for appropriate allocation. Allocation by residential customers vs commercial, institutional, etc. customers should be considered.
- Diurnal curves should be developed by pressure zone and for TOBM and ToNT.
- Future demands should be based on historical usage rates and peaking factors rather than the MOECC guideline values. Future demands per capita included in the model are almost double current usage rates and appear to be conservative.

3.4 *Valves and Controls*

- The locations, states, and settings of in-field control valves should be updated to better reflect real-world conditions.

3.5 *Other*

- The database of infrastructure included in the model should be cleaned and re-tagged to separate Zone 1 vs Zone 2 items, facility vs distribution system items, etc.
- The model should be developed based on continuous EPS simulation rather than the current steady-state simulation to provide the ability to understand the system in greater detail and expand the potential of the model.



APPENDIX A

Distribution System Process Flow Schematic

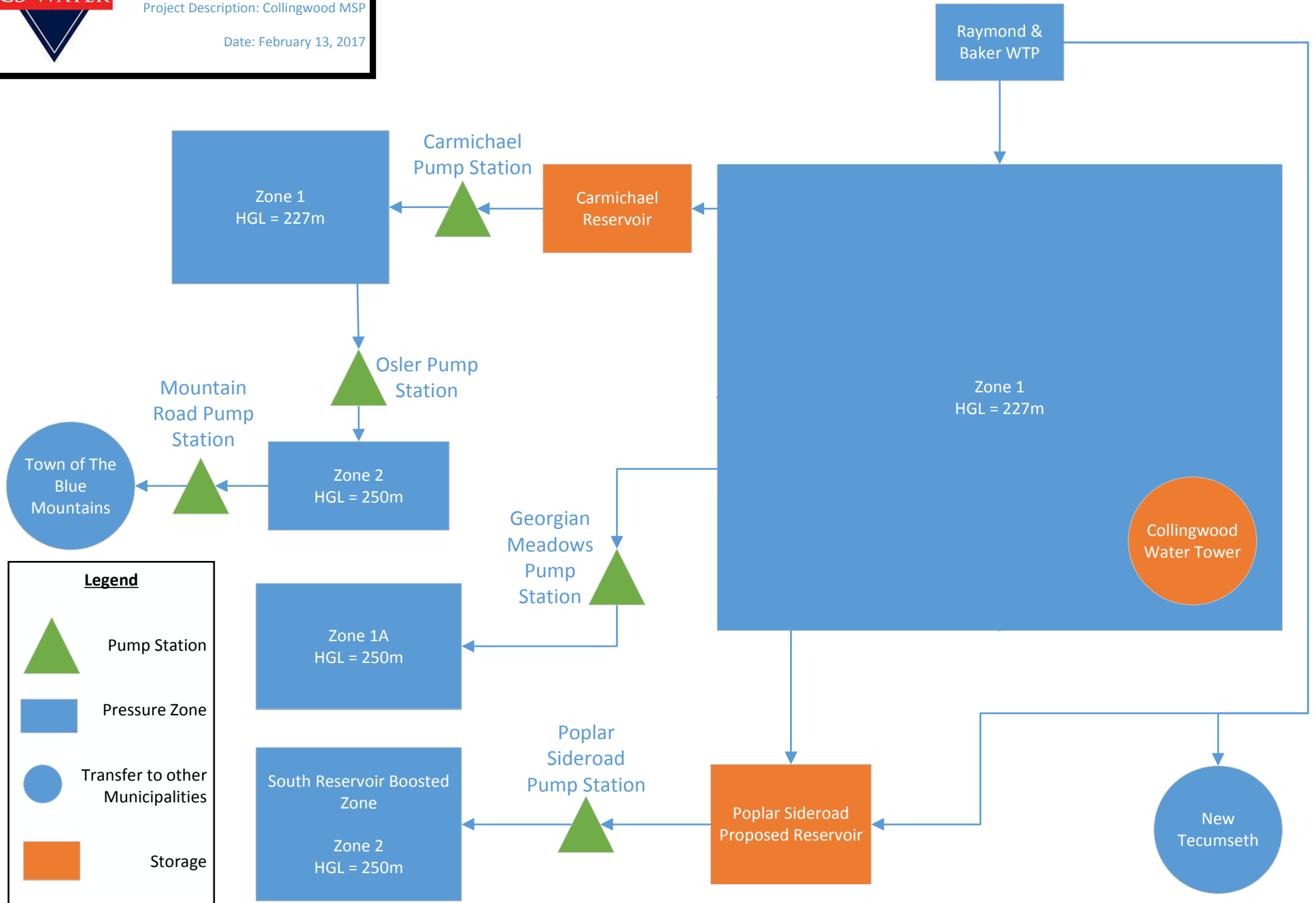
Collingwood Distribution System



Project ID: 75-41-161174

Project Description: Collingwood MSP

Date: February 13, 2017





APPENDIX D
Technical Memorandums

APPENDIX D



APPENDIX D1

Background Data Review and Analysis Technical Memorandum

XCG File No.: 3-1292-04-01

January 19, 2017

**Master Servicing Plan for Water and Sanitary Sewer System
Town of Collingwood
Technical Memorandum No. 1
Background Data Review and Analysis**

Prepared for:

Town of Collingwood

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Collingwood, Ontario, L9Y 2L9

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Oakville, Ontario, L6H 6Z7

In Association With:





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1. INTRODUCTION

A review of background information was completed as a starting point to the Collingwood Master Servicing Plan for Water and Sanitary Systems. The intent of the review is to document information received and identify where there are gaps. This Technical Memorandum is organized into three main sections focusing on the water system, the sanitary system, and a review of historical studies.

2. WATER SYSTEM REVIEW

The objective of the water system review is to review existing background information, reports and data from the Town with a view to identifying data gaps. The following sections summarize information on the existing water system.

2.1 Existing System Description

The Town's existing water system consists of approximately 2,100 watermains ranging in diameter from 19mm to 600mm. Watermains listed in the GIS database less than 100mm are expected to be private services. The Town's system includes four pumping stations. Storage is provided by two reservoirs and an elevated tank. Water is supplied to the water system by the Raymond A. Baker Water Treatment Plant (WTP).

2.1.1 Water Supply

Water is supplied to Collingwood from the Raymond A. Baker WTP. The WTP includes a 1067mm intake 765m into Nottawasaga Bay. The WTP is an ultra-filtration membrane plant. A clearwell with a capacity of 797m³ is utilized for high lift pumping. There are two pumping stations, one serving Collingwood with a total capacity of 472.5 L/s and a firm capacity of 333.9 L/s. The second pump station has a total pumping capacity of 408.3 L/s and a firm pumping capacity of 272.2 L/s. Further information on the Raymond A. Baker WTP will be required to define capacity and current flows.

2.1.2 Water Pumping Stations

There are four pumping stations in the Town of Collingwood used for distribution of water. These do not include the high lift pumping stations at the WTP. The four pumping stations are;

1. AR Carmichael West End Booster Pumping Station.
2. South Collingwood Booster Pumping Station.
3. Osler Bluff Road Booster Station.
4. Georgian Meadows Booster Station.

The following table provides a brief summary of each.



Table 2.1 Pumping Station Information

Pumping Station	Pumping Capacity (L/s)	Firm Capacity (L/s)	Standby Power	Zone	Re-chlorination
AR Carmichael West End PS	500	300	Yes	Zone 2	Yes
South Collingwood BPS	264	172	Yes	Zone 2	Yes
Osler Bluff Road Booster Station	131.7	87.8	Yes	?	No
Georgian Meadows Booster Station	21.3	11.8	No	Zone 1A	No

Daily flow reports were provided for the WTP and reservoirs. Flows from the pumping stations were not provided.

2.1.3 Storage

Water storage in the Town is provided by both in ground reservoirs and an elevated tank. Although the clearwell at the WTP has a capacity of 797m³, this has not been considered system storage.

Table 2.2 Storage Information

Storage	Capacity (m ³)	Type	Zone
Collingwood Water Tower	2,273	Elevated Tower	1
AR Carmichael West End Reservoir	6,800	In Ground	2
South Collingwood Reservoir	2,565	In Ground	2
Total	11,638		

2.1.4 Water Demands

The daily flow reports provide an indication of the daily demands for 2011 and 2012. Additional and newer information is required to project water demands into the future. More detailed information for each pump station including hourly flows is preferred to better calculate peak flows in the system.

Meter records have been provided but do not cover the full water system.

2.1.5 Water Distribution System

A GIS file has been provided indicating the location, diameter, material, and age of watermains. No further data is required.



2.2 Water Data Gaps

The following are the data gaps observed through the review of data;

- Pumping station daily flows for 2015 and 2016.
 - Hourly data for each PS will be requested when daily flows for 2015 and 2016 are analyzed.
- Demands – Daily supply for 2011 and 2012 provided, additional and newer information is needed.
 - Meter records shapefile is missing data.
- Zone Boundary Shapefile is missing data.

3. SANITARY SYSTEM REVIEW

The objective of the sanitary system review is to review existing background information, reports, and data from the Town with a view to identifying data gaps. The following sections summarize information on the existing sanitary system.

3.1 Existing System Description

The Town's existing sanitary sewer system consists of sanitary sewers ranging in size from 150mm to 1050mm, seven pumping stations, and the Collingwood Wastewater Treatment Plant. Figure 1 presents the location of sanitary sewers, pumping stations and the treatment plant. The following sections present a description and performance information for the existing system.

3.1.1 Wastewater Pumping Stations

The Town owns and maintains seven sanitary pumping stations as follows:

- Black Ash Creek Sanitary Pumping Station (SPS);
- Cranberry Trail SPS;
- Minnesota SPS;
- Patterson PS;
- Pretty River Estates SPS;
- Silver Glen Preserve SPS; and
- St Clair PS.

In addition to the above list, the Birch Street SPS provides raw sewage pumping at the Collingwood WWTP.

Figure 1 presents the location of each station. Information provided for each station is summarized in Table 3.1. Table 3.1 also includes information on the Birch Street SPS, which is part of the Collingwood WWTP.



Table 3.1 Pumping Station Information

Pumping Station	Information Provided for Each Station
Birch Street SPS	C of A No. 2639-5TLQB2 dated December 17, 2003. Station consists of three pumps, each with a rated capacity of 392 L/s at 11m TDH.
Black Ash Creek SPS	C of A No. 5925-6LMPB8 dated May 5, 2006. Station located at 231 Balsam Street Station consists of a 2.44m diameter wet well with 2 pumps, each with a rated capacity of 98 L/s at 6.2m TDH. Station is equipped with a 16m long 600mm diameter overflow pipe which discharges to Black Ash Creek, a 300mm diameter forcemain from the Pumping station to MH13 and a parallel 500mm diameter forcemain which is capped and planned to be used for future growth.
Cranberry Trail SPS	C of A No. 5925-5EATK8 dated October 8, 2002. Pumping station was constructed to service Cranberry resort condominium Station consists of a 2.4 diameter wet well (7.15m below grade) with 2 pumps, each with a rated capacity of 32.8 L/s at a TDH of 7.5m, a 200mm diameter forcemain and a station bypass.
Minnesota SPS	C of A not available.
Patterson SPS	C of A No. 2905 – 655M6H dated October 4, 2004 Station consists of a 3m x 3m x 6.5m wet well, two duty and one standby pumping, each with a capacity of 36 L/s at a TDH of 11.3m with a combined capacity with two pumps in parallel of 72 L/s at a TDH of 11.3m. 250mm diameter forcemain located along Patterson and Hamilton Street.
Pretty River Estates SPS	C of A No. 2372-7PRP2Z dated May 7, 2009. Pumping station constructed to service Pretty River Estates Phases 1 and 2. Station consists of a 2.4m diameter wet well, two pumps (duty and standby) each with a capacity of 29 L/s at a TDH of 24.3m, overflow to Pretty River and 150mm diameter forcemain.
Silver Glen Preserve SPS	C of A not available.
St Clair SPS	C of A 1434-622JRK dated June 21, 2004. Station consists of two wet wells (wet well #1 – 4.8m x 3.7m, wet well # 2 – 4.3m x 2.4m), two pumps (one duty one standby) each with a capacity of 155 L/s at a TDH of 15.8m, 3.0km long 450mm diameter forcemain along St. Clair, Highway 26, Pretty River Parkway and Huron Street.

Based on the above information and the Sanitary Sewer Design Sheet, last updated in January 2015, the firm capacities of each station were estimated. These capacities are presented in Table 3.2.



Table 3.2 Pumping Station Capacities

Pumping Station	Firm Capacity and Data Source
Birch Street SPS	Estimated firm capacity of 704.8 L/s (based on peak capacity of Collingwood WWTP).
Black Ash Creek SPS	Firm capacity of 98 L/s, consistent information obtained from C of A and Sanitary Sewer Design Sheet.
Cranberry Trail SPS	Firm capacity of 32.8 L/s based on C of A. Pumping station not included in Sanitary Sewer Design Sheet.
Minnesota PS	Sanitary Sewer Design Sheet has firm capacity of 196 L/s for this station.
Patterson SPS	Sanitary Sewer Design Sheet firm capacity of 94 L/s, Firm capacity based on C of A is 72 L/s.
Pretty River Estates SPS	Firm capacity of 29 L/s based on C of A. Pumping station not included in Sanitary Sewer Design Sheet.
Silver Glen Preserve SPS	No information available.
St Clair PS	Firm capacity of 155 L/s, consistent information obtained from C of A and Sanitary Sewer Design Sheet (named Fair SPS in Sanitary Sewer Design Sheet).

The Town provided daily flow information for each station for the period from January 2012 to October 31, 2016. Table 3.3 presents the average day, minimum day, and peak day flows recorded at each station.

Table 3.3 Pumping Station Average Day, Minimum Day, and Peak Day Flows

Pumping Station	Year	Average Day Flow (L/s)	Minimum Day Flow (L/s)	Peak Day Flow (L/s)
Birch Street SPS	2012	197.6	118.5	441.7
	2013	206.2	86.3	520.6
	2014	187.8	92.2	481.6
	2015	159.0	103.3	364.6
	2016	201.3	110.5	698.0
	Ave/Min/Max	190.3	86.3	698.0
Black Ash Creek SPS	2012	24.2	14.5	49.5
	2013	27.5	16.8	57.7
	2014	26	18.8	191.6
	2015	24.4	15.0	41.5
	2016	27.4	17.2	83.2
	Ave/Min/Max	27.0	14.5	191.6



Pumping Station	Year	Average Day Flow (L/s)	Minimum Day Flow (L/s)	Peak Day Flow (L/s)
Cranberry Trail SPS	2012	1.5	0.8	3.4
	2013	1.7	0.8	3.8
	2014	1.5	0.8	3.0
	2015	1.3	0.8	3.0
	2016	1.8	0.8	4.7
	Ave/Min/Max	1.6	0.8	4.7
Patterson SPS	2012	10.2	3.3	31.5
	2013	12.0	3.9	41.3
	2014	10.3	2.0	36.7
	2015	7.9	2.1	25.3
	2016	7.7	2.8	76.0
	Ave/Min/Max	9.6	2.0	76.0
Pretty River Estates SPS ¹	2012	0.7	0.4	1.3
	2013	0.6	0.3	4.1
	2014	0.9	0.7	3.1
	2015	1.1	0.9	4.8
	2016	1.5	1.1	6.7
	Ave/Min/Max	1.0	0.3	6.7
Silver Glen Preserve SPS	2012	0.2	0	0.7
	2013	0.2	0.1	0.9
	2014	0.3	0.1	0.8
	2015	0.3	0.1	0.7
	2016	0.5	0.2	1.8
	Ave/Min/Max	0.3	0	1.8
St Clair SPS	2012	46.3	12.1	490.6
	2013	39.1	8.7	70.3
	2014	31.5	10.2	67.6
	2015	26.8	10.6	49.8
	2016	30.9	12.8	91.7
	Ave/Min/Max	34.9	8.7	490.6
Notes: 1. Data available for Pretty River PS from September 23, 2012 to October 31, 2016. 2. Data was not provided for the Minnesota SPS.				



3.1.2 Wastewater Treatment Plant

The Collingwood WWTP is located at Birch Street and Front Street. Table 3.4 presents the average flow data recorded at the plant.

Table 3.4 Collingwood WWTP Historical Flows

Year	Average Day Flow (L/s)	Minimum Day Flow (L/s)	Peak Day Flow (L/s)
2012	197.6	118.5	441.7
2013	206.2	86.3	520.6
2014	187.8	92.2	481.6
2015	159.0	103.3	364.6
2016	201.3	110.5	698.0
Ave/Min/Max	189.4	86.3	698.0

The plant was first constructed in 1958 to provide primary treatment of the Town's domestic and industrial wastewater. The primary plant was expanded in 1968. Secondary treatment was added in 1981. The rated flow capacity is 24,548 m³/day (284 L/s) with a peak flow rate of 60,900 m³/day (704.8 L/s).

Annual Compliance Reports were reviewed for 2012, 2013, 2014, and 2015. In addition to flow information, these reports also provide information on compliance and on bypass events. Table 3.5 summarizes the information contained in the compliance reports.

Table 3.5 Collingwood WWTP Compliance Summary

Year	Average Day Flow (L/s)	Bypass Occurrences Recorded	Compliance Issues Identified
2012	197.6	No bypass events recorded.	No exceedance of effluent limits/objectives recorded.
2013	206.2	No bypass events recorded.	No exceedance of effluent limits/objectives recorded.
2014	187.8	No bypass events recorded.	No exceedance of effluent limits/objectives recorded.
2015	159.0	One secondary bypass event occurred on January 22, 2015 due to an equipment failure.	One exceedance of <i>E Coli</i> objective and limit identified.

3.1.3 Sanitary Collection System

The sanitary collection system that serves the Town of Collingwood consists of 53km of sanitary sewers ranging in diameter from 150mm to 1050mm. Figure 1 presents the location of the sanitary collection system and also indicates pipe sizes.



A number of sources of information exist to define the sanitary collection system. These include the following:

- GIS shapefiles for the sanitary sewers and maintenance holes;
- Updated sanitary sewer spreadsheet, last updated on January 13, 2015; and
- Results of maintenance hole inspections completed by Town Staff in 2003.

All of this information was considered to identify the following gaps:

- Sanitary sewers with missing invert elevations;
- Sanitary sewers with missing diameters or lengths; and
- Maintenance holes with missing ground elevations.

Figure 2 presents the locations where data is missing for maintenance holes. For these locations, it is proposed to investigate with the Town, the availability of as-constructed drawings. If as-constructed or design drawings are not available, the need to complete a survey to collect information will be assessed.

4. SUMMARY OF HISTORICAL STUDIES

4.1 Collingwood Wastewater Treatment Plant Class Environmental Assessment (2011)

In 2011, the Town completed a Schedule 'C' Class Environmental Assessment Report for expansion of the Collingwood WWTP from a rated capacity of 24,548 m³/d to a rated capacity of 36,548 m³/d. The study identified that the capacity of the existing plant would be reached somewhere between the year 2016 under high growth conditions and 2028 under low growth conditions. The Class EA study recommended that the expansion be in place by 2016. The expansion was identified as needed to provide wastewater treatment servicing needs for a 20- to 30-year timeframe and identified that the expansion could be implemented in two 6,000 m³/d increments to match growth rates.

The preferred alternative design concept consisted of:

- Continued use of the existing 24,548 m³/d conventional activated sludge (CAS) treatment process;
- Expansion of headworks (Screening and grit removal) and primary treatment to provide an additional capacity of 12,000 m³/d. Headworks improvements would also include improved odour control;
- Expansion of the existing facility with construction of a compact treatment technology, in two 6,000m³/d increments. Design alternatives considered for the expansion included biological aerated filter (BAF), membrane bioreactor (MBR), tertiary membranes, and tertiary ballasted flocculation. It was recommended that the selection of treatment technology be deferred until the need for the plant expansion was imminent.
- Relocation of the plant outfall to deeper waters in the Harbour in accordance with MOECC Policy B-1-5 as it was identified that the current shoreline discharge not be acceptable for an expanded discharge. At the time of the study, relocation of the



plant outfall would have triggered a Federal Environmental Assessment screening be completed.

The study concluded with a recommendation that time sensitive actions including performance/cost review of compact secondary and tertiary treatment technologies and initiation of the Federal EA screen processing for outfall relocation be triggered when the three-year average flow at the plant reached 80% of the current capacity or 19,638 m³/d.

4.2 Servicing Study, Lands Acquired Under Restructuring in the Town of Collingwood (1994)

This study was initiated to consider the potential to service lands acquired by the Town of Collingwood as part of the County of Simcoe Restructuring Plan. As part of the restructuring, the Town of Collingwood acquired 1,134 ha in total along its southern and eastern borders. The study estimated future needs based on a development density of 25 persons/ha in the acquired area. The study included a review of the existing sanitary sewer collection system, wastewater treatment needs, and water supply and distribution needs. The study identified sanitary servicing schemes as follows:

- West Central (Area A) which is bounded by the south and western boundary, Mountain Road to the north, and Nottawasaga Road to the east was identified to be serviced by a trunk sewer extension on Mountain Road.
- West South (Area B) which is bounded by Nottawasaga Road in the west, the south boundary in the south, a watercourse and High Street in the east, and 6th Street in the north was subdivided into Areas B1 and B2. Area B1, located on the west side of the creek, was identified to be serviced by a gravity sewer extension of the Magna sewer. Area B2 is located on the east side of the creek and was identified to be serviced by an expansion of a trunk sewer on 6th Street.
- South Centre (Area C), which is bounded by a creek in the west, Findlay Street in the north, the south boundary in the south, and the Pretty River in the east, was subdivided into Areas C1 through C5. Servicing of these areas was recommended by extending existing sewers located immediately to the north. For Area C5, a southward extension of an existing sanitary sewer from the intersection of Sproule Avenue and Collins Street was identified.
- East of the Pretty River, between the former Town Boundary and Poplar Sideroad (Area D), is bounded by the Pretty River in the west, a high point located east of Highway 26 in the east, the southern boundary in the south, and south of Sanford Fleming Drive in the north. A new gravity sewer was identified from the intersection of Hume Street and Pretty River Parkway to the south and west as required to service this area.
- North of Poplar Sideroad, south of the Former Town Boundary, astride of 6th Line (Area E) is bounded by a high point located east of Highway 26 in the east, the Town boundary in the south and west, and the former Town Boundary in the north. A new trunk sewer parallel to the lakeshore was identified as required to service this area.



- East End (Area F), is bounded by Georgian Bay in the west, Lakeview Avenue to the north, Ferguson Road to the south, and the Town boundary to the east. To service this area, a new trunk sewer on Beachwood Drive along with two pumping stations required to due to the virtually flat terrain.
- Collingwood West (Area G) is bounded by Georgian Bay in the north, the Town boundary in the west, Mountain Road in the south, and Eleventh Line in the east. This area was subdivided into Areas G1, G2, and G3. A pumping station was identified as required to service Area G with a discharge into the existing trunk sewer on Highway 26. To service Area G2, a new trunk sewer constructed south of Georgian Trail was identified, and to service Area G3, a new pumping station which would discharge to a proposed future collector is required for the lands north of Mountain Road, west of 10th Line.

Upgrade requirements of existing Town sanitary sewer infrastructure were also examined in the report. The following was noted:

- It was identified that servicing of full development of Area G1 would exceed the capacity of the Highway 26 West Trunk Sewer. However, development potential was identified as being outside of the foreseeable future and flow monitoring was recommended to establish when upgrade would be needed.
- An expansion of the Black Ash Pumping Station and forcemain was identified as necessary to service full development of Areas G1 and G2. The report estimated that expansion would not be required for at least 10 years and recommended flow monitoring to establish when upgrade would be needed.
- The report identified that a new interceptor sewer would be required to service Areas G3, A, and B1 on Mountainview Road and Harbourview Park to the Collingwood Wastewater Treatment Plant. The report identified that this new interceptor sewer was required immediately due to the poor condition and capacity limitations within the existing First Street Trunk Sewer.
- The report identified upgrade requirements to service Area C1 would include either a new sewer on Hurontario Street south from Lockhart Road and Golf View Drive or alternatively an extension to the existing 250mm diameter sanitary sewer at the intersection of Golf View Drive and Hurontario Street along with a new pumping station to service the eastern portion of Area C1.
- An upgrade of the Patterson SPS was identified as required to service growth in Areas C4 and C5. The report recommended that twinning the existing forcemain or replacement with a larger forcemain.
- To service Area D, the report recommended that the discharge of the Fair Drive SPS be redirected to either Simcoe Street or First Street to allow capacity to be available to service Area D through the Pretty River Trunk Sewer.
- The report recommended a new trunk sewer be constructed from the Fair Drive SPS to Georgian Manor Drive to service Areas E and F.
- An upgrade to the Fair Drive SPS and forcemain was identified to service Areas E and F. Recommended upgrades included replacement of the existing forcemain and modifying the discharge location to either First Street at Hurontario Street or a new



trunk sewer from the intersection of Hume Street and Pretty Parkway to the Minnesota SPS.

- An expansion of the Minnesota SPS to service ultimate development.
- Upgrade of the First Street Trunk Sewer to facilitate servicing of Area C with a new 900mm diameter trunk sewer.

The report also identified needs at the Collingwood Wastewater Treatment Plant to provide servicing for the 20-year estimated population of 33,500 persons. The report identified the following improvements at the Collingwood WWTP:

- Replacement of the existing outfall with a new 1200mm diameter outfall with a diffuser.
- Upgrade of the existing plant to provide an additional rated capacity of 3,604 m³/d.

In total, 13 required sanitary sewer system projects were identified to address existing infrastructure improvements needed to service growth from the additional lands. In 1994, the total cost to implement these works was estimated as \$13.2M.

4.3 Servicing Needs Analysis

The Town regularly updated analysis of their sanitary sewer system capacity and C.C. Tatham & Associates maintained a series of spreadsheets to predict capacity issues. These spreadsheets utilized a design sheet approach and were last updated in January 2015. Spreadsheets were created for First Street and East End Sewer Bypass and the CNR, Mair Mills Development, Mountain Road, High Street, Hickory Street, Oak, Beech Street, TEPCO Development, South Collingwood, Hurontario Street, Ste. Marie Street South, Ste. Marie Street North, St. Paul Street, Birch Street, Minnesota Street, Simcoe and Rodney Streets, Pretty River Parkway and Huron Street, Sixth Line and Huronia Pathways, Lakeside Pointe Development, Fair Drive West of SPS, and MacDonald and Fair Drive catchments. The approach identified undersized sanitary sewers based on design criteria. For the majority of the catchments, the design criteria shown in Table 4.1 were used.

Table 4.1 Design Criteria for Servicing Needs Analysis

Criteria	Values
Per Capita Residential Flow	450 Lpcd
Per Capita Flows (Schools)	90 L/student/day
Persons Per Unit	2.8
Infiltration	90 Lpcd
Peaking Factor	Harmon

4.4 Collingwood Public Utilities Annual Report (2013) 2014-2016 Business Plan

Collingwood Public Utilities prepared an Annual Report and 2014-2016 Business Plan. The report provided an updated on wastewater forecasts and infrastructure needs and identified the following:



- It was estimated that the Collingwood WWTP operated at 65% of its capacity due to lower water consumption (estimated at 170 Lpcd) and due to continued work by the Town to replace poor condition sanitary sewers and reduce inflow and infiltration. The report estimated that expansion of the Collingwood WWTP would not be required for another 15 years.
- Continued efforts on the Town's part to implement renewal of sanitary sewer assets. In 2014, the Town was scheduled to renew sanitary sewers on Simcoe and Rodney Streets.

5. SANITARY SYSTEM DATA GAPS

A detailed analysis of GIS data was completed to identify data gaps. In addition to the GIS information, the Town also provided a spreadsheet file containing sanitary sewer design sheets, and historical inspection reports. All three sources of information were examined to identify gaps.

The sanitary sewer design sheet model contained 22 separate tabs that each contained a separate design sheet. Information contained on the design sheets varied. A limited number of the sheets contained invert elevations as well as pipe sizes and slopes.

The inspection reports were completed in 2003 and included condition assessment of more than 800 maintenance holes in the Town. These reports also contained a plan with measured distances from the surface to the pipe inverts. Based on discussions with Town Staff, the measure down information was transferred to GIS and was also considered in the development of the design sheets. The maintenance hole inspections did not cover all of the maintenance holes in the Town. Figure 2 shows the locations where inspections were completed and were not completed. As shown in Figure 2, the inspections were completed in the Town core with inspections not completed in the outskirts of Town. It is likely that these areas correspond with more recent developments and as-constructed drawings may be necessary to fill data gaps.

6. SUMMARY OF DATA GAPS AND RECOMMENDED ACTIONS

A review of background information was completed as starting point to the Collingwood Master Servicing Plan for Water and Sanitary Systems. The intent of the review is to document information received and identify where there are gaps.

The background information review identified a number of data gaps. Table 6.1 presents data gaps and recommends actions to fill these gaps.



Table 6.1 Data Gaps and Recommended Actions

Gap	Recommended Action
Water distribution system pressure zones	Will be determined through the Water Model Review.
WTP current capacity	ECA for facility has been requested
Osler Bluff Road Booster Water Pumping Station	Confirmation of pressure zone will be obtained from Water Model Review.
Water pumping station flows	Town is requested to provide available information
Water demand water	Water demand data has been provided for 2011 and 2012. More recent data has been requested from the Town.
Minnesota SPS and Silver Glen Preserve	Information on the capacity of these pumping stations has been requested from the Town.
Sanitary Sewers and maintenance holes	Map has been provided showing locations where GIS data and inspection report data is not available. As-constructed drawings will be requested from the Town. Need for a survey will be assessed following review of as-constructed drawings.



FIGURES



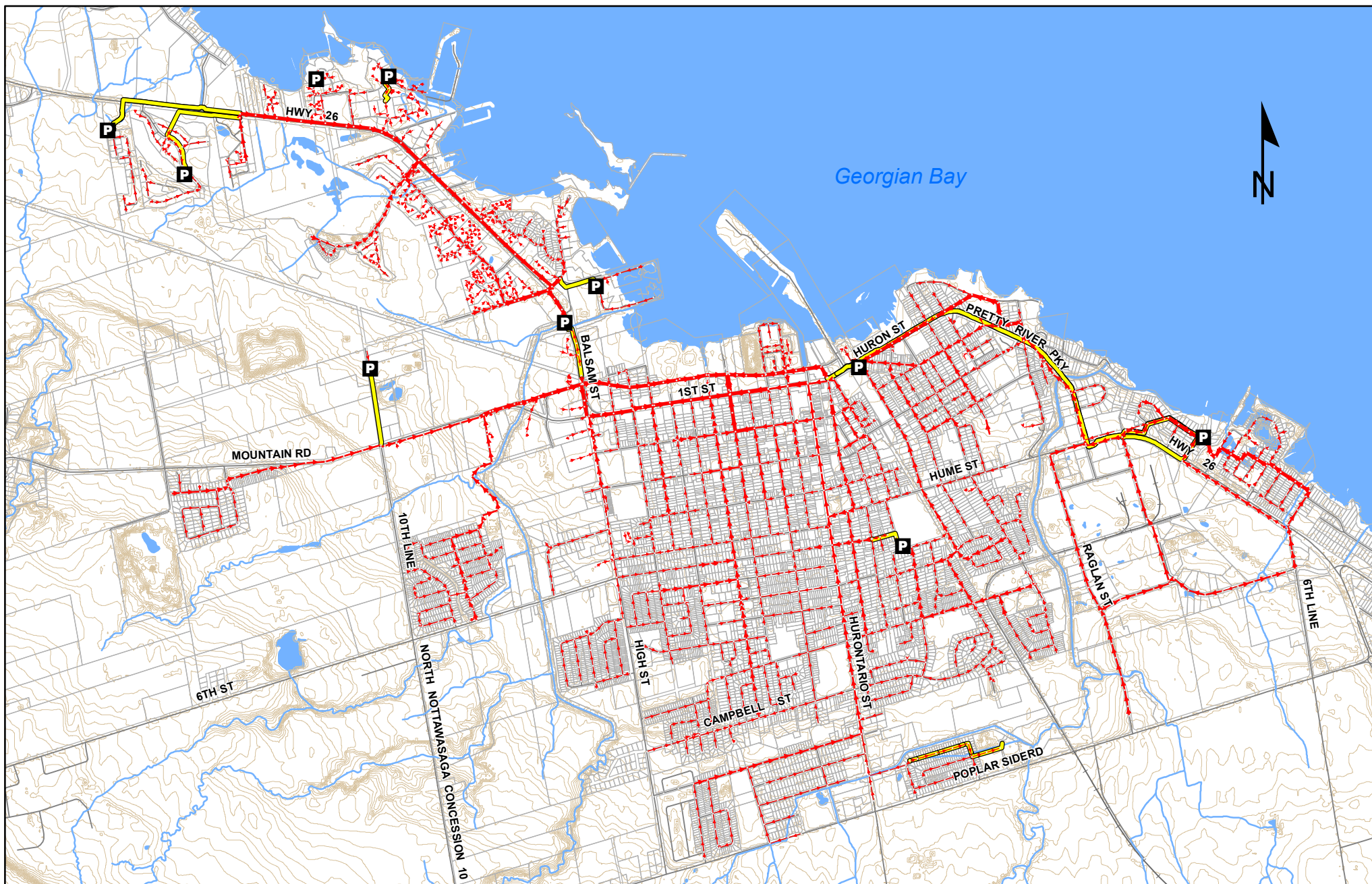
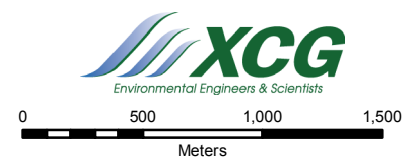
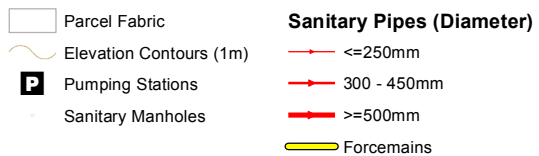
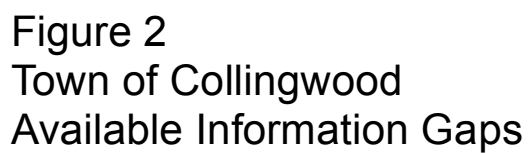
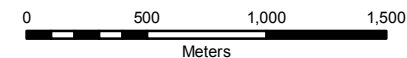


Figure 1
Town of Collingwood
Sanitary System





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APPENDIX D2

Flow Monitoring Data Analysis Technical Memorandum

September 18, 2019
Reference No. 2017-1013

John Velick
Town of Collingwood
97 Hurontario Street
Collingwood, ON L9Y 3Z5

Attention: John Velick
Manager, Engineering

Re: Town of Collingwood – Flow Monitoring Data Analysis

We are pleased to enclose final Technical Memorandum # 2 – Flow and Rainfall Data Analysis for your information as part of the Master Servicing Plan for Water and Sanitary Sewer System for Town of Collingwood.

Best Regards,
COLE ENGINEERING GROUP LTD.



Christine Hill, M.Eng., P.Eng.
Project Manager

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John Velick
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Issues and Revisions Registry

Identification	Date	Description of issued and/or revision
Draft TM2	November 4, 2017	For review by Town
Final	September 18, 2019	As per Town comments

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Appendix C	Dry Weather Flow Graphs
Appendix D	Wet Weather Flow Hydrographs

1 Introduction

The Town of Collingwood (the “Town”) Water and Sanitary Sewer Master Plan study will conclude with recommendations to address water and wastewater infrastructure needs to service growth to the year 2031. The project included a five month flow and rainfall monitoring program, developed to collect data at key locations within the existing sanitary sewer system. This technical memorandum provides information on the program undertaken as well as analysis results for the collected data.

Flow monitoring data will be used to assess system performance and identify areas with excessive inflow and infiltration. Collected rainfall and flow data will also be used to calibrate the hydraulic model. The hydraulic model will be used to assess existing system performance and identify future servicing needs.

2 Flow and Rainfall Monitoring Program

Flow monitoring was completed by Urban-X between May 4, 2017 and October 6, 2017 and flow, velocity and level data was collected at 5-minute intervals at a total of 12 sites. One (1) rain gauge was installed at the Collingwood Wastewater Treatment Plant (WWTP) and rainfall data was also collected in 5-minute intervals between May 19, 2017 and October 6, 2017. **Table 2.1** provides information on the locations where flow monitors were installed. **Figure 2–1** presents the location of the all flow monitors and the rainfall gauge and also identifies the service area upstream of each monitor.

Appendix A presents the flow monitors installation sheets completed by Urban X while **Appendix B** presents flow, depth and velocity versus time data graphs as well as the graphs of velocity against depth.

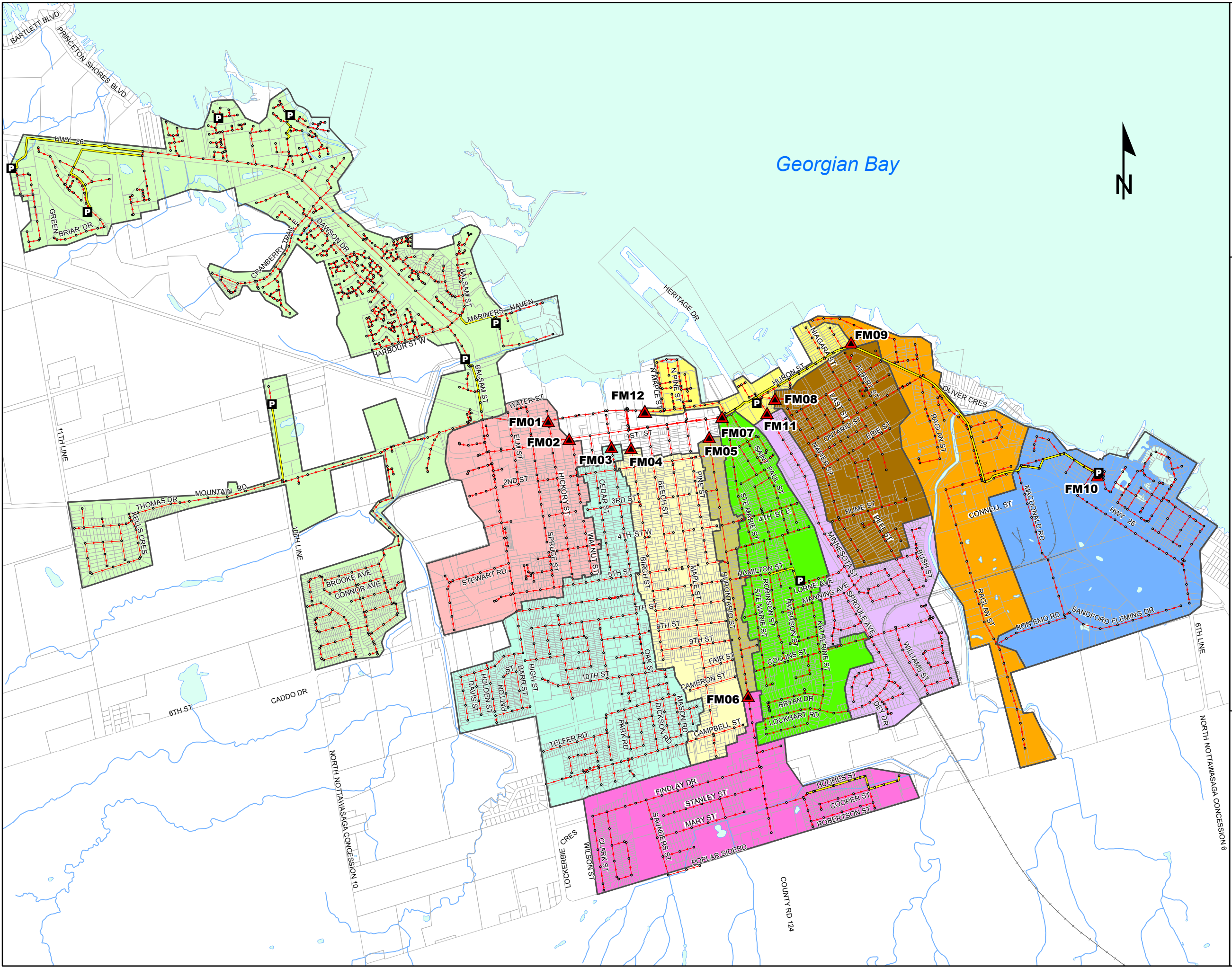
Table 2.1 Flow Monitor Locations

Site ID	Maintenance Hole ID	Installation Location in MH	Sewer Diameter (mm)	Installation Date	Removal Date
FM01	122-005	W Inlet	750	May 4, 2017	Oct. 6, 2017
FM02	05-009	E Outlet	600	May 4, 2017	Oct. 6, 2017
FM03	12-001	N Outlet	450	May 4, 2017	Oct. 6, 2017
FM04	14-001	N Outlet	600	May 4, 2017	Oct. 6, 2017
FM05	22-001	S Inlet	350	May 4, 2017	Oct. 6, 2017
FM06	22-018	S Inlet	350	May 4, 2017	Aug. 4, 2017
FM07	05-028	E Inlet	750	May 5, 2017	Oct. 6, 2017
FM08	56-002	NW Outlet	450	May 5, 2017	Oct. 6, 2017
FM09	51-011	E Inlet	500	May 4, 2017	Oct. 6, 2017
FM10	80-02	NE Outlet	900	May 8, 2017	Oct. 6, 2017
FM11	86-001	SE Inlet	450	May 4, 2017	Oct. 6, 2017
FM12	245-03	E Inlet	900	Aug. 4, 2017	Oct. 6, 2017

It should be noted that monitoring data was collected at the majority of the sites between early May and early October. Based on an initial review of flow data in July 2017, it is determined that sufficient data had been collected at FM06.

At the same time, Town Staff indicated a strong interest in collecting flow monitoring data at FM12 to collect data in an area of the Town where a recent flooding event had occurred. As a result, the period of record for FM06 and FM12 is shorter than 5 months.

Figure 2.1
Town of Collingwood
Flow Monitoring
Locations

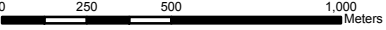


Legend

- P Pumping Stations
- ▲ Flow Meter Locations
- Manholes
- Force mains
- Sanitary Sewers

Existing Flow Monitoring Areas

- FM01
- FM02
- FM03
- FM04
- FM05
- FM06
- FM07
- FM08
- FM09
- FM10
- FM11
- FM12



3 QA/QC Flow Monitoring Data Review

A detailed review of the collected flow and rainfall monitoring data was completed to assess the overall quality of the data. The review focused on ensuring consistent measurements were taken over the monitoring period. Data considered as good or fair is usable for modelling while poor data may be incomplete or have periods of inconsistent data between velocity and depth and may be not usable for model calibration. **Table 3.1** presents a summary of the results.

Table 3.1 Flow Monitoring Data QA/QC Results

Site ID	Maintenance Hole ID	Data QA/QC Review Results
FM01	122-005	<ul style="list-style-type: none"> Recorded level data is generally consistent over the monitoring period; Recorded velocity is generally consistent over the monitoring period. Measured velocity from May 4 to June 1 period is generally lower than remainder of the record; Surcharge conditions (measured level reached 1.35 m) during June 17th rainfall event. Velocity measurements were reduced during this period; Velocity versus depth graph indicates a reasonable relationship between level and velocity; Review of data indicates that there is a response to rainfall at this site; and, Data quality is good.
FM02	05-009	<ul style="list-style-type: none"> Recorded level is generally consistent over the monitoring period; Recorded velocity does vary across the monitoring period but is within expected values; Surcharge conditions (measured level reach 2.0m) during June 17th rainfall event. Velocity measurements were reduced during this period; A review of data collected during the June 17th event indicates that measured depth was higher after the events than before the event. This may be an indication that a blockage occurred prior to the event which restricted flows at this location. The occurrence of the large rainfall event on June 17th likely eliminated the blockage; Velocity versus depth graph indicates a reasonable relationship between level and velocity; Review of data indicates that there is a response to rainfall at this site; and, Data quality is good.
FM03	12-001	<ul style="list-style-type: none"> Recorded level is generally consistent over the monitoring period; Recorded velocity does vary across the monitoring period but is within expected values;

		<ul style="list-style-type: none"> • Surge conditions (measured level reach 1.7 m) during June 17th rainfall event. Velocity measurements were reduced during this period; • Velocity versus depth graph indicates a reasonable relationship between level and velocity; • Review of data indicates that there is a definite and pronounced response to rainfall at this site; and, • Data quality is good.
FM04	14-001	<ul style="list-style-type: none"> • Recorded level is generally consistent over the monitoring period; • Recorded velocity does vary across the monitoring period but is within expected values; • Full pipe conditions (measured level reach 600mm) during June 17th rainfall event. Velocity measurements were reduced during this period; • Velocity versus depth graph indicates a reasonable relationship between level and velocity; • Review of data indicates that there is a definite and pronounced response to rainfall at this site; and, • Data quality is good.
FM05	22-001	<ul style="list-style-type: none"> • Site is located downstream of FM06; • Recorded level is generally consistent over the monitoring period, although some degradation of measured values occurred through August and September; • Recorded velocity does vary across the monitoring period. In particular, a variation in the pattern of values recorded occurred at the end of June 2017 and extended through the monitoring period; • Full pipe conditions (measured level reach 600mm) during June 17th rainfall event. Velocity measurements were reduced during this period; • Velocity versus depth graph indicates the adjustment in measured velocities that occurred at the end of June 2017; • Review of data indicates that there is a definite and pronounced response to rainfall at this site; and, • Data quality is good.
FM06	22-018	<ul style="list-style-type: none"> • Site is located upstream of FM05; • Recorded level is generally consistent over the monitoring period; • Recorded velocity does vary across the monitoring period but is within expected values; • Close to full pipe conditions (measured level reach 275mm) during June 17th rainfall event. Velocity measurements were reduced during this period; • Velocity versus depth graph indicates a reasonable relationship between level and velocity; • Review of data indicates that there is a definite and infiltration type response to rainfall at this site; and, • Data quality is good.

FM07	05-028	<ul style="list-style-type: none"> Recorded level is generally consistent over the monitoring period; Recorded velocity does vary across the monitoring period in accordance with rainfall response; Surcharge conditions (measured level reach 1.0 m) during June 17th rainfall event. Velocity measurements were reduced during this period; Velocity versus depth graph indicates a reasonable relationship between level and velocity; Review of data indicates that there is a definite inflow and infiltration type response to rainfall at this site; and, Data quality is good.
FM08	56-002	<ul style="list-style-type: none"> Recorded level is generally consistent over the monitoring period with a slight reduction in level values as the monitoring program continued. This is not unusual and may be indicative of groundwater infiltration; Recorded velocity does vary across the monitoring period in accordance with rainfall response; Surcharge conditions did not occur (measured level reach 3501.0 m) during June 17th rainfall event. Velocity measurements were reduced during this period; Velocity versus depth graph indicates a reasonable relationship between level and velocity; and, Data quality is good.
FM09	51-011	<ul style="list-style-type: none"> Recorded level is generally consistent over the monitoring period with a slight reduction in level values as the monitoring program continued. This is not unusual and may be indicative of groundwater infiltration; Recorded velocity does vary across the monitoring period in accordance with rainfall response; Surcharge conditions did not occur (measured level reached 300mm) during June 17th rainfall event. Velocity measurements were not reduced during this period confirming that surcharge and flow backup did not occur; Velocity versus depth graph indicates a reasonable relationship between level and velocity; and, Data quality is fair.
FM10	80-02	<ul style="list-style-type: none"> Site monitors flow from an ICI area, as a result, diurnal wastewater pattern is not typical for a residential area; Recorded level is generally consistent over the monitoring period; Recorded velocity does vary across the monitoring period in accordance with rainfall response; Surcharge conditions did not occur during the monitoring period (measured level reach 250 mm) during June 17th rainfall event. Velocity measurements were increased slightly in this period; Velocity versus depth graph indicates a reasonable relationship between level and velocity; and, Data quality is fair.

FM11	86-001	<ul style="list-style-type: none"> Recorded level is generally consistent over the monitoring period. Generally lower level measurements in late fall. This may be an indication of the presence groundwater infiltration as groundwater infiltration generally decreases in the fall as groundwater levels drop; Recorded velocity does vary across the monitoring period in accordance with rainfall response; Surcharge conditions did not occur during the monitoring period (measured level reach 1600 mm) during June 17th rainfall event. Velocity measurements were increased slightly in this period. However, there is an inflow and infiltration response to rainfall observed in the data; Velocity versus depth graph indicates a reasonable relationship between level and velocity; and, Data quality is good.
FM12	245-03	<ul style="list-style-type: none"> Flow monitor is located downstream of FM08, FM09, FM10 and FM11; Recorded level is generally consistent over the monitoring period. Various peak depths occur in the monitoring. Measured depth measurements are consistent with the presence of upstream pumping stations; Recorded velocity does vary across the monitoring period in accordance with rainfall response and with operation of upstream pumping stations; Full pipe conditions are observed in the data, due to operation of upstream pumping station; Velocity versus depth graph indicates a reasonable relationship between level and velocity and is a typical of a location with upstream pumping stations; and, Data quality is good.

In addition to the review of data quality, a continuity review was completed to check the consistency of flow measurements between sites. This analysis was completed for two areas Hurontario Street (FM05 and FM06) and First Street (FM08, FM09, FM10, FM11 and FM12).

Figure 3–1 presents the typical diurnal pattern of FM05, FM06 and the flow contributed by the area downstream of FM06 and upstream of FM05.

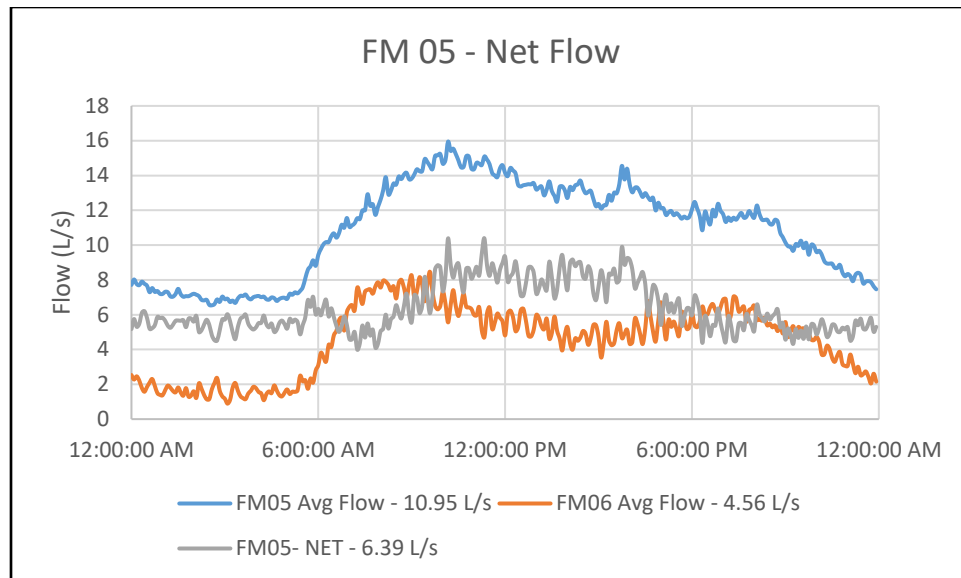


Figure 3–1 Continuity Analysis - FM05

A review of **Figure 3–1** indicates that the subtraction of average day flow measured at FM06 from the average day flow measured at FM05 is reasonable. Continuity of measurements between FM05 and FM06 is therefore reasonable.

A similar comparison of flows measured at FM08, FM09, FM10, FM11 and FM12 has also been underway and will be completed following confirmation of a flow split.

On the basis of the QA/QC checks completed, the data is considerable representative and suitable for use in system analysis and model calibration and validation tasks. Data for FM12 will be confirmed pending confirmation of a flow split and analyses results will be updated at a later date.

4 Data Analysis

An analysis of rainfall and flow data was completed to characterize both dry and wet weather flows at each monitoring location. The following sections present the results of the analysis.

4.1 Rainfall Data Analysis

The rainfall data collected at the treatment plant was reviewed to identify dry weather days and wet weather events. Based on a 6 hour inter-event time, rainfall event characteristics were identified for each rainfall event in monitoring period. These characteristics are presented in **Table 4.1** on the following page.

Table 4.1 Rainfall Event Characteristics

Start Date and Time	End Date and Time	Duration (hours:minutes)	Rainfall Volume (mm)	Peak Intensity (mm/hr)
5/21/2017 0:40	5/21/2017 14:55	14:15	7.75	18
5/24/2017 7:55	5/24/2017 8:10	0:15	1.50	12
5/24/2017 23:20	5/26/2017 5:10	29:50	16.25	3
5/28/2017 23:00	5/29/2017 5:40	6:40	6.50	27
6/1/2017 16:35	6/1/2017 17:35	1:00	0.75	3
6/4/2017 3:35	6/4/2017 7:20	3:45	10.50	6
6/5/2017 2:55	6/5/2017 10:15	7:20	1.25	3
6/5/2017 22:25	6/6/2017 5:25	7:00	1.75	3
6/13/2017 3:25	6/13/2017 11:00	7:35	10.50	27
6/15/2017 14:35	6/15/2017 14:40	0:05	0.25	3
6/17/2017 15:35	6/18/2017 13:50	22:15	67.75	51
6/20/2017 7:50	6/20/2017 20:10	12:20	4.75	9
6/23/2017 10:25	6/23/2017 15:20	4:55	0.75	3
7/7/2017 7:25	7/7/2017 7:35	0:10	1.00	6
7/8/2017 0:15	7/8/2017 0:50	0:35	8.50	66
7/9/2017 22:40	7/9/2017 22:45	0:05	0.25	3
7/12/2017 14:20	7/12/2017 19:40	5:20	30.50	120
7/13/2017 13:45	7/13/2017 14:00	0:15	2.50	15
7/21/2017 8:15	7/21/2017 8:25	0:10	1.25	9
7/22/2017 10:30	7/22/2017 11:40	1:10	0.50	3
7/23/2017 1:15	7/23/2017 3:45	2:30	3.50	12
7/24/2017 5:05	7/24/2017 5:10	0:05	0.25	3
7/26/2017 16:15	7/27/2017 5:30	13:15	9.75	18
8/1/2017 15:30	8/1/2017 16:25	0:55	1.25	3
8/3/2017 16:55	8/3/2017 17:20	0:25	0.75	3
8/4/2017 7:25	8/4/2017 13:10	5:45	12.50	30
8/7/2017 7:50	8/7/2017 17:15	9:25	1.75	3
8/10/2017 9:10	8/10/2017 9:15	0:05	0.25	3
8/11/2017 15:20	8/12/2017 4:00	12:40	21.50	39
8/17/2017 13:30	8/17/2017 17:00	3:30	5.00	9
8/18/2017 19:45	8/18/2017 19:50	0:05	0.25	3
8/19/2017 11:40	8/19/2017 15:55	4:15	3.50	15

8/22/2017 7:10	8/22/2017 15:45	8:35	9.50	24
8/23/2017 23:55	8/24/2017 0:35	0:40	3.00	12
8/29/2017 12:35	8/29/2017 12:40	0:05	0.75	9
8/30/2017 16:45	8/30/2017 23:40	6:55	3.00	9
9/1/2017 7:30	9/1/2017 7:35	0:05	0.25	3
9/2/2017 20:20	9/3/2017 4:25	8:05	9.25	6
9/4/2017 15:35	9/5/2017 11:20	19:45	8.75	12
9/6/2017 12:00	9/6/2017 15:50	3:50	3.25	12
9/7/2017 7:20	9/8/2017 0:45	17:25	8.25	18
9/18/2017 13:25	9/18/2017 18:15	4:50	9.75	21
9/19/2017 7:20	9/19/2017 22:20	15:00	1.00	3
9/29/2017 6:00	9/29/2017 19:50	13:50	15.25	9
10/4/2017 13:40	10/4/2017 15:10	1:30	2.00	3
10/6/2017 1:20	10/6/2017 12:45	11:25	1.75	6
10/10/2017 6:35	10/10/2017 6:40	0:05	1.00	12

A total of 48 rainfall events occurred during the monitoring period with rainfall volumes ranging from 0.25 mm to 67.75 mm on June 17th, 2017. Peak intensities ranged from 3 mm/hr to 120 mm/hr on July 12, 2017. There were eight (8) rainfall events with event volumes greater than 10 mm. These events are considered suitable for wet weather analysis and model calibration and validation. In general, the rainfall events captured represent a range of event types and event volumes.

4.2 Dry Weather Flow Analysis Results

Data analysis was undertaken to characterize dry weather flows at each monitoring site. This data will be used for hydraulic modelling. Flow data is considered to represent dry weather conditions when there was no rainfall in the prior 72 hours. In total, twenty-five week days and eight (8) weekend days were identified as dry weather days. Typical weekday and weekend dry weather flow hydrographs were generated by averaging flows recorded in each five minute interval for each dry weather flow day. Any erroneous data was removed. **Appendix C** presents the average weekday and weekend dry weather flow graphs at each monitoring location.

Table 4.2 on the following page, presents the total service drainage area, average dry weather, estimated groundwater infiltration flow and estimated groundwater infiltration flow rate for each flow monitoring site. Groundwater infiltration flows were assumed to be 85% of the minimum of dry weather flow. Groundwater infiltration rates were then calculated by normalizing groundwater infiltration flows using service area.

Table 4.2 Dry Weather Characteristics – Groundwater Infiltration

Site	Service Area (ha)	Average Dry Weather Flow (L/s)	Estimated Groundwater Infiltration Flow (L/s)	Estimated Groundwater Infiltration Rate (L/s/ha)
FM01	273.5	27.2	13.6	0.05
FM02	126.1	29.4	12.7	0.10
FM03	119.2	9.2	3.8	0.03
FM04	82.2	9.8	3.0	0.04
FM05	87.8	11.0	1.7	0.02
FM06	67.6	4.6	0.2	0.003
FM07	101.2	12.2	2.0	0.02
FM08	76.5	19.1	2.3	0.03
FM09	65.3	25.4	6.7	0.10
FM10	109.2	30.9	11.0	0.10
FM11	63.0	6.4	1.0	0.02
FM12	331.3	44.4	4.8	0.01

Average flows recorded from 4.6 L/s at FM06 to 44.4 L/s at FM12. Estimated groundwater infiltration flows ranged from 0.2 L/s at FM06 to 13.6 L/s at FM01. Groundwater infiltration flow values were normalized by service area to obtain a groundwater infiltration rate. Groundwater infiltration rates ranged from 0.003 L/s/ha for FM06 to 0.10 L/s/ha at FM02, FM09 and FM10. In general, a value in excess of 0.05 L/s/ha can be considered high. For the Collingwood monitoring program, high values of groundwater infiltration were recorded at FM02 (0.10 L/s/ha), FM09 (0.10 L/s/ha) and FM10 (0.10 L/s/ha).

Table 4.3 presents the peak dry weather flow, average dry weather flow, estimated wastewater flow, per capita wastewater flow and peaking factor recorded at each site. The estimated population that contributed flow to each site was calculated using Census track data and the Town's parcel layer. Estimated wastewater flow is the average dry weather flow less the estimated groundwater infiltration flow (as shown in **Table 4.2**). Per capita wastewater flow was calculated by dividing the estimated wastewater flow by the population.

Table 4.3 Dry Weather Flow Characteristics – Wastewater Generation

Site	Population	Peak Dry Weather Flow (L/s)	Average Dry Weather Flow (L/s)	Estimated Wastewater Flow (L/s)	Per Capita Wastewater Flow (Lpcd)	Peaking Factor
FM01	3,813	40.4	27.2	13.6	309	1.5
FM02	1,974	35.6	29.4	16.7	733	1.2
FM03V	3,372	16.0	9.2	5.4	139	1.7
FM04	2,044	15.0	9.8	6.8	286	1.5
FM05	1,561	16.6	11.0	9.3	514	1.5
FM06	1,336	11.2	4.6	4.4	281	2.4
FM07	2,037	18.4	12.2	10.1	429	1.5
FM08	1,708	26.6	19.1	16.8	849	1.4
FM09	805	31.8	27.6	20.9	2,241	1.2
FM10	803	36.3	30.2	19.2	2,058	1.2
FM11	1,487	10.4	6.4	5.5	318	1.6
FM12	5,145	66.2	44.4	39.6	665	1.5

A review of **Table 4.3** indicates the following:

- Per capita wastewater values calculated for FM01 (309 Lpcd), FM03 (139 Lpcd), FM04 (286 Lpcd), FM05 (514 Lpcd), FM06 (281 Lpcd), FM07 (429 Lpcd), FM11 (272 Lpcd) and FM12 (665 Lpcd) are within the range of typical values for wastewater generation. For comparison purposes, the Town utilizes a domestic wastewater generation rate of 450 Lpcd for new development, as per the Town's Development Standards (2007);
- Per capita wastewater values calculated for FM02 (733 Lpcd), FM08 (849 Lpcd), FM09 (2003 Lpcd), FM10 (2,143 Lpcd) are all higher than typical values. FM09 and FM10 both receive flows from industrial areas which is not accounted for in the population estimates. FM02 and FM08 both receive flow from downtown commercial areas which also are not reflected in the residential population estimates; and,
- Measured peaking factors ranged from 1.2 at FM02, FM09 and FM10 to 1.6 at FM11. These values are all typical of sanitary flow and are lower than peaking factors calculated using the Harmon Peaking Factor. It is noted that the Town utilizes the Harmon Peaking Factor for the design of new sanitary sewers (Town of Collingwood Development Standards, 2007).

4.3 Wet Weather Flow Analysis Results

This section presents the data analysis undertaken to characterize the wet weather response of rainfall derived inflow and infiltration (RDII) in the sanitary sewer system using the measured flow data at all of the flow monitoring locations. Wet weather flow analyses were completed for the eight (8) rainfall events that had rainfall event volumes greater than 10 mm. Wet weather analyses was completed for two events for FM12 due to the shorter period of record available at this site. **Table 4.4** presents the peak RDII flow rate, the volume of rainfall that entered the sanitary sewer, and the C_v value or the percentage of rainfall that entered the sanitary sewer for all flow monitoring sites. **Appendix D** presents the wet weather hydrographs for all of the rainfall events identified in **Table 4.4**.

Table 4.4 Wet Weather Flow Analysis Results

Site (Service Area)	Rainfall Event	Rainfall Volume (mm)	Peak RDII Flow (L/s)	Peak RDII Flow Rate (L/s/ha)	Wet Weather Flow Volume (m ³)	C_v Value (%)
FM01 (273.5 ha)	24-May-17	17.8	8.8	0.03	198	0.4%
	3-Jun-17	13.5	9.6	0.04	497	1.5%
	12-Jun-17	10.8	8.2	0.03	450	1.6%
	17-Jun-17	72.5	95.0	0.35	6,817	3.4%
	12-Jul-17	33.0	64.0	0.23	2,961	3.3%
	4-Aug-17	12.5	8.8	0.03	489	1.4%
	11-Aug-17	21.5	15.3	0.06	380	0.6%
	29-Sep-17	15.3	9.9	0.04	270	0.6%
FM02 (126.1 ha)	24-May-17	17.8	16.4	0.13	523	2.3%
	3-Jun-17	13.5	10.7	0.08	178	1.2%
	12-Jun-17	10.8	16.1	0.13	433	3.3%
	12-Jul-17	33.0	34.5	0.27	459	1.1%
	04-Aug-17	12.5	25.1	0.20	256	1.6%
	11-Aug-17	21.5	20.8	0.17	114	0.4%
	29-Sep-17	15.3	11.0	0.04	77	0.2%
	24-May-17	17.8	16.4	0.13	523	2.3%

FM03 (119.2 ha)	24-May-17	24.3	15.4	0.13	1,006	4.8%
	3-Jun-17	13.5	11.5	0.10	324	2.3%
	12-Jun-17	10.8	9.1	0.08	148	1.2%
	17-Jun-17	72.5	141.3	1.19	6,907	8.0%
	12-Jul-17	33.0	52.7	0.44	2,180	5.5%
	04-Aug-17	12.5	17.5	0.15	95	0.6%
	11-Aug-17	21.5	8.5	0.07	185	0.7%
	29-Sep-17	15.3	7.0	0.06	53	0.3%
FM04 (82.2 ha)	24-May-17	17.8	9.1	0.11	160	1.1%
	3-Jun-17	13.5	8.0	0.10	196	2.0%
	12-Jun-17	10.8	10.8	0.13	39	0.5%
	17-Jun-17	72.5	70.4	0.86	7,362	12.4%
	12-Jul-17	33.0	61.5	0.75	1,312	4.8%
	04-Aug-17	12.5	19.9	0.24	77	0.8%
	11-Aug-17	21.5	8.5	0.10	128	0.7%
	29-Sep-17	15.3	2.8	0.03	43	0.3%
FM05 (87.8 ha)	24-May-17	17.8	13.3	0.15	437	2.8%
	3-Jun-17	13.5	47.0	0.54	266	2.5%
	12-Jun-17	10.5	88.5	1.01	171	1.9%
	17-Jun-17	72.5	152.0	1.73	5,970	9.4%
	12-Jul-17	33.0	98.5	1.12	1,050	3.6%
	04-Aug-17	12.5	110.7	1.26	226	2.1%
	11-Aug-17	21.5	44.8	0.51	169	0.9%
	29-Sep-17	5.5	10.5	0.12	102	0.8%
FM06 (67.6 ha)	24-May-17	17.8	8.8	0.13	311	2.6%
	3-Jun-17	13.5	8.8	0.13	261	3.2%
	12-Jun-17	10.8	8.6	0.13	140	2.0%
	17-Jun-17	67.8	33.2	0.49	1,336	2.7%
	12-Jul-17	33.0	10.8	0.16	142	0.6%
FM07 (101.2 ha)	24-May-17	24.3	15.7	0.15	623	3.5%
	3-Jun-17	13.5	13.3	0.13	289	2.4%
	12-Jun-17	10.8	9.6	0.09	145	1.4%
	17-Jun-17	72.5	90.4	0.89	6,144	8.4%
	12-Jul-17	33.0	64.8	0.64	1,544	4.6%
	04-Aug-17	12.5	18.6	0.18	458	3.6%
	11-Aug-17	21.5	11.6	0.11	347	1.6%

	29-Sep-17	15.3	13.5	0.13	400	2.6%
FM08 (76.5 ha)	24-May-17	24.3	7.6	0.03	181	0.4%
	3-Jun-17	13.5	8.6	0.03	546	1.7%
	12-Jun-17	10.8	7.2	0.03	186	0.6%
	17-Jun-17	72.5	82.4	0.30	8,762	4.4%
	12-Jul-17	33.0	47.7	0.17	3,341	3.7%
	04-Aug-17	12.5	10.3	0.04	121	0.4%
	11-Aug-17	21.5	6.7	0.02	147	0.2%
	29-Sep-17	15.3	4.9	0.02	51	0.1%
FM09 (65.3 ha)	24-May-17	17.3	12.7	0.19	469	4.0%
	03-Jun-17	10.5	7.9	0.12	216	2.8%
	12-Jun-17	10.5	10.5	0.16	555	8.1%
	17-Jun-17	67.8	50.3	0.77	6,865	14.5%
	11-Aug-17	21.5	28.1	0.43	3,974	18.4%
FM10 (109.2 ha)	24-May-17	17.3	15.1	0.14	527	2.7%
	03-Jun-17	8.0	18.0	0.16	446	3.4%
	12-Jun-17	10.5	24.9	0.23	299	2.6%
	17-Jun-17	67.8	95.4	0.87	5,488	6.9%
	04-Aug-17	12.5	32.1	0.29	212	1.6%
	11-Aug-17	21.5	22.3	0.20	264	1.1%
	29-Sep-17	15.3	17.2	0.16	337	2.0%
FM11 (63.0 ha)	24-May-17	17.8	9.4	0.15	351	3.1%
	3-Jun-17	13.5	5.3	0.08	128	1.7%
	12-Jun-17	10.8	5.4	0.09	82	1.2%
	17-Jun-17	72.5	56.0	0.89	3,891	8.5%
	12-Jul-17	33.0	12.8	0.20	727	3.5%
	04-Aug-17	12.5	6.7	0.11	37	0.5%
	11-Aug-17	21.5	7.6	0.12	81	0.6%
	29-Sep-17	15.3	3.4	0.05	27	0.3%
FM12 (331.3 ha)	11-Aug-17	21.5	137.3	0.50	1,164	2.0%
	28-Sep-17	15.3	32.9	0.12	1,445	3.5%

A review of the results presented in **Table 4.4** and **Appendix D** indicates the following:

- At FM01, peak RDII rates ranged from 0.03 L/s/ha for three of eight events to 0.35 L/s/ha for the June 17th event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for one of eight events. Cv values ranged from 0.4% for the May 24, 2017 rainfall event to 3.4% for the June 17, 2017 rainfall event. Overall, an average of 3.2% of rainfall entered the sanitary sewer. Typically a Cv value greater than 5% is indicative of significant wet weather flows. Measured data from FM01 do not indicate the presence of significant wet weather inflow and infiltration sources;
- At FM02, peak RDII rates ranged from 0.04 L/s/ha for the September 29, 2017 event to 0.27 L/s/ha for the July 12, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for one (1) of seven (7) events. Cv values ranged from 0.2% for the September 29, 2017 rainfall event to 3.3% for the June 12, 2017 rainfall event. Overall, an average of 1.3% of rainfall entered the sanitary sewer. Measured data from FM02 do not indicate the presence of significant wet weather inflow and infiltration sources;
- At FM03, peak RDII rates ranged from 0.06 L/s/ha for the September 29, 2017 event to 1.19 L/s/ha for the June 17, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for two (2) of eight (8) events. Cv values ranged from 0.3% for the September 29, 2017 rainfall event to 8.0% for the June 17, 2017 rainfall event. Overall, an average of 4.6% of rainfall entered the sanitary sewer. Measured data from FM03 do indicate the presence of significant wet weather inflow and infiltration sources. FM03 monitors flows from an older part of Collingwood located west of Birch Street;
- At FM04, peak RDII rates ranged from 0.03 L/s/ha for the September 29, 2017 event to 0.86 L/s/ha for the June 17, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for three (3) of seven (7) events. Cv values ranged from 0.3% for the September 29, 2017 rainfall event to 12.4% for the June 17, 2017 rainfall event. Overall, an average of 5.8% of rainfall entered the sanitary sewer. Measured data from FM04 do indicate the presence of significant wet weather inflow and infiltration sources. In particular, a review of the data indicates a significant infiltration response. FM04 monitored flows from an older part of Collingwood located between Birch Street and Hurontario Street;
- At FM05, peak RDII rates ranged from 0.12 L/s/ha for the September 29, 2017 event to 1.73 L/s/ha for the June 17, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for six (6) of seven (7) events. Cv values ranged from 0.8% for the September 29, 2017 rainfall event to 9.4% for the June 17, 2017 rainfall event. Overall, an average of 4.8% of rainfall entered the sanitary sewer. Measured data from FM05 do indicate the presence of significant wet weather inflow and infiltration sources. FM05 monitored flows from an older part of Collingwood in the vicinity of Hurontario Street;
- At FM06, peak RDII rates ranged from 0.13 L/s/ha for three events to 0.49 L/s/ha for the June 17, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for one (1) of five (5) events. Cv values ranged from 0.6% for the September 29, 2017 rainfall event to 2.7% for the June 17, 2017 rainfall event. Overall, an average of 2.2% of rainfall entered the sanitary sewer. Measured data from FM06 do not indicate the presence of significant wet weather inflow and infiltration sources. FM06 was located in the Hurontario Street sanitary sewer upstream of FM05 and monitored flows from a newer development areas;

- At FM07, peak RDII rates ranged from 0.09 L/s/ha for the June 12, 2017 event to 0.89 L/s/ha for the June 17, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for two (2) of eight (8) events. Cv values ranged from 1.4% for the June 12, 2017 rainfall event to 8.4% for the June 17, 2017 rainfall event. Overall, an average of 5.0% of rainfall entered the sanitary sewer. Measured data from FM07 do indicate the presence of significant wet weather inflow and infiltration sources. FM07 monitored flows from an older area of Collingwood located west of Hurontario Street;
- At FM08, peak RDII rates ranged from 0.02 L/s/ha for two events to 0.30 L/s/ha for the June 17, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for one (1) of eight (8) events. Cv values ranged from 0.1% for the September 29, 2017 rainfall event to 4.4% for the June 17, 2017 rainfall event. Overall, an average of 2.5% of rainfall entered the sanitary sewer. Measured data from FM08 do not indicate the presence of significant wet weather inflow and infiltration sources;
- At FM09, peak RDII rates ranged from 0.12 L/s/ha for the May 24, 2017 event to 0.77 L/s/ha for the June 17, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for two (2) of five (5) events. Cv values ranged from 2.8% for the June 3, 2017 rainfall event to 18.4% for the August 11, 2017 rainfall event. Overall, an average of 11% of rainfall entered the sanitary sewer. Measured data from FM09 do indicate the presence of significant wet weather inflow and infiltration sources;
- At FM10, peak RDII rates ranged from 0.14 L/s/ha for the May 24, 2017 event to 0.87 L/s/ha for the June 17, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for two (2) of seven (7) events. Cv values ranged from 1.1% for the August 11, 2017 rainfall event to 6.9% for the June 17, 2017 rainfall event. Overall, an average of 4.1% of rainfall entered the sanitary sewer. Measured data from FM10 do indicate the presence of significant wet weather inflow and infiltration sources;
- At FM11, peak RDII rates ranged from 0.05 L/s/ha for the September 29, 2017 event to 0.89 L/s/ha for the June 17, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for one (1) of seven (7) events. Cv values ranged from 0.3% for the September 29, 2017 rainfall event to 8.5% for the June 17, 2017 rainfall event. Overall, an average of 4.3% of rainfall entered the sanitary sewer. Measured data from FM11 do not indicate the presence of significant wet weather inflow and infiltration sources; and,
- At FM12, peak RDII rates ranged from 0.12 L/s/ha for the August 11, 2017 event to 0.50 L/s/ha for the September 28, 2017 event. Measured peak RDII rates exceeded the Town's wet weather infiltration rate used to design new sanitary sewers of 0.23 L/s for one (1) of two (2) events. Cv values ranged from 2.0% for the August 11, 2017 rainfall event to 3.5% for the September 28, 2017 rainfall event. Overall, an average of 2.7% of rainfall entered the sanitary sewer. Measured data from FM12 do not indicate the presence of significant wet weather inflow and infiltration sources.

A detailed review of analysis results indicates that FM03, FM04, FM05, FM07, FM09 and FM10 received significant inflow and infiltration flows. For the most part, all of this sites monitored flows from older areas of the Town where there may be condition issues with the sanitary sewer system, such as cracks in pipes and maintenance holes, as well as sources of inflow such as foundation drains.

5 Summary

Flow data and rainfall data were collected from the beginning of May to the beginning of October, 2017. A review of the data quality indicated that consistent data was collected at all of the sites. Data quality was good and significant information was collected. Analyses identified eight (8) rainfall events suitable for model calibration occurred. Of note, one (1) large rainfall event occurred on June 17th, 2017 which had a rainfall event volume of 67.7 mm.

Analysis of dry weather flows did characterize dry weather wastewater as well as groundwater infiltration flows. Groundwater infiltration rates ranged from 0.003 L/s/ha to 0.10 L/s/ha for three sites. In general, a value greater than 0.05 L/s/ha can be considered high. In this context, high groundwater infiltration rates were observed for monitored areas FM02, FM09 and FM10. The service area of FM02 includes the downtown area to the west of Birch Street while FM09 monitored flows in the Raglan Street area and FM10 monitored flows entering the St. Clair SPS. All three (3) of these areas are close to the Lake where higher groundwater levels are anticipated.

Dry weather flow analyses also characterized typical wastewater generation rates. In general, the calculated rates were within a typical range for residential areas and either close to or below the Town's wastewater design rate of 450 Lpcd. Two (2) monitored areas, FM09 and FM10, had much higher per capita flow rates. This is likely the result of ICI land use within these areas.

Wet weather analyses were also completed to characterize the response to rainfall. Analyses identified peak I/I rates as well as Cv values. A Cv value represents the percentage of rainfall that entered the sanitary sewer system. A detailed review of analysis results indicates that FM03, FM04, FM05, FM07, FM09 and FM10 received significant inflow and infiltration flows. For the most part, all of these sites monitored flows from older areas of the Town where there may be condition issues with the sanitary sewer system, such as cracks in pipes and maintenance holes, as well as sources of inflow such as foundation drains.

APPENDIX A
Monitoring Site Installation And Maintenance Logs

GENERAL SITE INFORMATION

Date / Time	May 4, 2017 9:37:00 AM EDT
Assigned Technician(s)	Mark Bukovec Matt Bowes
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX16-085
Site ID	FM-01
MH ID (if Available)	n/a
Location Details	21 hickory
Sewer System	Sanitary

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



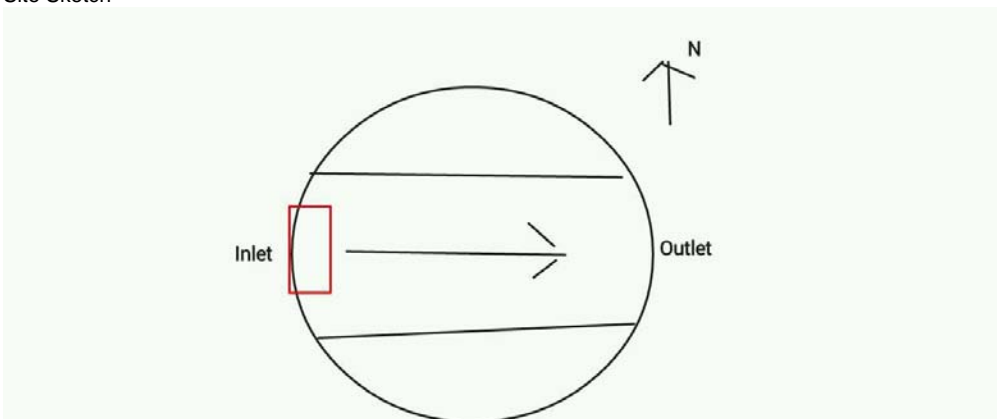
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	750
D/S Pipe Diameter (mm)	750

Site Sketch



Flow Meter Sensors are installed in:

Downstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20111208956
PMAC ID	1647
Ultrasonic Serial Number	121306174
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 AM EDT

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	9:59:00 AM EDT
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MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	182
Flow Depth- Down-looking Ultrasonic (mm)	170
Velocity (msec)	0.52

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	180
Flow Depth- Down-looking Ultrasonic (mm)	180
Velocity (msec)	0.45
Depth of Sediment (mm)	20

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit was installed successfully. sensor was offset due to 2cm of sediment
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GENERAL SITE INFORMATION

Date / Time	May 4, 2017 11:16:06 AM AST
Assigned Technician(s)	Mark Bukovec Matt Bowes
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX17-085
Site ID	FM-02
MH ID (if Available)	n/a
Location Details	First and Walnut St
Sewer System	Sanitary

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



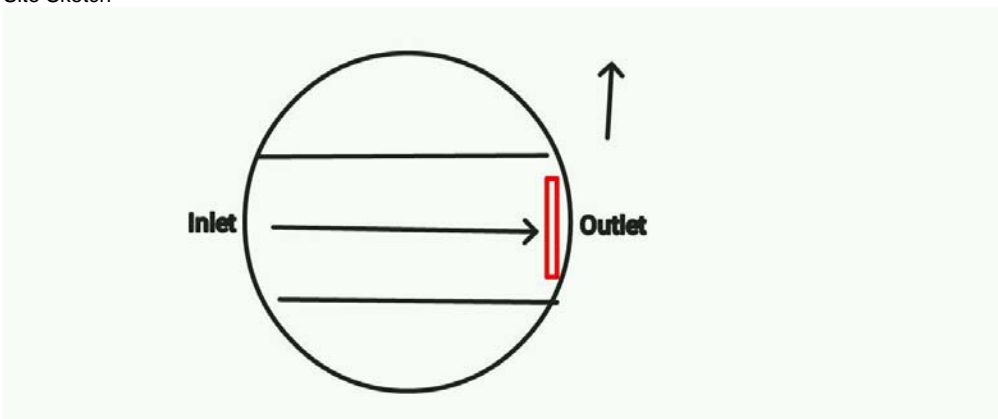
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	600
D/S Pipe Diameter (mm)	600

Site Sketch



Flow Meter Sensors are installed in:

Downstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20111208965
PMAC ID	2002
Ultrasonic Serial Number	121306182
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 AM AST

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	11:46:00 AM AST
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MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	320
Flow Depth- Down-looking Ultrasonic (mm)	340
Velocity (msec)	0.41

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	320
Flow Depth- Down-looking Ultrasonic (mm)	340
Velocity (msec)	0.44
Depth of Sediment (mm)	50

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit was installed successfully. telemetry works well. offset was added to the pressure sensor.
----------	---

GENERAL SITE INFORMATION

Date / Time	May 4, 2017 12:30:03 PM AST
Assigned Technician(s)	Matt Bowes Mark Bukovec
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX17-085
Site ID	FM-03
MH ID (if Available)	n/a
Location Details	oak between first and second streets
Sewer System	Sanitary

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



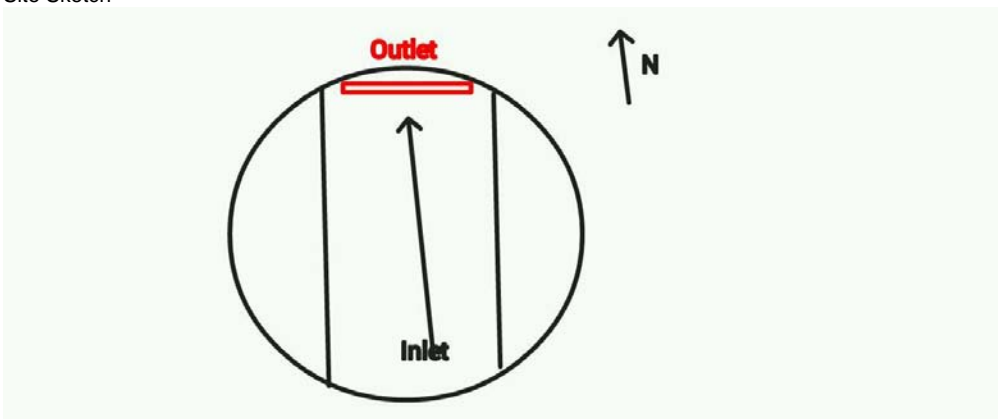
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	450
D/S Pipe Diameter (mm)	450

Site Sketch



Flow Meter Sensors are installed in:

Downstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20112011898
PMAC ID	1470
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 PM AST

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	12:52:00 PM AST
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MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	162
Flow Depth- Down-looking Ultrasonic (mm)	180
Velocity (msec)	0.67

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	170
Flow Depth- Down-looking Ultrasonic (mm)	180
Velocity (msec)	0.61
Depth of Sediment (mm)	0

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit was installed successfully. No telemetry
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GENERAL SITE INFORMATION

Date / Time	May 4, 2017 1:19:17 PM AST
Assigned Technician(s)	Mark Bukovec Matt Bowes
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX17-085
Site ID	FM-04
MH ID (if Available)	n/a
Location Details	40 birch street
Sewer System	Sanitary

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



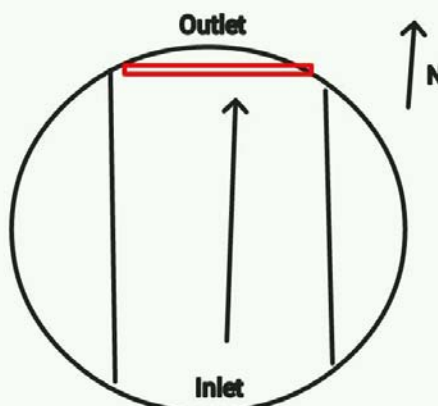
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	600
D/S Pipe Diameter (mm)	600

Site Sketch



Flow Meter Sensors are installed in:

Downstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20114319162
PMAC ID	1476
Ultrasonic Serial Number	121306164
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 AM AST

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	1:37:00 PM AST
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MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	101
Flow Depth- Down-looking Ultrasonic (mm)	90
Velocity (msec)	0.97

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	100
Flow Depth- Down-looking Ultrasonic (mm)	100
Velocity (msec)	1.01
Depth of Sediment (mm)	0

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit was installed successfully. No telemetry
----------	---

GENERAL SITE INFORMATION

Date / Time	May 4, 2017 6:40:27 AM AST
Assigned Technician(s)	Mark Bukovec Matt Bowes
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX17-085
Site ID	FM-05
MH ID (if Available)	n/a
Location Details	hurontario street across from the Cora couture
Sewer System	Sanitary

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



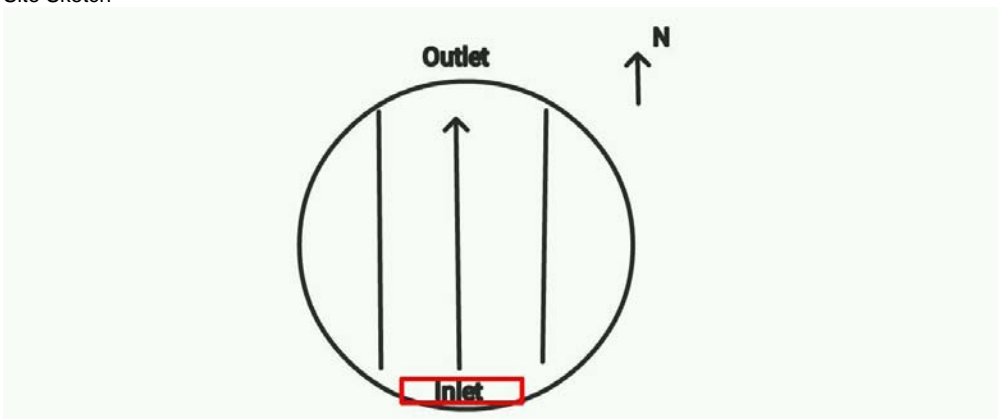
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	350
D/S Pipe Diameter (mm)	350

Site Sketch



Flow Meter Sensors are installed in:

Upstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20112613706
PMAC ID	1648
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 AM AST

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	7:06:00 AM AST
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MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	105
Flow Depth- Down-looking Ultrasonic (mm)	100
Velocity (msec)	0.38

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	110
Flow Depth- Down-looking Ultrasonic (mm)	100
Velocity (msec)	0.34
Depth of Sediment (mm)	0

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit was installed successfully. telemetry works well. best time of day to do maintenance is before 9am.
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GENERAL SITE INFORMATION

Date / Time	May 4, 2017 2:22:14 PM AST
Assigned Technician(s)	Matt Bowes Mark Bukovec
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX17-085
Site ID	FM-06
MH ID (if Available)	n/a
Location Details	the candy factory
Sewer System	Sanitary

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



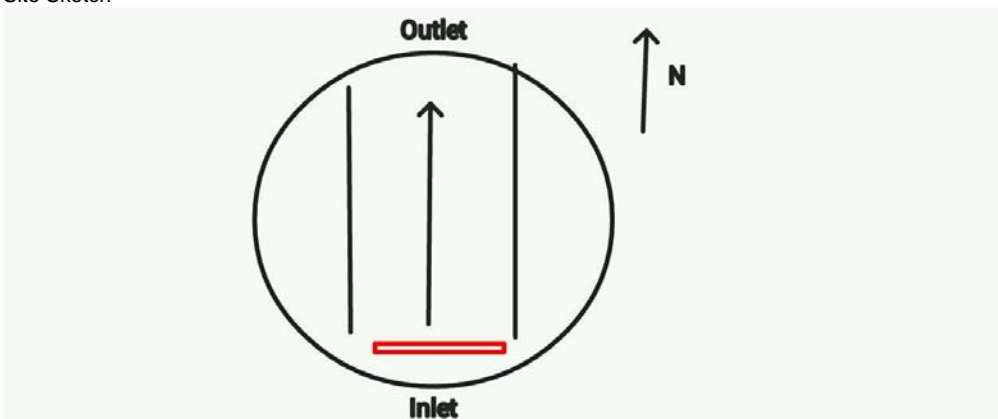
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	350
D/S Pipe Diameter (mm)	350

Site Sketch



Flow Meter Sensors are installed in:

Upstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20114118492
PMAC ID	1542
Ultrasonic Serial Number	121306187
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 AM AST

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	2:38:00 PM AST
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MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	137
Flow Depth- Down-looking Ultrasonic (mm)	130
Velocity (msec)	0.26

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	130
Flow Depth- Down-looking Ultrasonic (mm)	130
Velocity (msec)	0.33
Depth of Sediment (mm)	0

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit was installed successfully
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GENERAL SITE INFORMATION

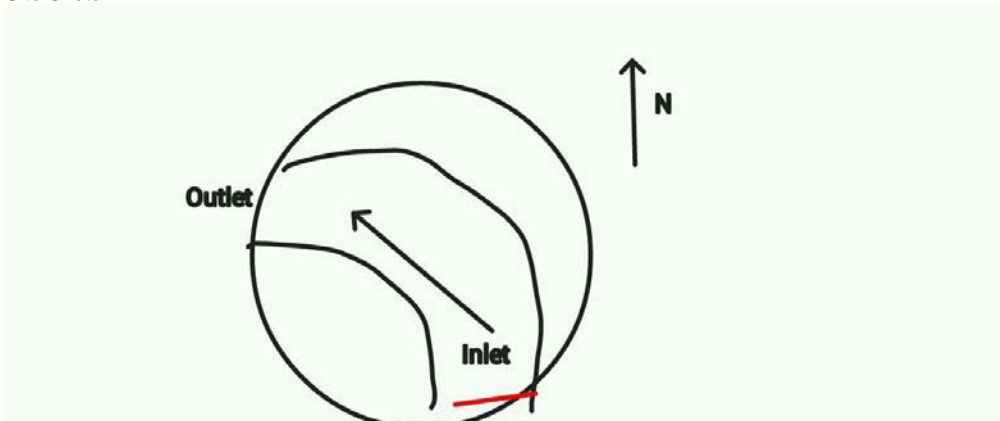
Date / Time	May 5, 2017 7:22:14 AM EDT
Assigned Technician(s)	Mark Bukovec Matt Bowes
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX17-085
Site ID	FM-07
MH ID (if Available)	n/a
Location Details	first and hurontario
Sewer System	Sanitary
<div> <div>PHOTO 1 - Site Overview</div> <div>PHOTO 2 - Down Manhole</div> </div>	

MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	0
D/S Pipe Diameter (mm)	0
Site Sketch	



Flow Meter Sensors are installed in:

Upstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20111208968
PMAC ID	1659
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 AM EDT

CALIBRATION MEASUREMENTS

Time of Calibration Measurements 8:50:00 AM EDT

MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	164
Flow Depth- Down-looking Ultrasonic (mm)	150
Velocity (msec)	0.99

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	170
Flow Depth- Down-looking Ultrasonic (mm)	160
Velocity (msec)	0.91
Depth of Sediment (mm)	0

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit was successfully installed. No telemetry.
----------	--

GENERAL SITE INFORMATION

Date / Time	May 5, 2017 6:30:12 AM EDT
Assigned Technician(s)	Mark Bukovec Matt Bowes
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX17-085
Site ID	FM-08
MH ID (if Available)	n/a
Location Details	41 rodney
Sewer System	Sanitary
<div> <div>PHOTO 1 - Site Overview</div> <div>PHOTO 2 - Down Manhole</div> </div>	

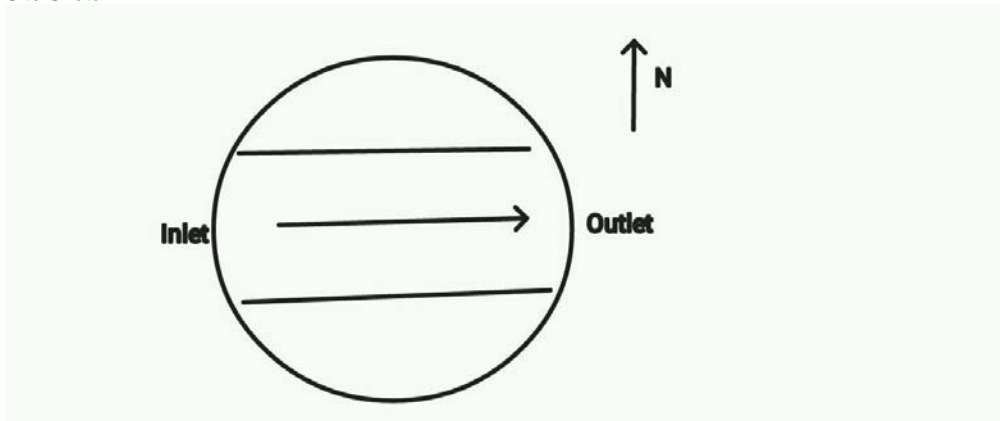
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	450
D/S Pipe Diameter (mm)	450

Site Sketch



Flow Meter Sensors are installed in:

Downstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20111208961
PMAC ID	1433
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 AM EDT

CALIBRATION MEASUREMENTS

Time of Calibration Measurements 7:12:00 AM EDT

MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	250
Flow Depth- Down-looking Ultrasonic (mm)	240
Velocity (msec)	0.52

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	250
Flow Depth- Down-looking Ultrasonic (mm)	240
Velocity (msec)	0.51
Depth of Sediment (mm)	30

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit was installed successfully. telemetry works. there is an 8cm offset on the pressure sensor
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GENERAL SITE INFORMATION

Date / Time	May 4, 2017 8:57:58 AM AST
Assigned Technician(s)	Mark Bukovec Matt Bowes
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX17-085
Site ID	FM-09
MH ID (if Available)	n/a
Location Details	98 Huron street
Sewer System	Sanitary

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



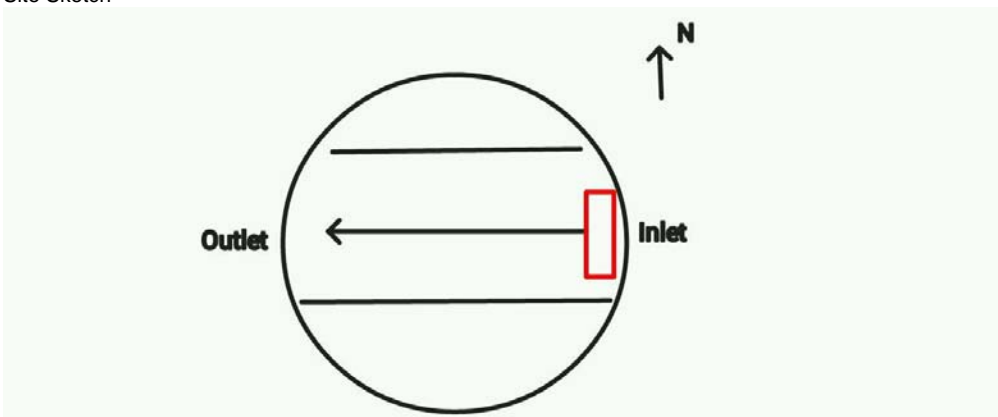
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	500
D/S Pipe Diameter (mm)	500

Site Sketch



Flow Meter Sensors are installed in:

Upstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20111208959
PMAC ID	1826
Sensor Configuration	Depth 1 (pressure) Velocity
Programmed Daily Wake-up Time	6:01:00 AM AST

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	9:13:00 AM AST
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MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	222
Flow Depth- Down-looking Ultrasonic (mm)	0
Velocity (msec)	0.45

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	230
Flow Depth- Down-looking Ultrasonic (mm)	0
Velocity (msec)	0.52
Depth of Sediment (mm)	0

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	Unit was installed successfully. No ultrasonic was installed due to benching coming out too far into chamber.
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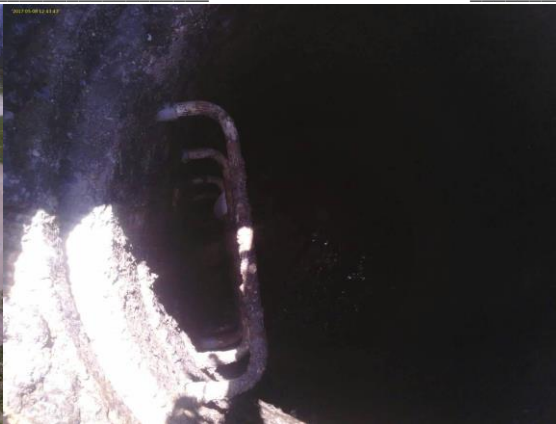
GENERAL SITE INFORMATION

Date / Time	May 8, 2017 12:42:31 PM AST
Assigned Technician(s)	Mark Bukovec Matt Bowes Salman Baig
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX17-085
Site ID	FM-10
MH ID (if Available)	n/a
Location Details	51 st Clair st
Sewer System	Sanitary

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



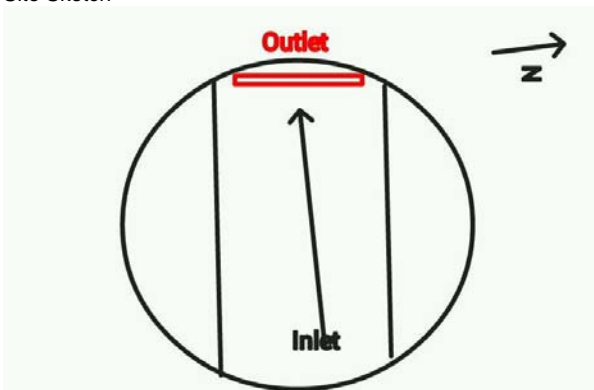
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	900
D/S Pipe Diameter (mm)	900
Other Pipes (mm)	600

Site Sketch



Flow Meter Sensors are installed in:

Downstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20114218845
PMAC ID	1822
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 AM AST

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	1:22:00 PM AST
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MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	150
Flow Depth- Down-looking Ultrasonic (mm)	160
Velocity (msec)	0.9

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	140
Flow Depth- Down-looking Ultrasonic (mm)	150
Velocity (msec)	0.84
Depth of Sediment (mm)	0

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit was installed successfully. telemetry works well. pictures were taken with the field camera
----------	--



GENERAL SITE INFORMATION

Date / Time	May 4, 2017 7:44:33 AM AST
Assigned Technician(s)	Mark Bukovec Matt Bowes
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	PUX17-085
Site ID	FM-11
MH ID (if Available)	collingwood fm11
Location Details	39 Minnesota st
Sewer System	Sanitary

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



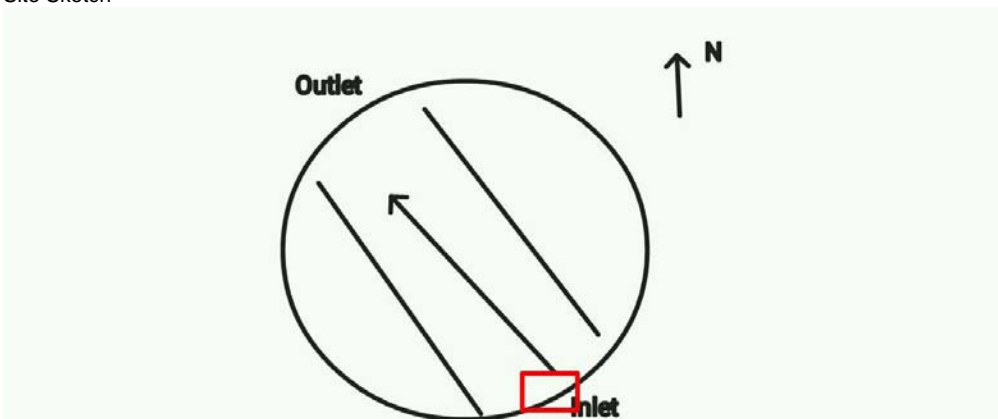
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	On Roadway- Traffic Control Required
Site Conditions Upon Arrival	Excellent
Flow Characteristics	Moderate Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	na

PIPE INFORMATION

U/S Pipe Diameter (mm)	450
D/S Pipe Diameter (mm)	450

Site Sketch



Flow Meter Sensors are installed in:

Upstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20114319179
PMAC ID	1557
Ultrasonic Serial Number	121306183
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 AM AST

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	8:08:00 AM AST
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MONITOR MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	63
Flow Depth- Down-looking Ultrasonic (mm)	70
Velocity (msec)	1.2

MANUAL MEASUREMENTS

Flow Depth- In-flow Pressure Transducer (mm)	70
Flow Depth- Down-looking Ultrasonic (mm)	70
Velocity (msec)	1.21
Depth of Sediment (mm)	0

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit was installed successfully. telemetry works well.
----------	--

GENERAL SITE INFORMATION

Date / Time	Aug 4, 2017 10:25:00 AM EDT
Assigned Technician(s)	Matt Bowes Glen Robbins
Project	Collingwood Flow Monitoring
Client	XCG
Project Code	2017-0289
Site ID	FM12
Location Details	walking path east of birch Street
Sewer System	Sanitary

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



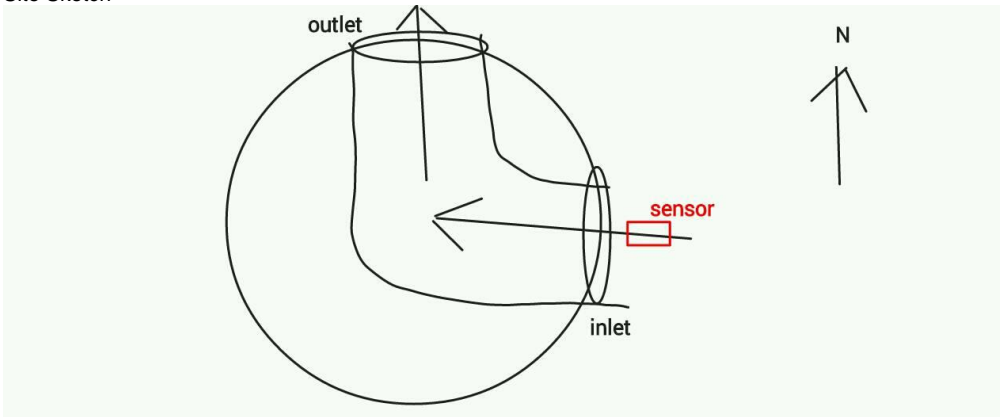
MONITORING LOCATION CHARACTERISTICS

Special Site Access Considerations	Off Roadway- Vehicle Access
Site Conditions Upon Arrival	Excellent
Flow Characteristics	High Velocity Turbulent Flow High Flow Volume
Factors Affecting Hydraulics (ie. bends, slopes, pipes etc.)	bend downstream of sensor

PIPE INFORMATION

U/S Pipe Diameter (mm)	900
D/S Pipe Diameter (mm)	950

Site Sketch



Flow Meter Sensors are installed in:

Upstream

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Unit Model	MSFM
Unit Serial Number	20114118492
PMAC ID	1542
Ultrasonic Serial Number	121306187
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
Programmed Daily Wake-up Time	6:01:00 AM EDT

CALIBRATION MEASUREMENTS- (With Velocity Panel)

Time	12:01:00 PM EDT
MONITOR MEASUREMENTS	
Flow Depth (mm)	156
Velocity (m/s)	0.66
MANUAL MEASUREMENTS	
Flow Depth (mm)	160
Velocity Panel	
Velocity TL (m/s)	0.94
Velocity TM (m/s)	0.96
Velocity TR (m/s)	0.74
Velocity BR (m/s)	0
Velocity MM (m/s)	0
Velocity BL (m/s)	0
Velocity BM (m/s)	0.86

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	unit successfully installed in upstream pipe, 4 cm physical offset (to the left of the invert), depth reading well (ultrasonic MM and sensor are 120mm). velo reading okay, see panel measurements
----------	--

SITE INFORMATION

Date / Time	Jul 21, 2017 8:44:35 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM01
Staff	Mark Bukovec Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.8
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 8:49:00 AM AST
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	177
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	160
Velocity (m/s)	0.42

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	170

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	170
Velocity (m/s)	0.45

COMMENTS / NOTES

Comments / Notes	cleaned sensor, manual measurements to confirm sensors.
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SITE INFORMATION

Date / Time	Aug 29, 2017 9:38:56 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM01
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Aug 29, 2017 9:49:00 AM EDT
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	162
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	140
Velocity (m/s)	0.41

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	155

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	140
Velocity (m/s)	0.4

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors were reading correctly cleaned sensors and changed battery
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SITE INFORMATION

Date / Time	Sep 14, 2017 7:35:30 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM01
Staff	Matt Bowes Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	12.3
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 7:43:00 AM EDT
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	145
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	140
Velocity (m/s)	0.44

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	140

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	140
Velocity (m/s)	0.45

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors cleaned sensors
------------------	--

SITE INFORMATION

Date / Time	Jul 21, 2017 6:32:58 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM05
Staff	Mark Bukovec Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Manual Calibration Measurements
Battery Voltage	12.1
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 6:37:00 AM AST
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	245
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	210
Velocity (m/s)	0.2

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	240

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	200
Velocity (m/s)	0.21

COMMENTS / NOTES

Comments / Notes	data is consistent with previous site visits
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SITE INFORMATION

Date / Time	Aug 29, 2017 8:54:26 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM02
Staff	Matt Bowes Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.8
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Aug 29, 2017 8:59:00 AM EDT
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	250
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	220
Velocity (m/s)	0.24

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	240

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	220
Velocity (m/s)	0.2

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors were reading correctly
------------------	---

SITE INFORMATION

Date / Time	Sep 14, 2017 6:46:26 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM02
Staff	Matt Bowes Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.7
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 6:50:00 AM EDT
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MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	237
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	220
Velocity (m/s)	0.24

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	200

FM MAINTENANCE/CALIBRATION

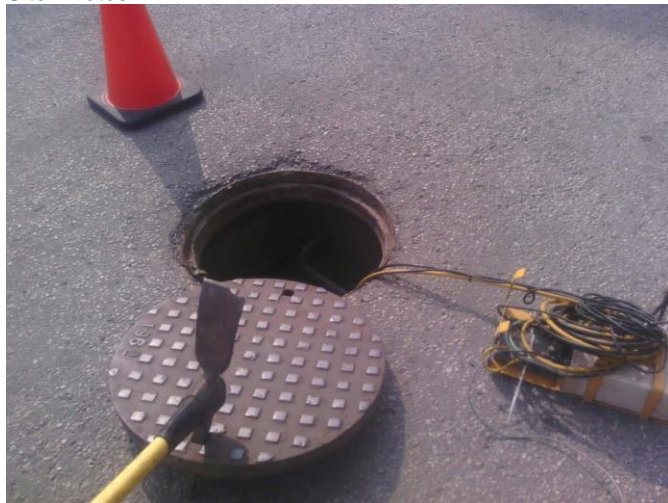
Flow Depth Down Ultra (mm)	210
Velocity (m/s)	0.27

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors cleaned ragging off sensor
------------------	---

SITE INFORMATION

Date / Time	Jul 21, 2017 8:56:48 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM03
Staff	Mark Bukovec Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Manual Calibration Measurements
Battery Voltage	11.8
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 9:01:00 AM AST
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	100
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	120
Velocity (m/s)	0.54

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	110

FM MAINTENANCE/CALIBRATION

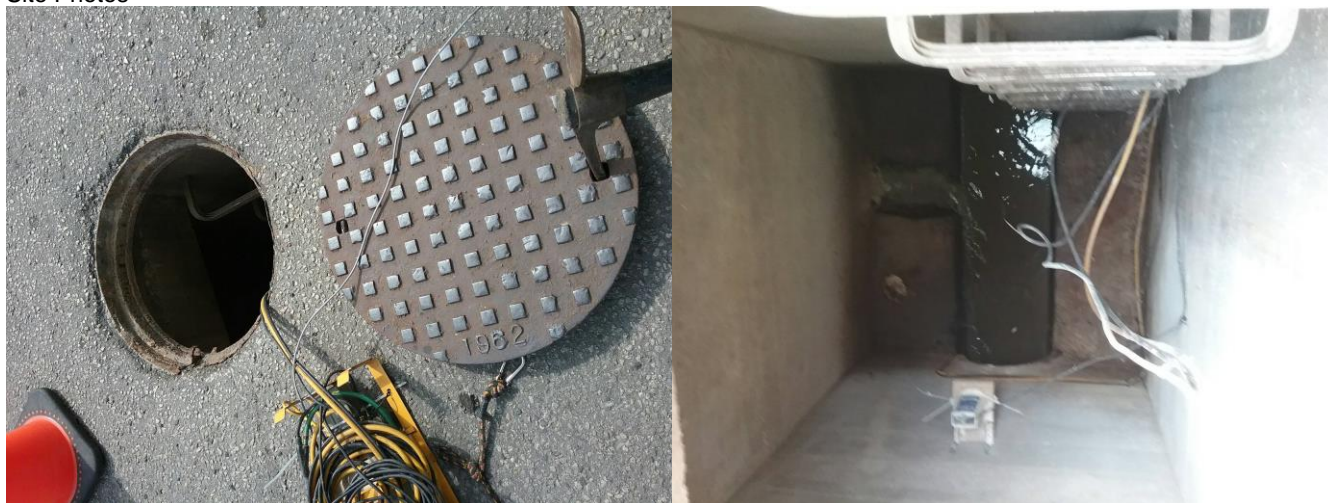
Flow Depth Down Ultra (mm)	120
Velocity (m/s)	0.5

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors
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SITE INFORMATION

Date / Time	Aug 29, 2017 10:03:23 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM03
Staff	Matt Bowes Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Battery Swap Manual Calibration Measurements
Battery Voltage	12
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Aug 29, 2017 10:11:00 AM EDT
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MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	74
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	100
Velocity (m/s)	0.48

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
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FM MAINTENANCE/CALIBRATION

Flow Depth- Pressure (mm)	80
Flow Depth Down Ultra (mm)	100
Velocity (m/s)	0.4

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors were reading correctly cleaned sensors and changed battery
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SITE INFORMATION

Date / Time	Sep 14, 2017 8:01:53 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM03
Staff	Matt Bowes Glen Robbins

Site PhotosSITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	12.4
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 8:07:00 AM EDT
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MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	82
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	110

FM MAINTENANCE/CALIBRATION

Velocity (m/s)	0.51
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MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
--------------------------	---

Flow Depth- Pressure (mm)	90
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Flow Depth Down Ultra (mm)	100
----------------------------	-----

Velocity (m/s)	0.5
----------------	-----

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors
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SITE INFORMATION

Date / Time	Jul 21, 2017 9:15:11 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM04
Staff	Mark Bukovec Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Manual Calibration Measurements
Battery Voltage	11.8
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 9:14:00 AM AST
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MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	62
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	70
Velocity (m/s)	0.82

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	70

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)

70

Velocity (m/s)

0.58

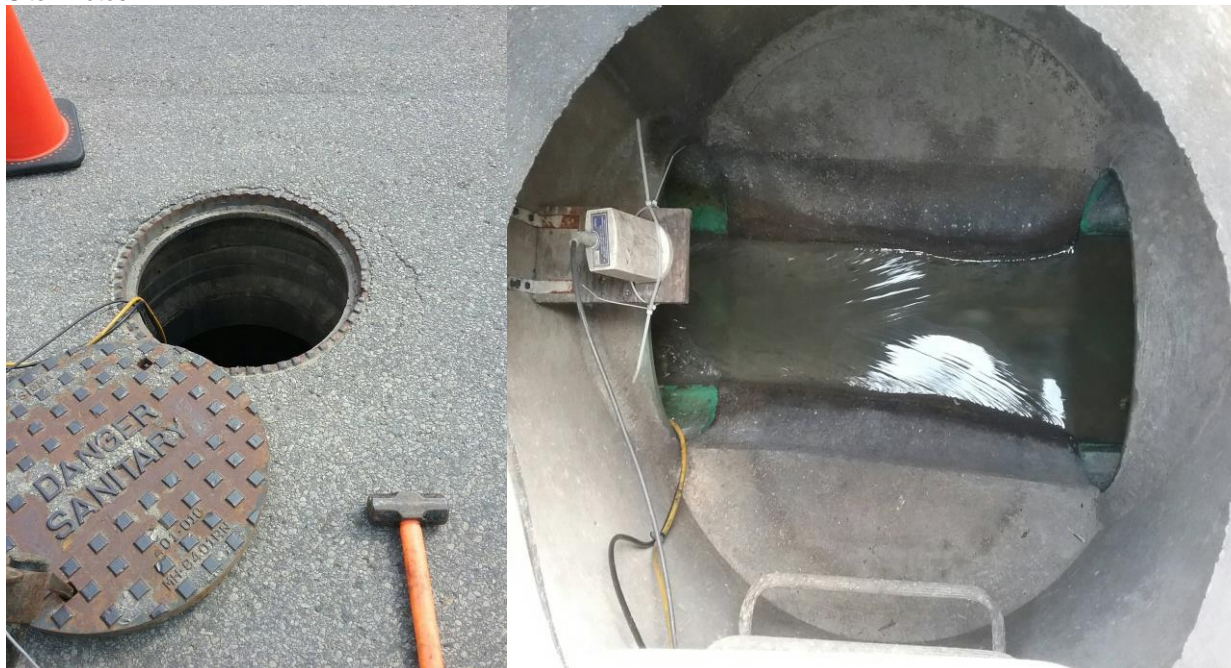
COMMENTS / NOTES

Comments / Notes

downloaded data and is consistent with previous site visits manual measurements to confirm sensors were reading correctly

SITE INFORMATION

Date / Time	Aug 29, 2017 10:20:37 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM04
Staff	Matt Bowes Glen Robbins

Site PhotosSITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.6
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Aug 29, 2017 10:31:00 AM EDT
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	49
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	60

FM MAINTENANCE/CALIBRATION

Velocity (m/s)	0.73
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MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
--------------------------	---

Flow Depth- Pressure (mm)	50
---------------------------	----

Flow Depth Down Ultra (mm)	50
----------------------------	----

Velocity (m/s)	0.7
----------------	-----

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits velocity was starting to get messy due to ragging sensors were cleaned and are now reading correctly manual measurements to confirm sensors were reading correctly
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SITE INFORMATION

Date / Time	Sep 14, 2017 8:18:52 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM04
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Battery Swap Manual Calibration Measurements
Battery Voltage	12.1
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 8:24:00 AM EDT
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	48
Flow Depth- Up Ultra (mm)	0

FM MAINTENANCE/CALIBRATION

Flow Depth- Down Ultra (mm)	50
Velocity (m/s)	0.78

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	50
Flow Depth Down Ultra (mm)	50
Velocity (m/s)	0.7

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors changed battery 12.1
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SITE INFORMATION

Date / Time	Jul 21, 2017 6:58:55 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM05
Staff	Mark Bukovec Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Manual Calibration Measurements
Battery Voltage	11.5
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 7:07:00 AM AST
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	83
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	60
Velocity (m/s)	0.71

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	80

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)

60

Velocity (m/s)

0.7

COMMENTS / NOTES

Comments / Notes

downloaded data and is consistent with previous
site visits

SITE INFORMATION

Date / Time	Aug 29, 2017 9:17:21 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM05
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Battery Swap
Battery Voltage	12.3
Was the Flow Meter reactivated onsite?	Yes (add reason)

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits changed battery
------------------	--

SITE INFORMATION

Date / Time	Sep 14, 2017 7:15:59 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM05
Staff	Matt Bowes Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	12.2

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 7:18:00 AM EDT
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	54
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	30
Velocity (m/s)	0.84

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	50
Flow Depth Down Ultra (mm)	30

FM MAINTENANCE/CALIBRATION

Velocity (m/s)

0.8

COMMENTS / NOTES

Comments / Notes

downloaded data and is consistent with previous
site visits manual measurements to confirm sensors

SITE INFORMATION

Date / Time	Jul 21, 2017 9:32:37 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM06
Staff	Mark Bukovec Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Manual Calibration Measurements
Battery Voltage	11.8
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 9:34:00 AM AST
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MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	109
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	110
Velocity (m/s)	0.19

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	110
Flow Depth- Pressure (mm)	0

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	110
Velocity (m/s)	0.24

COMMENTS / NOTES

Comments / Notes	both depths reading very consistent with each other downloaded data and velocity is reading slightly lower than previous site visits manual measurements to confirm velocity and depth sensors
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SITE INFORMATION

Date / Time	Jul 21, 2017 9:45:33 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM07
Staff	Mark Bukovec Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Manual Calibration Measurements
Battery Voltage	11.8
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 9:47:00 AM AST
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	75
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	100
Velocity (m/s)	0.52

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	80

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	100
Velocity (m/s)	0.5

COMMENTS / NOTES

Comments / Notes	downloaded data and pattern is consistent with previous site visits manual measurements to confirm sensors were reading correctly
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SITE INFORMATION

Date / Time	Aug 29, 2017 10:41:03 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM07
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Battery Swap Manual Calibration Measurements
Battery Voltage	12.2
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Aug 29, 2017 10:49:00 AM EDT
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	73
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	60
Velocity (m/s)	0.46

MANUAL MEASUREMENTS

Revised- 07.03.2016

FM MAINTENANCE/CALIBRATION

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	70
Flow Depth Down Ultra (mm)	60
Velocity (m/s)	0.45

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors were reading correctly cleaned sensors and changed battery
------------------	---

SITE INFORMATION

Date / Time	Sep 14, 2017 8:36:35 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM07
Staff	Matt Bowes Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	12
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 8:39:00 AM EDT
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	83
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	80
Velocity (m/s)	0.46

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	80

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)

80

Velocity (m/s)

0.45

COMMENTS / NOTES

Comments / Notes

downloaded data and is consistent with previous
site visits manual measurements to confirm sensors

SITE INFORMATION

Date / Time	Jul 21, 2017 11:15:26 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM08
Staff	Mark Bukovec Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.8
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 11:17:00 AM AST
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	196
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	160
Velocity (m/s)	0.31

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	190

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	170
Velocity (m/s)	0.33

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors were reading correctly
------------------	---

SITE INFORMATION

Date / Time	Aug 29, 2017 11:20:50 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM08
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.6
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Aug 29, 2017 11:27:00 AM EDT
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	184
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	150
Velocity (m/s)	0.2

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	170

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	150
Velocity (m/s)	0.2

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors were reading correctly
------------------	---

SITE INFORMATION

Date / Time	Sep 14, 2017 9:12:38 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM08
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	12.4
Was the Flow Meter reactivated onsite?	Yes (add reason)
Was the Flow Meter reactivated onsite? Comments	detec

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 9:23:00 AM EDT
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	152
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	160
Velocity (m/s)	0.17

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
--------------------------	---

FM MAINTENANCE/CALIBRATION

Flow Depth- Pressure (mm)	150
Flow Depth Down Ultra (mm)	150
Velocity (m/s)	0.19

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors changed
------------------	--

SITE INFORMATION

Date / Time	Jul 21, 2017 10:33:00 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM09
Staff	Mark Bukovec Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.8
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 10:35:00 AM AST
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	205
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	0
Velocity (m/s)	0.5

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
--------------------------	---

FM MAINTENANCE/CALIBRATION

Flow Depth- Pressure (mm)	215
Flow Depth Down Ultra (mm)	0
Velocity (m/s)	0.48

COMMENTS / NOTES

Comments / Notes	Flow data pattern has changed slightly, manual measurements to confirm sensors.
------------------	---

SITE INFORMATION

Date / Time	Aug 29, 2017 11:36:42 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM09
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	12.3
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Aug 29, 2017 11:44:00 AM EDT
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	196
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	0
Velocity (m/s)	0.44

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	190

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	0
Velocity (m/s)	0.4

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits pressure and velocity dip down for about a day and come back to normal manual measurements to confirm sensors were reading correctly
------------------	---

SITE INFORMATION

Date / Time	Sep 14, 2017 9:34:57 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM09
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	12.2
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 9:42:00 AM EDT
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	193
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	0
Velocity (m/s)	0.44

FM MAINTENANCE/CALIBRATION

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	200
Flow Depth Down Ultra (mm)	0
Velocity (m/s)	0.45

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors cleaned sensors graph shows ragging and drops but comes back
------------------	---

SITE INFORMATION

Date / Time	Jul 21, 2017 10:52:56 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM10
Staff	Mark Bukovec Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Manual Calibration Measurements
Battery Voltage	11.8
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 10:52:00 AM AST
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	86
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	110
Velocity (m/s)	0.61

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	100

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	110
Velocity (m/s)	0.58

COMMENTS / NOTES

Comments / Notes	data is consistent with previous site visits
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SITE INFORMATION

Date / Time	Aug 29, 2017 1:01:50 PM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM10
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Battery Swap Manual Calibration Measurements
Battery Voltage	12
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Aug 29, 2017 1:35:00 PM EDT
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	106
Flow Depth- Up Ultra (mm)	0

FM MAINTENANCE/CALIBRATION

Flow Depth- Down Ultra (mm)	128
Velocity (m/s)	0.64

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	100
Flow Depth Down Ultra (mm)	110
Velocity (m/s)	0.6

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors were reading correctly cleaned sensors and changed battery
------------------	---

SITE INFORMATION

Date / Time	Sep 14, 2017 11:21:27 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM10
Staff	Matt Bowes Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.9
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 11:26:00 AM EDT
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	140
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	130
Velocity (m/s)	0.56

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	135

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	135
Velocity (m/s)	0.5

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors
------------------	---

SITE INFORMATION

Date / Time	Jul 21, 2017 10:16:00 AM AST
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM11
Staff	Mark Bukovec Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Battery Swap Manual Calibration Measurements
Battery Voltage	12.3
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Jul 21, 2017 10:17:00 AM AST
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	48
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	60
Velocity (m/s)	0.82

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	50

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	50
Velocity (m/s)	0.8

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits changed battery from 11.4 to 12.3 manual measurements to confirm sensors were reading correctly
------------------	---

SITE INFORMATION

Date / Time	Aug 29, 2017 10:59:27 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM11
Staff	Matt Bowes Glen Robbins

Site PhotosSITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	12
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Aug 29, 2017 11:03:00 AM EDT
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	63
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	50

FM MAINTENANCE/CALIBRATION

Velocity (m/s)	0.81
----------------	------

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
--------------------------	---

Flow Depth- Pressure (mm)	55
---------------------------	----

Flow Depth Down Ultra (mm)	40
----------------------------	----

Velocity (m/s)	0.8
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COMMENTS / NOTES

Comments / Notes	downloaded data,shows depth rise about 2cm manual measurements to confirm sensors were reading correctly, cleaned sensors
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SITE INFORMATION

Date / Time	Sep 14, 2017 8:53:34 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM11
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.9
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 8:56:00 AM EDT
----------------------------------	-----------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	54
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	40
Velocity (m/s)	1.01

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	50

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	45
Velocity (m/s)	0.93

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors cleaned sensors
------------------	--

SITE INFORMATION

Date / Time	Aug 29, 2017 12:01:46 PM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM12
Staff	Matt Bowes Glen Robbins

Site Photos**SITE CONDITIONS**

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.9
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Aug 29, 2017 12:20:00 PM EDT
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	162
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	110

FM MAINTENANCE/CALIBRATION

Velocity (m/s)	0.64
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MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
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Flow Depth- Pressure (mm)	160
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Flow Depth Down Ultra (mm)	115
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Velocity (m/s)	0.6
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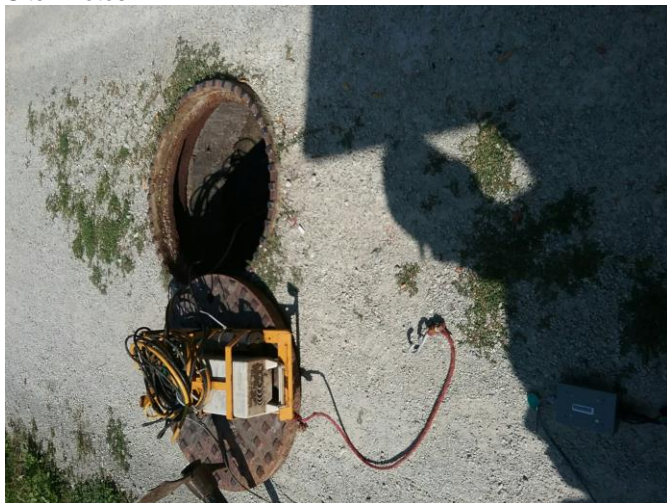
COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors were reading correctly
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SITE INFORMATION

Date / Time	Sep 14, 2017 9:58:27 AM EDT
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Client	XCG
Site ID	FM12
Staff	Matt Bowes Glen Robbins

Site Photos



SITE CONDITIONS

Site Condition on arrival	Excellent
comments and/or regarding site condition?	no

MAINTENANCE ACTIVITIES

Maintenance Activities	Data Download Sensor Cleaning Manual Calibration Measurements
Battery Voltage	11.9
Was the Flow Meter reactivated onsite?	Yes (add reason)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	Sep 14, 2017 10:02:00 AM EDT
----------------------------------	------------------------------

MONITOR MEASUREMENTS

Flow Depth- Pressure (mm)	178
Flow Depth- Up Ultra (mm)	0
Flow Depth- Down Ultra (mm)	130
Velocity (m/s)	0.73

MANUAL MEASUREMENTS

Flow Depth Up Ultra (mm)	0
Flow Depth- Pressure (mm)	170

FM MAINTENANCE/CALIBRATION

Flow Depth Down Ultra (mm)	170
Velocity (m/s)	0.75

COMMENTS / NOTES

Comments / Notes	downloaded data and is consistent with previous site visits manual measurements to confirm sensors
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General Info

Project Name	Collingwood Flow Monitoring
RG Site ID	RG01
Client	XCG
Date/Time	Aug 29, 2017 12:28:43 PM EDT
Assigned Technician(s)	Glen Robbins
Weather Conditions	Sun and Cloud
Temperature (°C)	25

Rain Gauge Information

Type	Novalynx
Model	260-2500.25
Tip Volume	7.85 ml
Equivalent Depth of Rain	0.247mm
Collector Diameter	200 mm

PHOTO 1 (Site Overview)

IMAGE 2 (Funnel)



Maintenance

Action Taken	Data Download & Review
Logger time is confirmed to be Correct (EST)	Yes
Additional Comments	downloaded data and rain events visible

Rain Gauge Condition Assessment

Rain Gauge Required Cleaning	No
Ice in the Rain Gauge funnel	N/A
Rain Gauge Site Secure	Yes
Rain Gauge damaged	No

Additional Comments

Comments	downloaded data and rain events visible changed logger battery
----------	---

RG CALIBRATION LOG

5 tips at 12:34

Signature

Technician Signature
Signature

Glen Robbins

A handwritten signature in black ink, appearing to be 'GR' with a stylized flourish.

General Info

Project Name	Collingwood Flow Monitoring
RG Site ID	RG01
Client	XCG
Date/Time	Sep 14, 2017 10:12:35 AM EDT
Assigned Technician(s)	Glen Robbins
Weather Conditions	Sunny
Temperature (°C)	25

Rain Gauge Information

Type	Novalynx
Model	260-2500.25
Tip Volume	7.85 ml
Equivalent Depth of Rain	0.247mm
Collector Diameter	200 mm

PHOTO 1 (Site Overview)

IMAGE 2 (Funnel)



Maintenance

Action Taken	Data Download & Review Logger Battery Swap
Logger time is confirmed to be Correct (EST)	Yes
Additional Comments	downloaded data and rain events visible changed logger battery 76%

Rain Gauge Condition Assessment

Rain Gauge Required Cleaning	No
Ice in the Rain Gauge funnel	N/A
Rain Gauge Site Secure	Yes
Rain Gauge damaged	No

Signature

Technician Signature	Glen Robbins
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RG CALIBRATION LOG

Signature

A handwritten signature in black ink, consisting of a large, stylized 'G' followed by a series of loops and a final upward stroke.

GENERAL INFORMATION

Date / Time	Oct 6, 2017 8:03:18 AM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM01
Technician	Matt Bowes Glen Robbins

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



MONITORING LOCATION CHARACTERISTICS

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	.75cm
Special Site Access Considerations	On Roadway- Traffic Control Required

PIPE INFORMATION

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Model	MSFM
Serial Number	20111208956
PMAC ID	1647

CALIBRATION MEASUREMENTS- (With Velocity Panel)

Time	8:22:00 AM EDT
MONITOR MEASUREMENTS	
Flow Depth (mm)	150
Velocity (m/s)	0.47
MANUAL MEASUREMENTS	
Flow Depth (mm)	140
Velocity Panel	
Velocity TL (m/s)	0.4
Velocity TM (m/s)	0.52

Velocity TR (m/s)	0.35
Velocity BR (m/s)	0
Velocity MM (m/s)	0
Velocity BL (m/s)	0
Velocity BM (m/s)	0.33

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	downloaded data and measured depth of sediment manual measurements before removing unit 4 point velocity profile was taken as well as photos ultrasonic manual measurement was 140mm and unit was reading 150mm
----------	--

GENERAL INFORMATION

Date / Time	Oct 6, 2017 7:26:00 AM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM02
Technician	Glen Robbins Matt Bowes

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



MONITORING LOCATION CHARACTERISTICS

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	5
Special Site Access Considerations	On Roadway- Traffic Control Required

PIPE INFORMATION

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Model	MSFM
Serial Number	20111208965
PMAC ID	2002
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)

EQUIPMENT / PROGRAMMING DETAILS

Sensor Configuration	Depth (mm)- pressure Depth (mm)- down-ultrasonic
----------------------	---

Velocity (m/s)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	7:40:00 AM EDT
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MONITOR MEASUREMENTS

Flow Depth (mm)	250
Velocity (m/s)	0.31

MANUAL MEASUREMENTS

Flow Depth (mm)	200
Velocity (m/s)	0.35

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	downloaded data and confirmed depth is reading lower than sensor, pressure reading 250mm on unit and only 200mm for the manual ultrasonic sensor reading very well 210mm for manual and 220 for the unit
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GENERAL INFORMATION

Date / Time	Oct 6, 2017 8:42:26 AM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM03
Technician	Matt Bowes Glen Robbins

PHOTO 1 - Site Overview

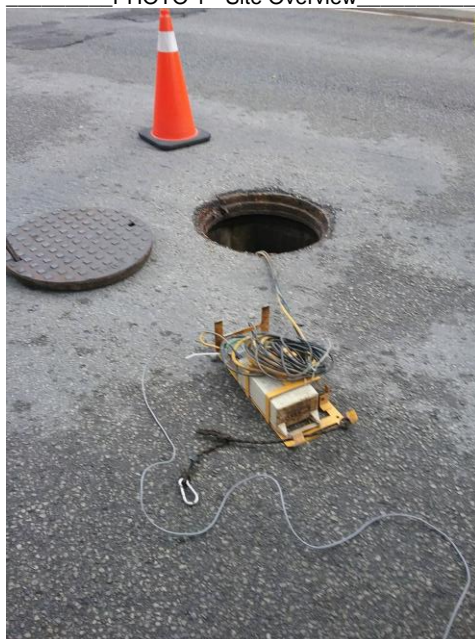


PHOTO 2 - Down Manhole

MONITORING LOCATION CHARACTERISTICS

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	0
Special Site Access Considerations	On Roadway- Traffic Control Required

PIPE INFORMATIONEQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Model	MSFM
Serial Number	20112011898
PMAC ID	1470
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)

CALIBRATION MEASUREMENTS- (With Velocity Panel)

Time	9:00:00 AM EDT
MONITOR MEASUREMENTS	
Flow Depth (mm)	100

Velocity (m/s)	0.47
----------------	------

MANUAL MEASUREMENTS

Flow Depth (mm)	110
Velocity Panel	
Velocity TL (m/s)	0.46
Velocity TM (m/s)	0.54
Velocity TR (m/s)	0.44
Velocity BR (m/s)	0
Velocity MM (m/s)	0
Velocity BL (m/s)	0
Velocity BM (m/s)	0.43

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	
----------	--

downloaded data checked pipe for sediment and the pipe was clean manual measurements before removing unit ultrasonic manual was 110mm, and monitor reading was 100mm pressure sensor manual was 80, monitor reading 75. photos were taken
--

GENERAL INFORMATION

Date / Time	Oct 6, 2017 9:22:48 AM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM04
Technician	Matt Bowes Glen Robbins

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole

**MONITORING LOCATION CHARACTERISTICS**

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	0
Special Site Access Considerations	On Roadway- Traffic Control Required

PIPE INFORMATION**EQUIPMENT / PROGRAMMING DETAILS**

Type	DETECTRONIC
Model	MSFM
Serial Number	20114319162
PMAC ID	1476
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)

CALIBRATION MEASUREMENTS

MONITOR MEASUREMENTS

Flow Depth (mm)	45
Velocity (m/s)	0.73

MANUAL MEASUREMENTS

Flow Depth (mm)	60
Velocity (m/s)	0.97

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	downloaded data and took manual measurements before removing unit
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GENERAL INFORMATION

Date / Time	Oct 6, 2017 6:50:23 AM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM05
Technician	Matt Bowes Glen Robbins

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole

**MONITORING LOCATION CHARACTERISTICS**

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	0
Special Site Access Considerations	On Roadway- Traffic Control Required

PIPE INFORMATION**EQUIPMENT / PROGRAMMING DETAILS**

Type	DETECTRONIC
Model	MSFM
Serial Number	20112613706
PMAC ID	1648
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	6:56:00 AM EDT
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MONITOR MEASUREMENTS

Revised- 16.01.2017

Flow Depth (mm)	63
Velocity (m/s)	0.78

MANUAL MEASUREMENTS

Flow Depth (mm)	55
Velocity (m/s)	0.75

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	velocity panel right -.10 left -.6 middle .75 Downloaded data and cleaned ragging off sensors manual measurements before removing unit downward ultrasonic was reading 20mm for both monitor readings and manual readings
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GENERAL INFORMATION

Date / Time	Aug 4, 2017 9:40:00 AM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
location	Collingwood
Site ID	fm06
Technician	Matt Bowes Glen Robbins

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole

**MONITORING LOCATION CHARACTERISTICS**

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	10
Special Site Access Considerations	On Roadway- Traffic Control Required

PIPE INFORMATION**EQUIPMENT / PROGRAMMING DETAILS**

Type	DETECTRONIC
Model	MSFM
Serial Number	20114118492
PMAC ID	1542

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	9:55:00 AM EDT
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MONITOR MEASUREMENTS

Flow Depth (mm)	97
Velocity (m/s)	0.12

MANUAL MEASUREMENTS

Flow Depth (mm)	80
Velocity (m/s)	0.25

ADDITIONAL INSTALL NOTES / COMMENTS

Revised- 16.01.2017

Comments

depth data is pristine, velocity drops off.

depth manuals accurate, velo slightly off due to silt on sensor
(~1cm) affecting results

unit removed successfully from inlet pipe

GENERAL INFORMATION

Date / Time	Oct 6, 2017 9:51:04 AM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM07
Technician	Matt Bowes Glen Robbins

PHOTO 1 - Site Overview

PHOTO 2 - Down Manhole



MONITORING LOCATION CHARACTERISTICS

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	0
Special Site Access Considerations	On Roadway- Traffic Control Required

PIPE INFORMATION

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Model	MSFM
Serial Number	20111208968
PMAC ID	1659
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)

CALIBRATION MEASUREMENTS

MONITOR MEASUREMENTS

Flow Depth (mm)	72
Velocity (m/s)	0.55

MANUAL MEASUREMENTS

Flow Depth (mm)	80
Velocity (m/s)	0.5

ADDITIONAL INSTALL NOTES / COMMENTS

Comments

downloaded data manual measurements before removing unit
ultrasonic manual was 60mm and unit was reading 70mm

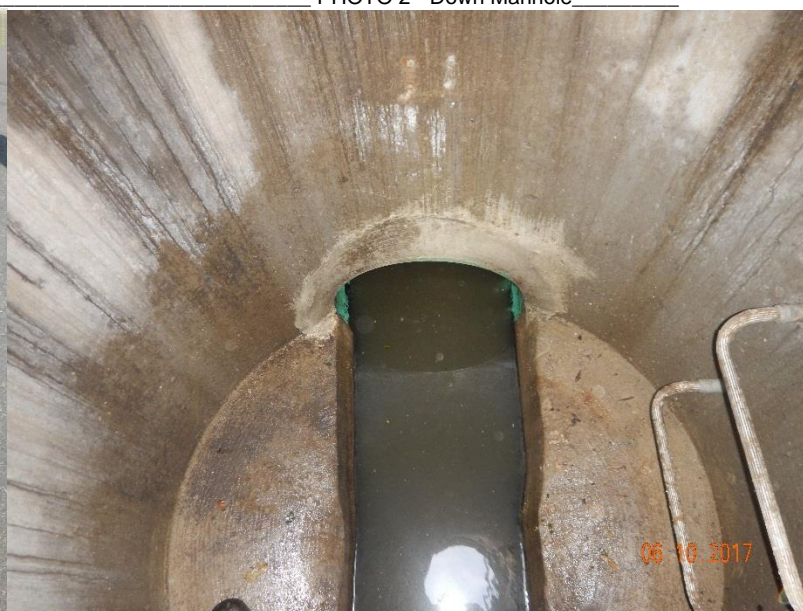
GENERAL INFORMATION

Date / Time	Oct 6, 2017 10:32:16 AM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM08
Technician	Matt Bowes Glen Robbins

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



MONITORING LOCATION CHARACTERISTICS

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	30mm
Special Site Access Considerations	On Roadway- Traffic Control Required

PIPE INFORMATION

EQUIPMENT / PROGRAMMING DETAILS

Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)
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EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Model	MSFM
Serial Number	20111208961
Sensor Configuration	Depth (mm)- pressure Depth (mm)- down-ultrasonic Velocity (m/s)

CALIBRATION MEASUREMENTS- (With Velocity Panel)

Time	10:37:00 AM EDT
MONITOR MEASUREMENTS	
Flow Depth (mm)	176
Velocity (m/s)	0.24

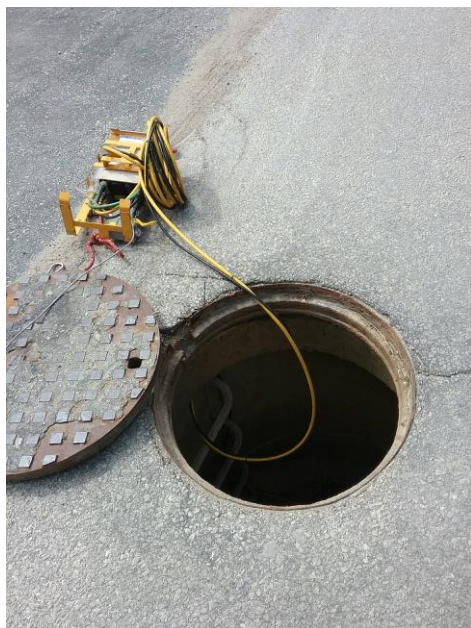
MANUAL MEASUREMENTS	
Flow Depth (mm)	160
Velocity Panel	
Velocity TL (m/s)	0.14
Velocity TM (m/s)	0.24
Velocity TR (m/s)	0.12
Velocity BR (m/s)	0
Velocity MM (m/s)	0
Velocity BL (m/s)	0
Velocity BM (m/s)	0.11

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	sediment depth taken manual measurements before removing unit ultrasonic manual was 170mm the unit was reading 150mm 4 point velocity profile was taken
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GENERAL INFORMATION

Date / Time	Oct 6, 2017 10:53:50 AM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM09
Technician	Matt Bowes Glen Robbins

PHOTO 1 - Site OverviewPHOTO 2 - Down ManholeMONITORING LOCATION CHARACTERISTICS

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	0
Special Site Access Considerations	On Roadway- Traffic Control Required

PIPE INFORMATIONEQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Model	MSFM
Serial Number	20111208959
PMAC ID	1826
Sensor Configuration	Depth 1 (pressure) Velocity

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
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CALIBRATION MEASUREMENTS

MONITOR MEASUREMENTS

Flow Depth (mm)	171
Velocity (m/s)	0.4

MANUAL MEASUREMENTS

Flow Depth (mm)	180
Velocity (m/s)	0.4

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	manual measurements before removing unit
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GENERAL INFORMATION

Date / Time	Oct 6, 2017 1:01:07 PM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM10
Technician	Matt Bowes Glen Robbins

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



MONITORING LOCATION CHARACTERISTICS

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	0

PIPE INFORMATION

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Model	MSFM
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Model	MSFM
Serial Number	20114218845

CALIBRATION MEASUREMENTS

Time of Calibration Measurements	1:12:00 PM EDT
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MONITOR MEASUREMENTS

Revised- 16.01.2017

Flow Depth (mm)	96
Velocity (m/s)	0.69

MANUAL MEASUREMENTS

Flow Depth (mm)	90
Velocity (m/s)	0.7

ADDITIONAL INSTALL NOTES / COMMENTS

Comments	manual measurements before removing unit ultrasonic manual was 100mm ultrasonic on the unit was 128mm downloaded data
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GENERAL INFORMATION

Date / Time	Oct 6, 2017 10:18:31 AM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM11
Technician	Matt Bowes Glen Robbins

PHOTO 1 - Site Overview



PHOTO 2 - Down Manhole



MONITORING LOCATION CHARACTERISTICS

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	0
Special Site Access Considerations	On Roadway- Traffic Control Required

PIPE INFORMATION

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Model	MSFM
Serial Number	20114319179
PMAC ID	1557
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)

EQUIPMENT / PROGRAMMING DETAILS

Sensor Configuration	Other
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CALIBRATION MEASUREMENTS

Time of Calibration Measurements	10:20:00 AM EDT
<hr/>	
MONITOR MEASUREMENTS	
Flow Depth (mm)	66
Velocity (m/s)	0.77
<hr/>	
MANUAL MEASUREMENTS	
Flow Depth (mm)	60
Velocity (m/s)	0.8
<hr/>	
ADDITIONAL INSTALL NOTES / COMMENTS	
Comments	Manual measurements before removing unit ultrasonic manual was 40mm and unit was reading 40mm not enough flow to complete a 4 Point velocity profile velocity readings at time of removal

GENERAL INFORMATION

Date / Time	Oct 6, 2017 12:02:57 PM EDT
Project Client	XCG
Project Name	Collingwood Flow Monitoring
Project Code	2017-0289
Location	Collingwood
Site ID	FM12
Technician	Glen Robbins Matt Bowes

PHOTO 1 - Site Overview

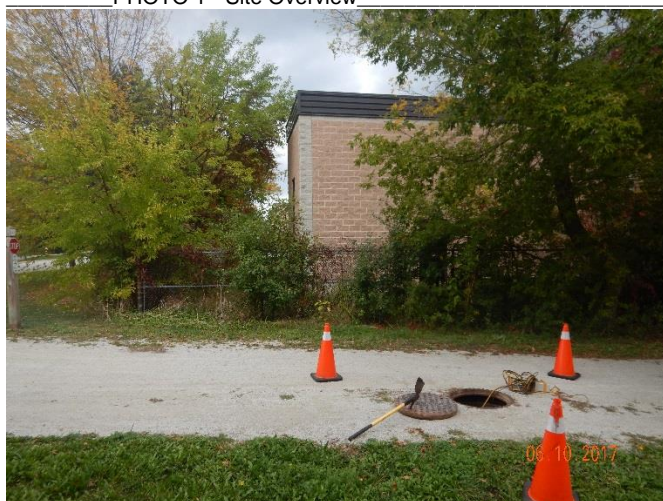


PHOTO 2 - Down Manhole



MONITORING LOCATION CHARACTERISTICS

System	Sanitary
General Site Conditions Upon Arrival	Good
Depth of Sediment (mm)	0
Special Site Access Considerations	Off Roadway- Vehicle Access

PIPE INFORMATION

EQUIPMENT / PROGRAMMING DETAILS

Type	DETECTRONIC
Model	MSFM
Serial Number	20114118492
PMAC ID	1542
Sensor Configuration	Depth 1 (pressure) Velocity Depth 2 (down-ultrasonic)

CALIBRATION MEASUREMENTS- (With Velocity Panel)

Time	12:15:00 PM EDT
MONITOR MEASUREMENTS	
Flow Depth (mm)	169
Velocity (m/s)	0.63

MANUAL MEASUREMENTS

Flow Depth (mm)	155
Velocity Panel	

Revised- 16.01.2017

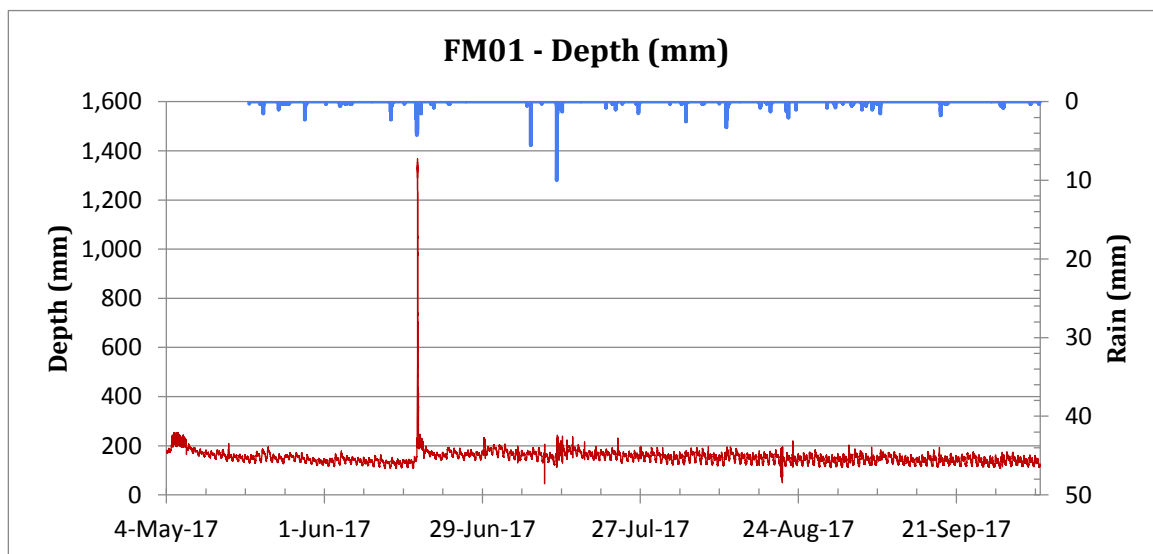
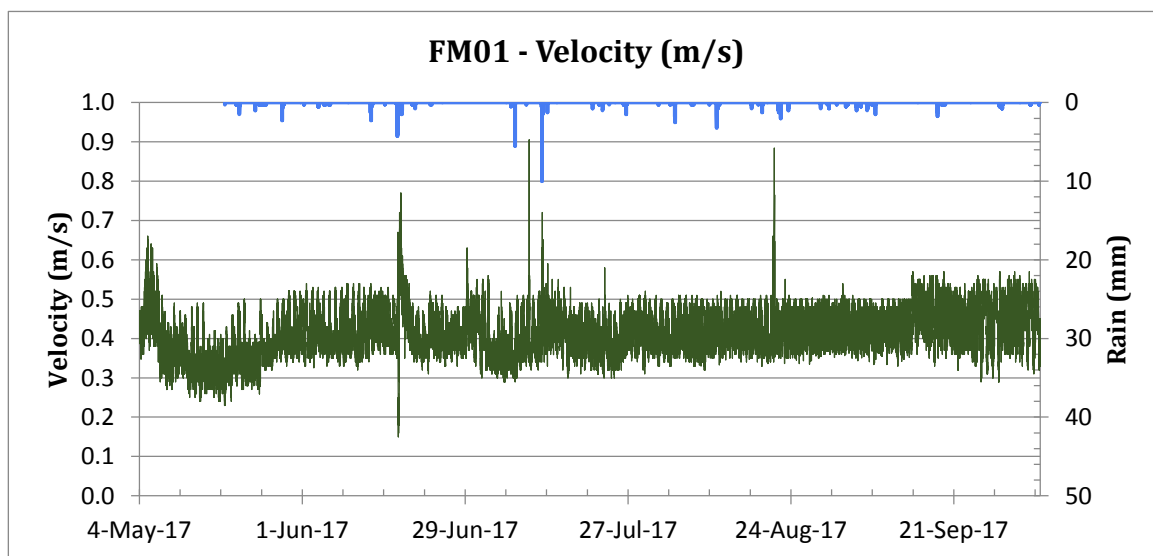
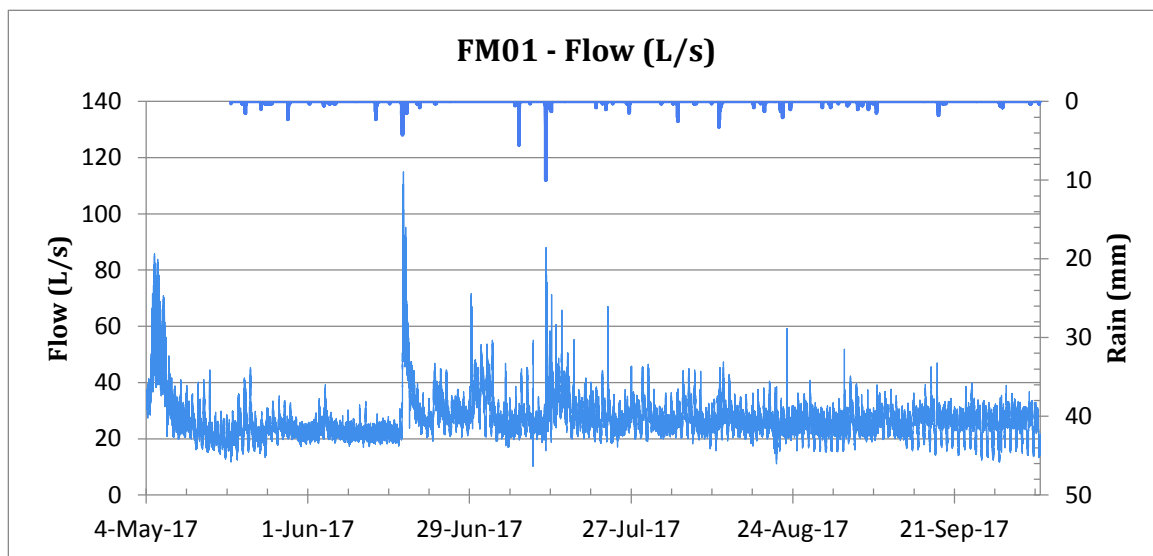
Velocity TL (m/s)	1.1
Velocity TM (m/s)	0.94
Velocity TR (m/s)	0.82
Velocity BR (m/s)	0
Velocity MM (m/s)	0
Velocity BL (m/s)	0
Velocity BM (m/s)	0.89

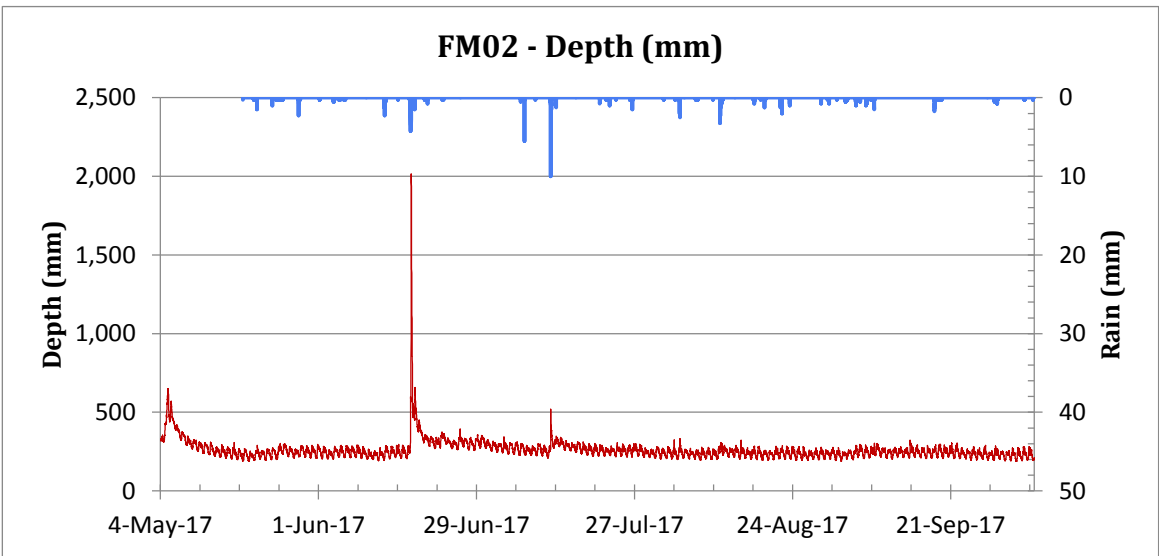
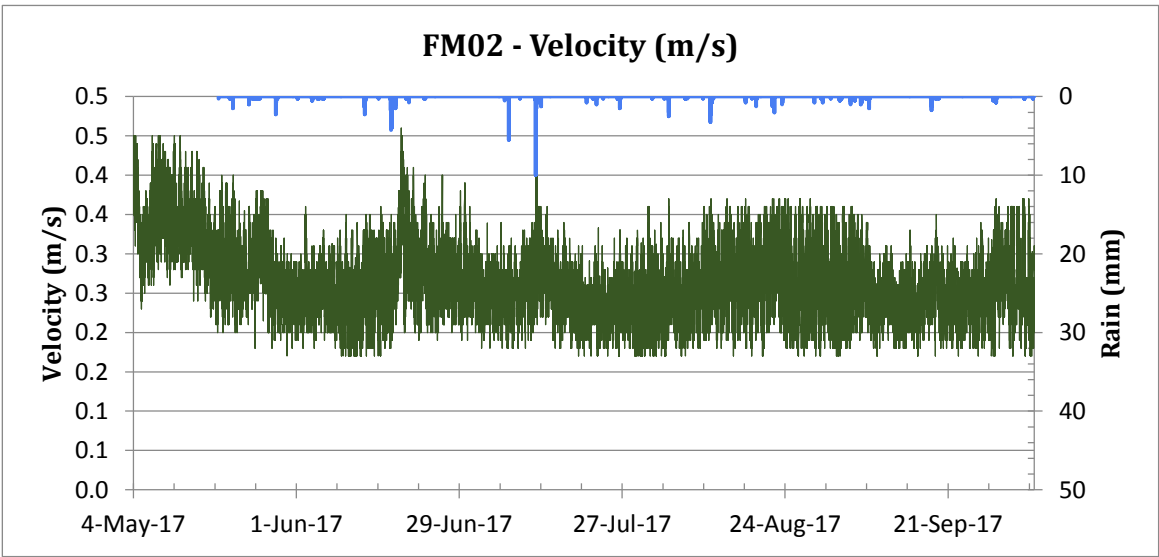
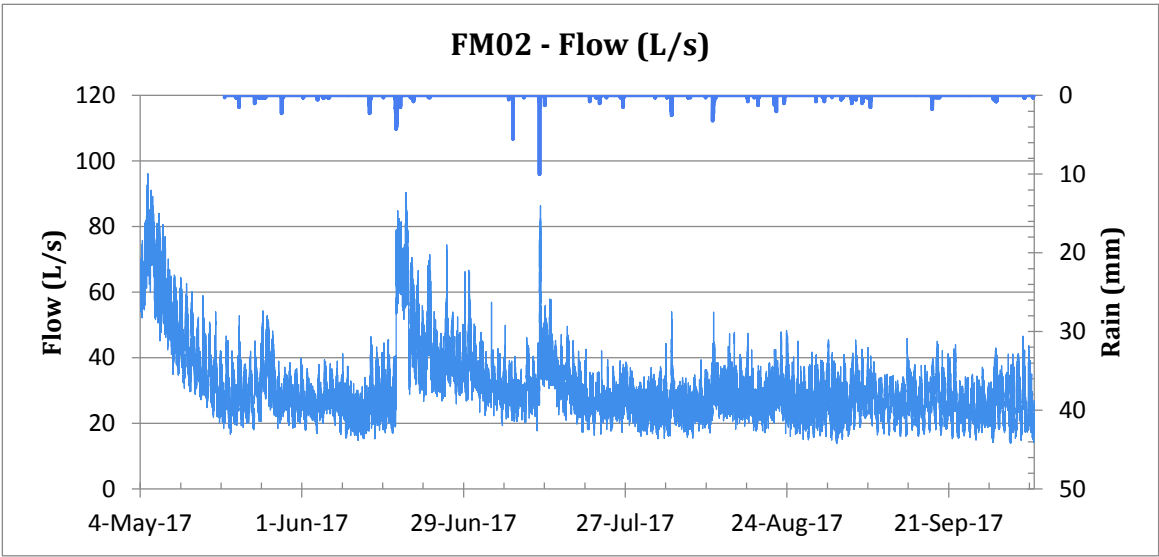
ADDITIONAL INSTALL NOTES / COMMENTS

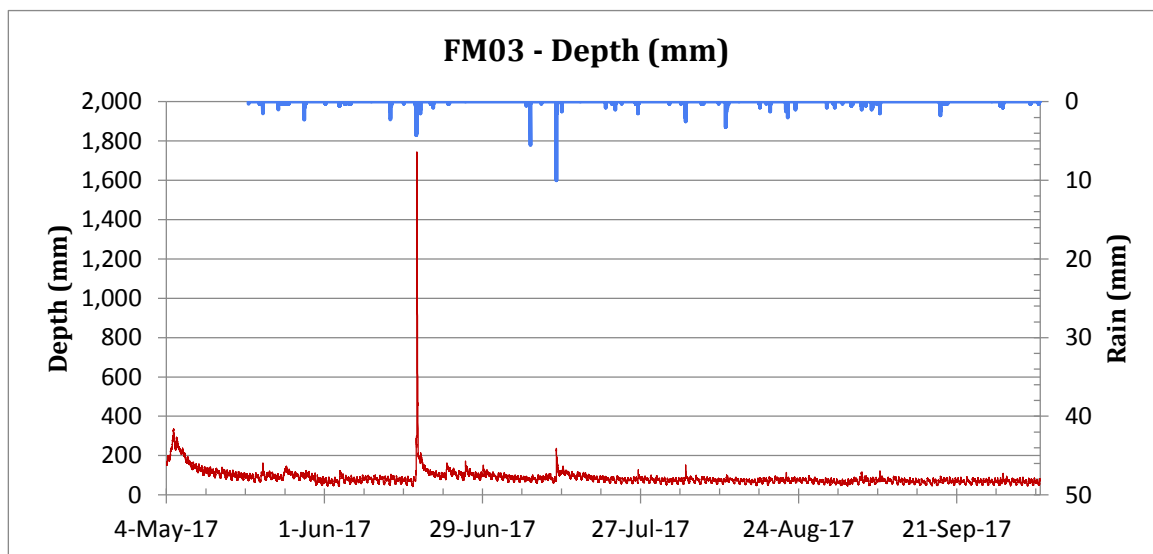
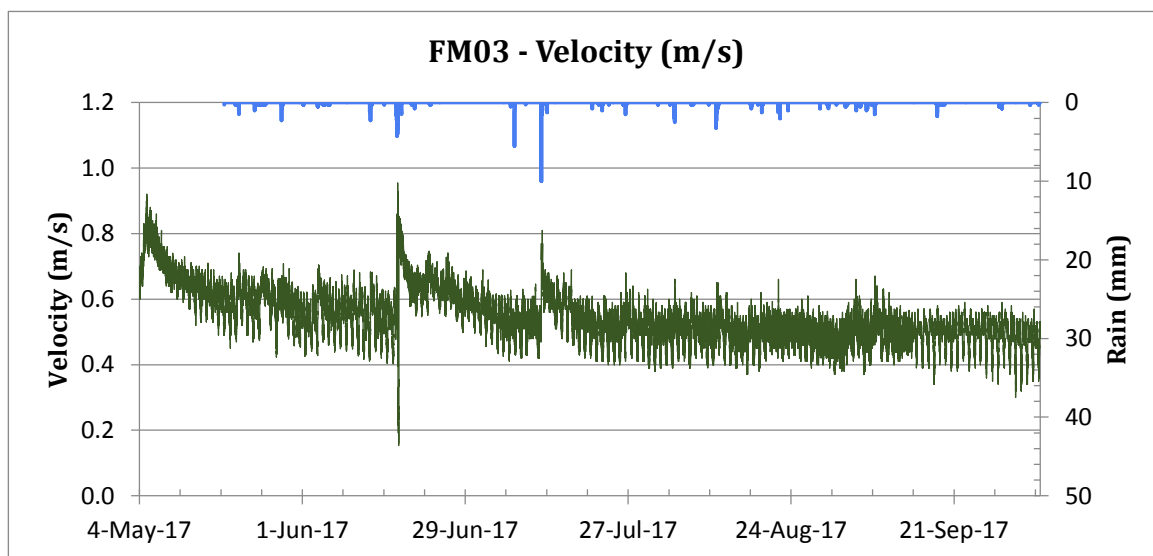
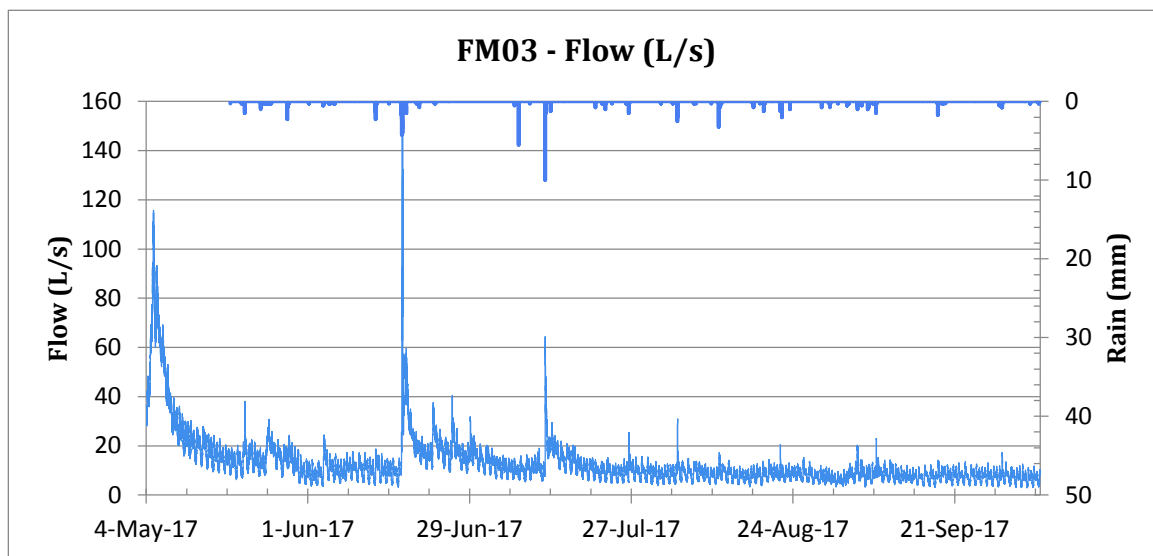
Comments	ultrasonic manual and sensor reading the same, 0.11m unit successfully removed from inlet velocity panel taken
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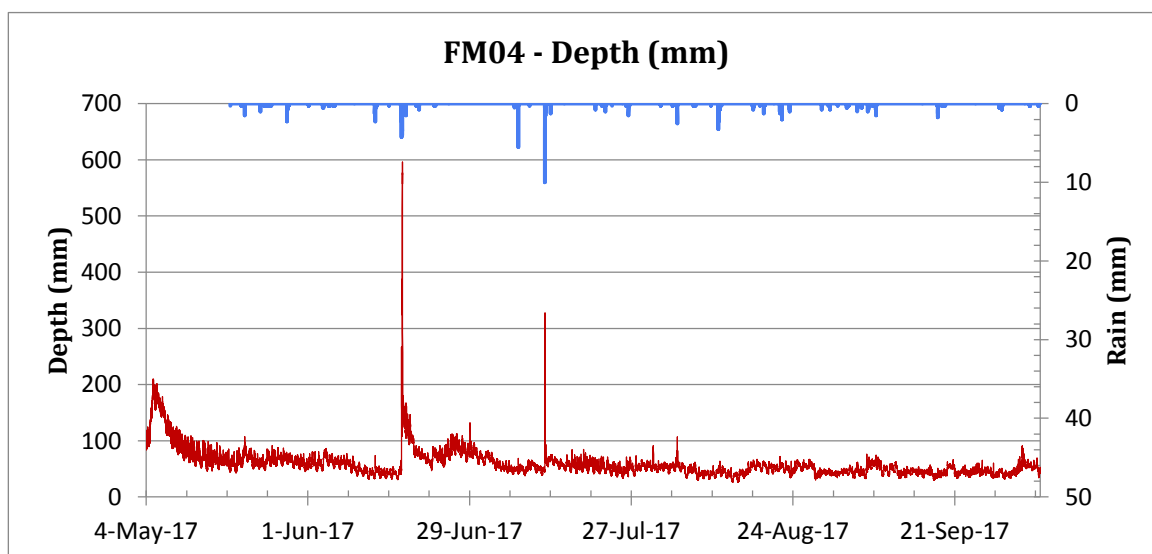
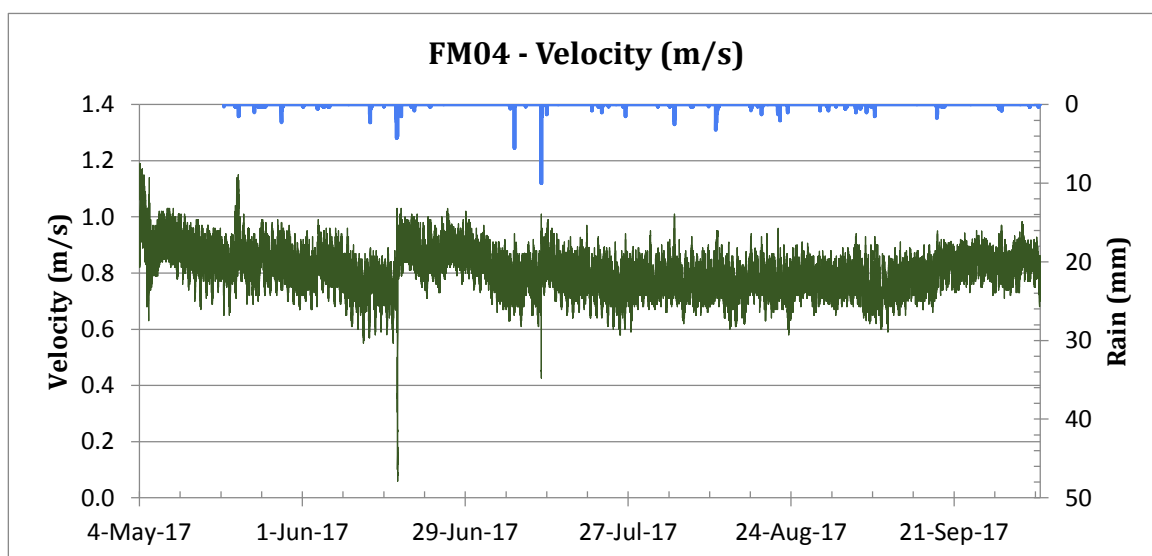
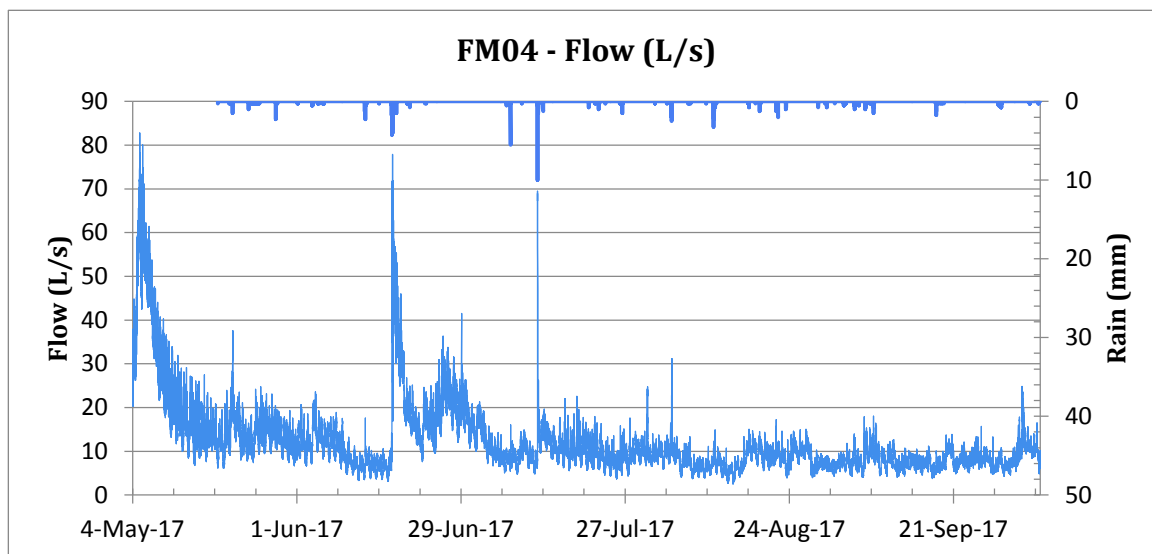
APPENDIX B

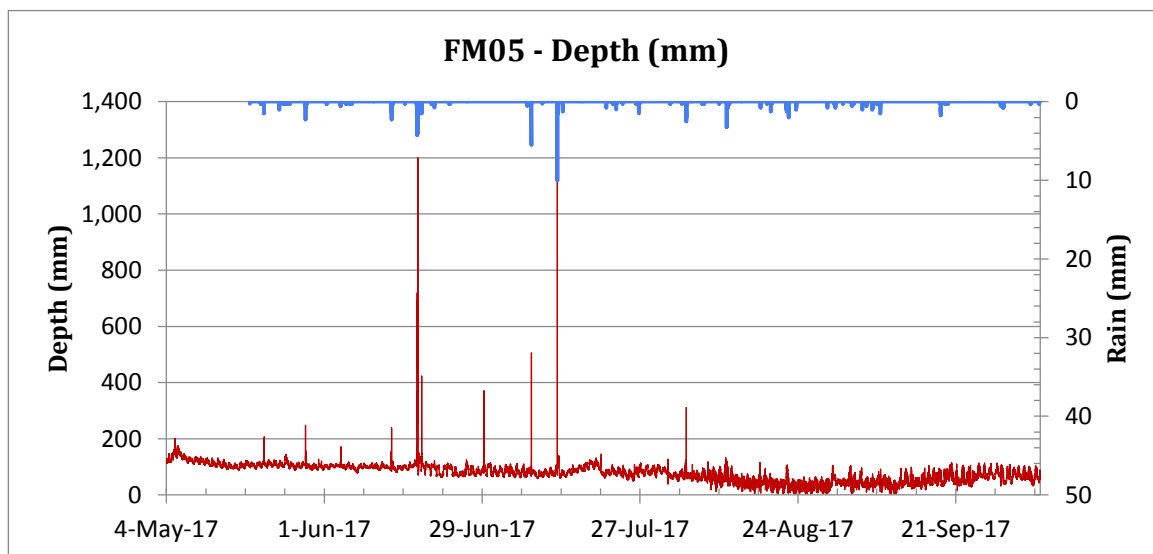
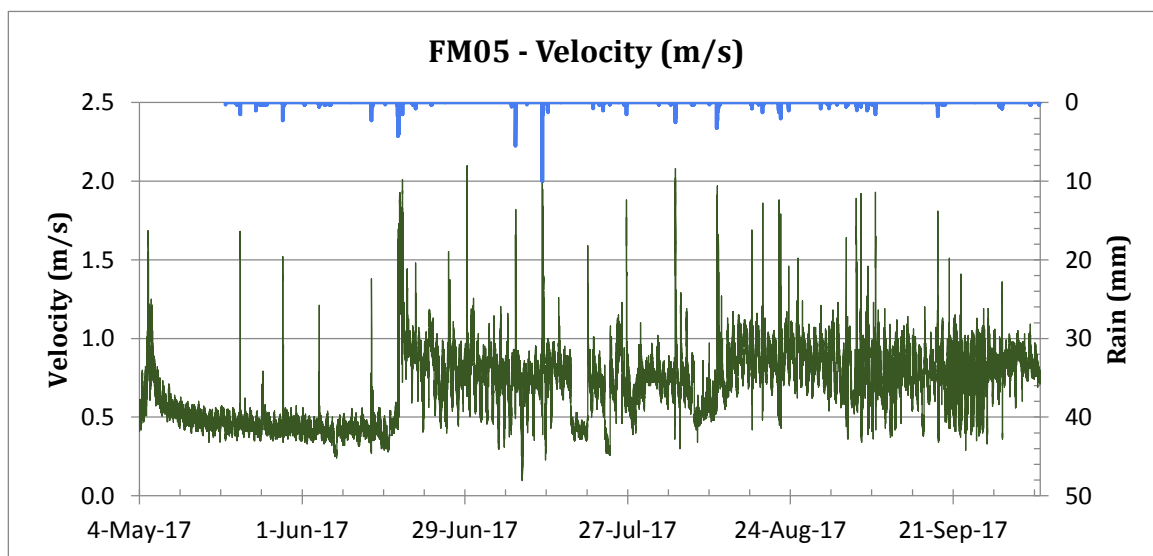
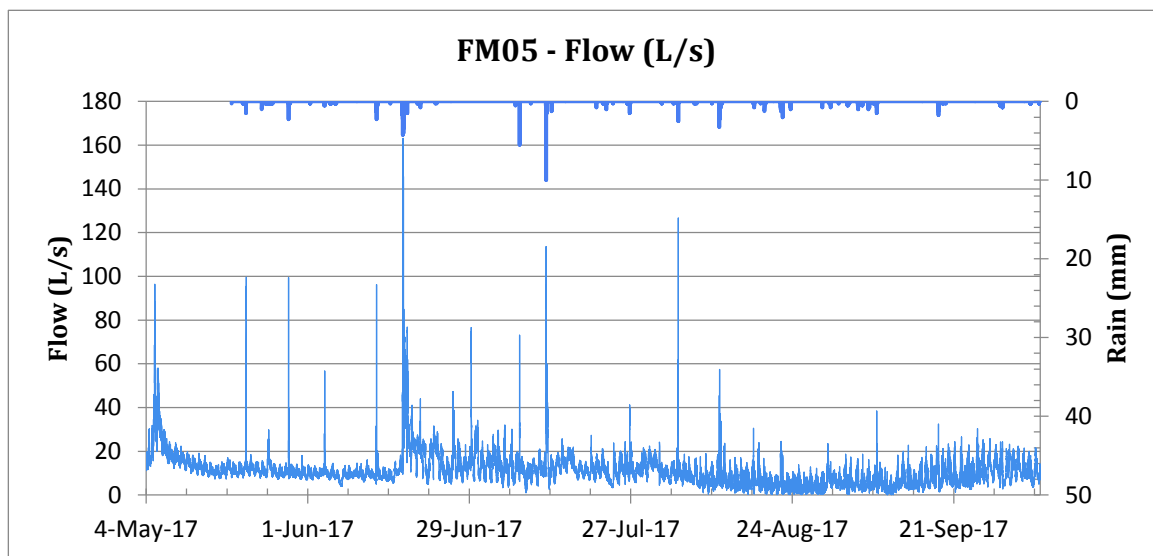
Flow Monitoring Data

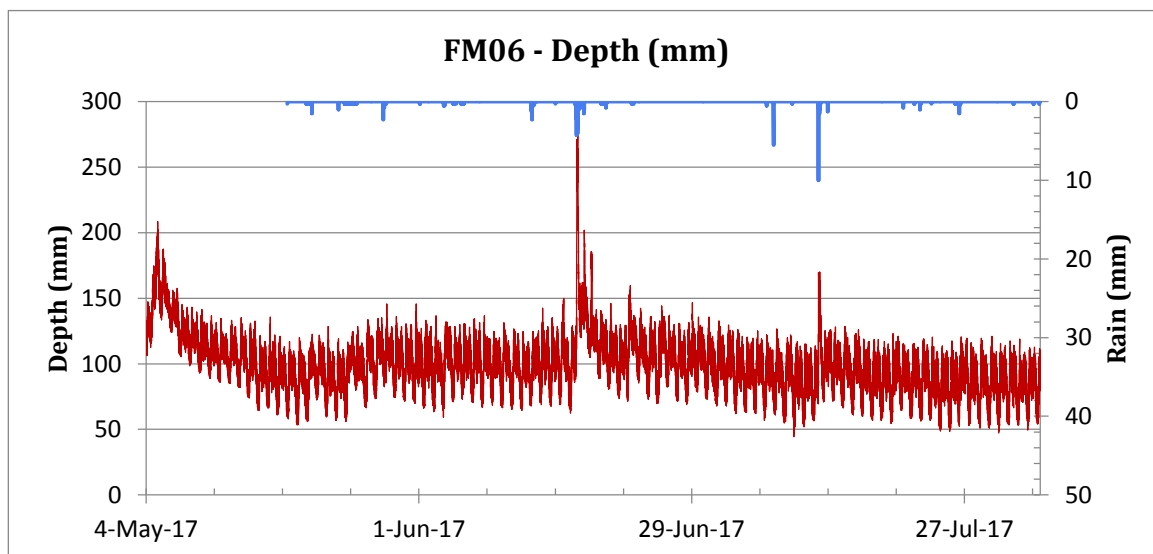
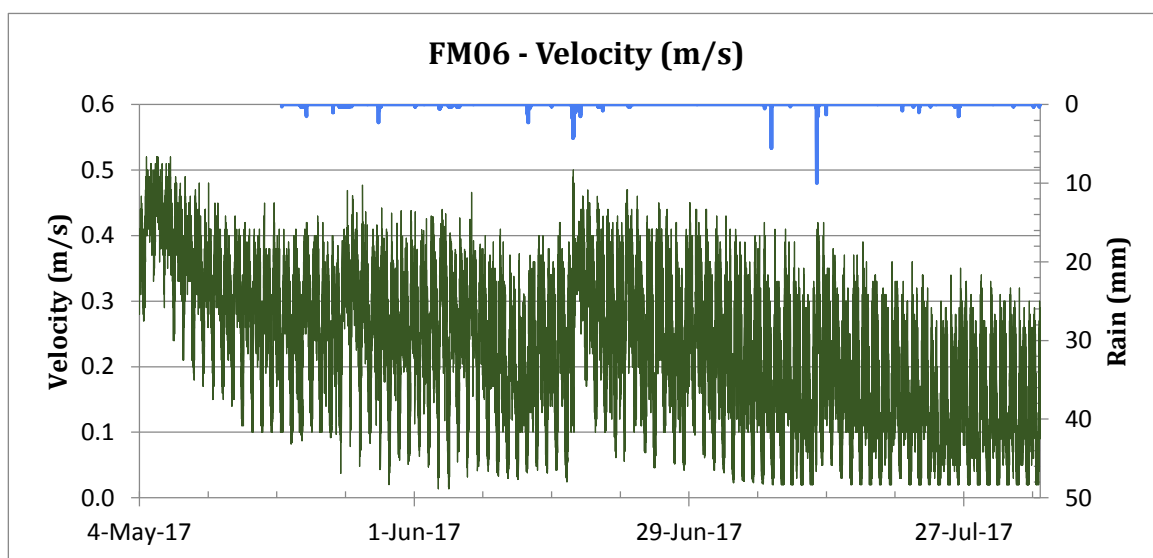
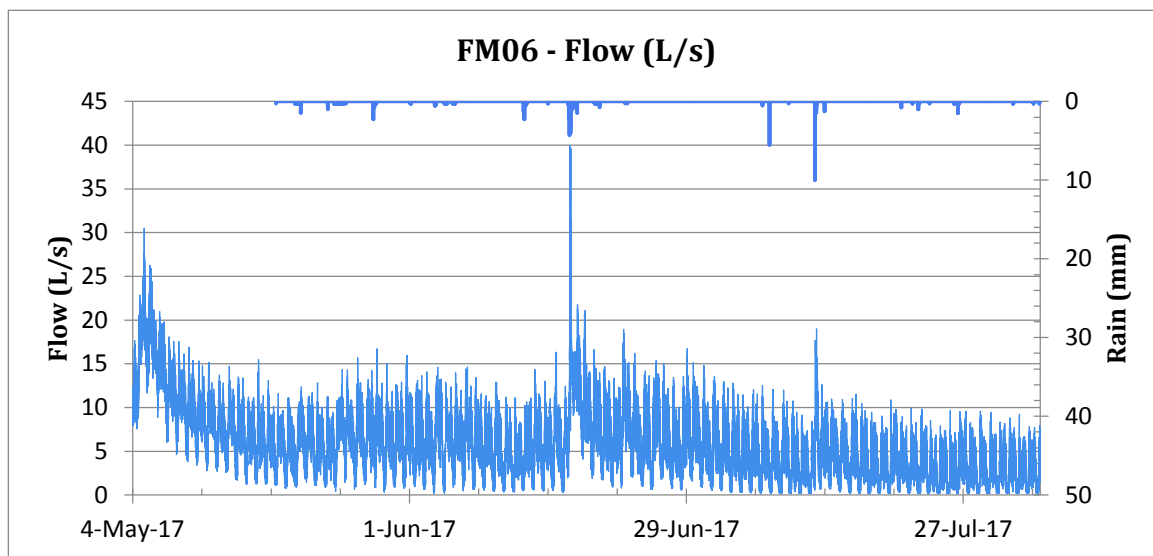


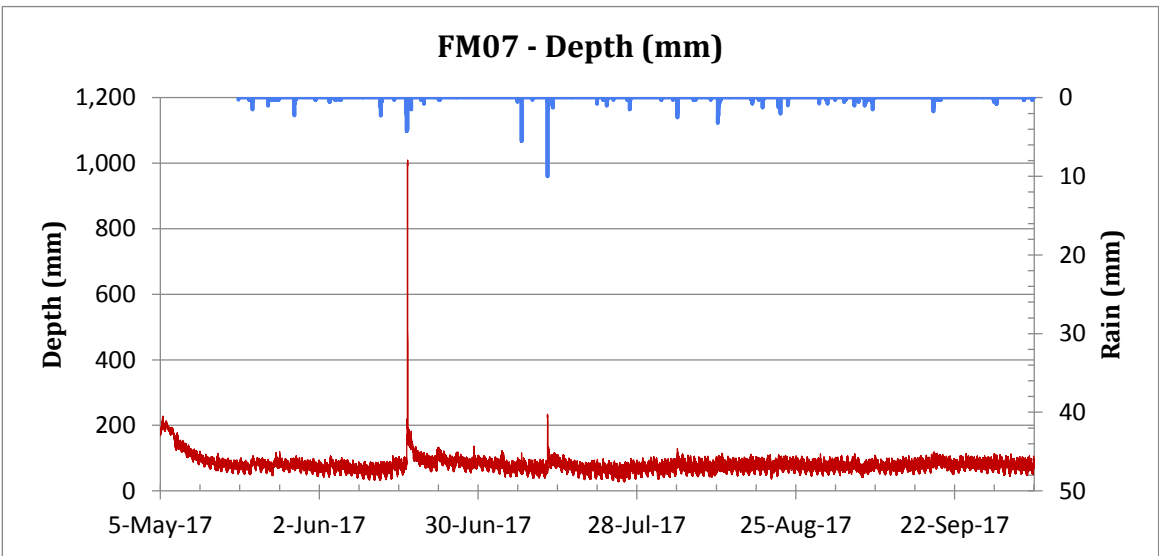
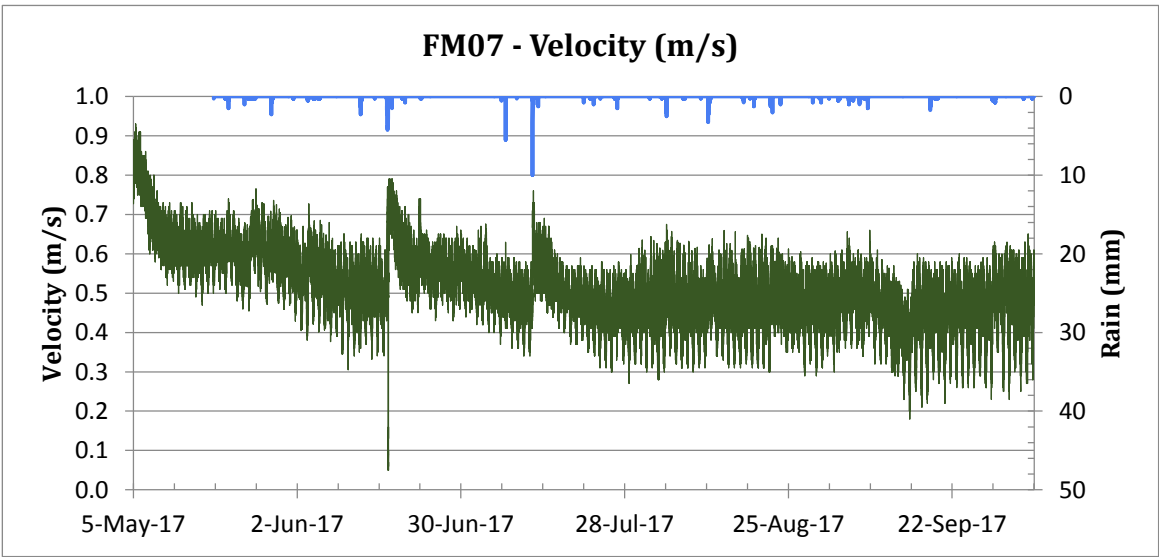
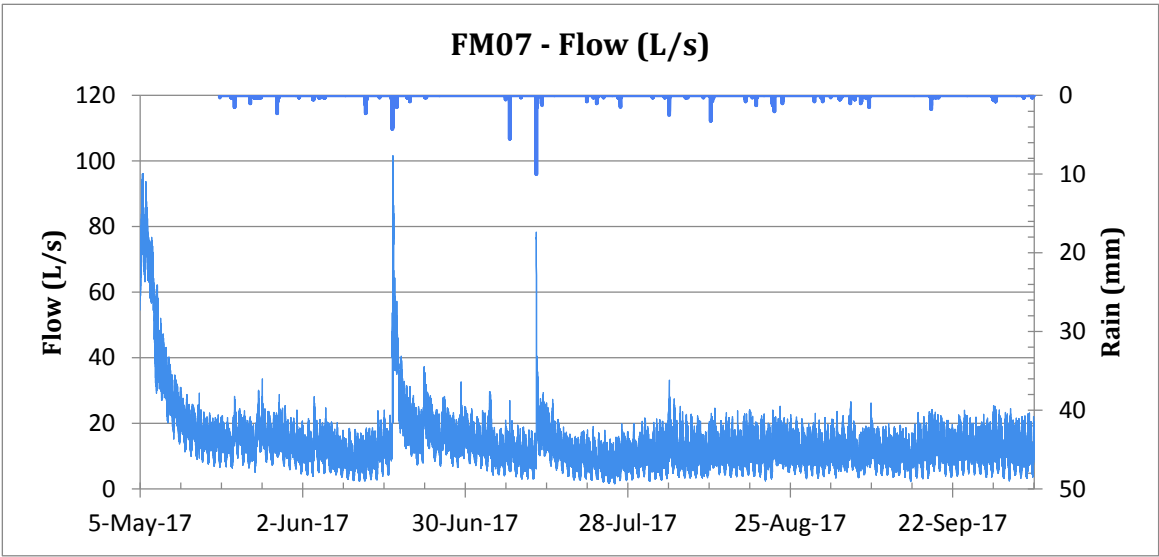


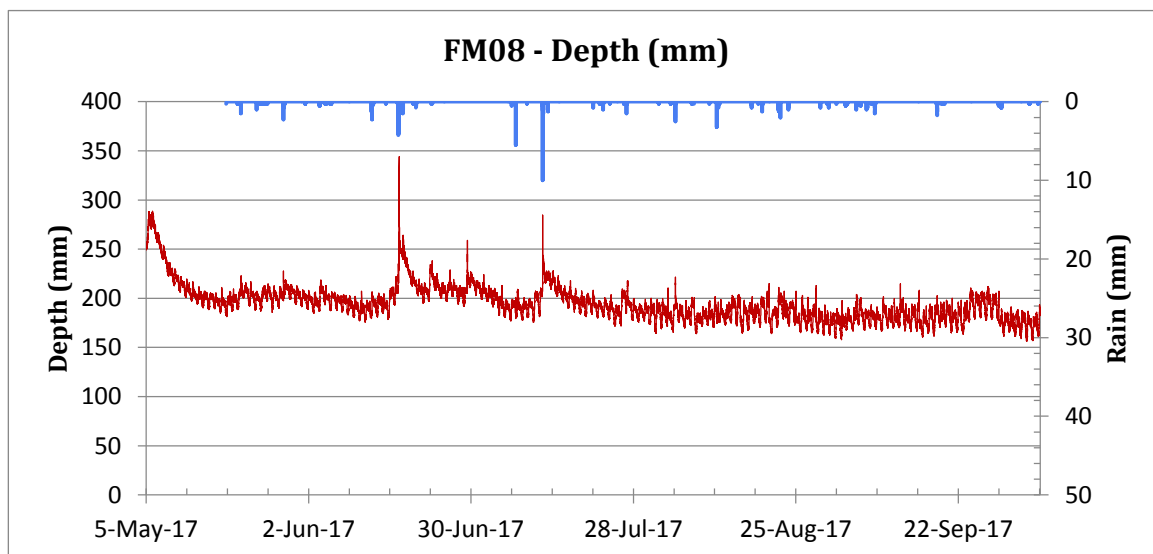
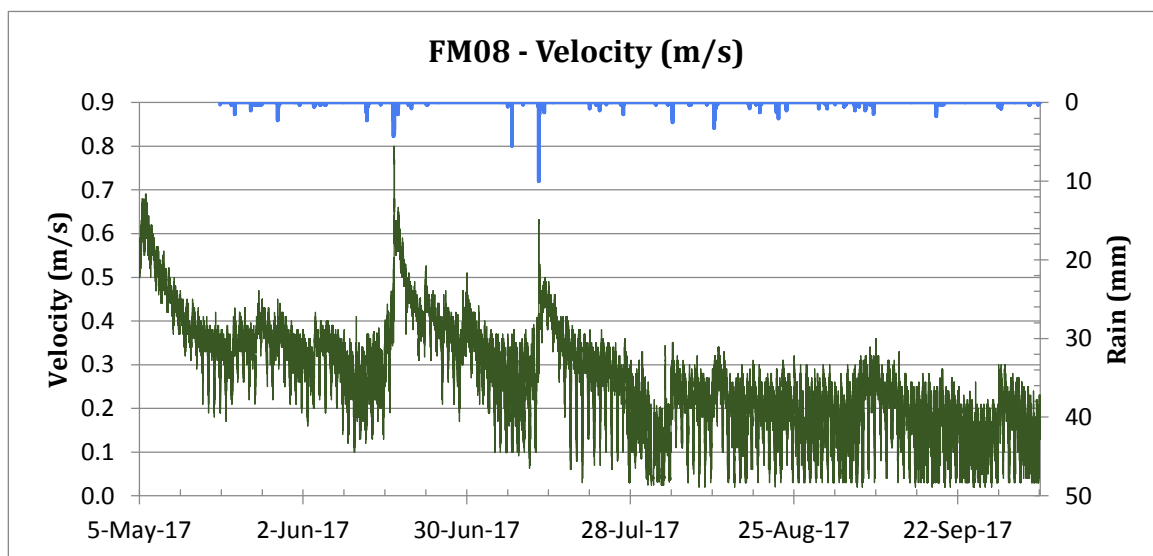
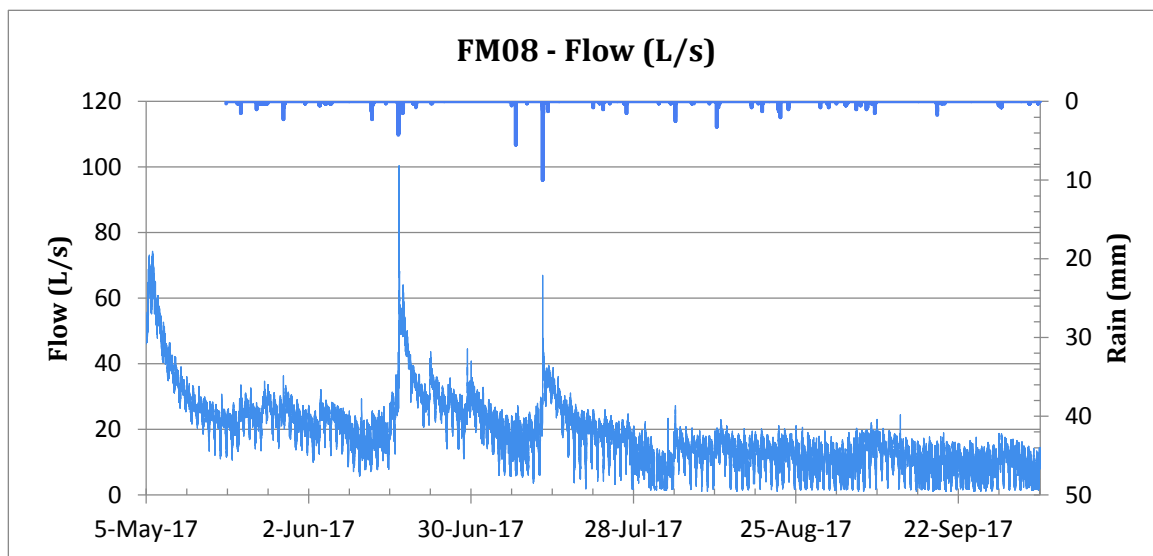


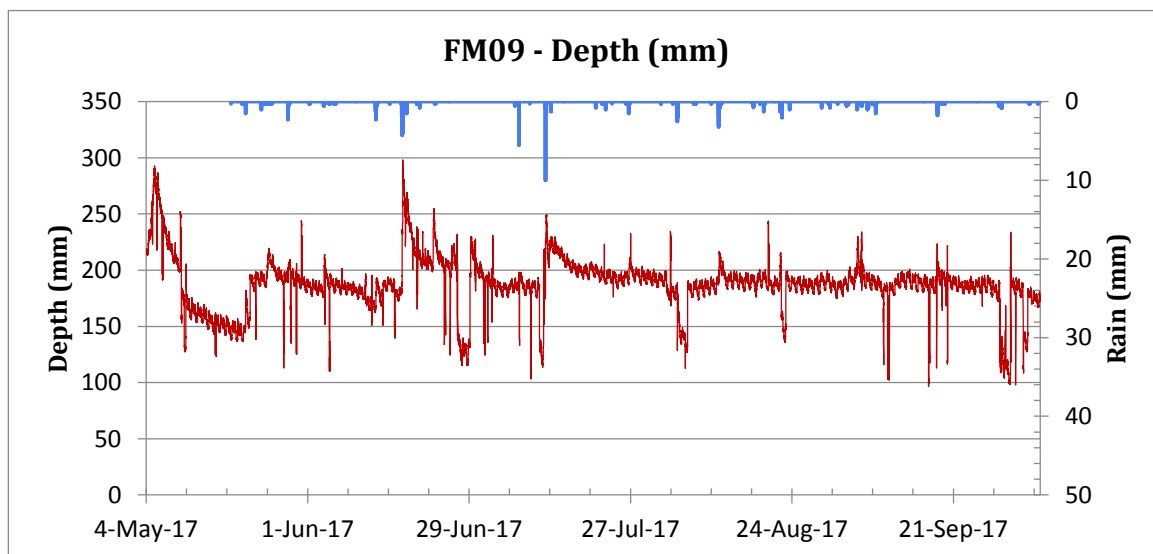
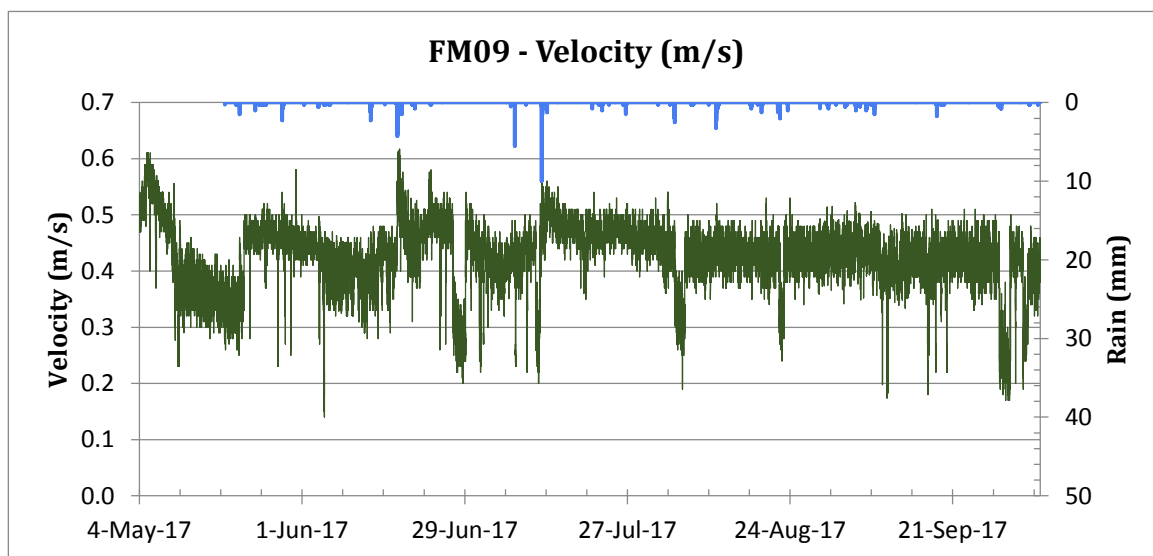
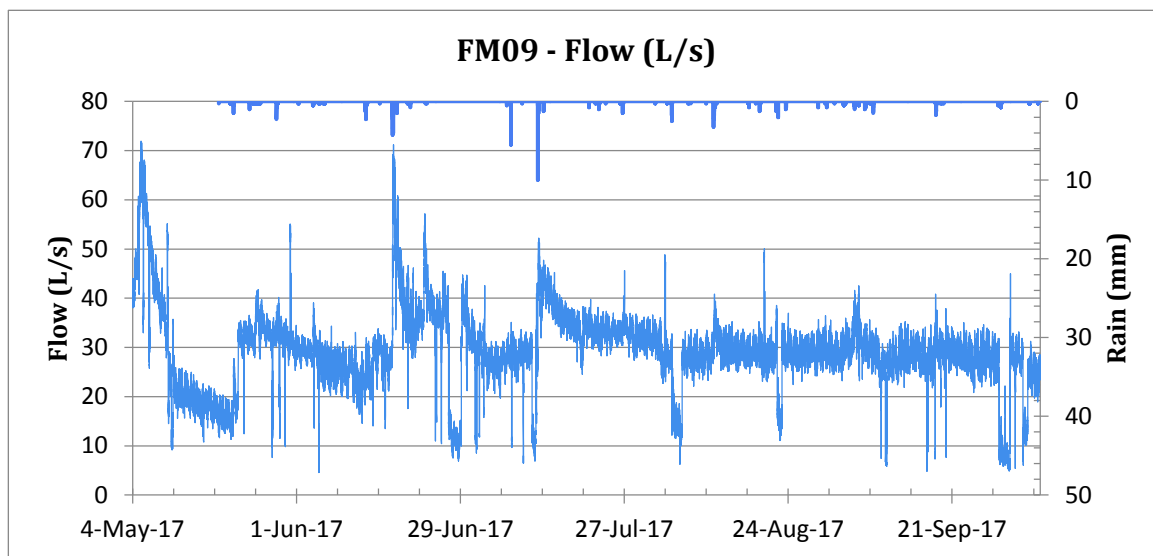


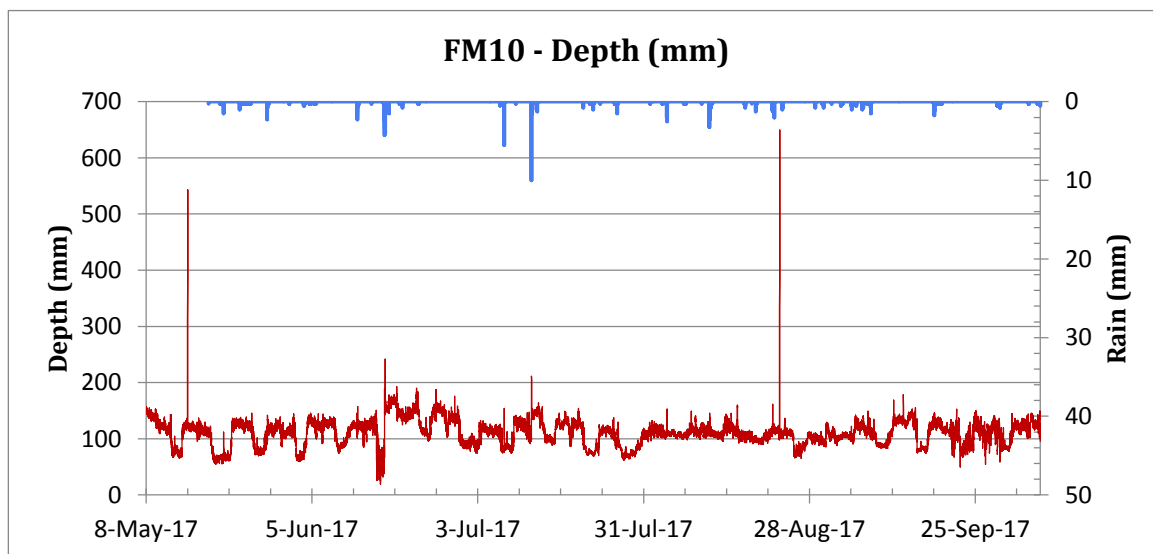
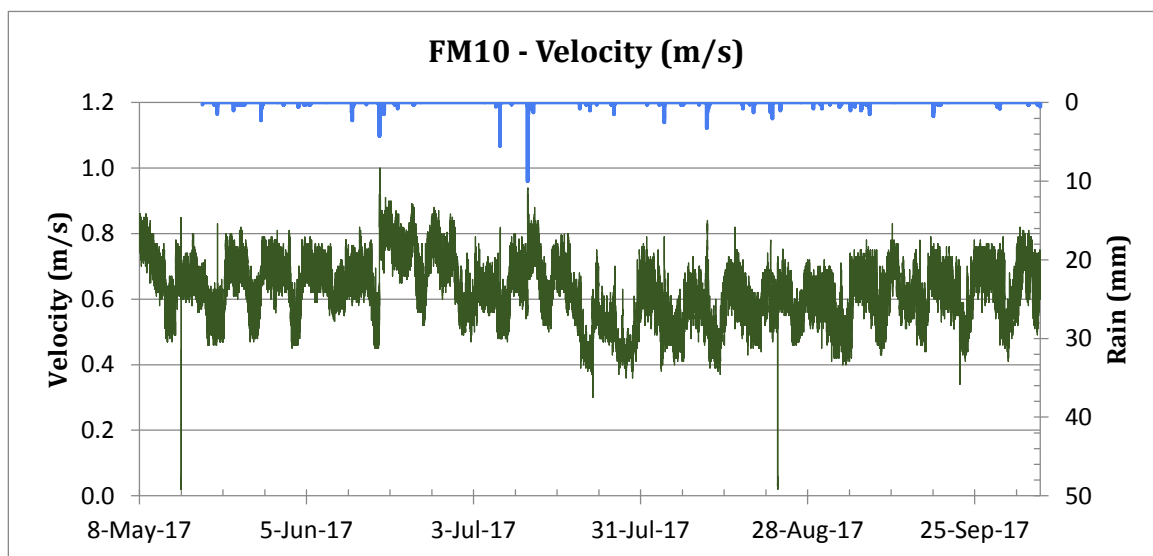
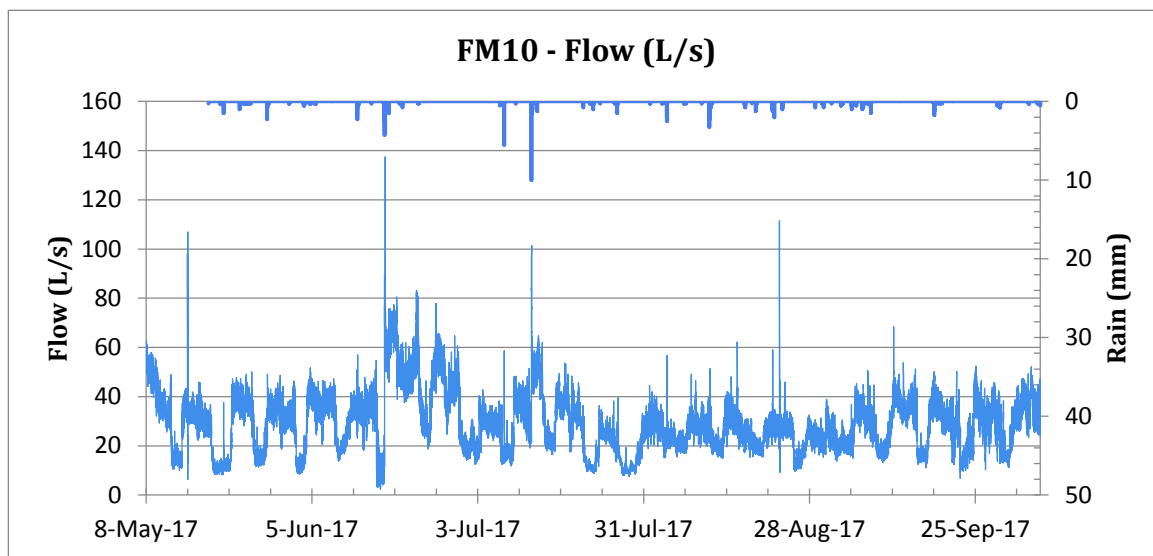


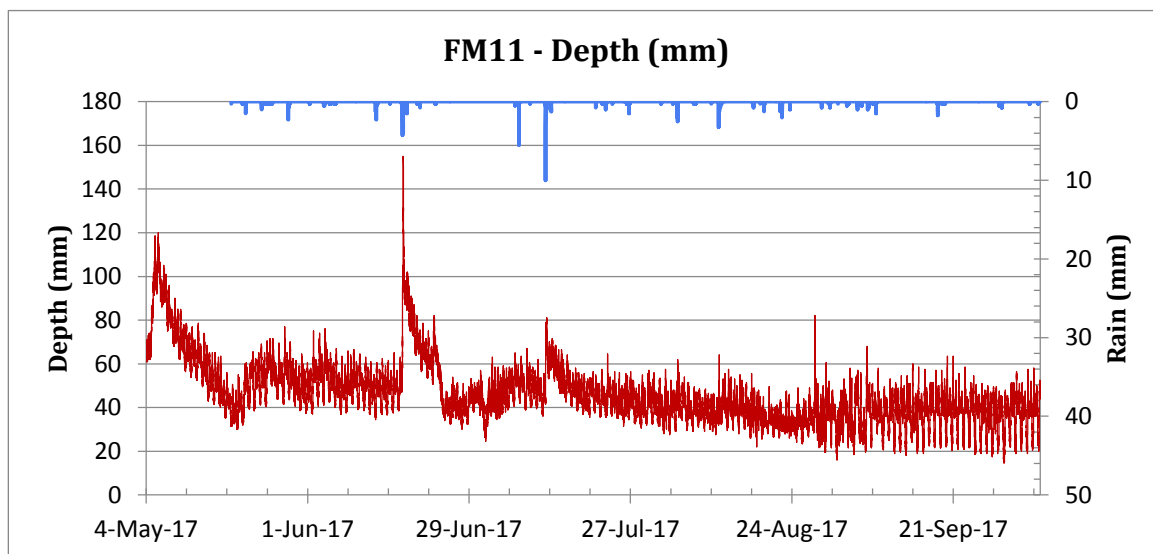
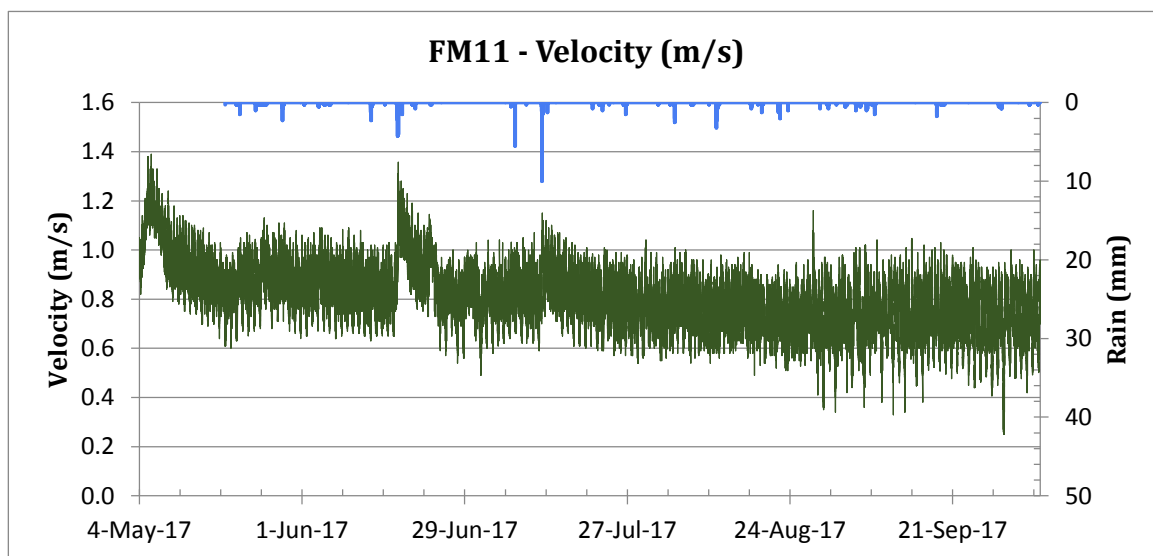
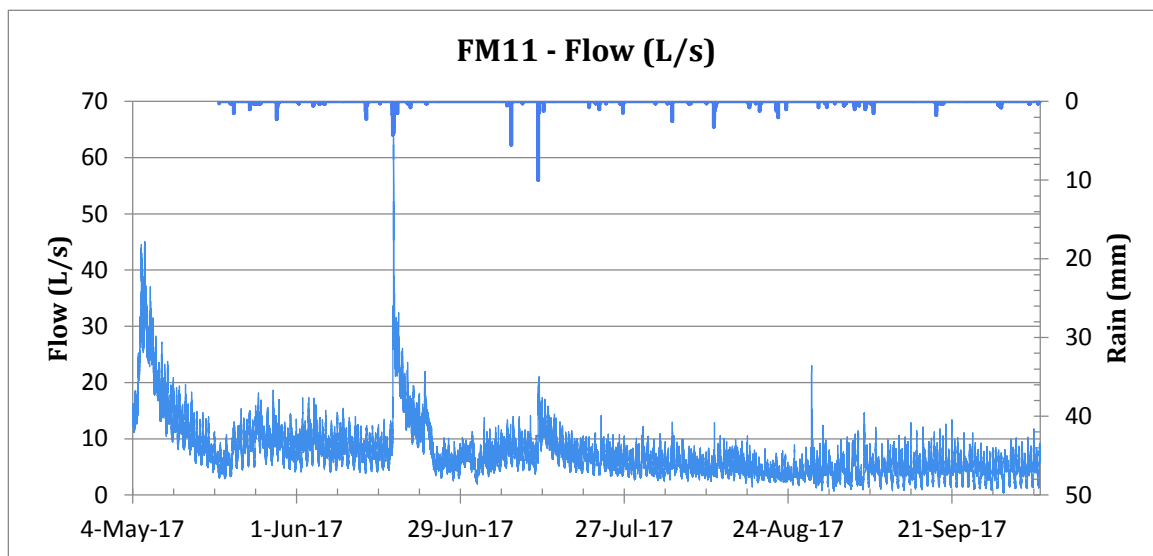


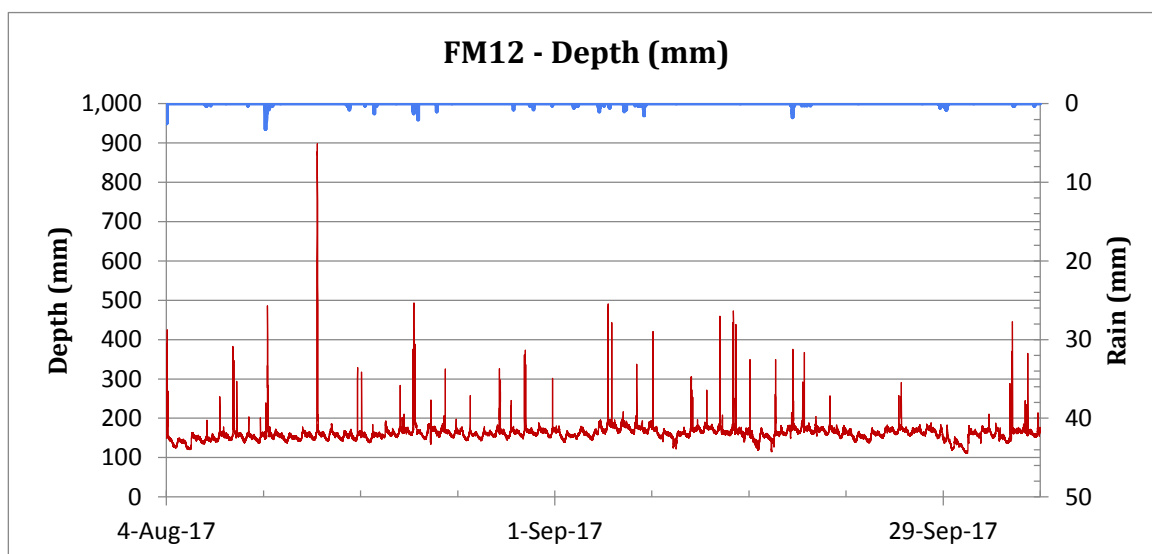
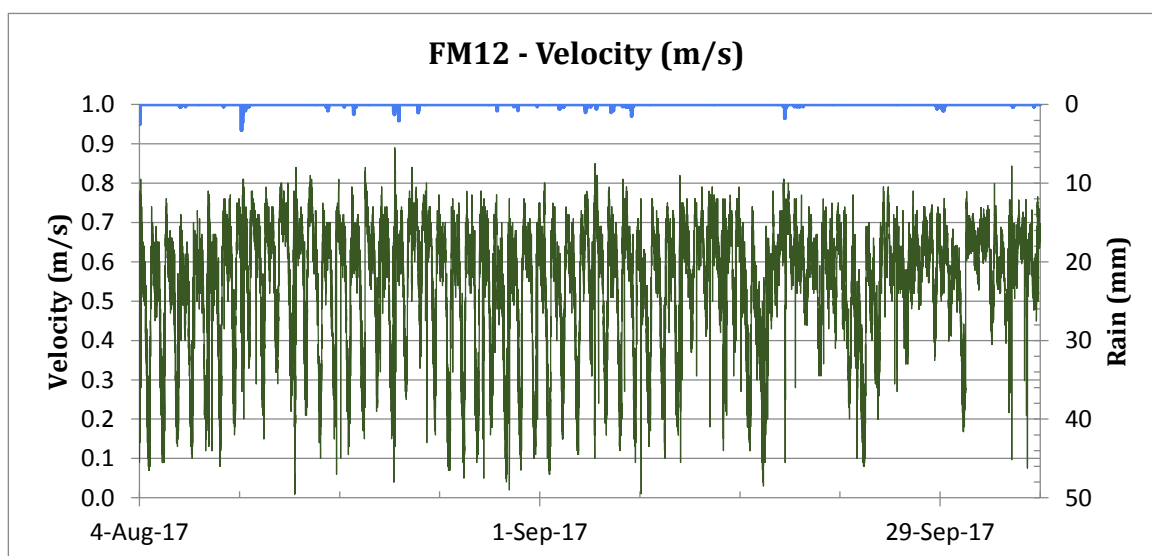
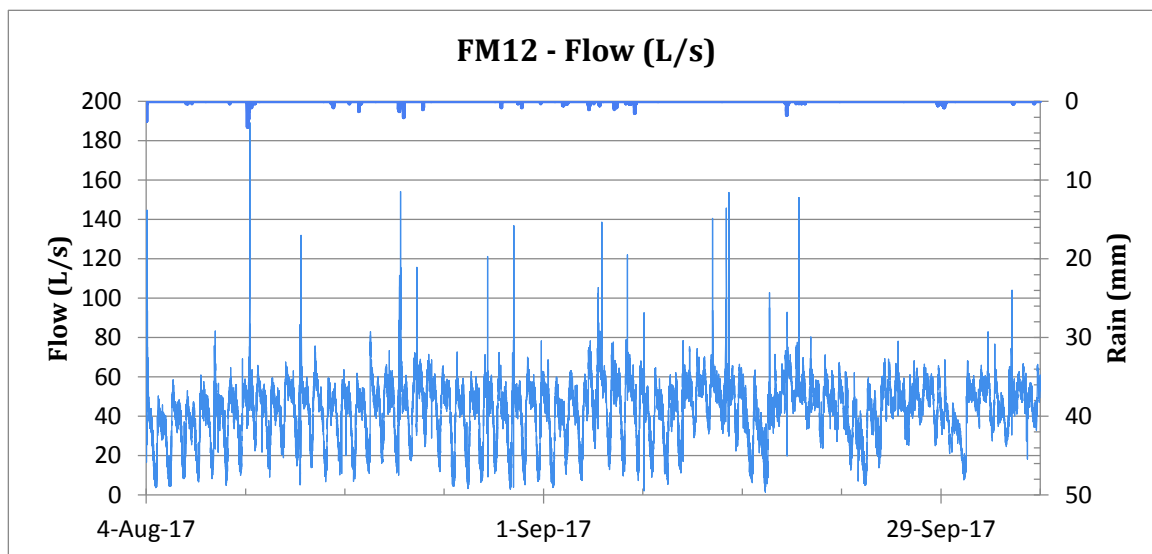




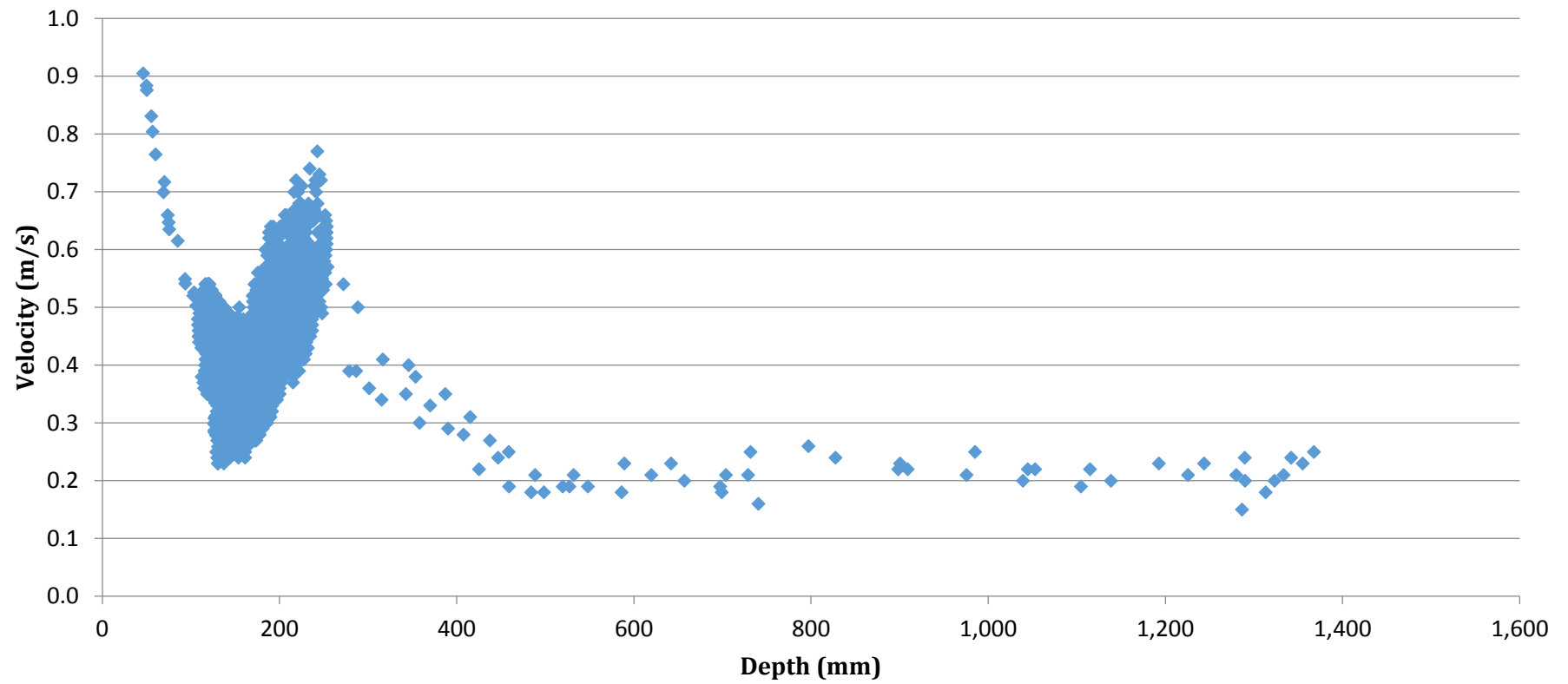




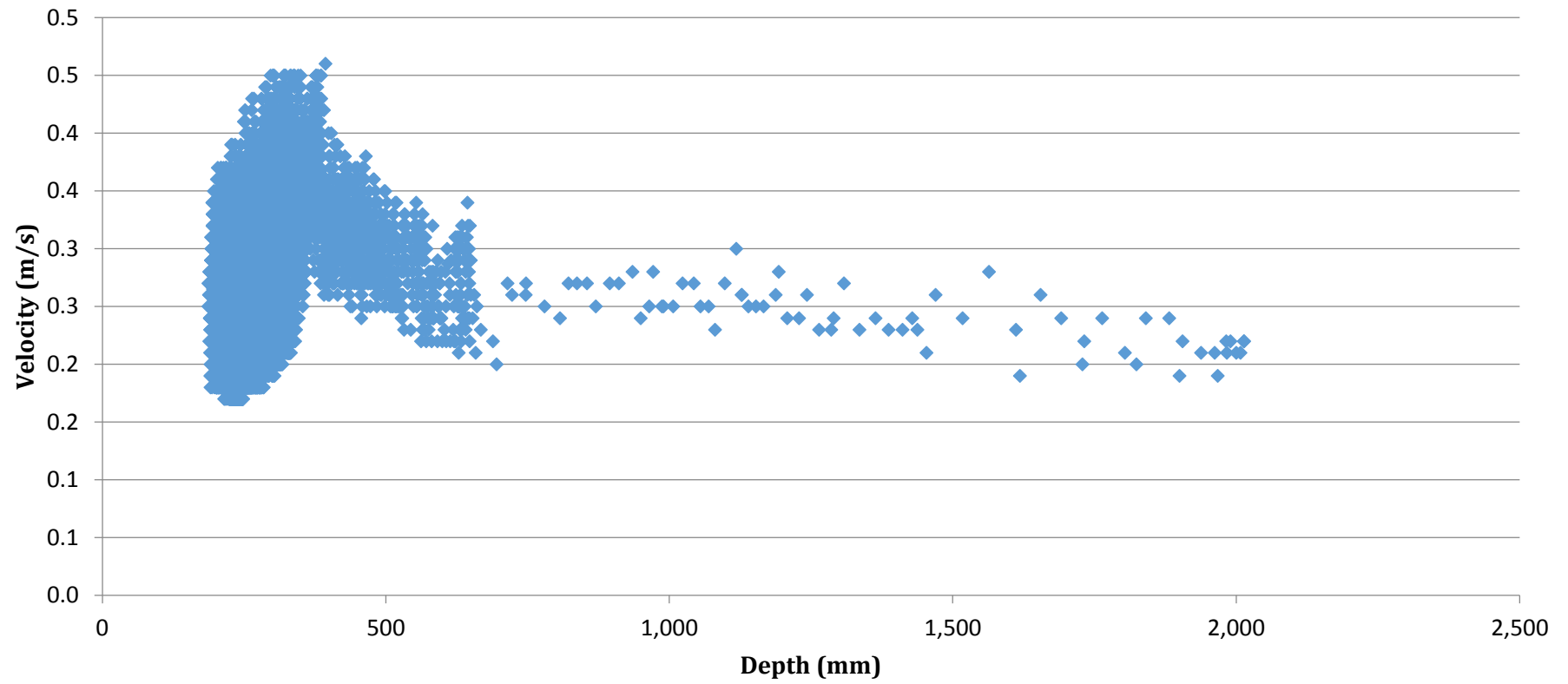




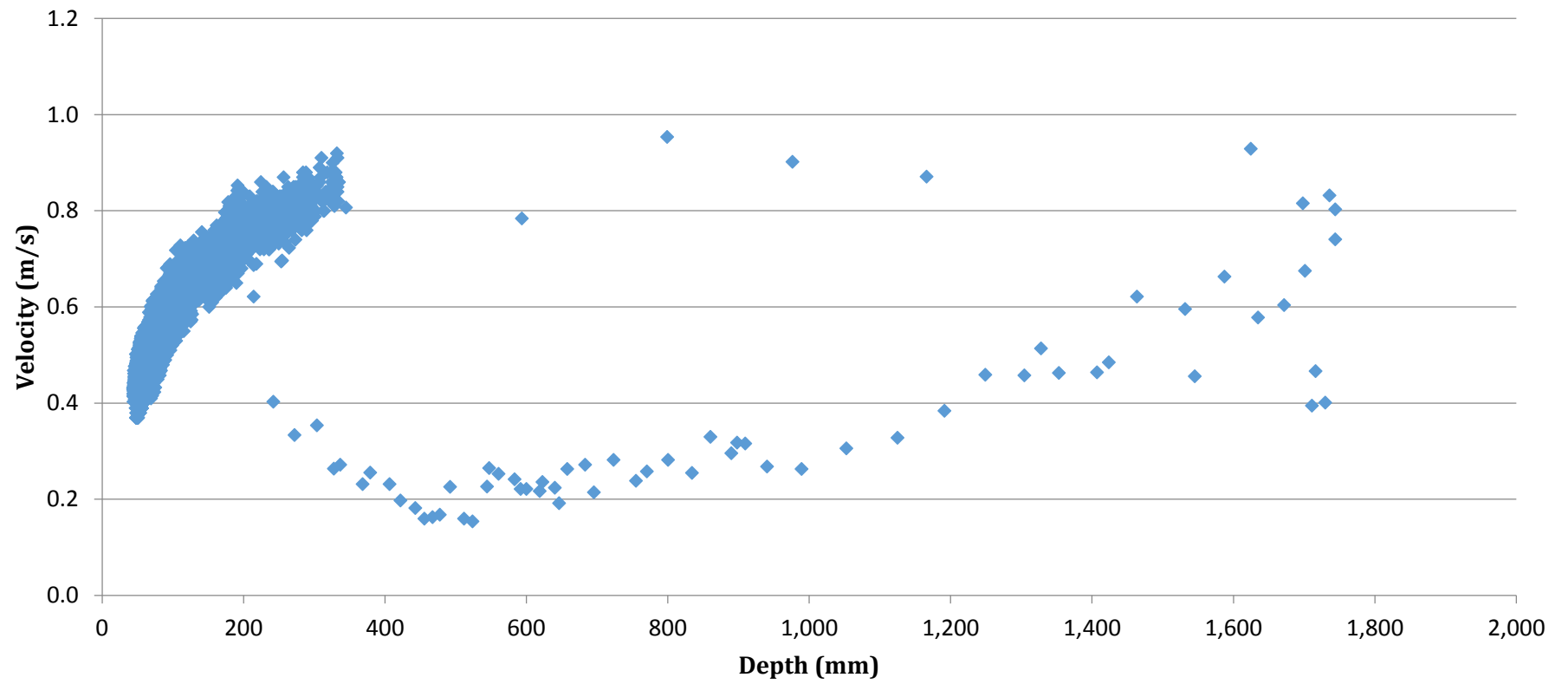
FM01 - V vs D



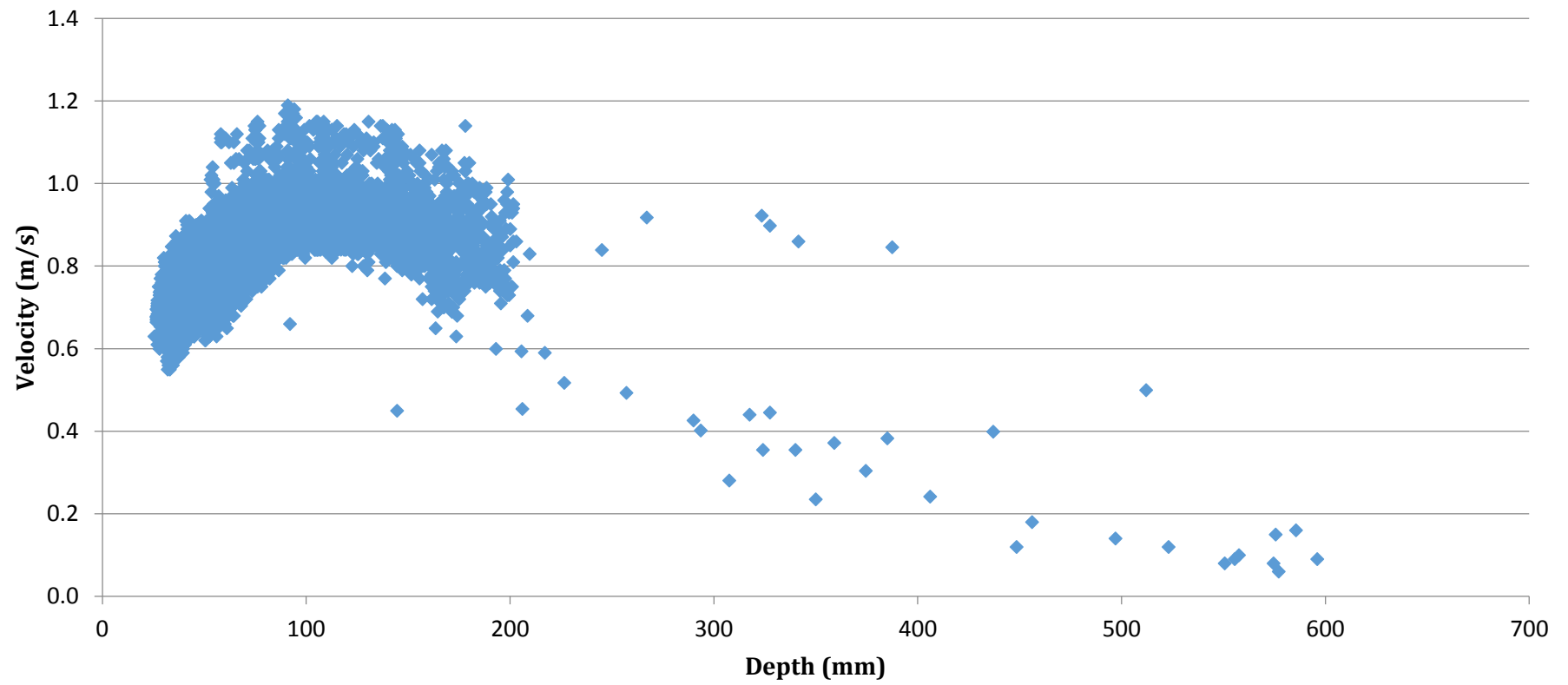
FM02 - V vs D



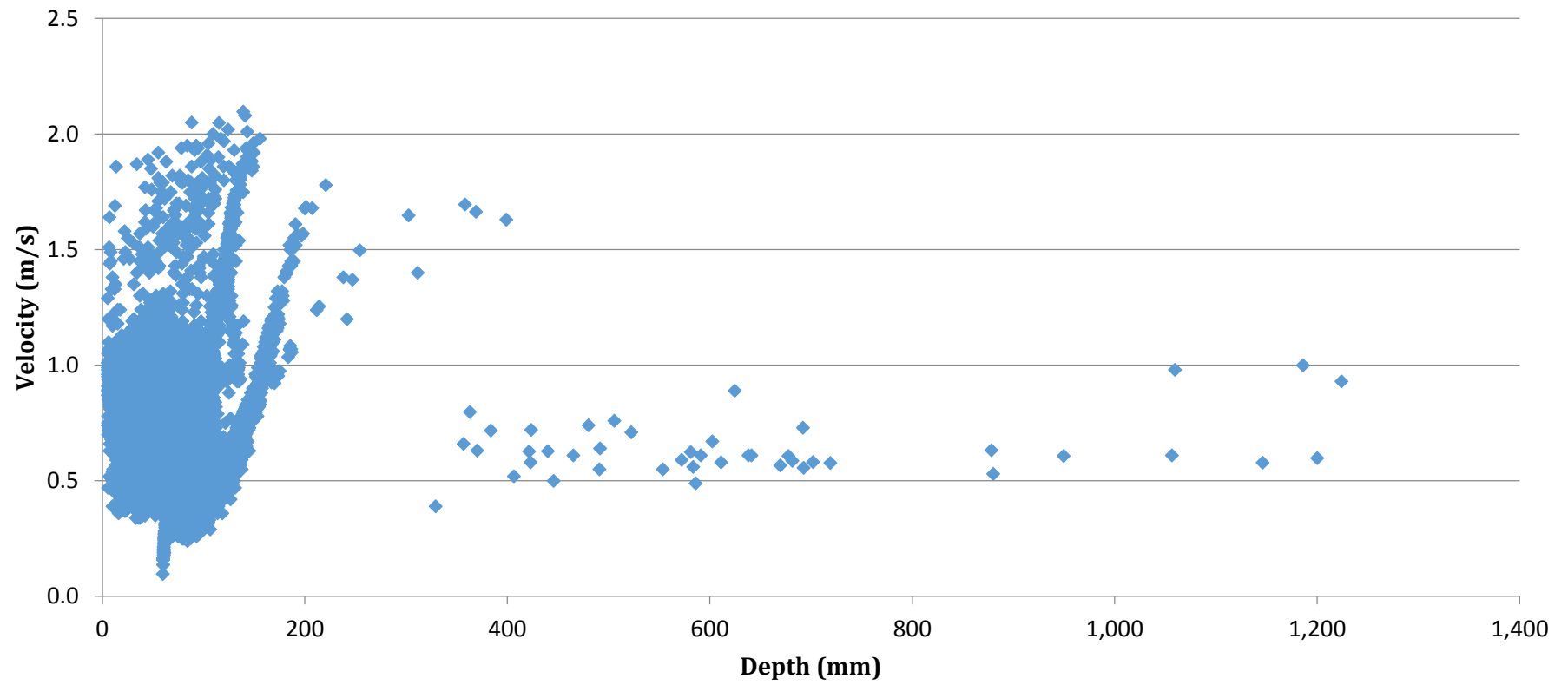
FM03 - V vs D



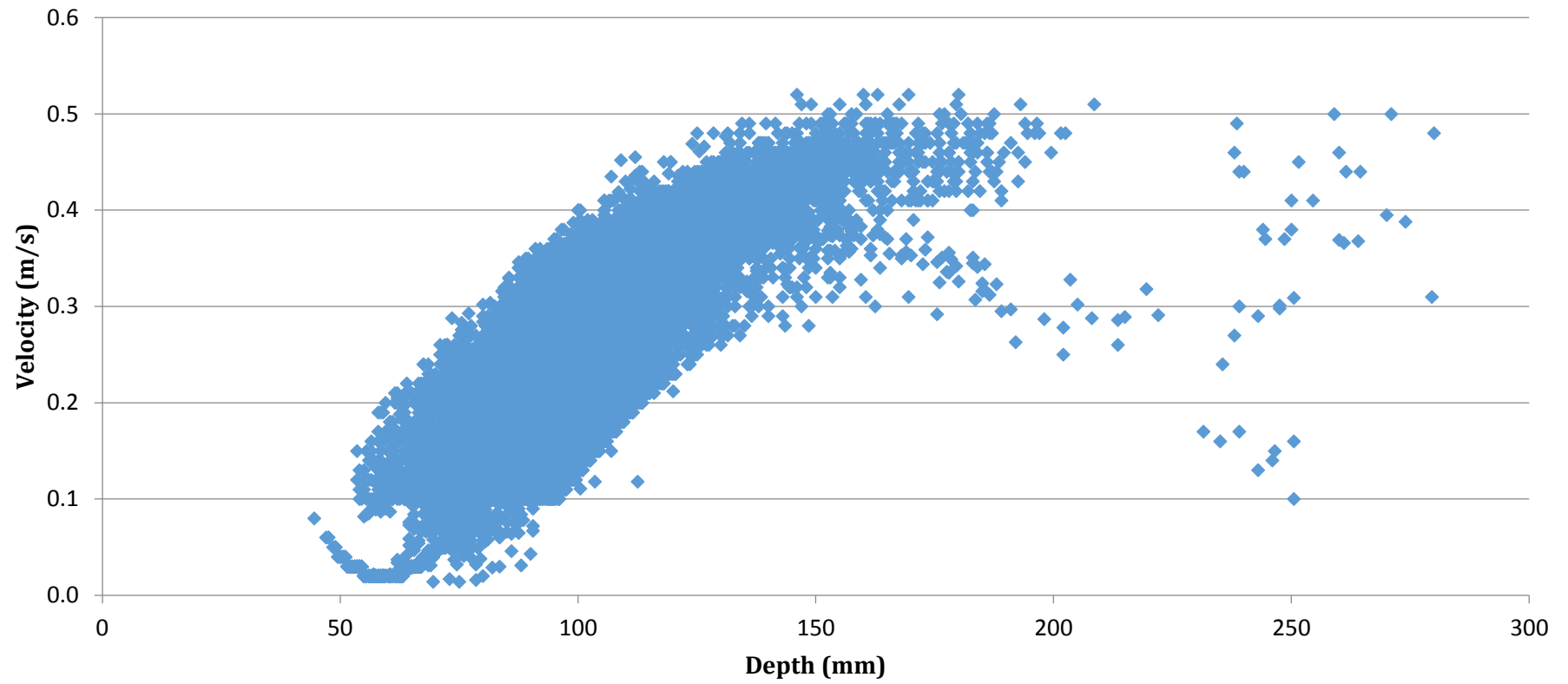
FM04 - V vs D



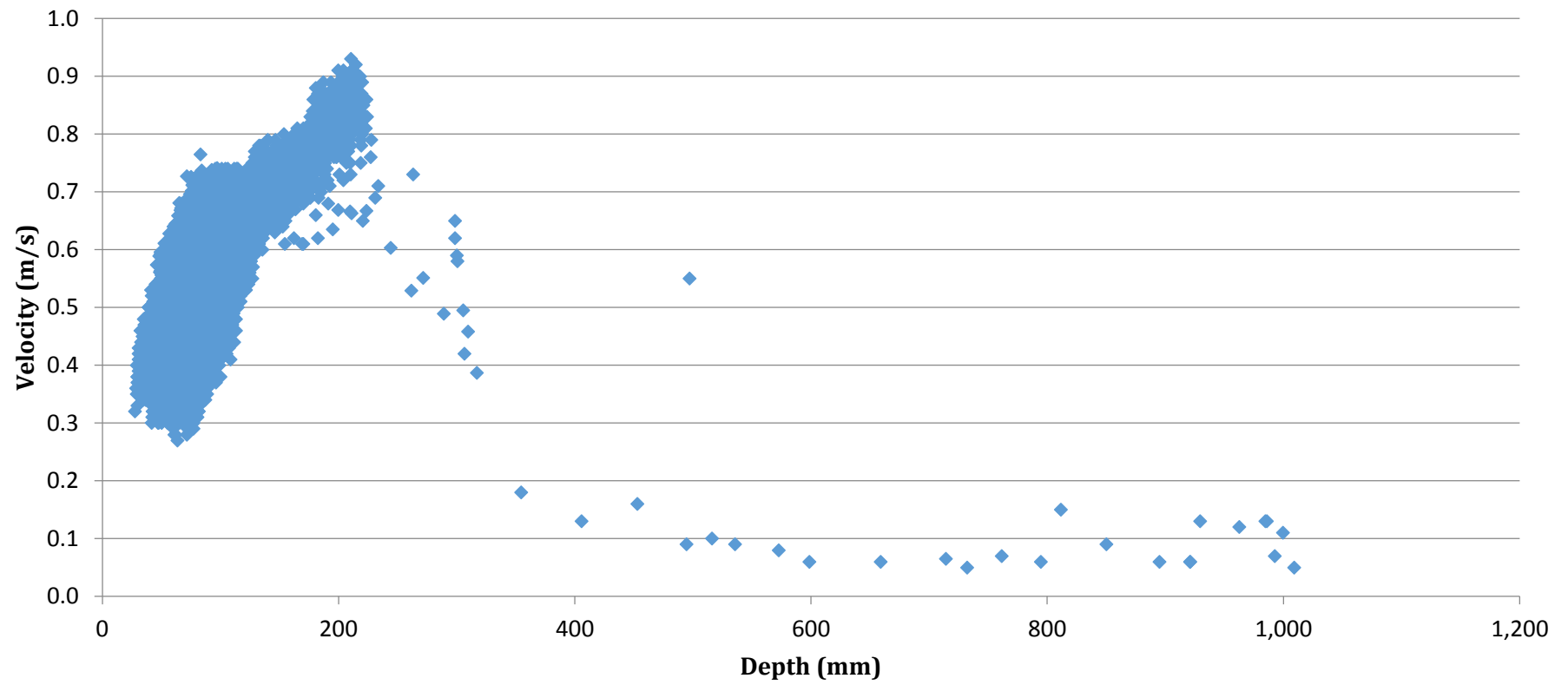
FM05 - V vs D



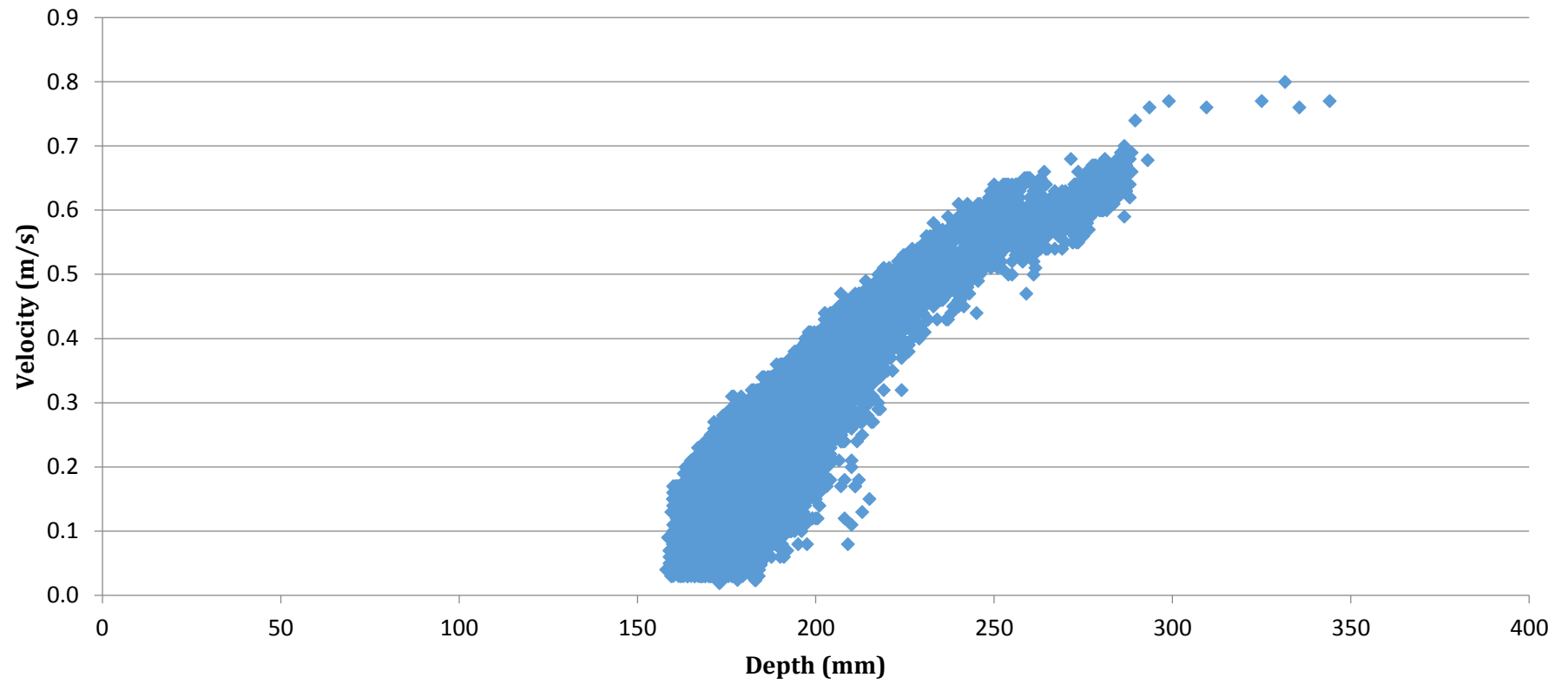
FM06 - V vs D



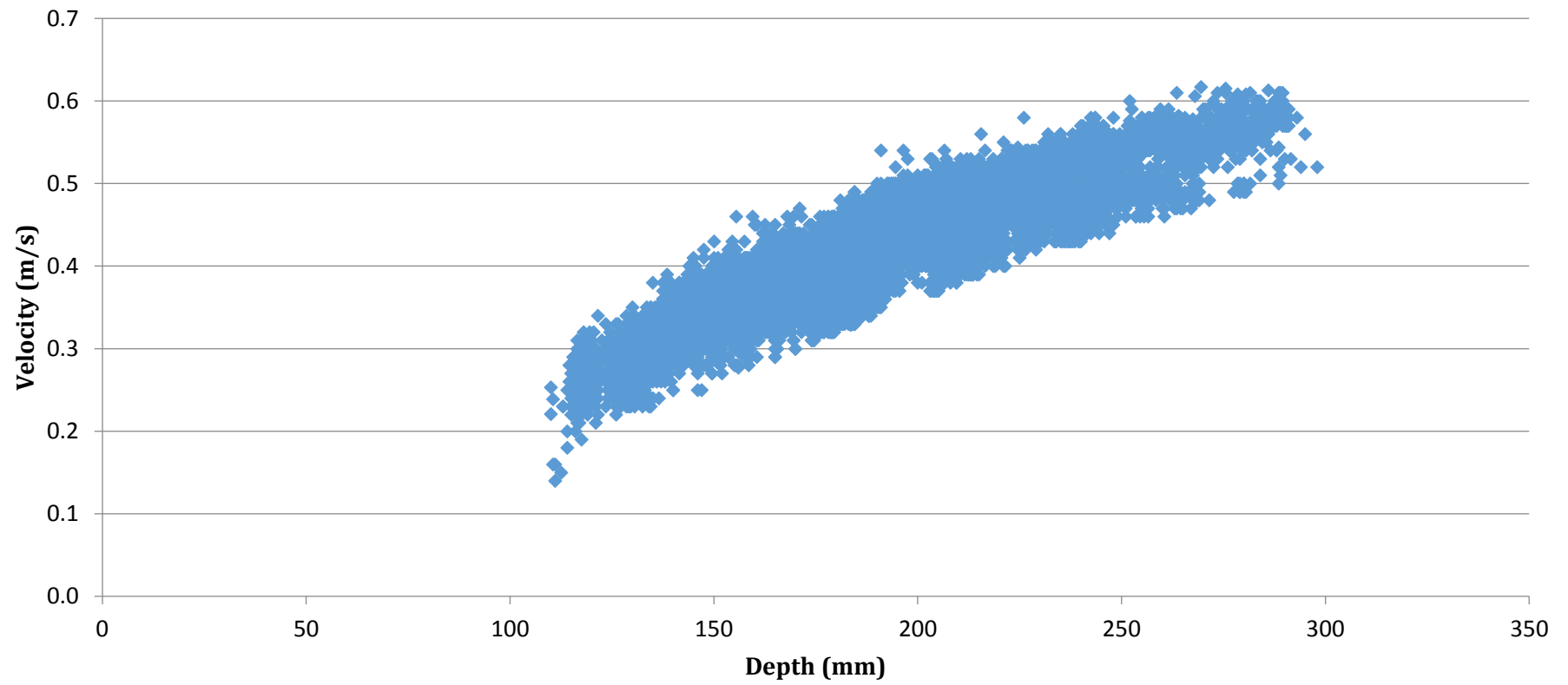
FM07 - V vs D

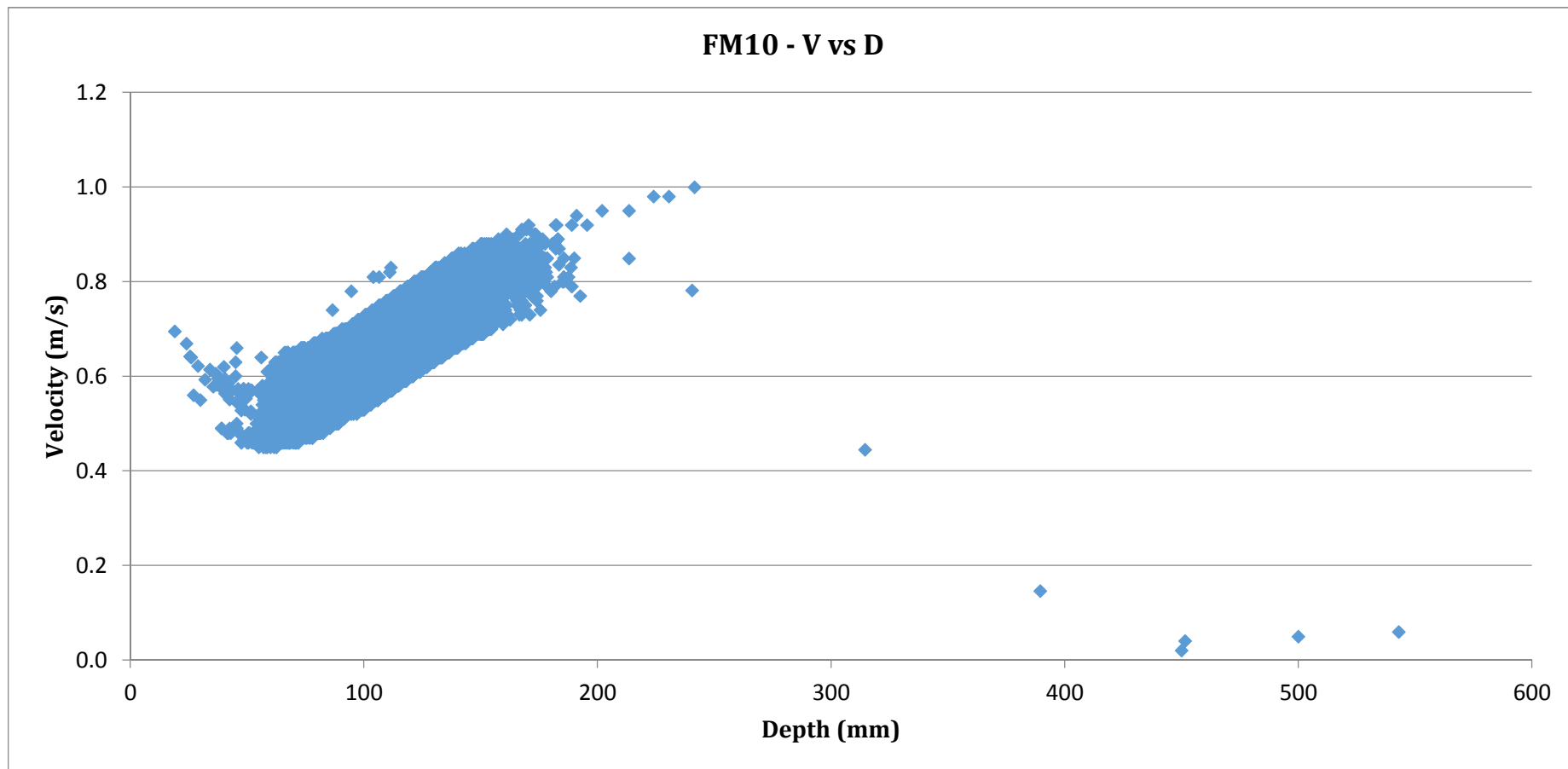


FM08 - V vs D

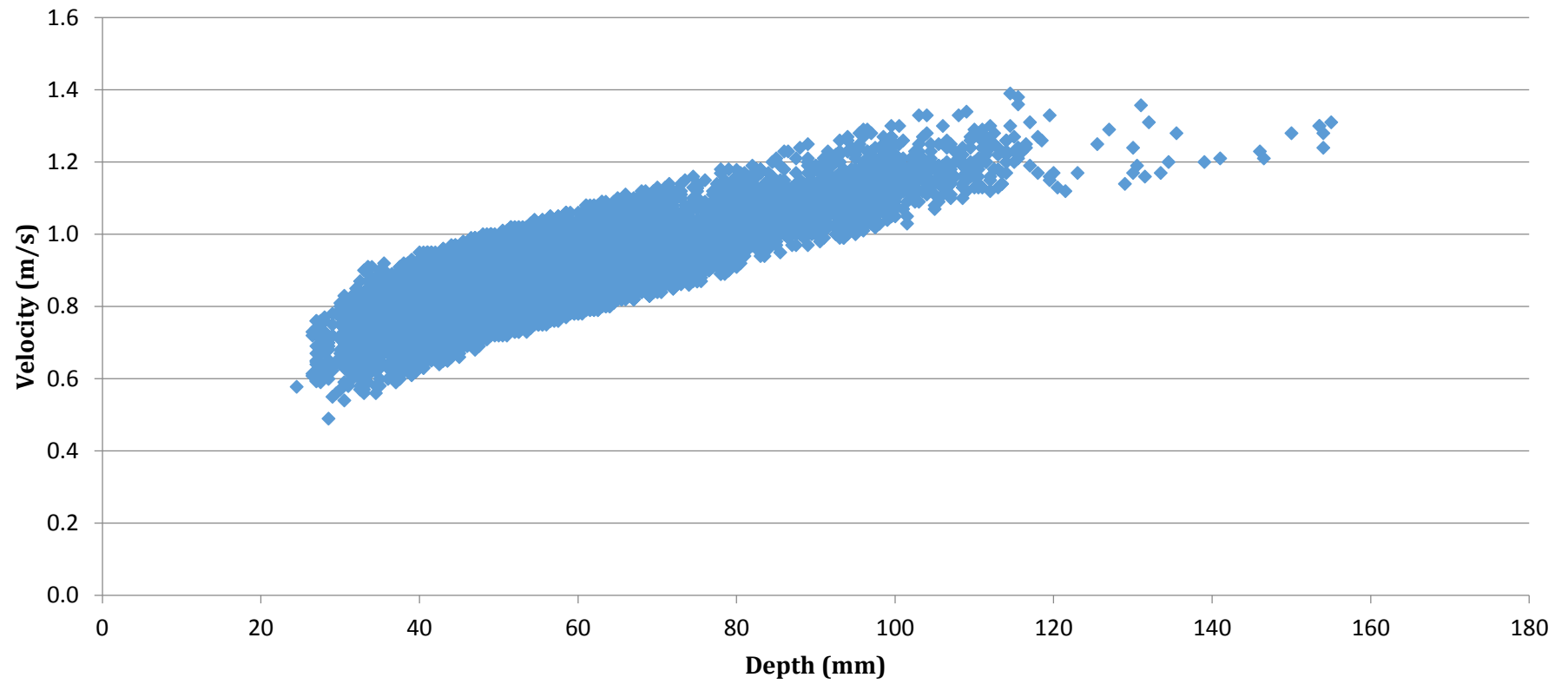


FM09 - V vs D

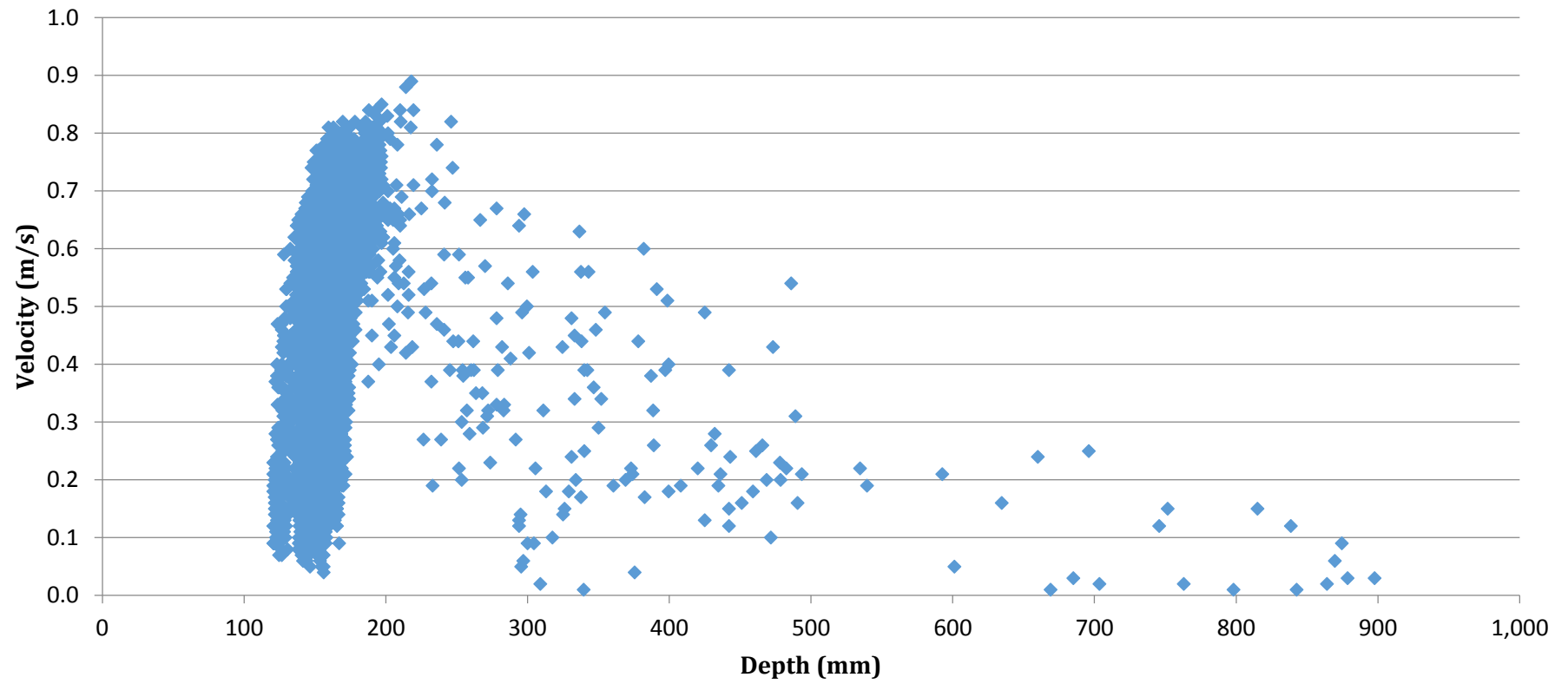




FM11 - V vs D



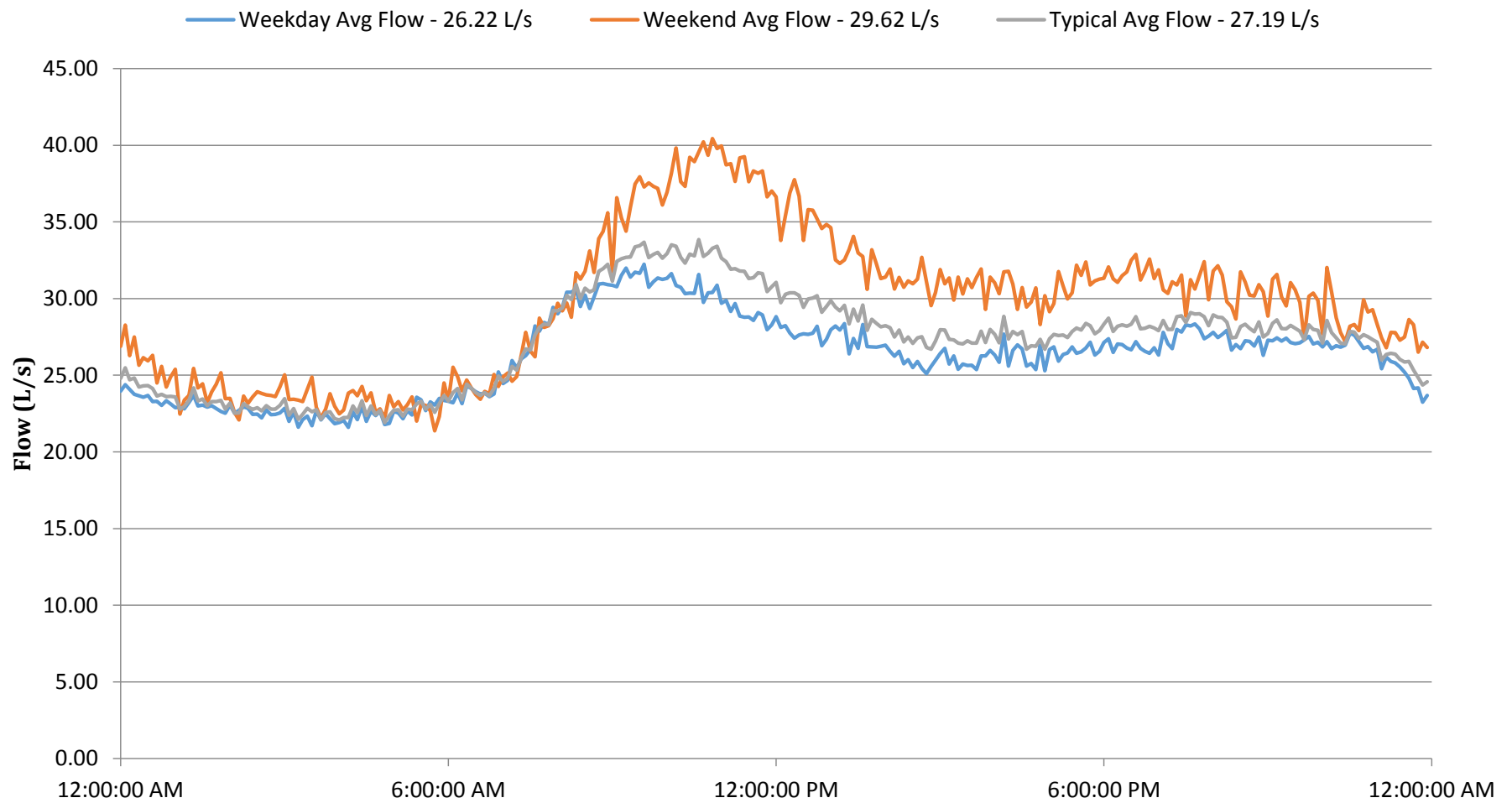
FM12 - V vs D



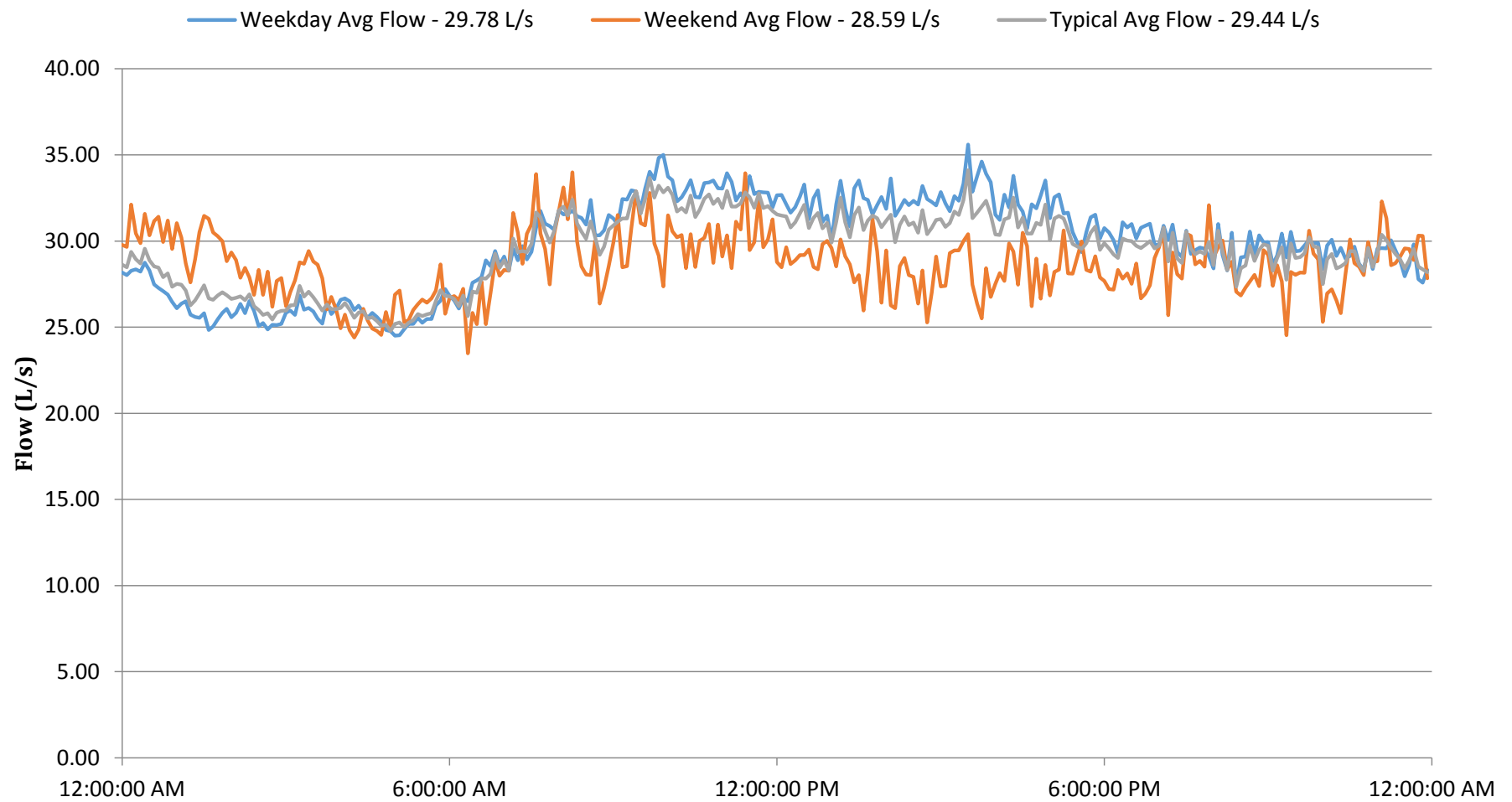
APPENDIX C

Dry Weather Flow Graphs

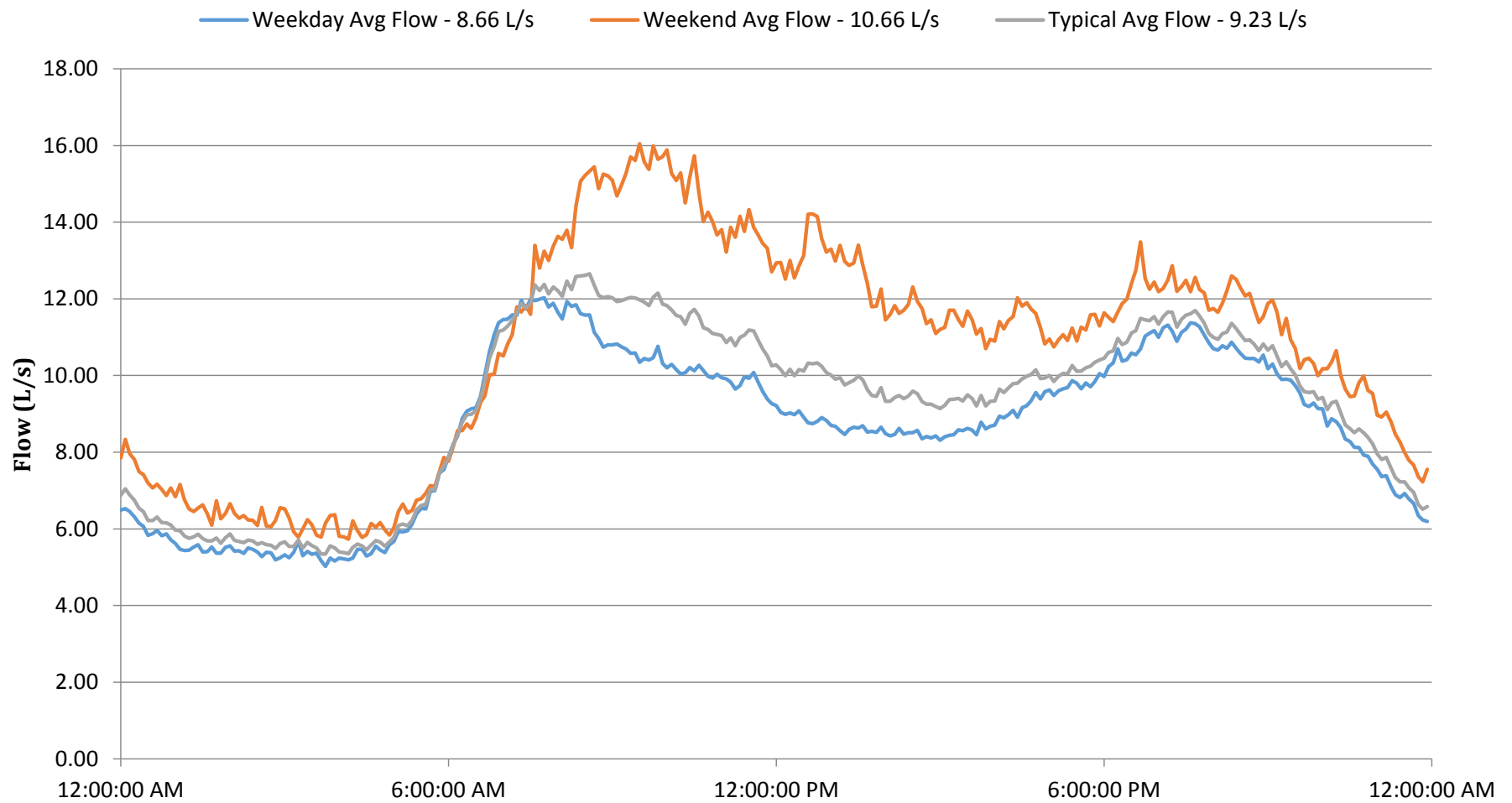
FM01 Diurnal Pattern



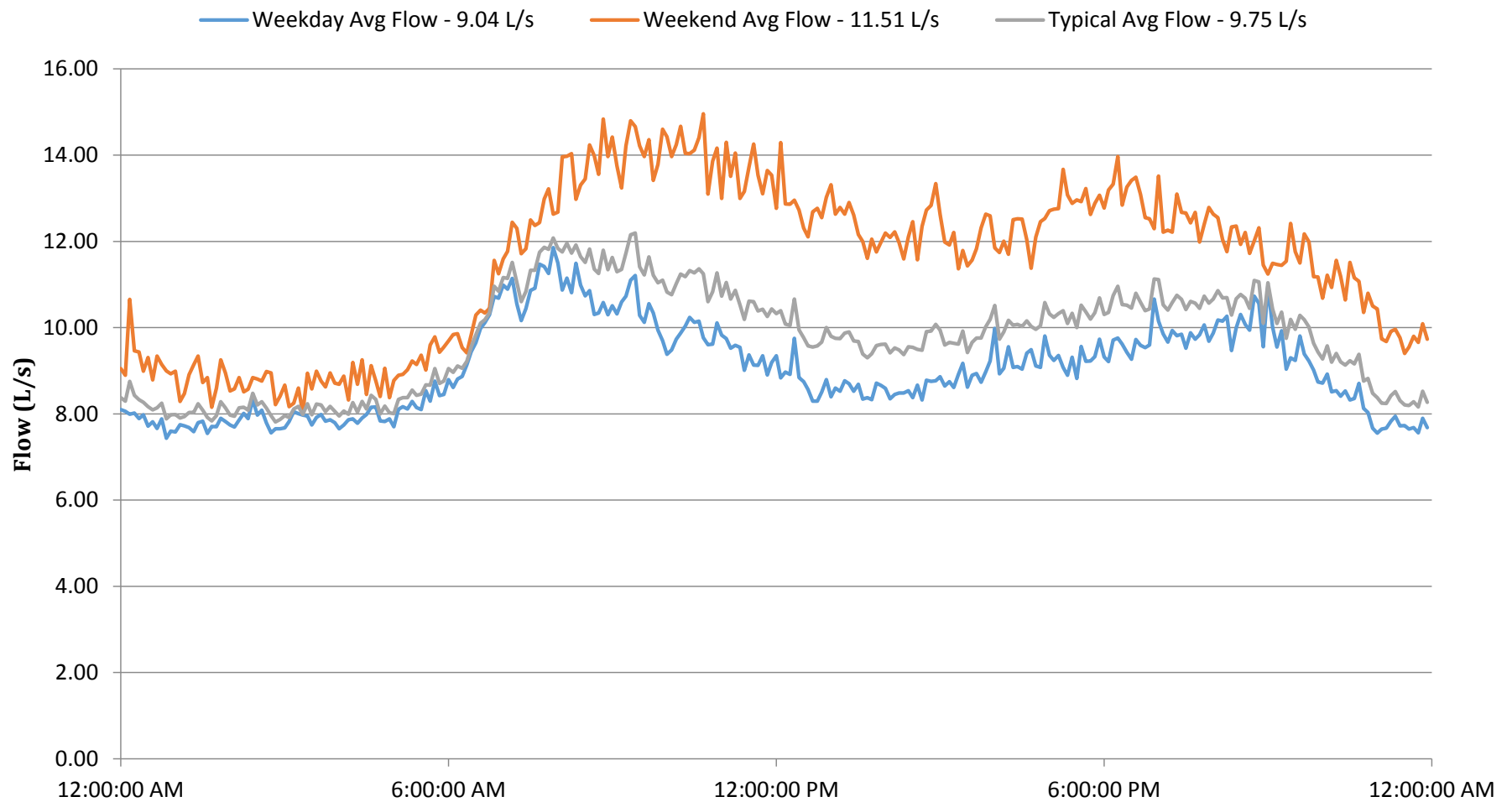
FM02 Diurnal Pattern



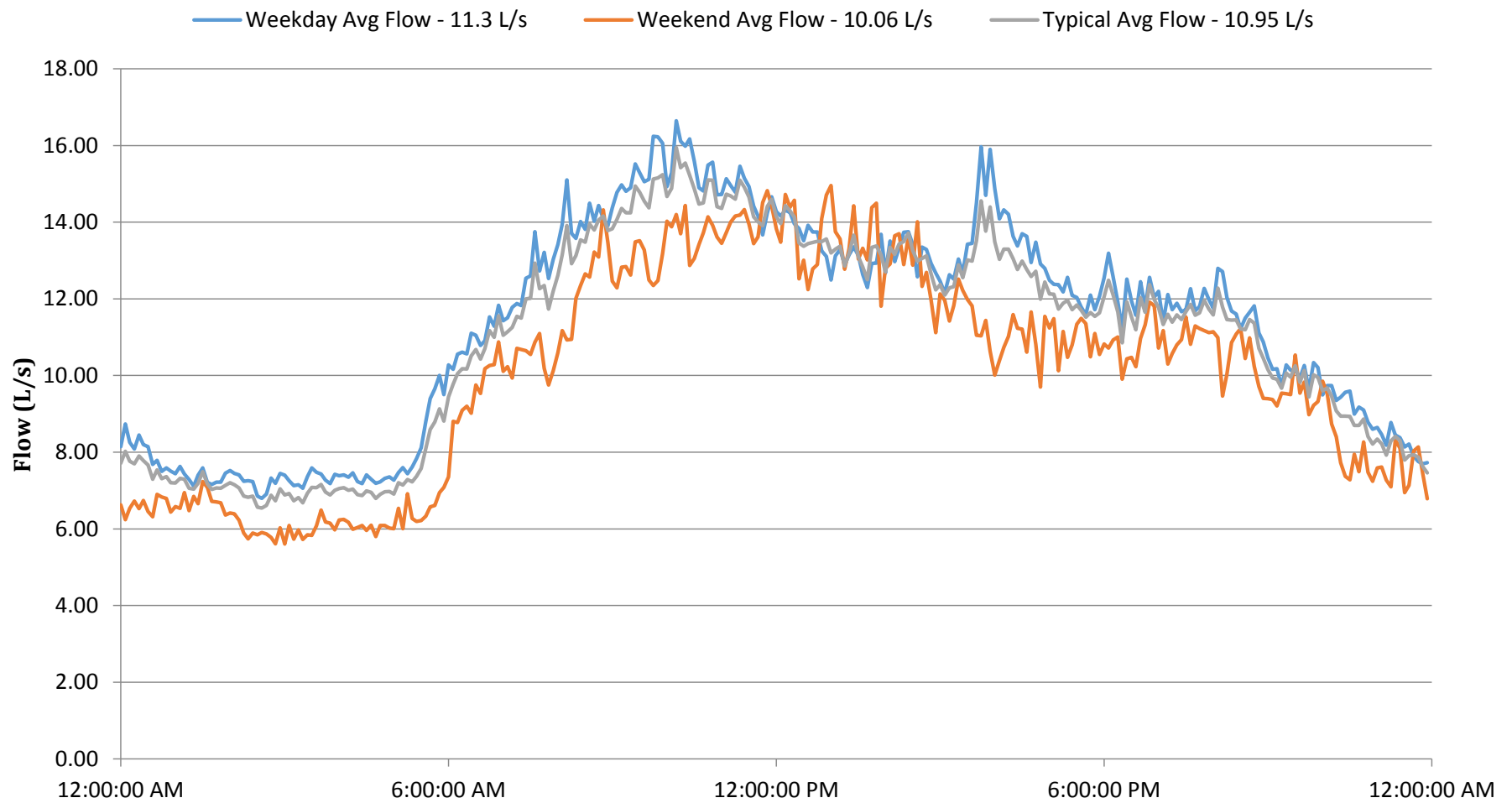
FM03 Diurnal Pattern



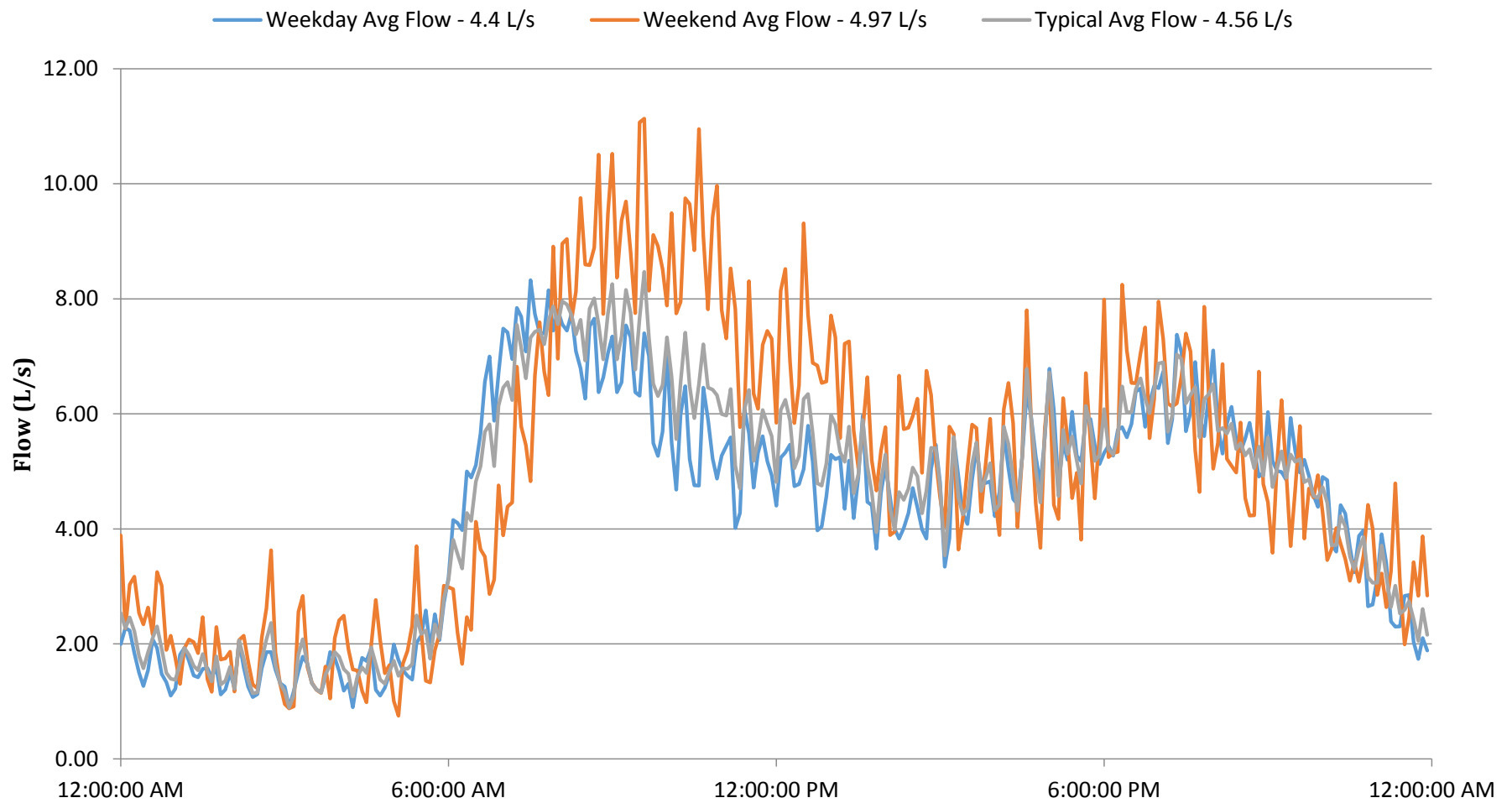
FM04 Diurnal Pattern



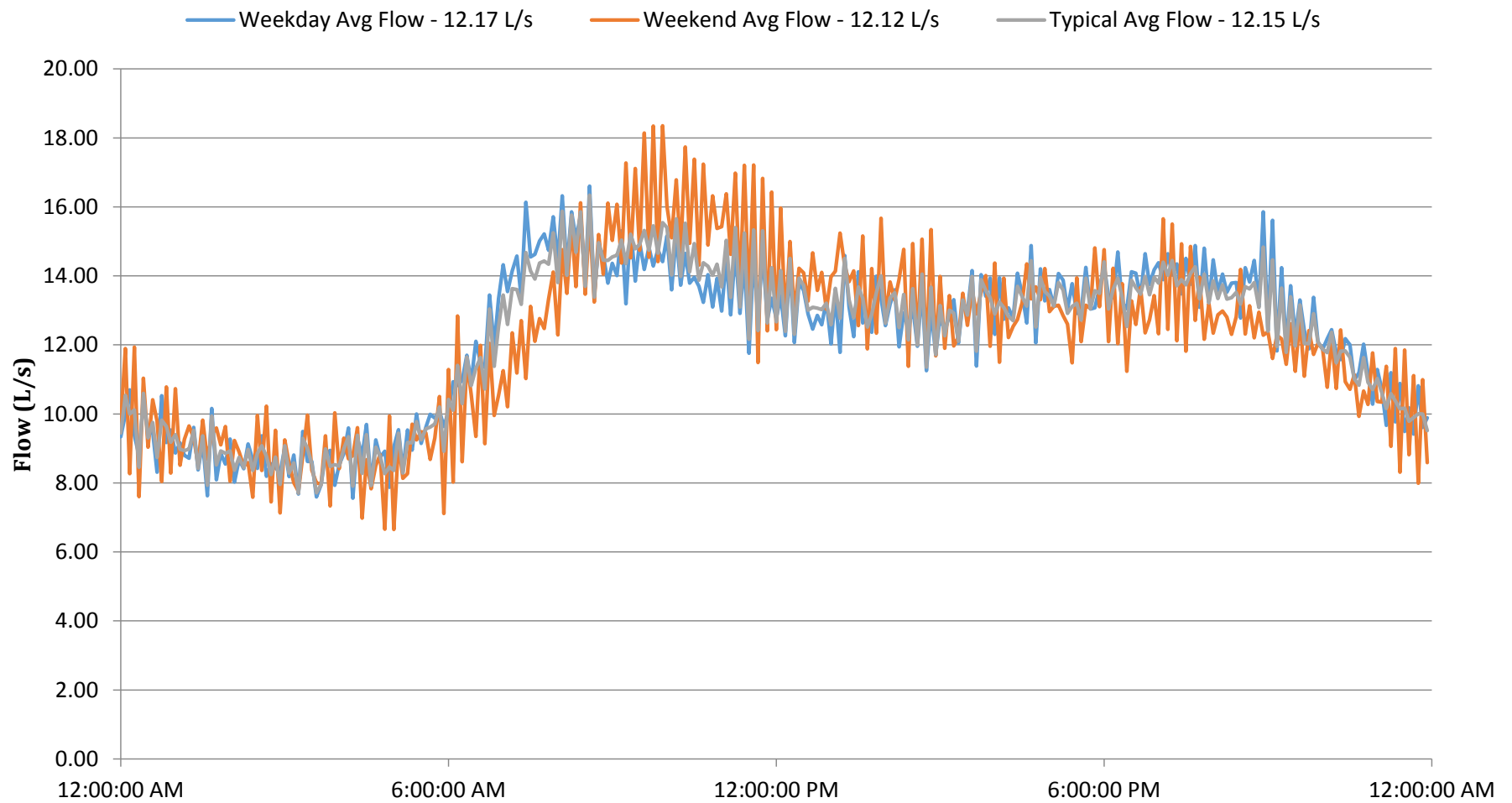
FM05 Diurnal Pattern



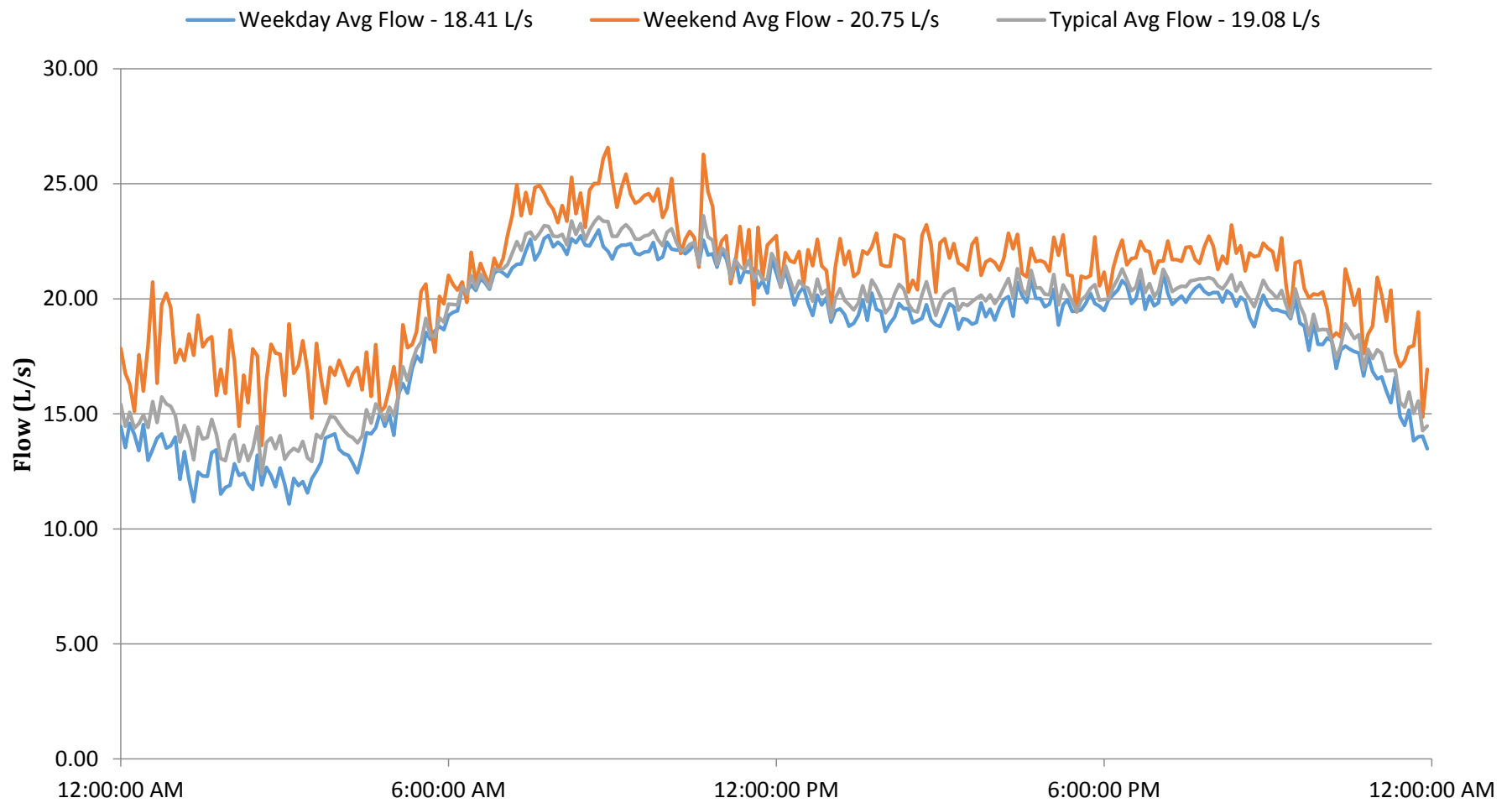
FM06 Diurnal Pattern



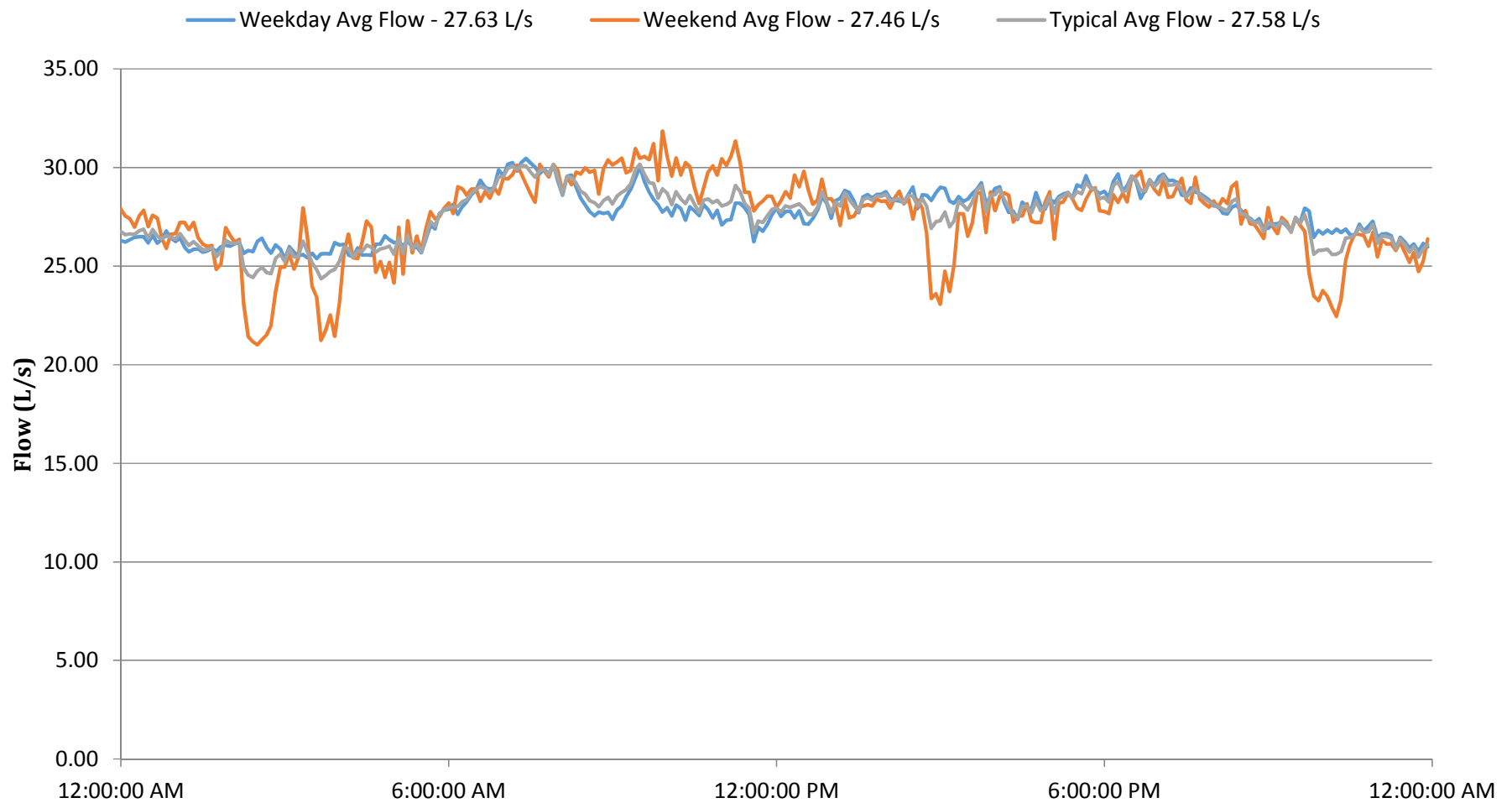
FM07 Diurnal Pattern



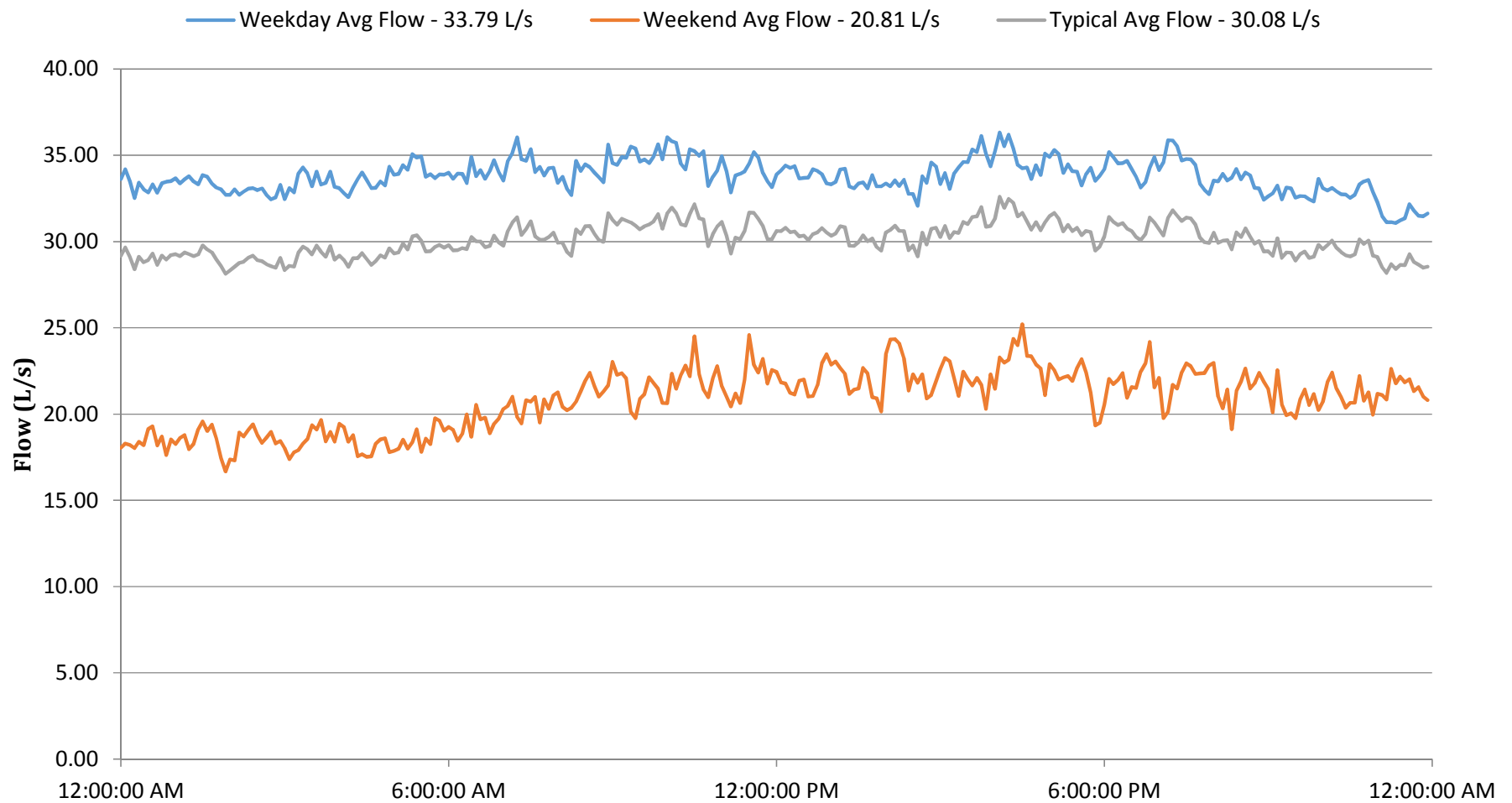
FM08 Diurnal Pattern



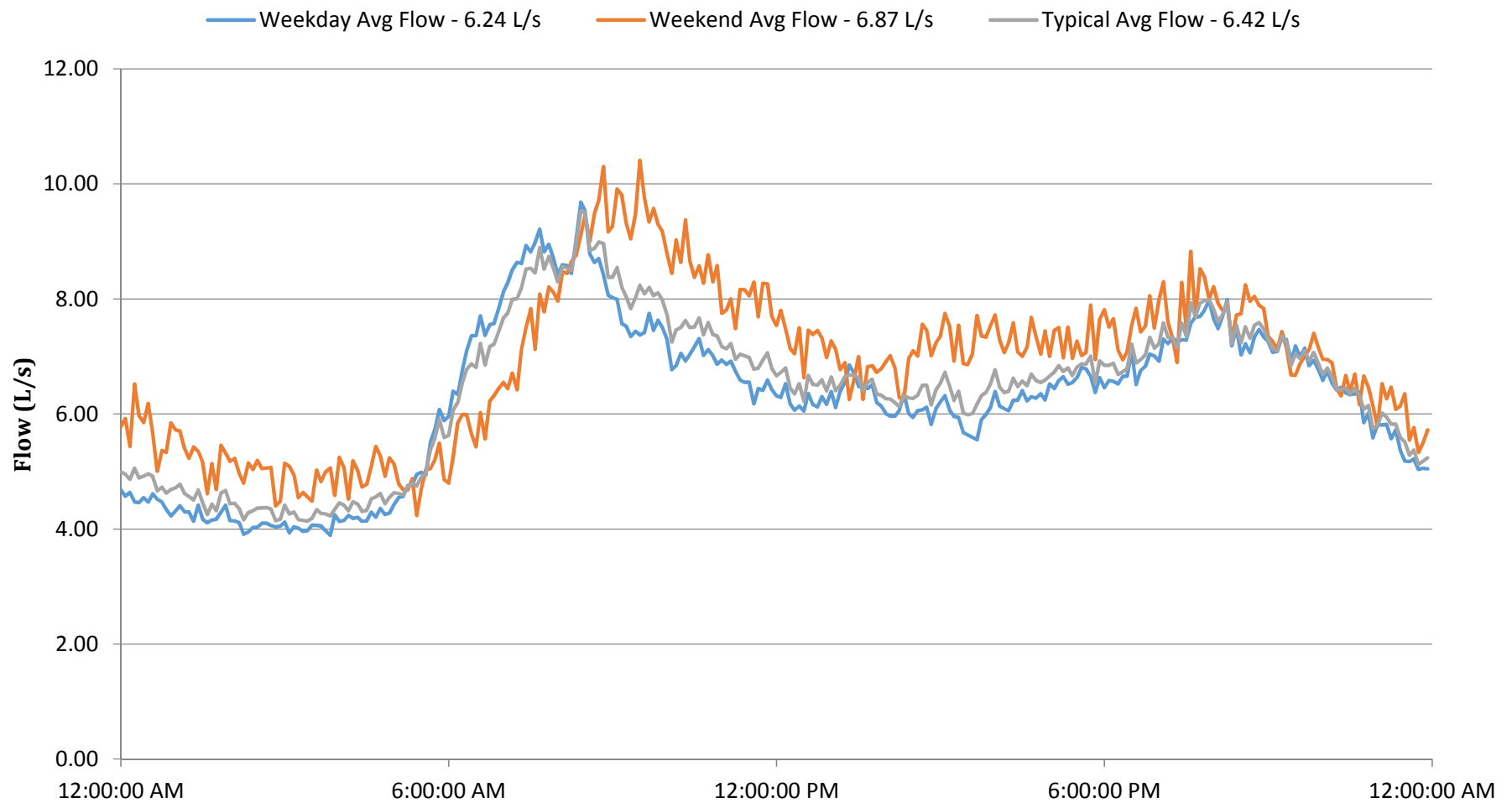
FM09 Diurnal Pattern



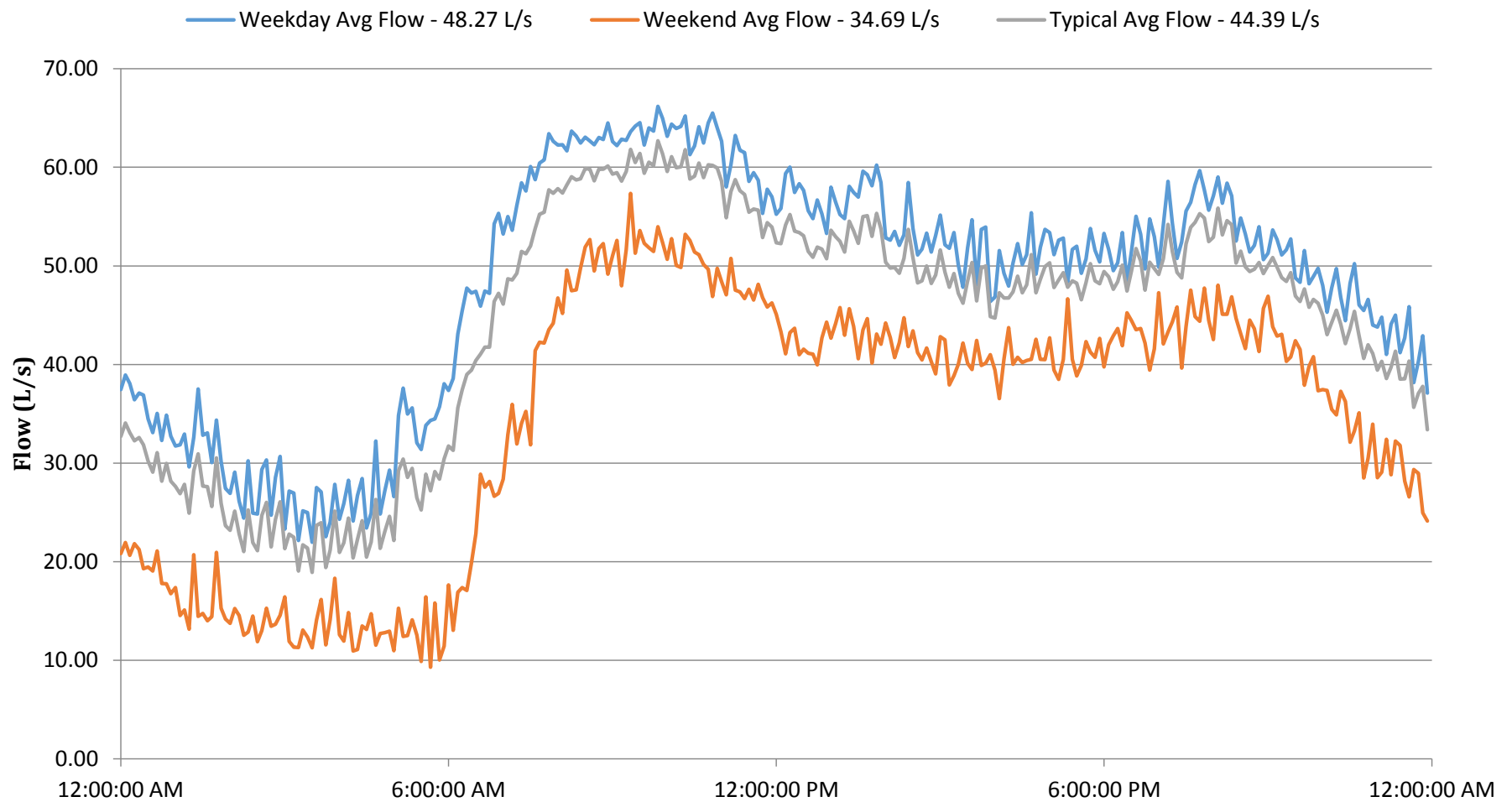
FM10 Diurnal Pattern



FM11 Diurnal Pattern



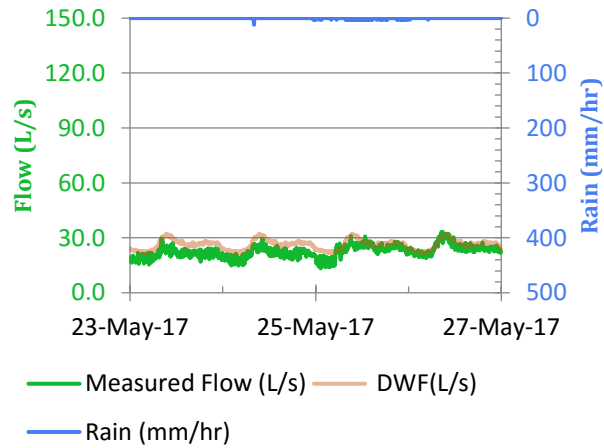
FM12 Diurnal Pattern



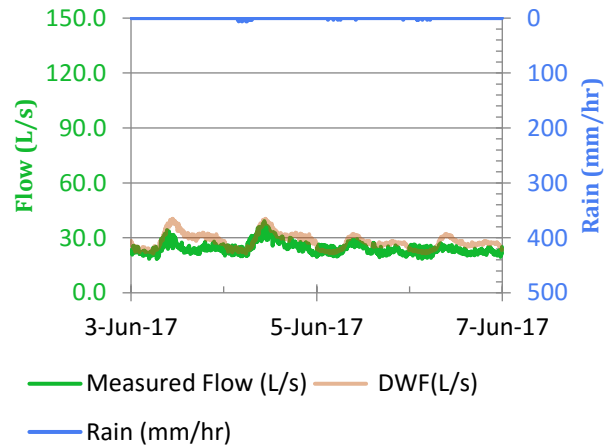
APPENDIX D

Wet Weather Flow Hydrographs

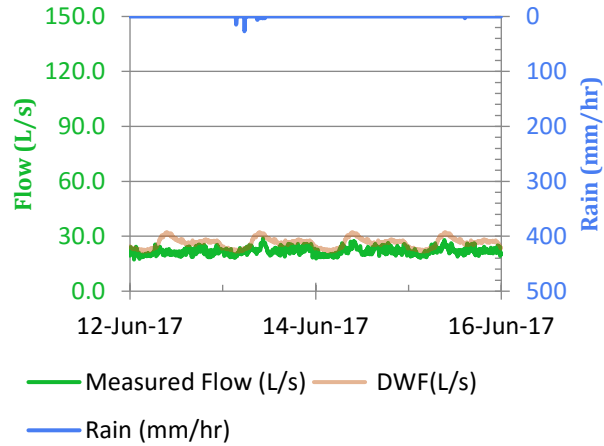
FM01 (5/24/2017 Event)



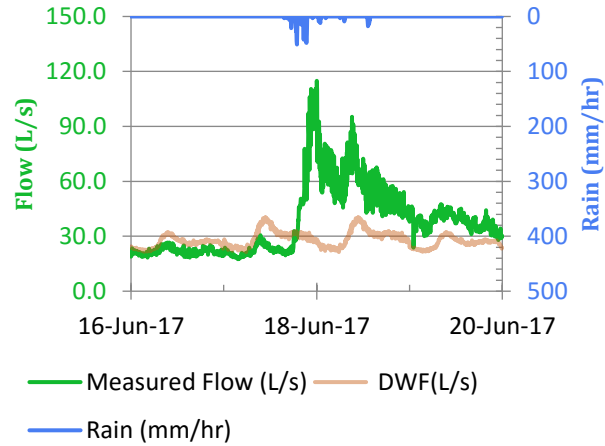
FM01 (6/4/2017 Event)



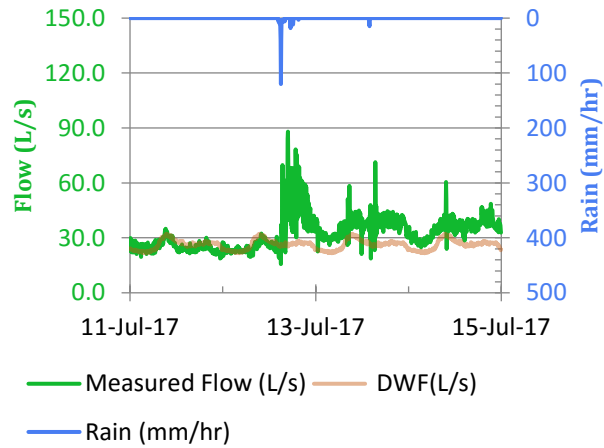
FM01 (6/13/2017 Event)



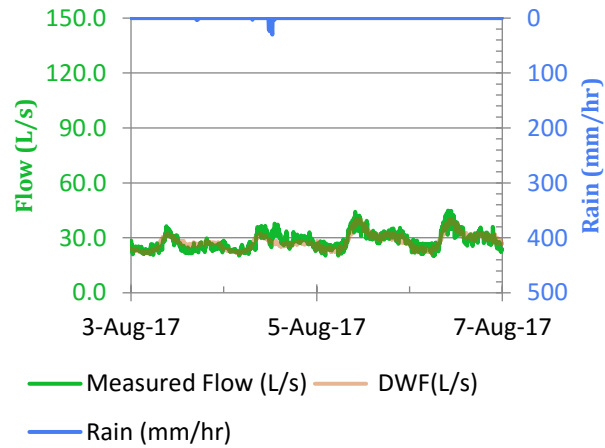
FM01 (6/17/2017 Event)



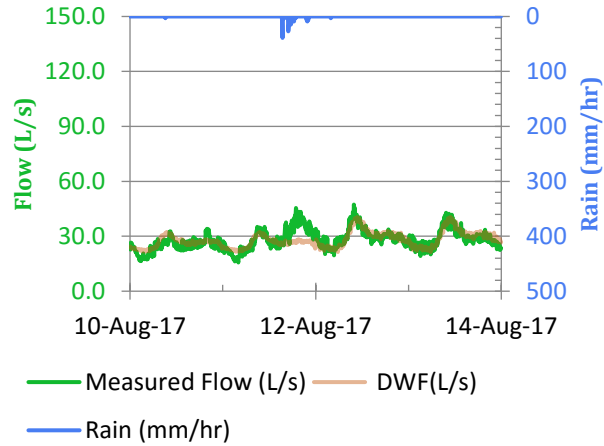
FM01 (7/12/2017 Event)



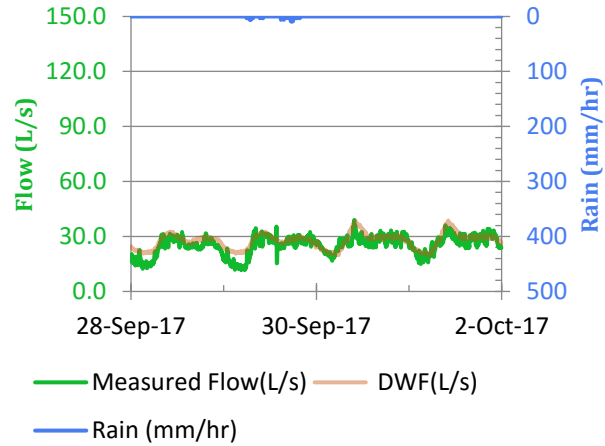
FM01 (8/4/2017 Event)



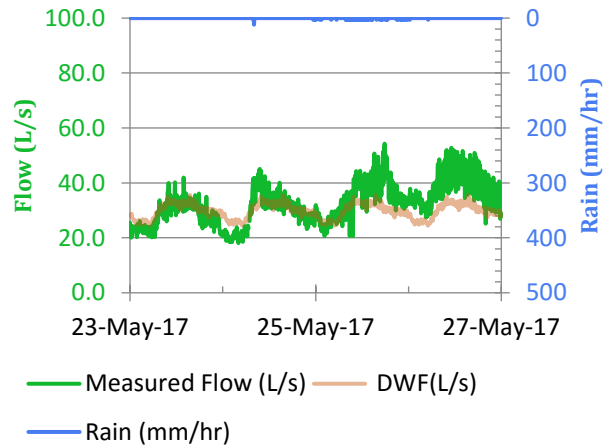
FM01 (8/11/2017 Event)



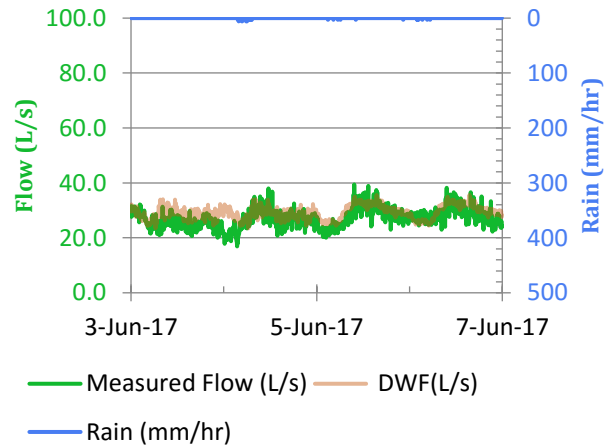
FM01 (9/29/2017 Event)



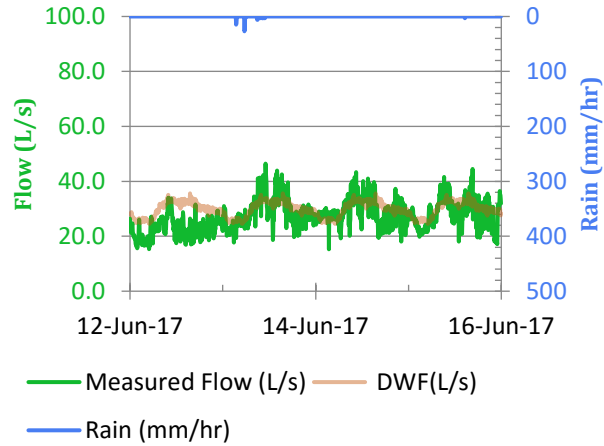
FM02 (5/24/2017 Event)



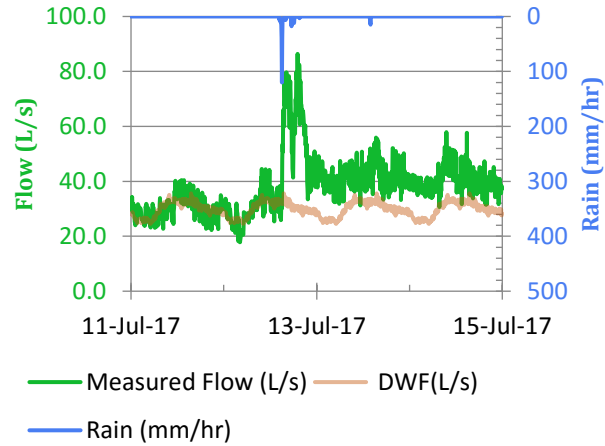
FM02 (6/4/2017 Event)



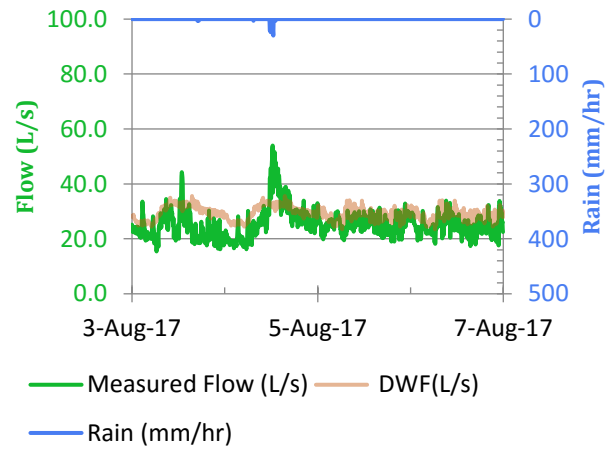
FM02 (6/13/2017 Event)



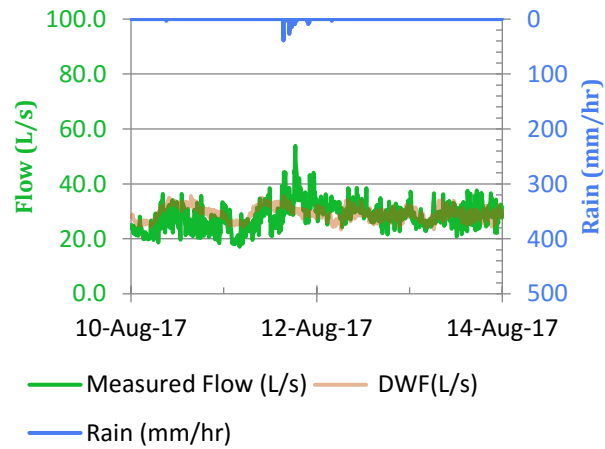
FM02 (7/12/2017 Event)



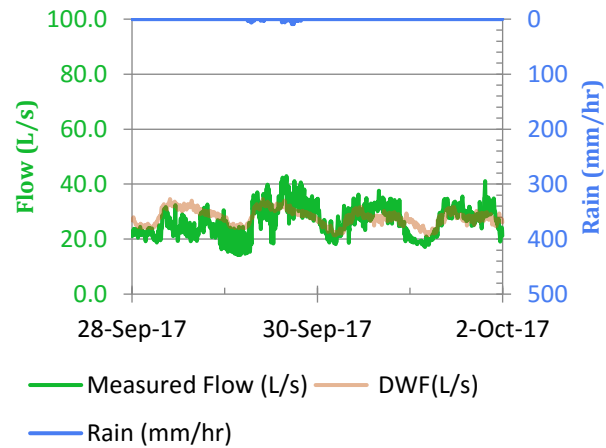
FM02 (8/4/2017 Event)



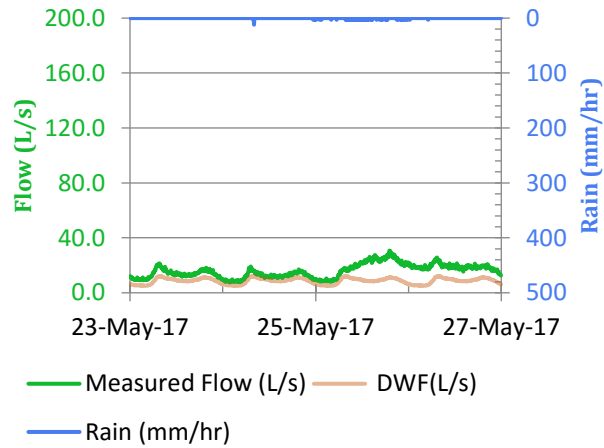
FM02 (8/11/2017 Event)



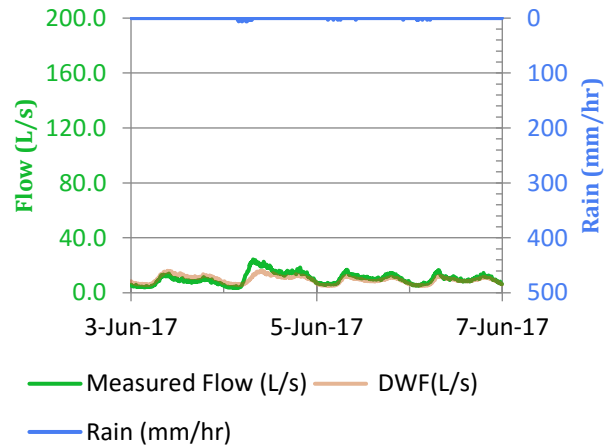
FM02 (9/29/2017 Event)



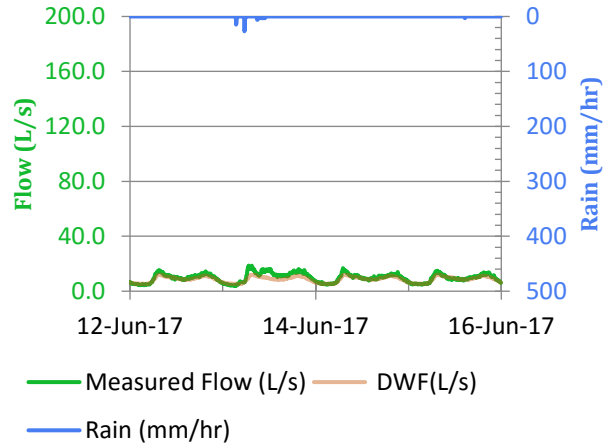
FM03 (5/24/2017 Event)



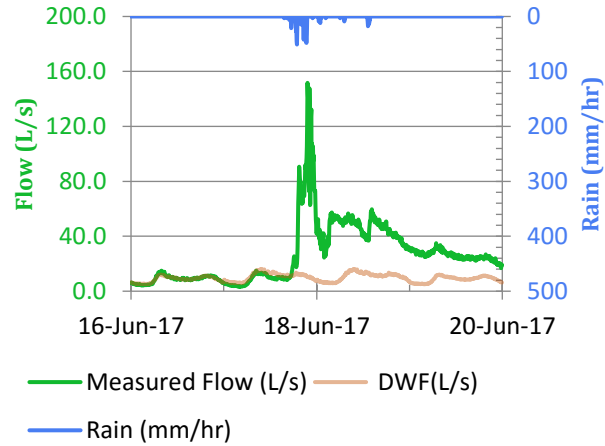
FM03 (6/4/2017 Event)



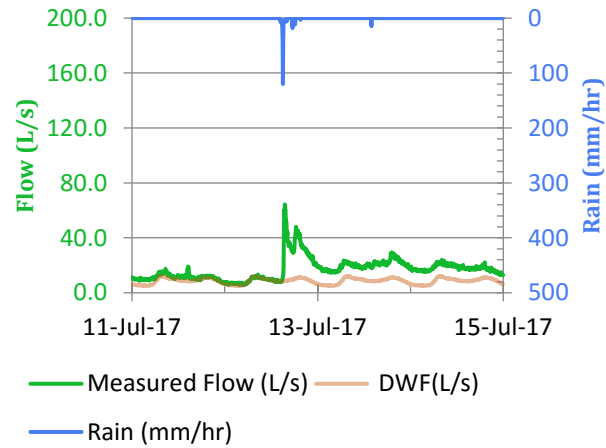
FM03 (6/13/2017 Event)



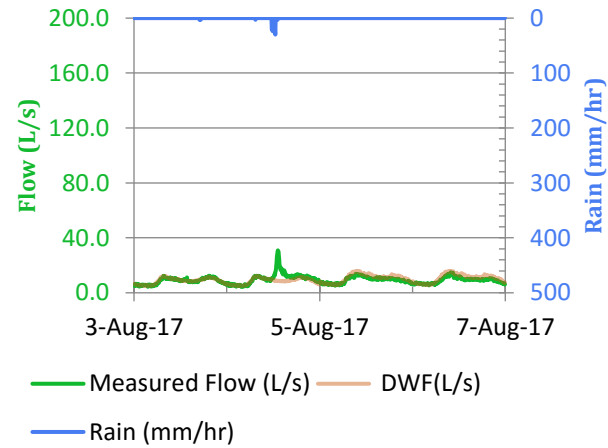
FM03 (6/17/2017 Event)



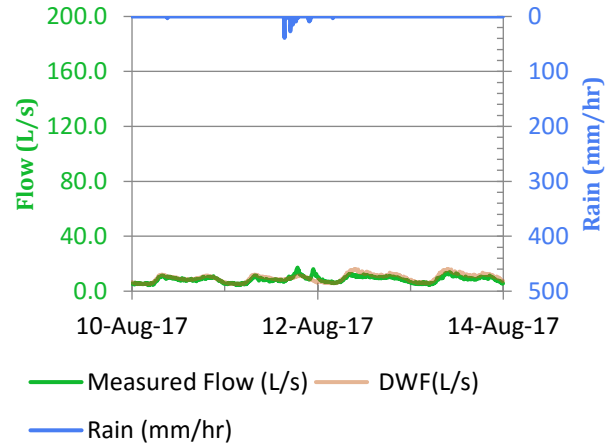
FM03 (7/12/2017 Event)



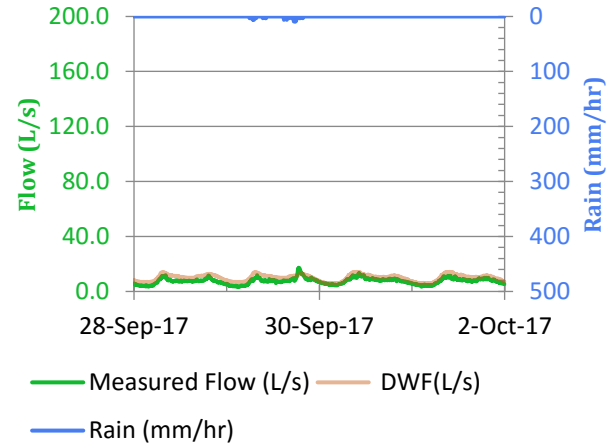
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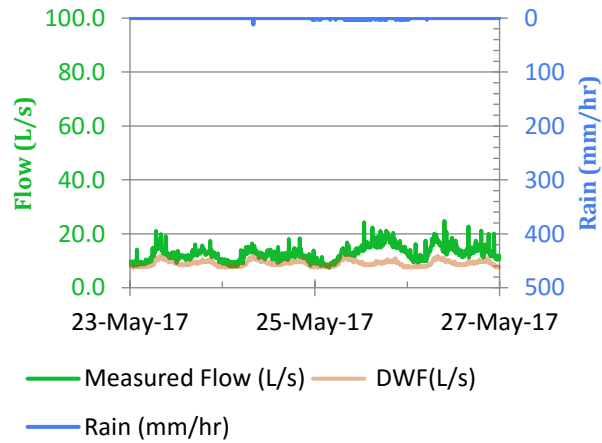
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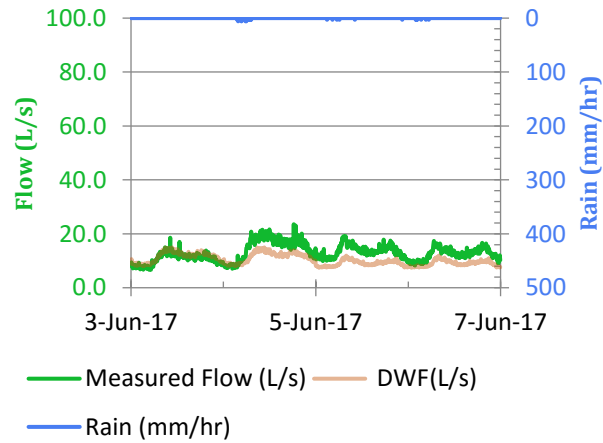
FM03 (9/29/2017 Event)



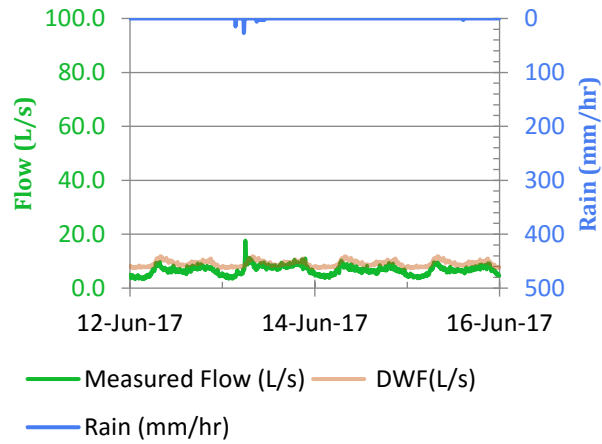
FM04 (5/24/2017 Event)



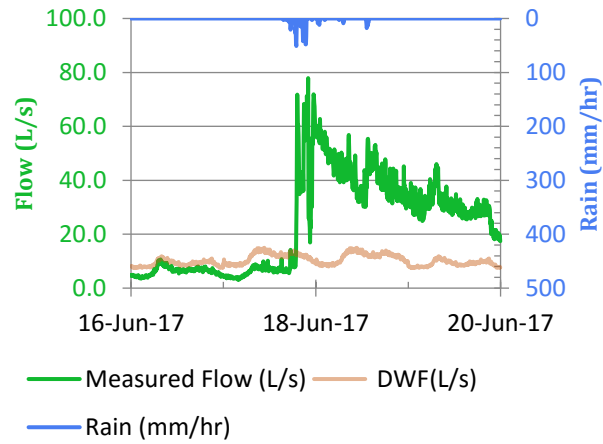
FM04 (6/4/2017 Event)



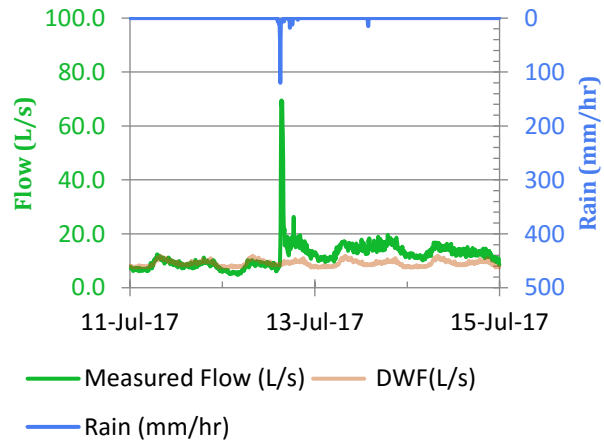
FM04 (6/13/2017 Event)



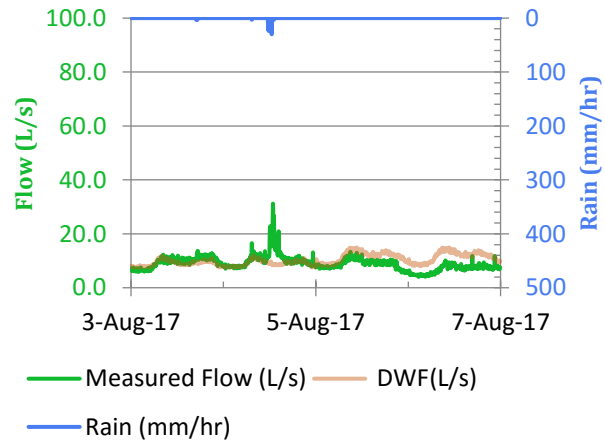
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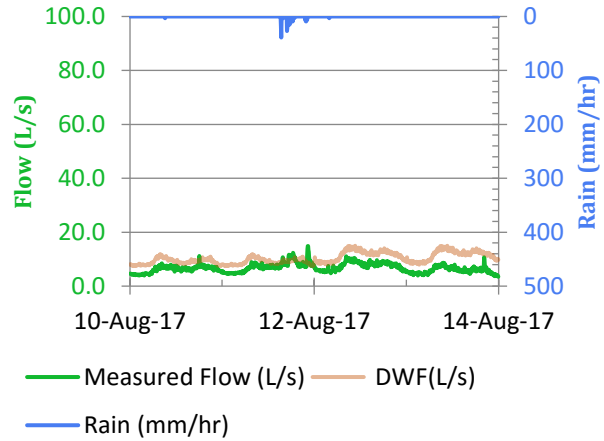
FM04 (7/12/2017 Event)



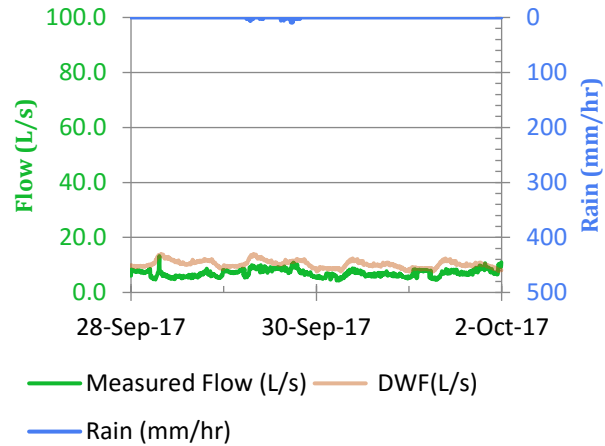
FM04 (8/4/2017 Event)



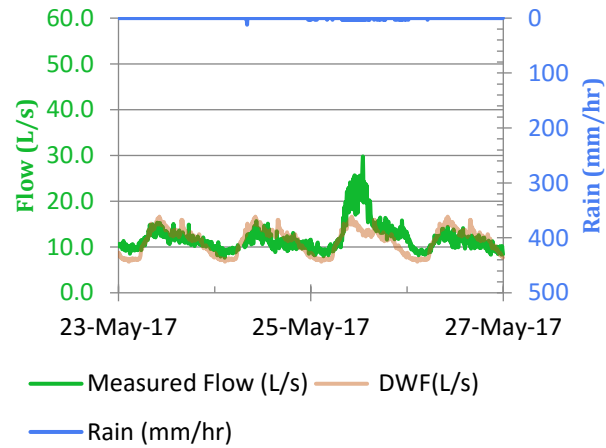
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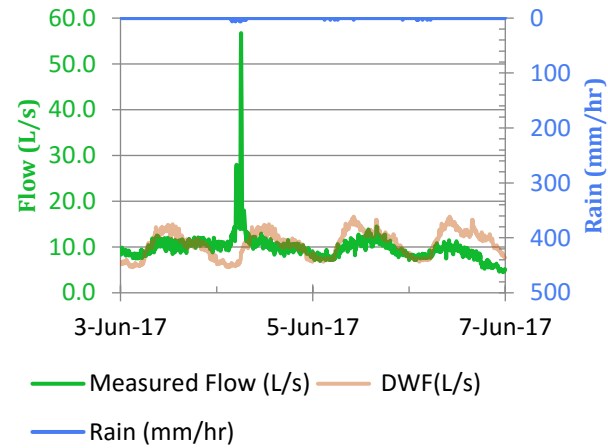
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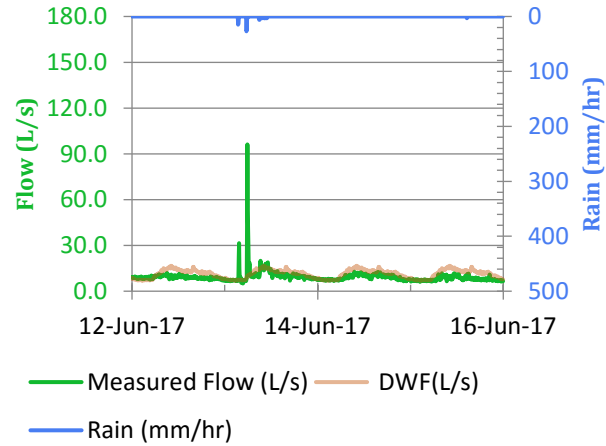
FM05 (5/24/2017 Event)



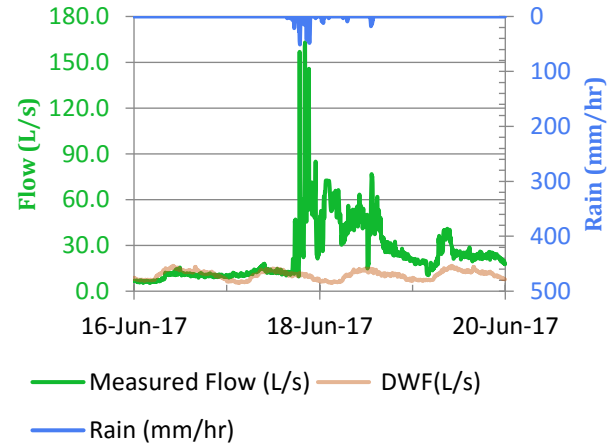
FM05 (6/4/2017 Event)



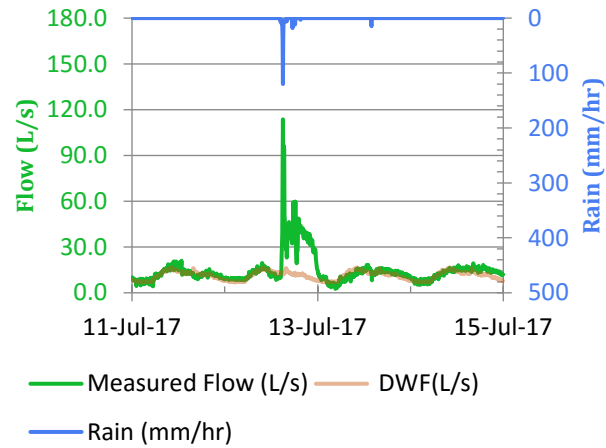
FM05 (6/13/2017 Event)



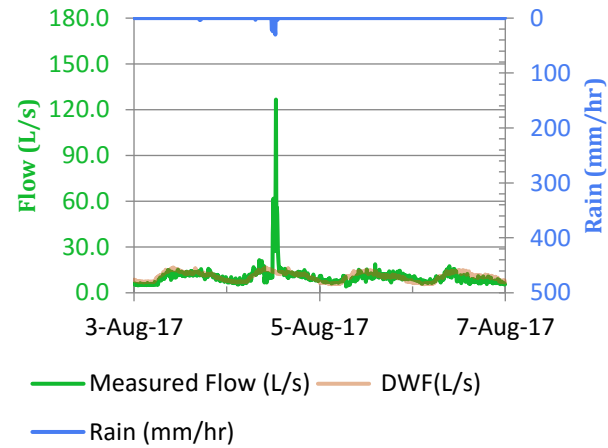
FM05 (6/17/2017 Event)



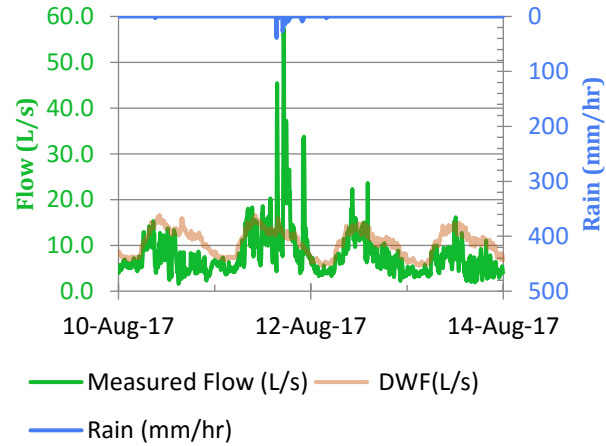
FM05 (7/12/2017 Event)



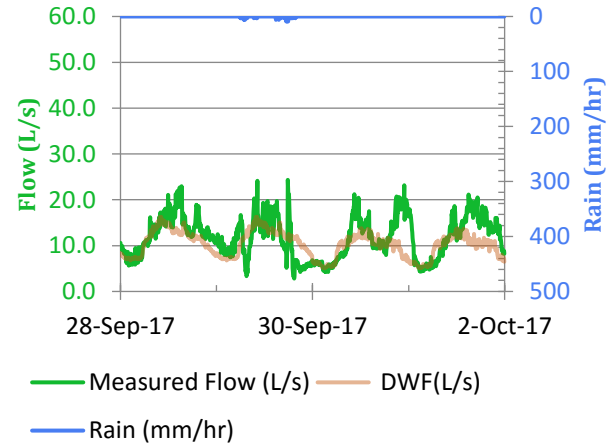
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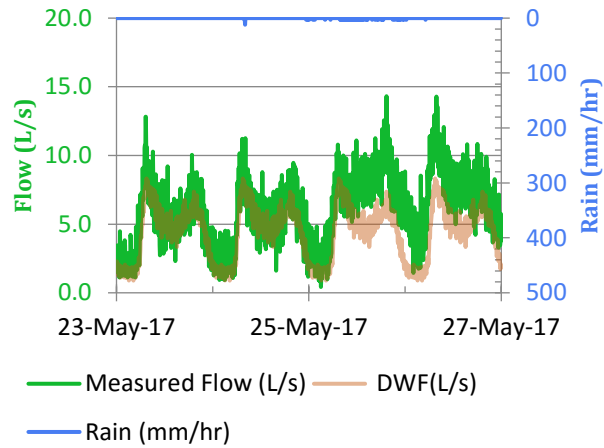
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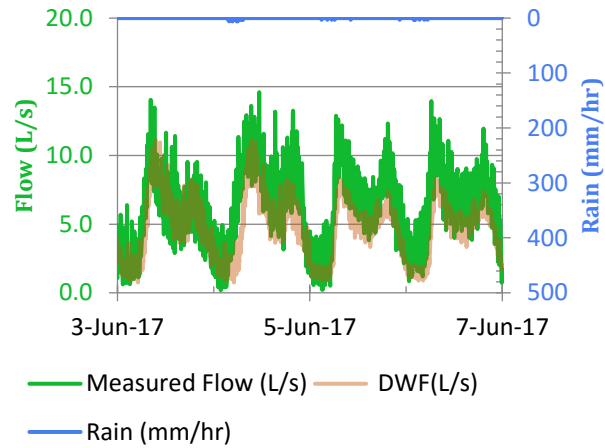
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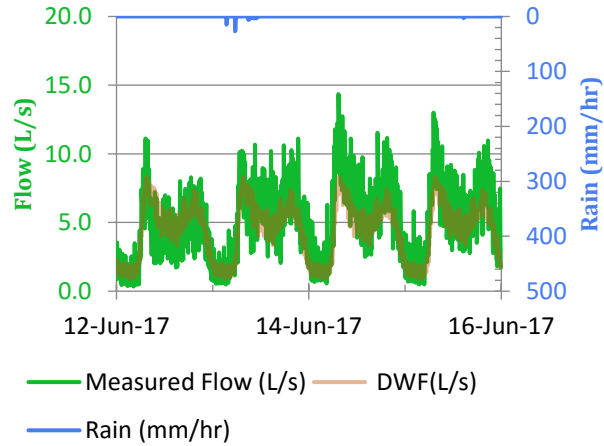
FM06 (5/24/2017 Event)



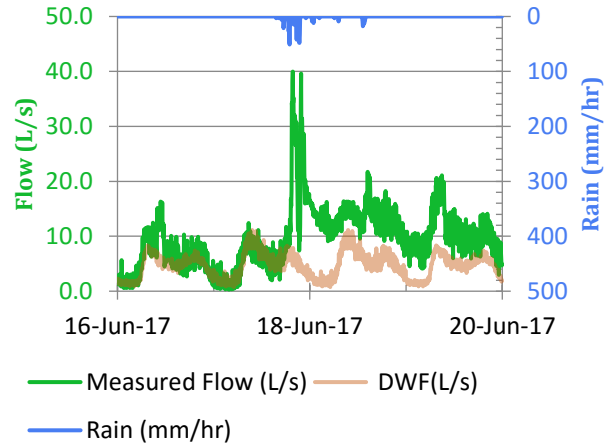
FM06 (6/4/2017 Event)



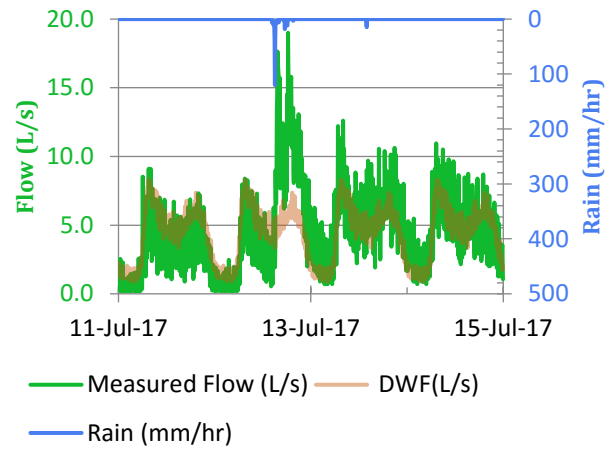
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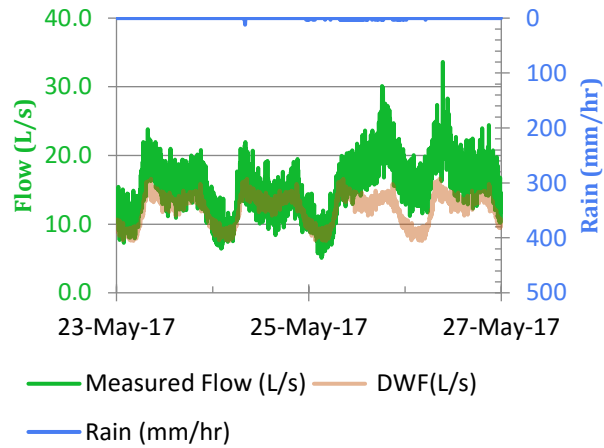
FM06 (6/17/2017 Event)



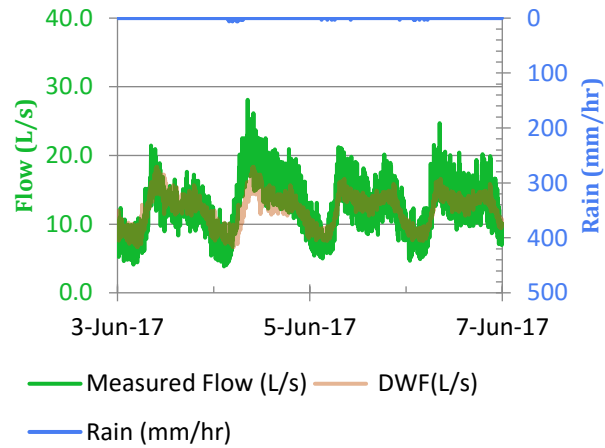
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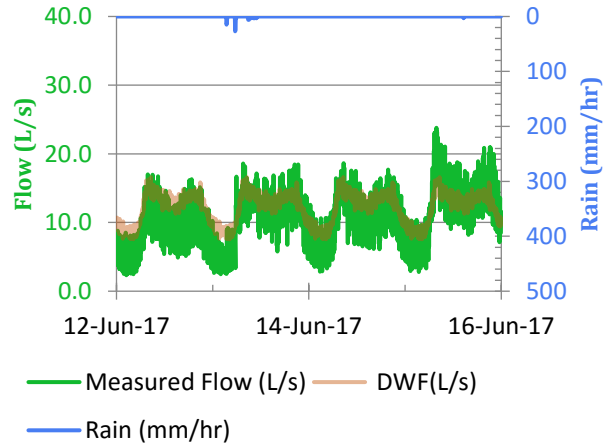
FM07 (5/24/2017 Event)



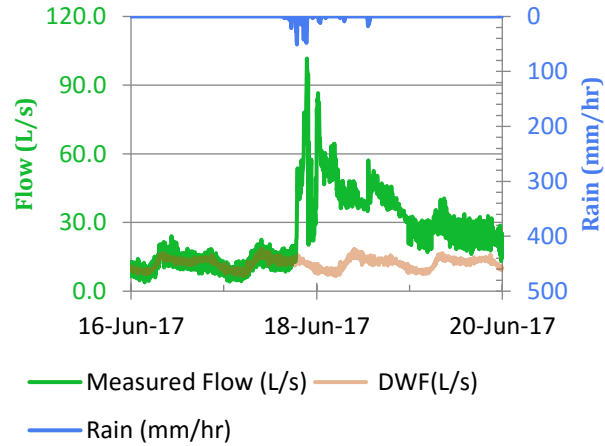
FM07 (6/4/2017 Event)



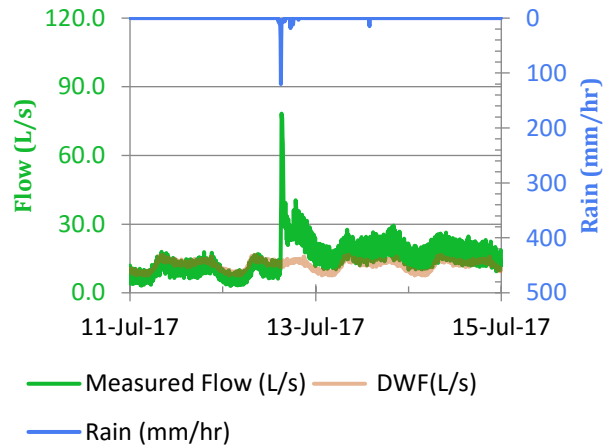
FM07 (6/13/2017 Event)



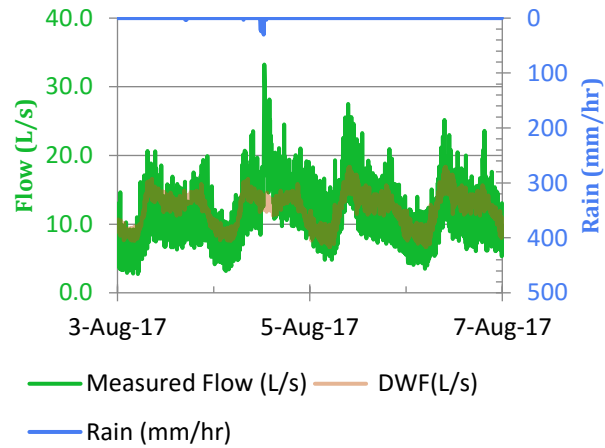
FM07 (6/17/2017 Event)



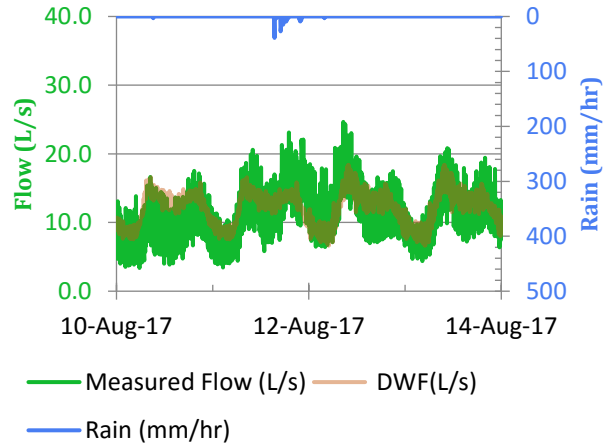
FM07 (7/12/2017 Event)



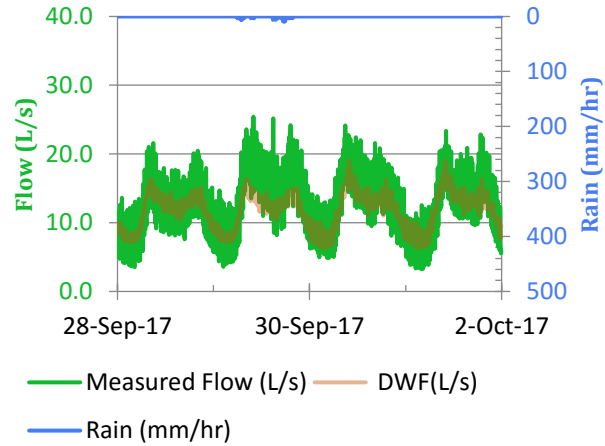
FM07 (8/4/2017 Event)



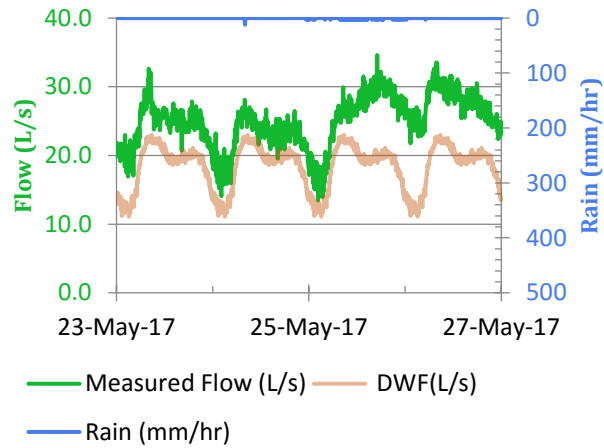
FM07 (8/11/2017 Event)



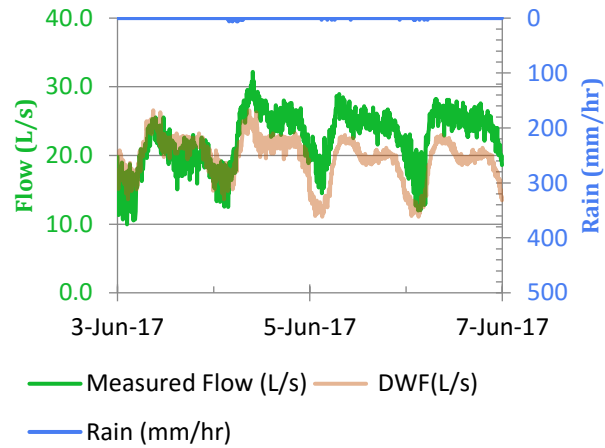
FM07 (9/29/2017 Event)



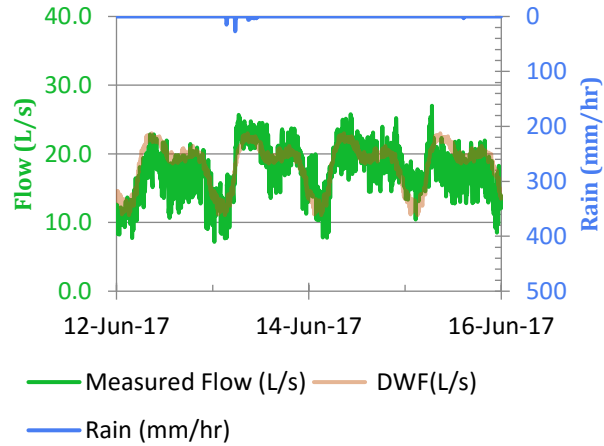
FM08 (5/24/2017 Event)



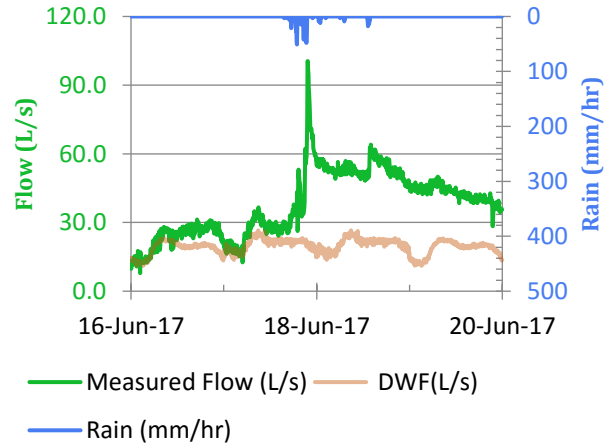
FM08 (6/4/2017 Event)



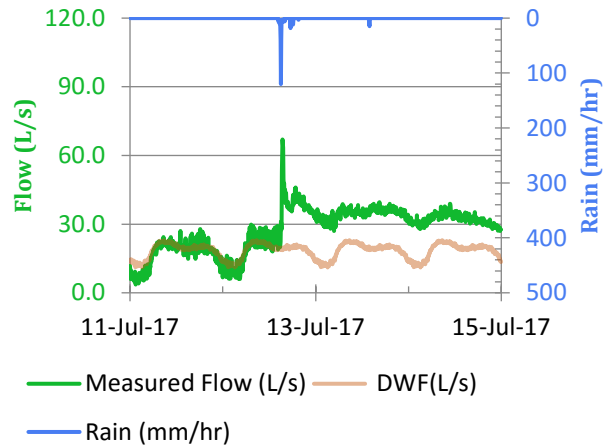
FM08 (6/13/2017 Event)



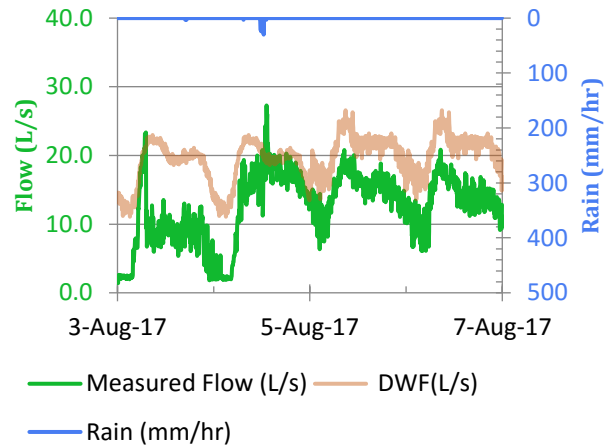
FM08 (6/17/2017 Event)



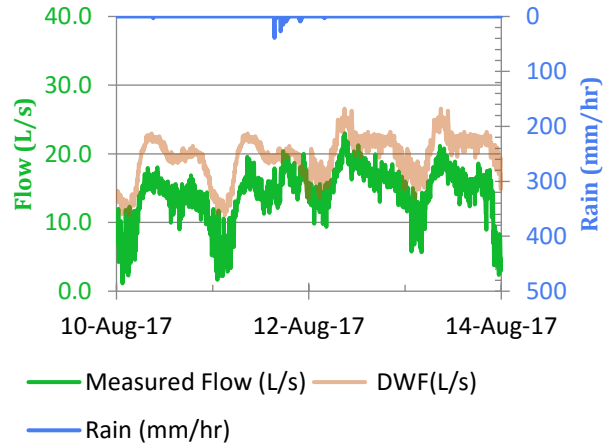
FM08 (7/12/2017 Event)



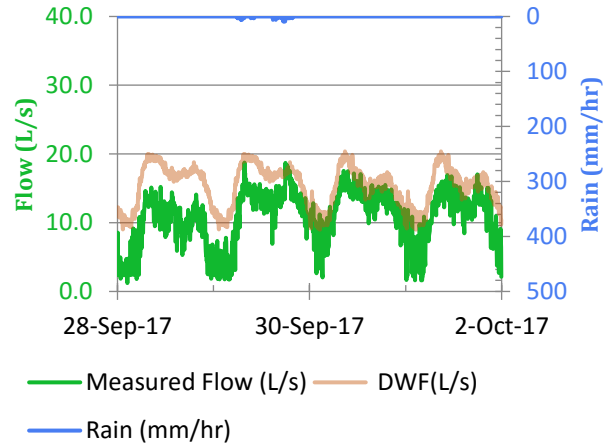
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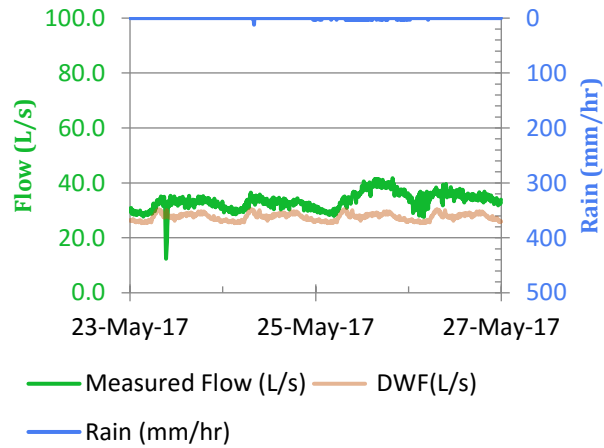
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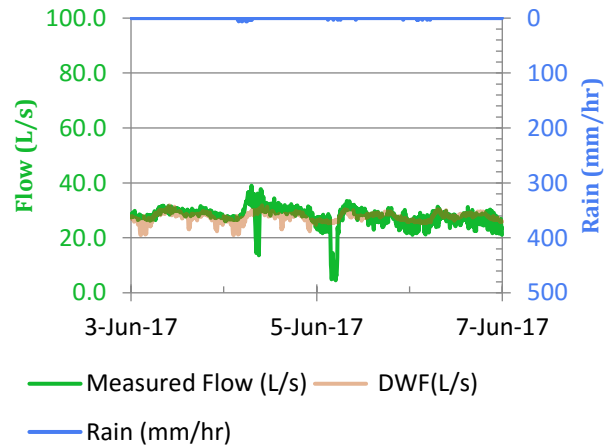
FM08 (9/29/2017 Event)



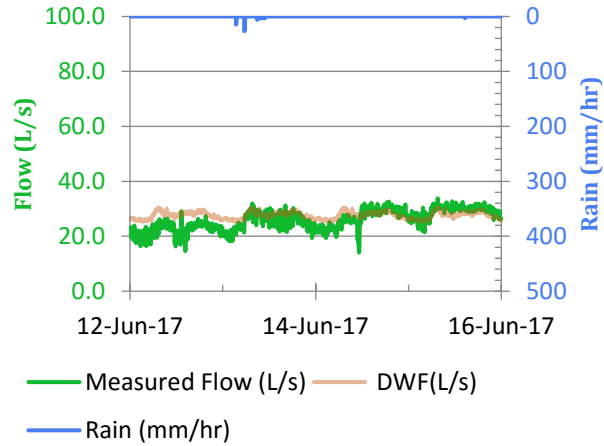
FM09 (5/24/2017 Event)



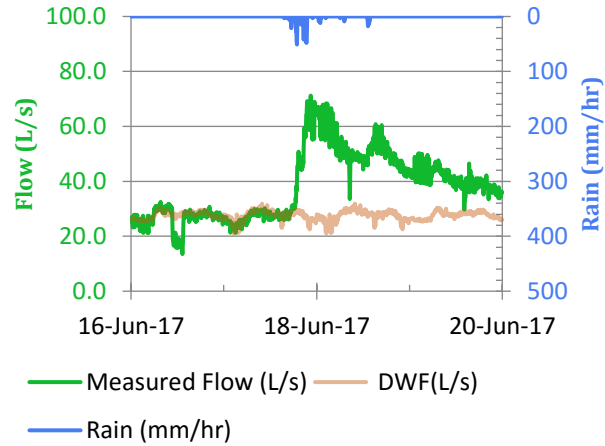
FM09 (6/4/2017 Event)



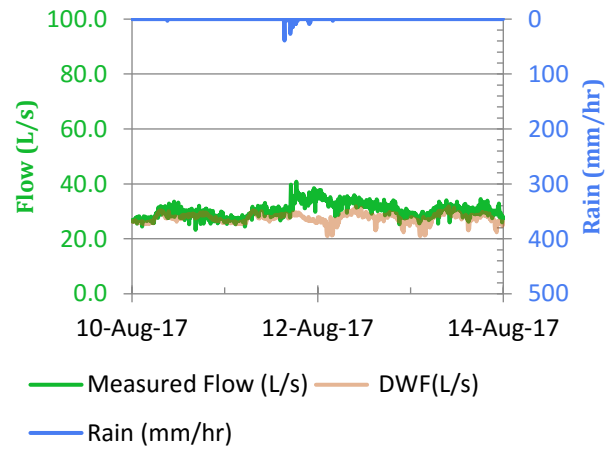
FM09 (6/13/2017 Event)



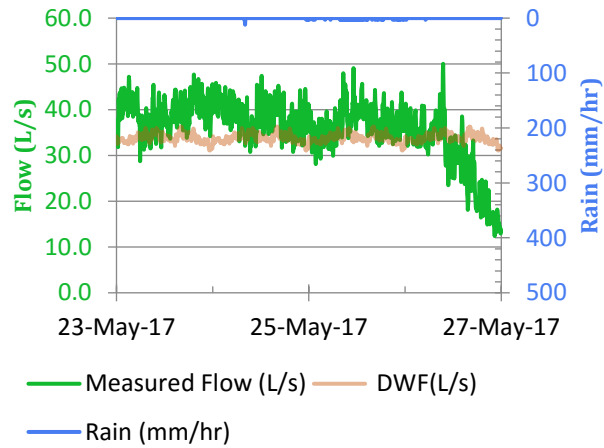
FM09 (6/17/2017 Event)



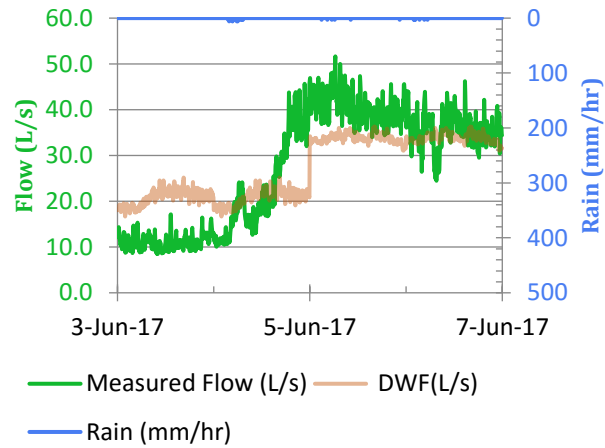
FM09 (8/11/2017 Event)



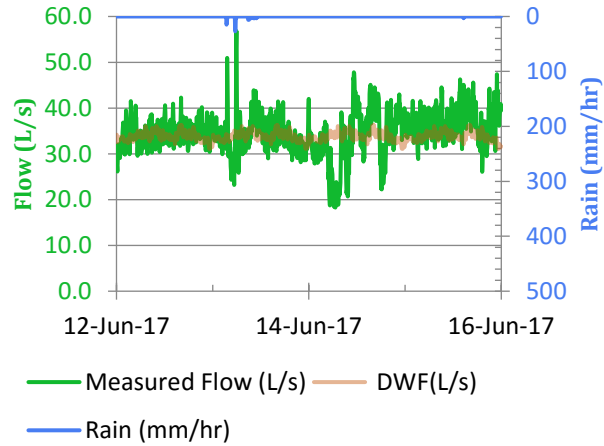
FM10 (5/24/2017 Event)



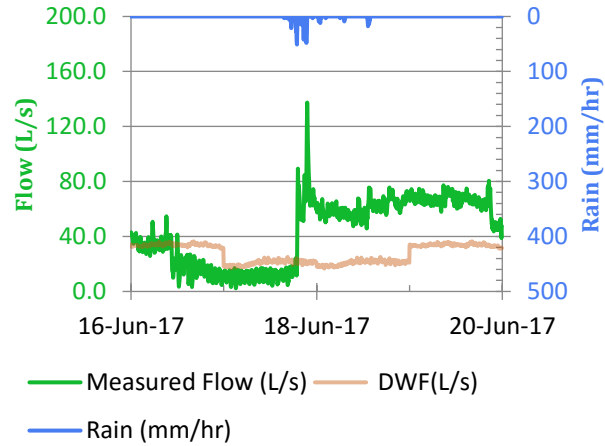
FM10 (6/4/2017 Event)



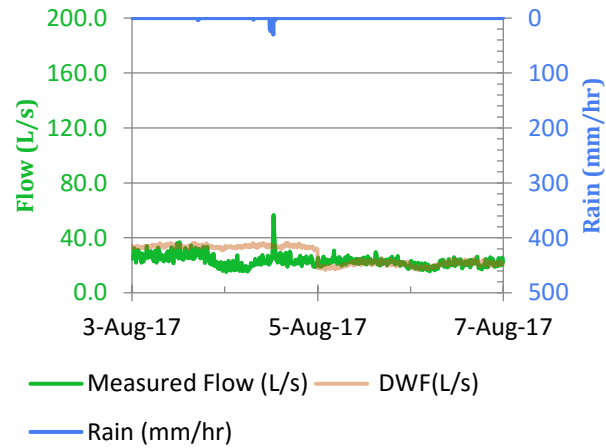
FM10 (6/13/2017 Event)



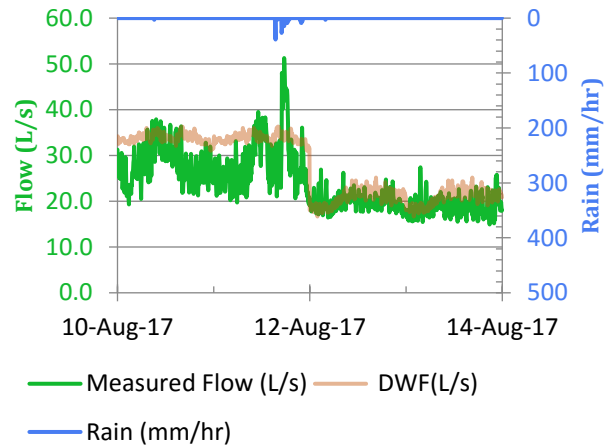
FM10 (6/17/2017 Event)



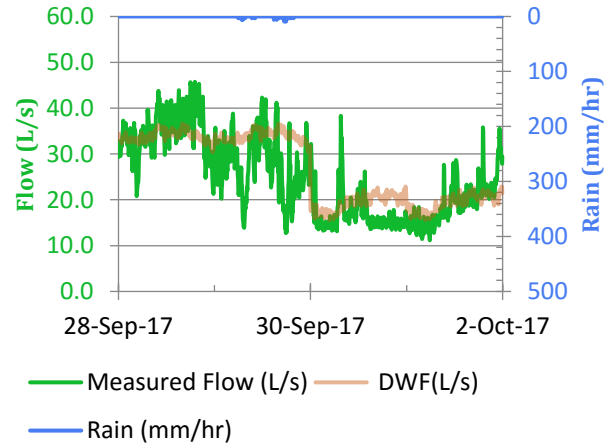
FM10 (8/4/2017 Event)



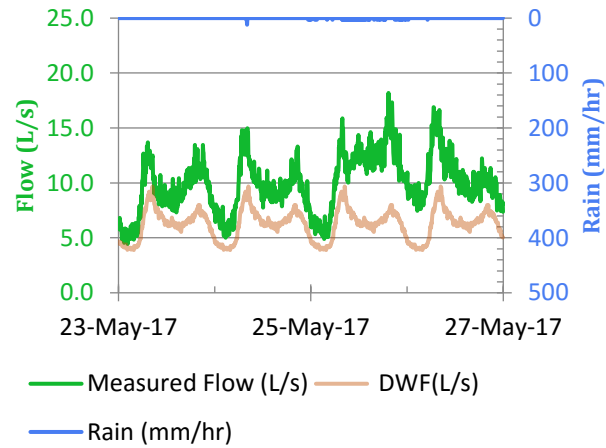
FM10 (8/11/2017 Event)



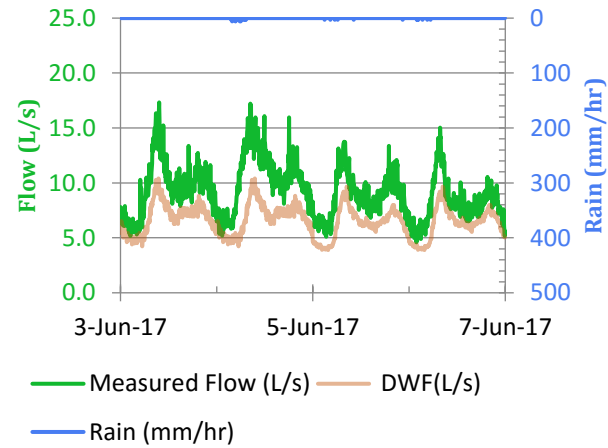
FM10 (9/29/2017 Event)



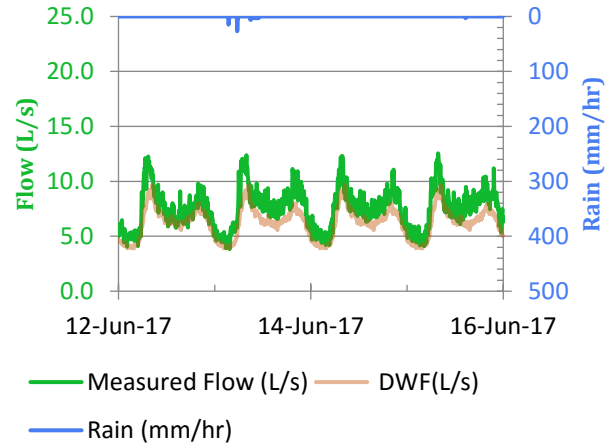
FM11 (5/24/2017 Event)



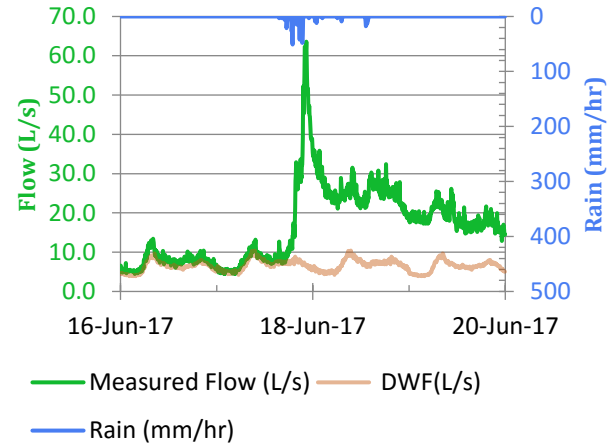
FM11 (6/4/2017 Event)



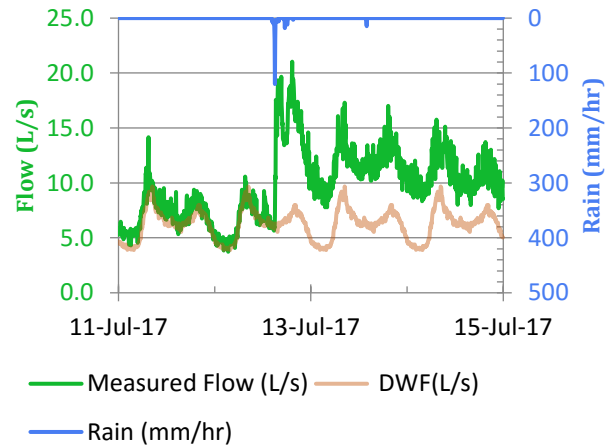
FM11 (6/13/2017 Event)



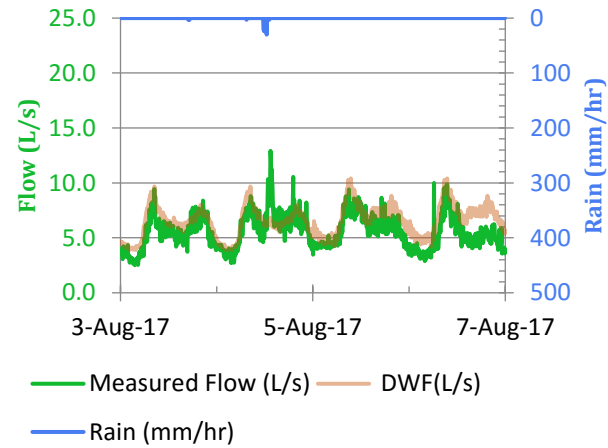
FM11 (6/17/2017 Event)



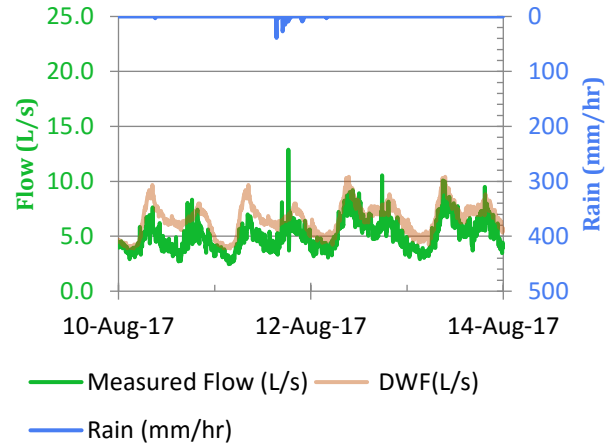
FM11 (7/12/2017 Event)



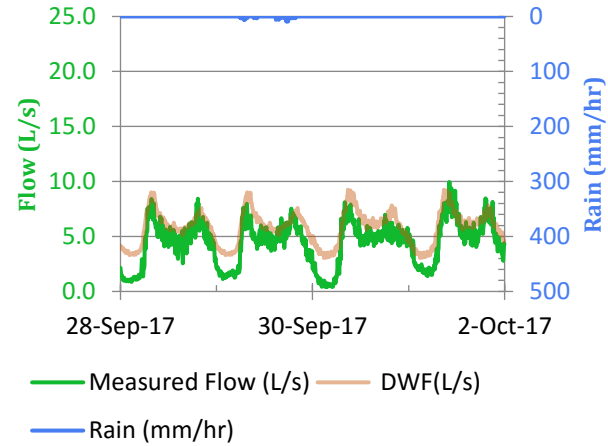
FM11 (8/4/2017 Event)



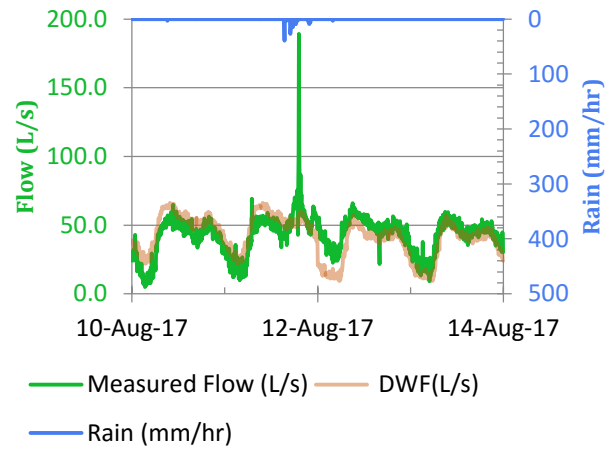
FM11 (8/11/2017 Event)



FM11 (9/29/2017 Event)



FM12 (8/11/2017 Event)



FM12 (9/29/2017 Event)

