

**Appendix A**

Record of Public  
Consultation



**Appendix A-1**

Public Notices



# **Municipal Class Environmental Assessment Angus Infrastructure Master Plan Notice of Study Commencement – 14 July, 2021**

The Township of Essa has initiated a Municipal Class Environmental Assessment (Class EA) to complete an Infrastructure Master Plan (IMP) for the Community of Angus. The purpose of the IMP is to complete a 25-year forecast of proposed capital projects for water, wastewater, transportation and stormwater servicing requirements to facilitate future growth expected in Angus. The IMP will also further assist the Township with the on-going development of their municipal infrastructure asset management plan (including modeling) for the Community of Angus, with the assistance of a decision support tool with respect to project prioritization.

The primary objective of this assignment is to ensure the municipality has a reliable baseline framework for assessment of future development projects and infrastructure needs, including both capital and maintenance projects.

This study is being conducted in accordance with the Municipal Class EA process, a Schedule 'B' activity as defined by the Municipal Engineers Association Class EA documentation. The Class EA process looks at potential environmental, cultural and economic effects, develops alternatives, determines preferred measures, and incorporates mitigation methods. This type of EA includes public and agency consultation.

Project updates and notices will be posted on the Township's website (<https://www.essatownship.on.ca/>) to inform the public of the Class EA's progress. Residents and interested parties are encouraged to regularly visit the website to find out more about the Project.

If you have any questions or concerns, and/or would like to be added to the project mailing list, please contact one of the study representatives listed below via email.

**Michael Mikael, P.Eng**  
**Manager of Public Works**  
Township of Essa  
Email: [mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)

**Josh Maitland, P. Eng.**  
**Consultant Project Manager**  
Greenland Consulting Engineers  
Email: [jmaitland@grnland.com](mailto:jmaitland@grnland.com)

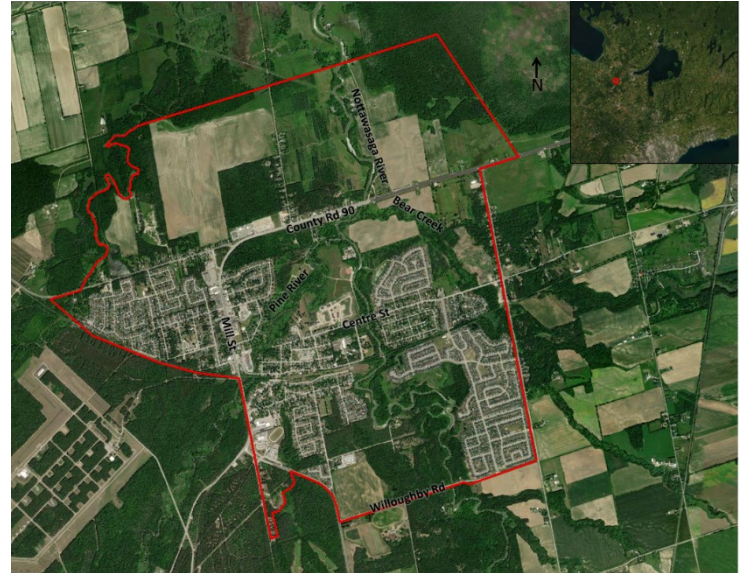
## **Township of Essa Class Environmental Assessment Schedule ‘B’ Angus Infrastructure Management Plan: NOTICE OF PUBLIC INFORMATION CENTRE**

The Township of Essa has initiated a Municipal Class Environmental Assessment (Class EA) to complete an Infrastructure Master Plan (IMP) for the Community of Angus. The purpose of the IMP is to complete a 25-year forecast of proposed capital projects for water, wastewater, transportation and stormwater servicing requirements to facilitate future growth expected in Angus.

### **Preliminary Class EA Report:**

A Preliminary Study Report is completed and has identified preliminary preferred alternatives for infrastructure improvements in Angus to service projected future population growth. The results of the preliminary report are to be presented to the public through a Public Information Centre (‘PIC’).

A PIC is being held to provide an opportunity for the Public to review and provide input on servicing options under consideration. The PIC will consist of a short presentation (repeated hourly for the duration of the PIC, i.e. at 2:30, 3:30 etc.) followed by a question-and-answer period. Representatives from the project team will be present to provide the presentation and answer questions regarding the preliminary study report.



*Figure 1. Study Area*

Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act (‘FIPPA’). With the exception of personal information, all comments will become part of the public record.

The preliminary Study Report will be updated based on input received at the PIC and a final version will be issued for a 30-day public review period in accordance with the EA Process.

### **PUBLIC INFORMATION CENTRE:**

**Angus Recreation Centre  
8529 County Rd 10  
Angus, ON L0M1B2**

**Thursday July 14<sup>th</sup>, 2022  
2:00 PM to 8:00 PM**

**If you are unable to attend or require further information, please contact or provide any comments in writing to:**

**Josh Maitland, P. Eng.  
Consultant Project Manager  
Greenland Consulting Engineers  
120 Hume Street  
Collingwood, Ontario L9Y 1V5  
Email: [jmaitland@grnland.com](mailto:jmaitland@grnland.com)**

**Michael Mikael, P.Eng.  
Manager of Public Works  
Township of Essa  
5786 Simcoe County Road 21  
Utopia, ON L0M1T0  
Email: [mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)**

**From:** [Josh Maitland](#)  
**To:** [Kirsten McFarlane](#)  
**Subject:** FW: Notice: Angus Infrastructure Master Plan  
**Date:** Wednesday, September 7, 2022 1:34:46 PM  
**Attachments:** [Angus IMP PIC Presentation 07-14-22 - FINAL.pdf](#)  
[Notice of Commencement.pdf](#)

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Agency outreach email below

Sincerely,

**Josh Maitland, P.Eng.**

Project Manager

(705) 790 6300 (Mobile)



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Finally, the recipient should check this email and any attachments for the presence of viruses. GREENLAND accepts no liability for any damage caused by any virus transmitted by this email.

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**From:** Kirsten McFarlane <[kmcfarlane@grnland.com](mailto:kmcfarlane@grnland.com)>

**Sent:** August 24, 2022 2:27 PM

**Cc:** Josh Maitland <[jmaitland@grnland.com](mailto:jmaitland@grnland.com)>; Michael Mikael <[mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)>

**Subject:** Notice: Angus Infrastructure Master Plan

Good Afternoon,

Please be advised that the Township of Essa (Township) is completing an Infrastructure Master Plan for the Community of Angus (Angus), in accordance with the Municipal Class Environmental Assessment (EA) process. The Notice of Commencement is attached.

A summary of the EA process and preliminary preferred servicing alternatives, including assessment process completed to date has been provided in the Angus PIC presentation slides, also attached.

A draft Summary Report for the project will be complete the week of 29 August 2022. If you would like a copy of the report to review in advance of the official 30-day review period, please advise via response to this email correspondence prior to 09 September 2022. If no response is received, we will provide you with the pertinent details at the outset of the official EA review period.

We look forward to any feedback you may have on this important project.

Sincerely,

**Kirsten McFarlane**

Environmental Analyst

Tel: (705) 444-8805 ext. 267



**GREENLAND® Consulting Engineers**  
A member of the Greenland Group of Companies

120 Hume Street, Collingwood, Ontario, Canada L9Y 1V5  
tel: 705 444 8805 • fax: 705 444 5482  
web: [www.grnland.com](http://www.grnland.com)

water resources • municipal infrastructure • environmental management  
monitoring • information systems • research & development

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**From:** [Josh Maitland](#)  
**To:** [Kirsten McFarlane](#)  
**Subject:** FW: Notice: Angus Infrastructure Master Plan  
**Date:** Wednesday, September 7, 2022 1:34:30 PM  
**Attachments:** [Initial Project Information - Angus IMP.pdf](#)  
[Notice of Commencement.pdf](#)  
[Angus IMP PIC Presentation 07-14-22 - FINAL.pdf](#)  
[Study Area.pdf](#)

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Indigenous outreach email below

Sincerely,

**Josh Maitland, P.Eng.**

Project Manager

(705) 790 6300 (Mobile)



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**From:** Kirsten McFarlane <[kmcfarlane@grnland.com](mailto:kmcfarlane@grnland.com)>

**Sent:** August 24, 2022 3:00 PM

**To:** [associate.ri@saugeenajibwaynation.ca](mailto:associate.ri@saugeenajibwaynation.ca)

**Cc:** [manager.ri@saugeenajibwaynation.ca](mailto:manager.ri@saugeenajibwaynation.ca); [execassist.ri@saugeenajibwaynation.ca](mailto:execassist.ri@saugeenajibwaynation.ca); Josh Maitland <[jmaitland@grnland.com](mailto:jmaitland@grnland.com)>; Michael Mikael <[mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)>

**Subject:** Notice: Angus Infrastructure Master Plan

Good Afternoon,

Please be advised that the Township of Essa (Township) is completing an Infrastructure Master Plan for the Community of Angus (Angus), in accordance with the Municipal Class Environmental Assessment (EA) process. The Notice of Commencement is attached. Per the SON Consultation Checklist, the Initial Project Information document has been included with this email.

A summary of the EA process and preliminary preferred servicing alternatives, including assessment process completed to date has been provided in the Angus PIC presentation slides, also attached.

A draft Summary Report for the project will be complete the week of 29 August 2022. If you would

like a copy of the report to review in advance of the official 30-day review period, please advise via response to this email correspondence prior to 09 September 2022. If no response is received, we will provide you with the pertinent details at the outset of the official EA review period.

We look forward to any feedback you may have on this important project.

Sincerely,

**Kirsten McFarlane**

Environmental Analyst

Tel: (705) 444-8805 ext. 267



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Organization	First Name	Last Name	Personal Title	Title
<b>Local Government &amp; Other Agencies</b>				
Nottawasaga Valley Conservation Authority	Chris	Hibberd	Mr.	Director, Watershed Management Services
Nottawasaga Valley Conservation Authority	Lee	Bull	Ms.	Manager, Planning Services
Nottawasaga Valley Conservation Authority	Doug	Hevenor	Mr.	Chief Administration Officer
Township of Essa	Colleen	Healey-Dowdall	Ms.	Chief Administration Officer
Township of Essa	Bob	Morrison	Mr.	Manager of Public Works
Township of Essa	Sandie	Macdonald	Ms.	Mayor
Township of Essa	Michael	Smith	Mr.	Deputy Mayor
Township of Essa	Keith	White	Mr.	Councillor - Ward 1
Township of Essa	Henry	Sander	Mr.	Councillor - Ward 2
Township of Essa	Ron	Henderson	Mr.	Councillor - Ward 3
Ainley Group	Claude	Marchand	Mr.	Senior Engineering Technologist
Ainley Group	Preya	Balgobin	Ms.	Senior Project Manager
Ontario Clean Water Agency	Mark	Yandt	Mr.	Senior Operations Manager
Ontario Clean Water Agency	Steven	Priestly	Mr.	Cluster Manager
County of Simcoe	Mark	Aitken	Mr.	Chief Administration Officer
County of Simcoe	David	Parks	Mr.	Director of Planning, Economic Development, and Transit
County of Simcoe	Dan	Amadio	Mr.	Manager of Planning (South/East)
County of Simcoe	Greg	Marek	Mr.	Manager of Planning (North/West)
Ontario Provincial Police	To Whom It May Concern			
Simcoe Muskoka Catholic District School Board	Jennifer	Sharpe	Ms.	Manager of Planning and Properties
Simcoe County District School Board	Andrew	Keuken	Mr.	Manager of Planning, Enrolment and Community Use
Angus & Area Chamber of Commerce	Cheryl	Ferguson	Ms.	President
Simcoe Muskoka District Health Unit	Charles	Gardner	Dr.	Medical Officer of Health
<b>Provincial &amp; Federal Agencies</b>				
Ontario Ministry of Environment, Conservation, and Parks	Jennifer	Barnett	Ms.	Senior Environmental Officer
Ontario Ministry of Environment, Conservation, and Parks	Chunmei	Liu	Mr.	Environmental Resource Planner & EA Coordinator
Ontario Ministry of Environment, Conservation, and Parks	Annamaria	Cross	Ms.	Director, Environmental Assessment
Ontario Ministry of Environment, Conservation, and Parks	Paul	Martin	Mr.	Supervisor, Air, Pesticides and Environmental Planning
Ontario Ministry of Environment, Conservation, and Parks	Tom	McKinlay	Mr.	Director, Legal Services Branch
Ontario Ministry of Transportation	Mary	Gersht	Ms.	Director, Legal Services Branch
Ontario Ministry of Natural Resources and Forestry	Diane	Zimnica	Ms.	Director, Legal Services Branch
Ontario Ministry of Indigenous Affairs	Candice	Telfer	Ms.	Director, Legal Services Branch
Ontario Ministry of Infrastructure	Fateh	Salim	Mr.	Director, Legal Services Branch
Ontario Ministry of Agriculture, Food and Rural Affairs	Michele	Ireland	Ms.	Director, Legal Services Branch
Ontario Ministry of Municipal Affairs and Housing	Jeff	Schelling	Mr.	Legal Director, Legal Services Branch
Canadian Pacific Railway	Josie	Tomei	Ms.	
Service Ontario	To Whom It May Concern			Ministry of Health Secretary
<b>Indigenous Communities</b>				
Aamjiwnaang (Chippewas of Sarnia First Nation)	Christopher	Todd Plain		Chief
Alderville First Nation	David	Mowat		Chief
Aundeck-Omni-Kaning (Ojibways of Sucker Creek)	Patsy	Corbiere		Chief
Algonquins of Ontario Consultation Office	Janet	Stavinga	Ms.	Executive Director
Beausoleil First Nation (Christian Island)	Guy	Monague		Chief
Chippewas of Georgina Island	Donna	Big Canoe		Chief
Chippewas of Kettle and Stony Point	Jason Michael	Henry		Chief
Chippewas of Nawash First Nation	Veronica	Smith		Chief
Chippewas of Mnjikaning (Rama)	Rodney	Noganosh		Chief
Chippewas of the Thames First Nation	Jacqueline	French		Chief
Curve Lake First Nation	Emily	Whetung		Chief
Georgian Bay Metis Council	David	Dusome		President (Building Committee)
Hiawatha First Nation	Lauire	Carr		Chief
M'Chigeeng First Nation	Linda	Debassige		Chief
Metis Nation of Ontario	To Whom It May Concern			Consultation
Mississauga's of Scugog Island First Nation	Kelly	Larocca		Chief
Mississaugas of the Credit	Ralph	Laforme		Chief
Mohawks of Akwesasne	Abram	Benedict		Grand Chief
Mohawks of the Bay of Quinte	Rodrick	Maracle		Chief
Saugeen Ojibway Nation	Kathleen	Ryan		Acting Manager
Saugeen First Nation	Lester	Anoquot		Chief
Sheguiandah	Andrew	Aguonie		Chief
Six Nations of the Grand River	Mark	Hill		Chief
Walpole Island	Daniel	Miskokomon		Chief
Wikwemikong	Norman	Peltier		Chief
Zhiibaahaasing First Nation	Irene	Kells		Chief
Huron-Wendat Nation				
<b>Utilities</b>				
Angus Horticultural Society	Wendy	Harry	Ms.	President, Angus Horticultural Society
<b>Home Owners / Other</b>				

<b>Draft Report Requests</b>		
<b>Name</b>	<b>Organization</b>	<b>Date of Request</b>
Sam Haniff	Township of Essa	8/24/2022
Wes Crown	MHBC	8/24/2022
Marie Leroux	Ainley Group	8/25/2022
Darren Vella	IPS Consulting	8/25/2022
Vanessa Simpson	IPS Consulting	8/25/2022
Brian Goodreid	Goodreid Planning Group	8/25/2022
Brandi Clement	Jones Consulting	8/25/2022
Zoran Nedelkovski	County of Simcoe	8/25/2022
Blair Scorgie	SVN Architects + Planners	8/25/2022
Brent Yanch	Yanch Homes	8/25/2022
Ian Kemp	OCWA	8/29/2022



**Township of Essa**  
**Municipal Class Environmental Assessment**  
**Angus Infrastructure Master Plan**  
**Notice of Study Completion – 12 September 2022**



The Township of Essa has completed a Municipal Class Environmental Assessment (Class EA) to develop an Infrastructure Master Plan (IMP) for the Community of Angus. The purpose of the IMP is to complete a 25-year forecast of proposed capital projects for water, wastewater and transportation servicing requirements to facilitate future growth expected in Angus. Existing conditions stormwater management modeling was also developed as part of the project. The IMP will also further assist the Township with the on-going development of their municipal infrastructure asset management plan (including modeling) for the Community of Angus.

The Class EA Summary Report (Report) was completed in accordance with the Municipal Class EA process, a Schedule 'B' activity as defined by the Municipal Engineers Association (MEA) Class EA documentation. The Report documents potential environmental, social, cultural, technical and economic impacts, alternative solutions, solution evaluations, preferred project solutions, and recommended mitigation measures and implementation strategies associated with the preferred infrastructure solution projects in each category. The Schedule 'B' Class EA process includes public and agency consultation components which are also documented in the Report.

The Class EA Report is posted on the Township's website (<https://www.essatownship.on.ca/>) for public review and comment for a duration of thirty (30) days in accordance with the requirements of the Schedule 'B' Class EA process, ending 12 October 2022.

To provide comments on the project, or if you require alternative accommodations to view the EA report, please contact either of the project representatives listed below via email before 5:00 pm local time 12 October 2022.

**Michael Mikael, P.Eng**  
**Manager of Public Works**  
Township of Essa  
Email: [mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)

**Josh Maitland, P. Eng.**  
**Consultant Project Manager**  
Greenland Consulting Engineers  
Email: [jmaitland@grnland.com](mailto:jmaitland@grnland.com)

If there are concerns regarding potential impacts to constitutionally protected Aboriginal and Treaty rights, a request for a Part II order in writing should be addressed to the Minister of Environment Conservation and Parks as well as the Director of the Environmental Assessments Branch. Requests on any other grounds will not be considered in accordance with current Provincial regulations. Above noted requests are to be sent no later than 5:00 pm local time 12 October 2022.

All information collected will be done in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With exception of personal information, all comments will become part of the public record.

This notice was issued at the Township of Essa on 12 September 2022.

## **Appendix A-2**

Presentation Slides



# Angus Infrastructure Master Plan

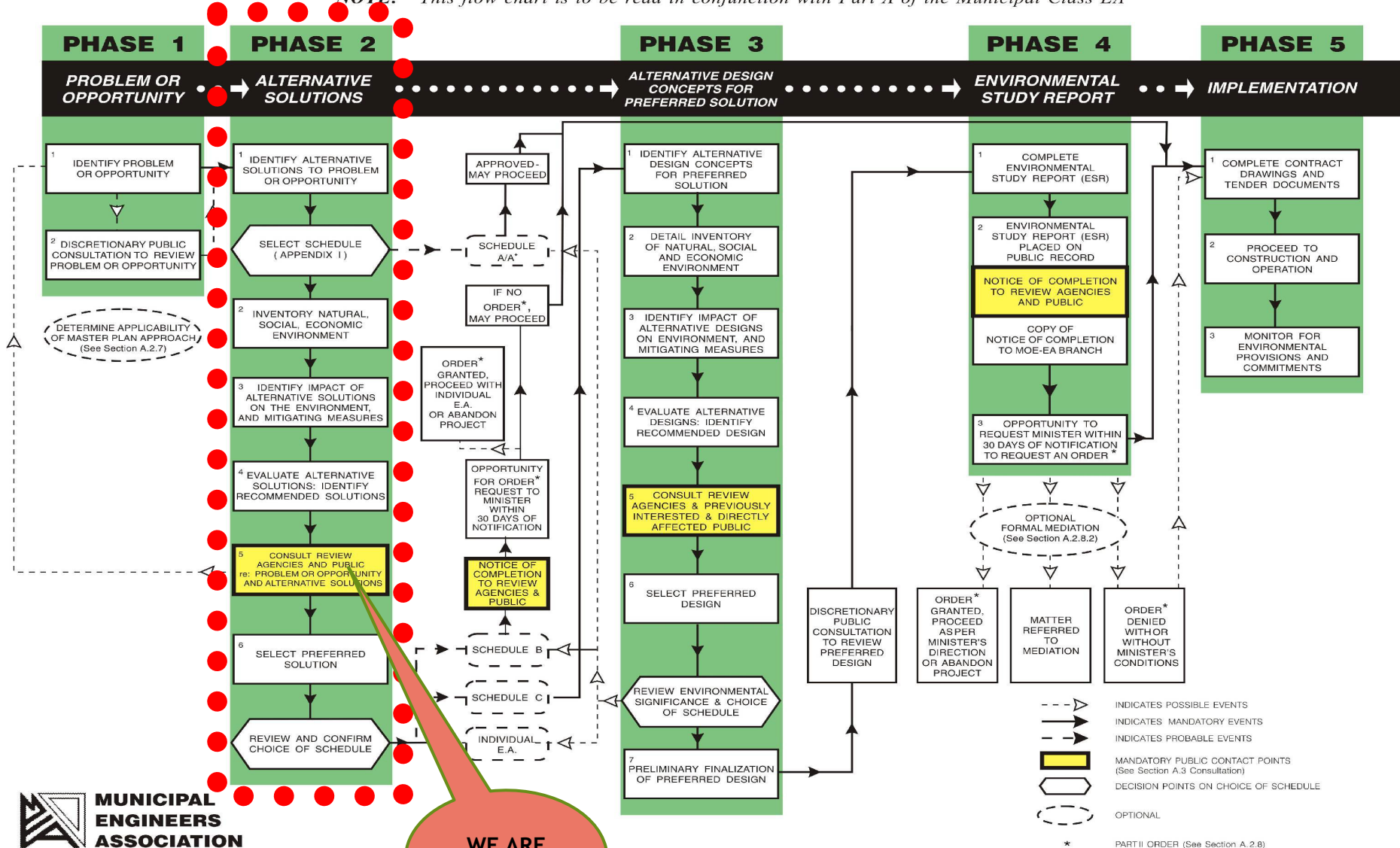
Public Information Centre

July 14, 2022



# EA Process

**NOTE:** This flow chart is to be read in conjunction with Part A of the Municipal Class EA



# EA Process

This Schedule “B” Environmental Assessment is being prepared in accordance with the requirements of the Municipal Class Environmental Assessment (Class EA) process. Alternative Solutions will be evaluated, selected, and recommended for implementation.

## Schedule “A/A+” Projects

- ❖ Considered minor operation and maintenance activities and are selected for pre-approval without requirements for further assessment.
- ❖ These projects are typically limited in scale and present minimal impacts to the surrounding environment.
- ❖ Schedule A+ projects require that the public be advised prior to project implementation.

## Schedule “B” Projects

- ❖ Generally include improvements and minor expansions to existing facilities where there is potential for some environmental impacts.
- ❖ These projects require screening of alternatives for their environmental impacts and completion of Phases 1 and 2 of the Class EA planning process.
- ❖ Provided no significant impacts are identified, Schedule “B” projects are approved and may proceed directly to Phase 5.

## Schedule “C” Projects

- ❖ These projects have the potential for significant environmental effects and therefore must proceed under full planning and documentation procedures.
- ❖ Requires that an Environmental Study Report be prepared and filed for review by the public and review agencies.
- ❖ Generally consist of construction of new facilities and major expansions to existing facilities (e.g. new Wastewater Treatment Plant with surface water discharge).

# Study Purpose

- ▶ Complete a 25 year forecast (ultimate development horizon) of proposed capital projects for water, wastewater, roads and stormwater management in Angus
- ▶ Servicing solutions to facilitate future growth expected in Angus
- ▶ Assist Township in development of the municipal infrastructure Asset Management Plan

## Problem / Opportunity Statement

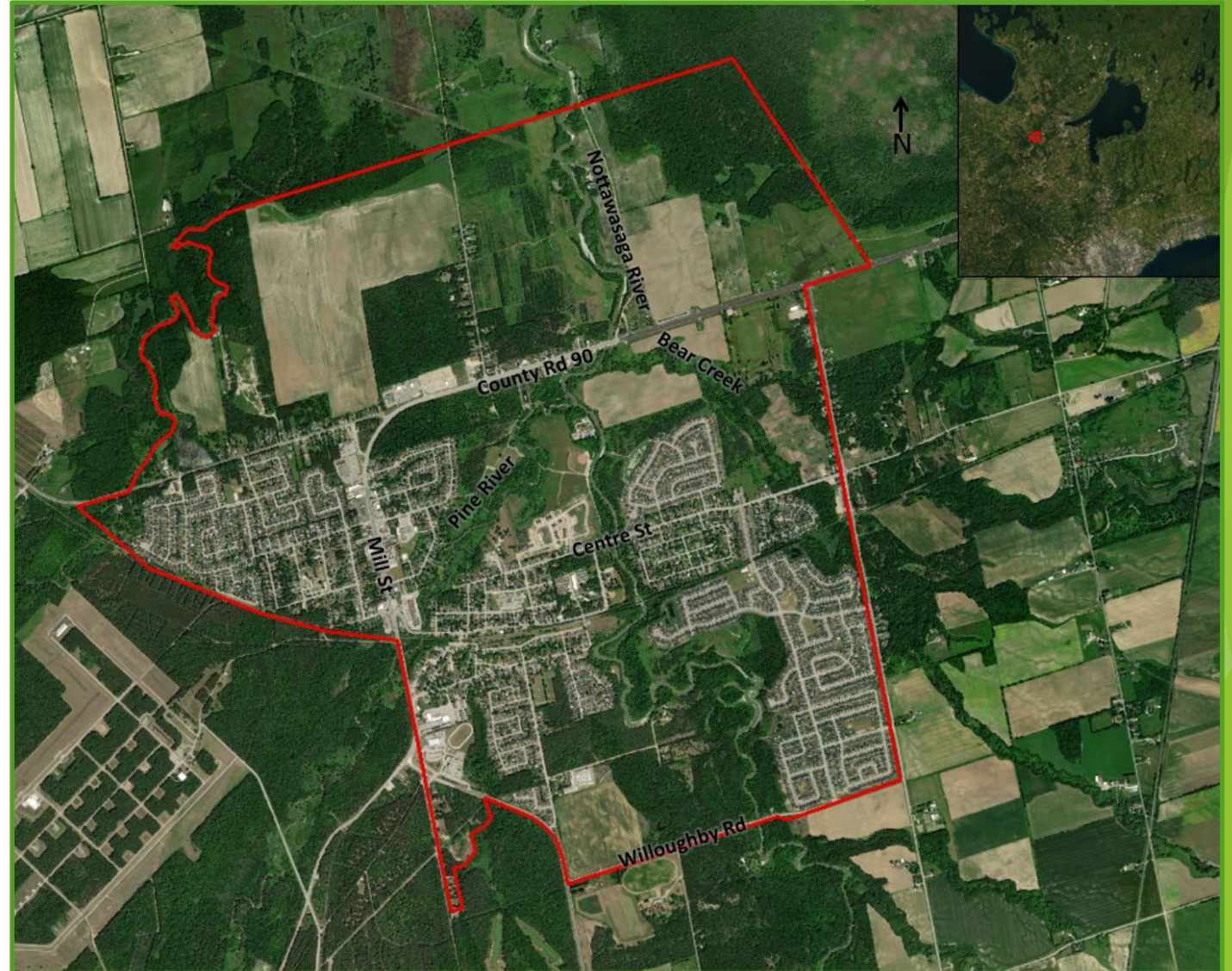
*The Objective of the Angus Infrastructure Master Plan (IMP) is to identify and select preferred alternative water supply and storage, wastewater collection, treatment and disposal servicing strategies for the Community of Angus and its ultimate development horizon which minimizes impacts to both the natural and social environments and are both technically feasible and economically sensible.*

*The IMP will also provide existing conditions infrastructure modeling and asset management/planning recommendations for all of these systems as well as stormwater management and road infrastructure.*



# Study Area

- ▶ Angus has an existing population of 13,669 people
- ▶ Primary Settlement Area for Essa Township
  - ▶ Complete community providing full municipal services and a full range and mix of services and facilities
  - ▶ Majority of future growth in Essa Township will be directed toward Angus



# Study Area - Existing & Proposed (Ultimate) Population & Servicing Demands Summary

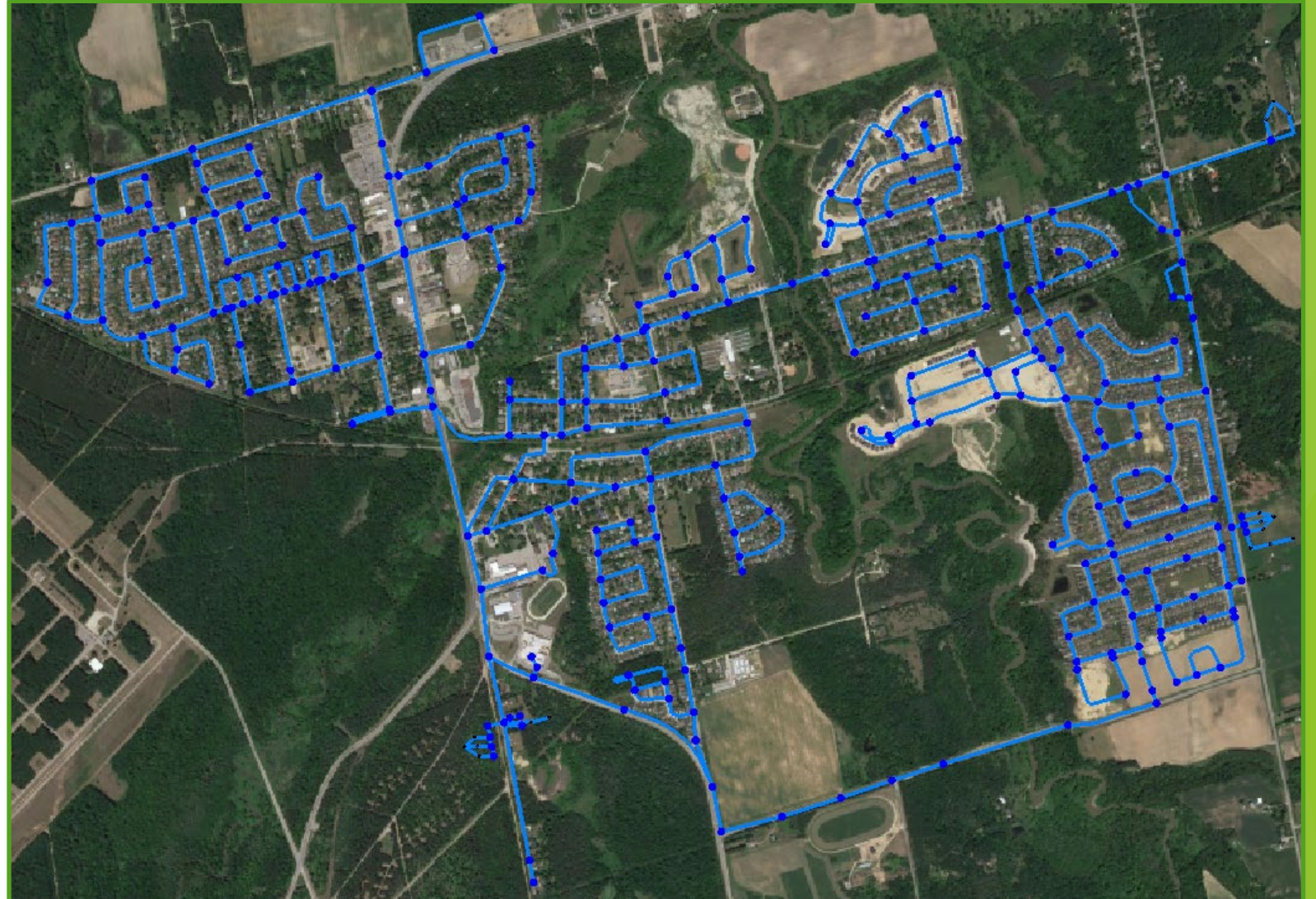
	Residential Units	Residential Population (Persons)	Equivalent Residential Units (ERU - 3 ppu)	Equivalent Residential Population (Persons)
<b>Updated* Existing Population</b>	4,581	13,669	4,591 (Water) 4,610 (Wastewater)	13,773 (Water) 13,830 (Wastewater)
<b>Ultimate Population</b>	7,390	22,096	7,526 (Water) 7,577 (Wastewater)	22,578 (Water) 22,731 (Wastewater)

\*Current serviced population (OCWA data) updated to include Angus developments currently under construction

# Existing Municipal Systems

## Water

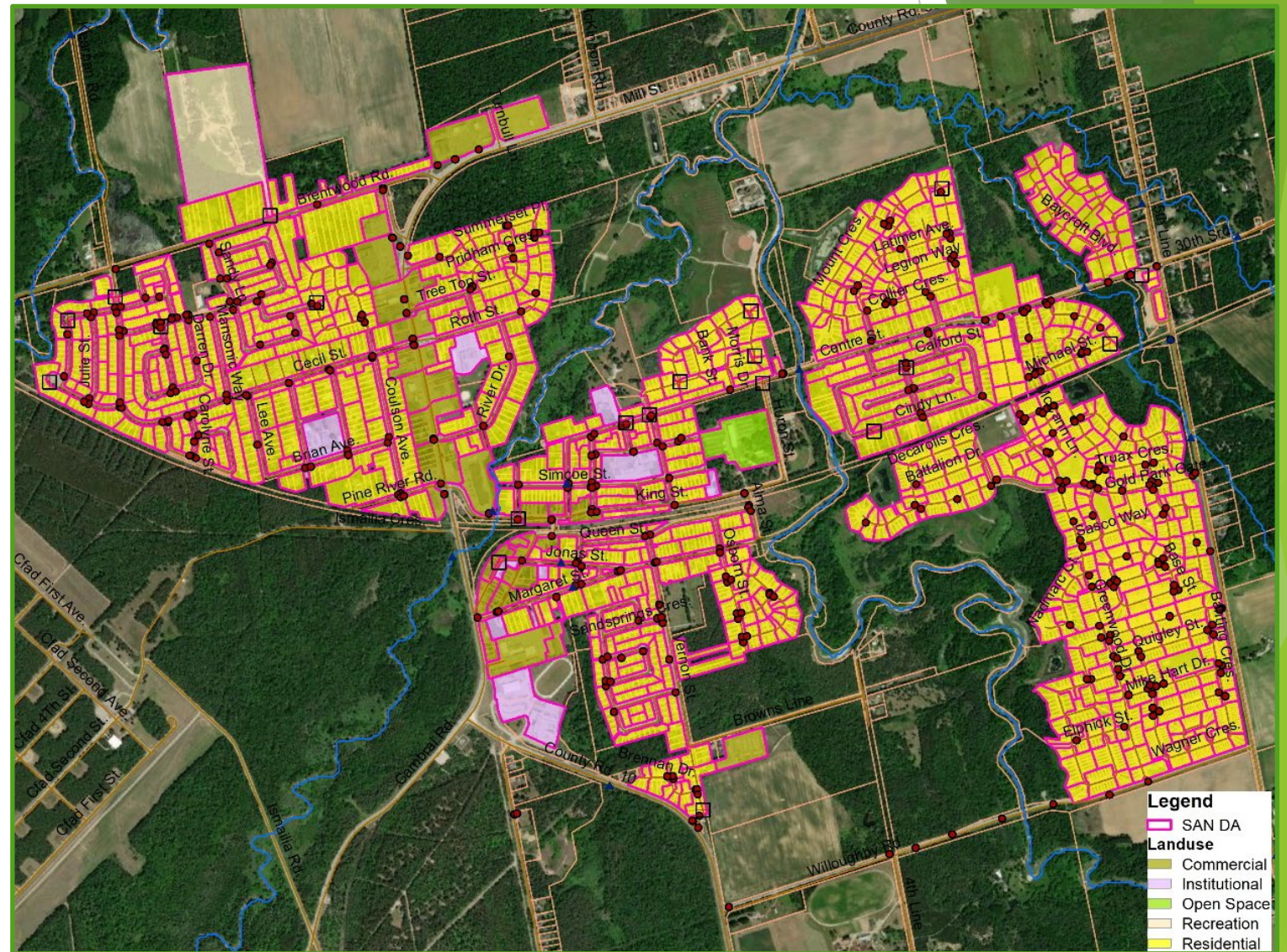
- ▶ 62 KM of watermain
- ▶ 3 well sites, each containing a pump station and reservoir
  - Water supply residual capacity of 1,572 m<sup>3</sup>/d or 568 Equivalent Residential Units
  - 124 nodes fail to meet updated minimum pressure requirements under a fire flow scenario (draft updated standard flow of 150 L/s)
  - Water storage residual capacity of 1,010 m<sup>3</sup>



# Existing Municipal Systems

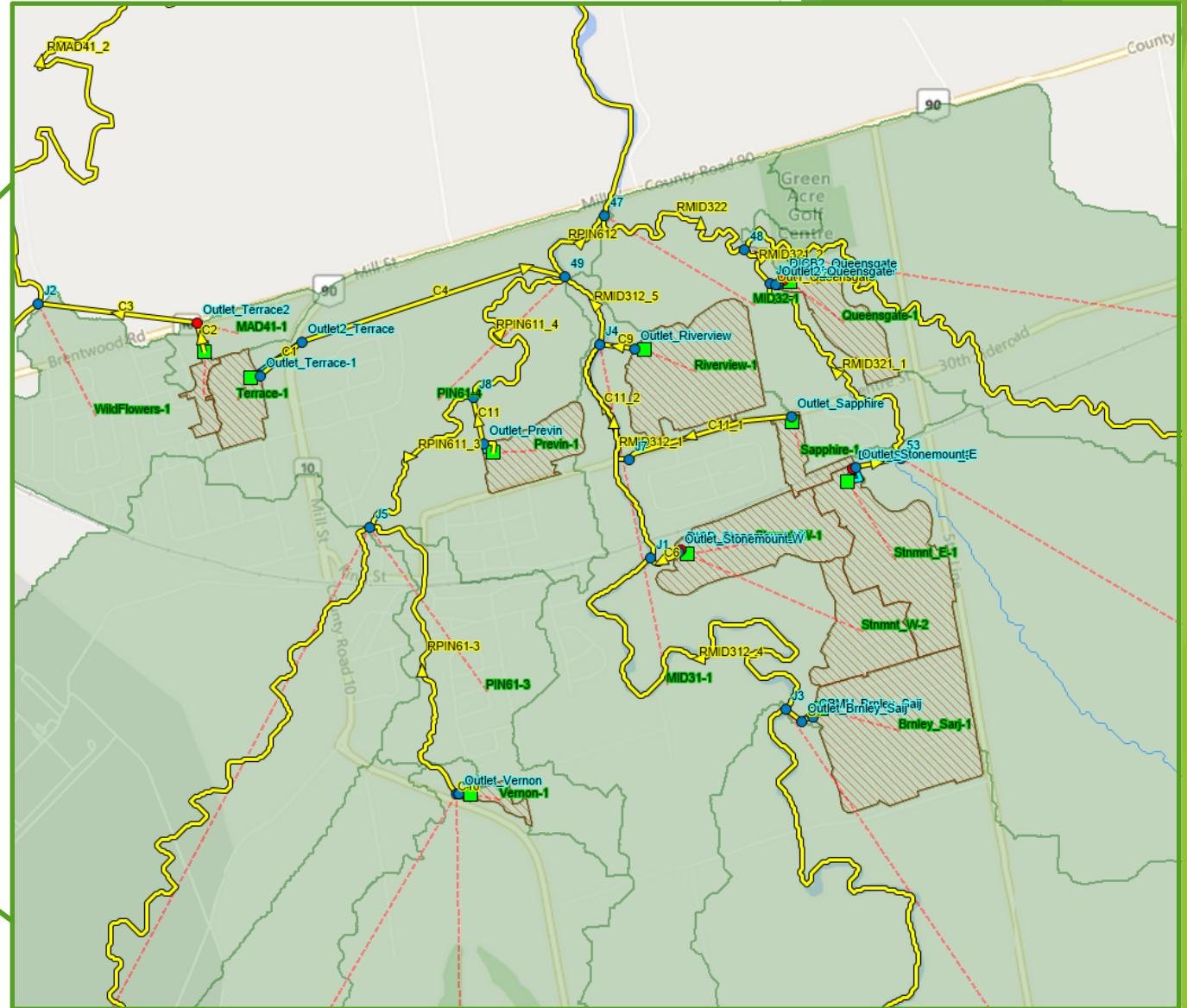
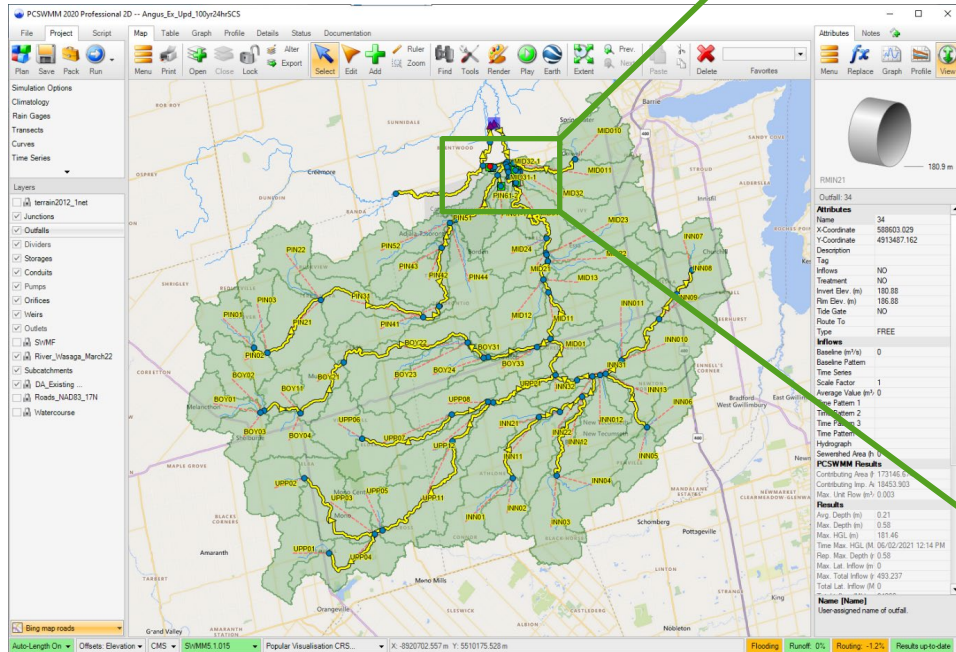
## Sanitary

- ▶ 50 km of gravity sewer
- ▶ 2 km of force main
- ▶ 4 Sewage Pumping Stations (1 private @ 305 Mill St.)
- ▶ 1 WWTP
- Residual capacity of 1,159 m<sup>3</sup>/d or 858 ERUs
- No manholes flood (i.e. to surface elevation) under existing conditions (modeled)
- 16 manholes with potential surcharge issues under peak flow conditions (modeled)



# Existing Municipal Systems: Stormwater

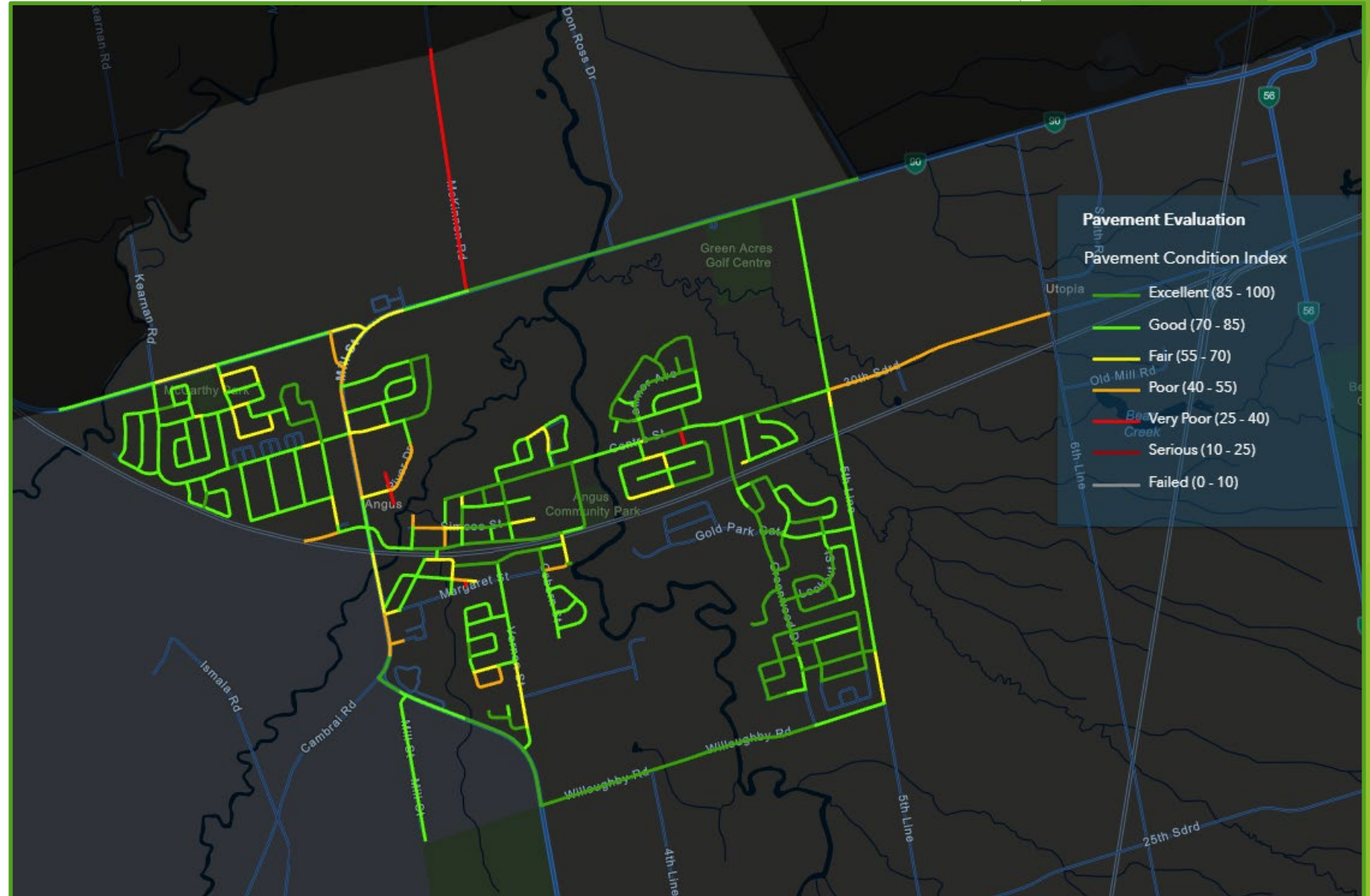
- ▶ 10 Existing Stormwater Management Facilities/Ponds (SWMF's)
- ▶ 26 km of Storm Sewer
- ▶ 24 km of Ditch Conveyance
- ▶ High level hydrologic modeling completed as part of IMP, detailed SWM Master Plan & Hydraulic Modeling Recommended



# Existing Municipal Systems

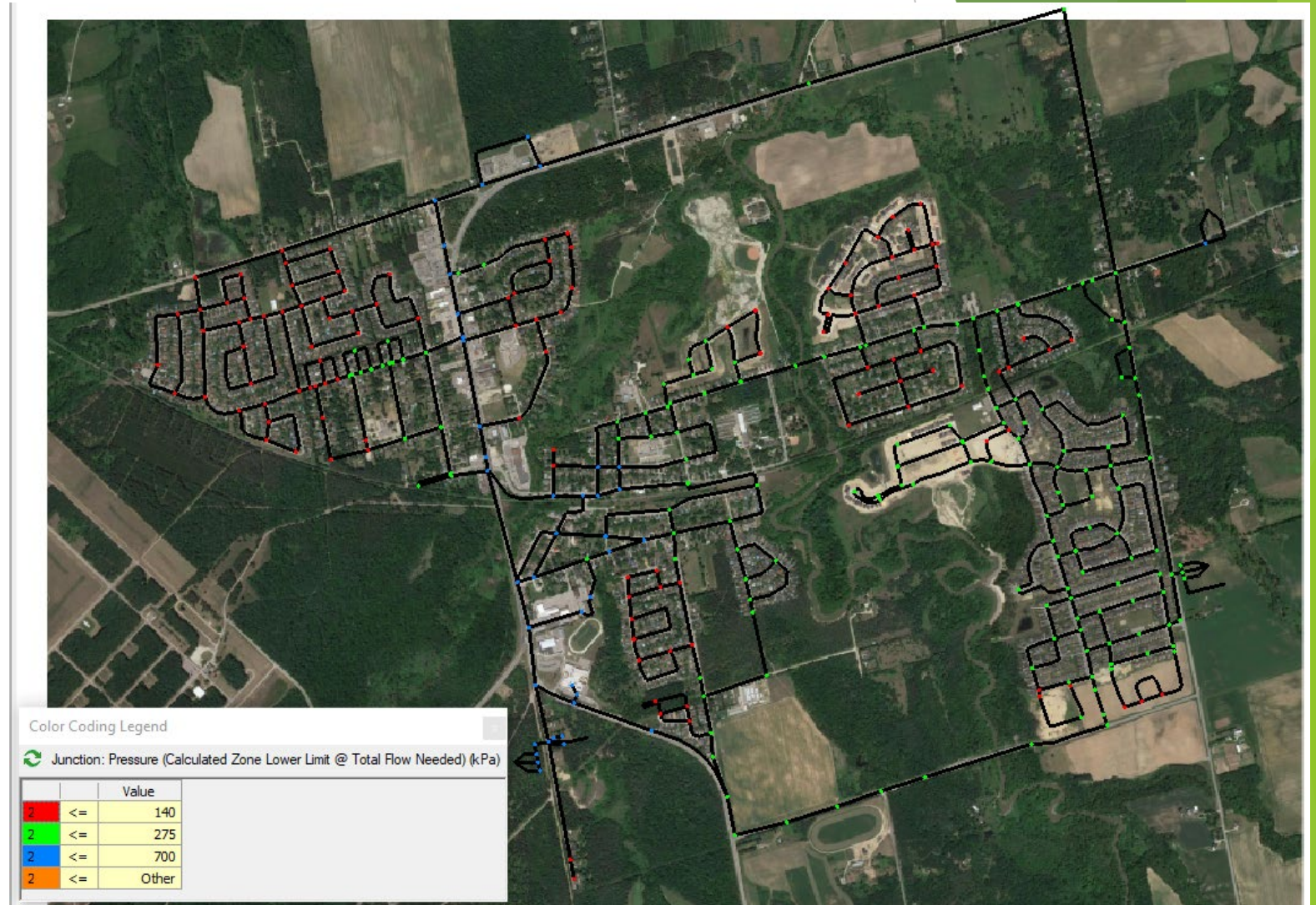
## Roads

- ▶ 71 km of road in Angus
- ▶ Average Pavement Condition Index (PCI) of 78 (good)



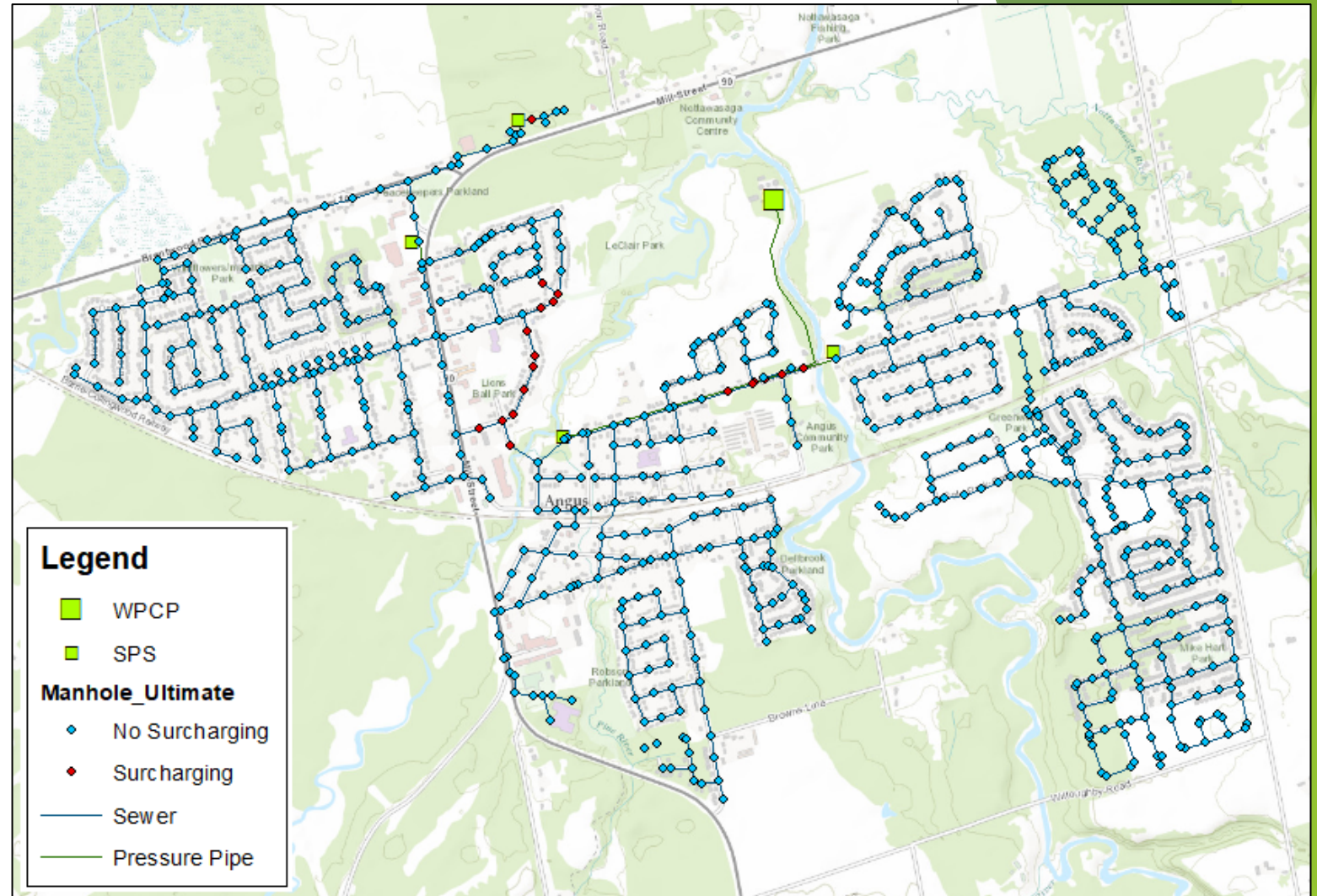
# Ultimate Conditions - Water

- Water supply shortfall of 4,635 m<sup>3</sup>/d
- 156 of 315 locations fail to meet pressure requirements under a fire flow scenario (Shown in **Red** based on draft Township Standard of 150 L/s, increased from 38 L/s)
- Water Storage shortfall of 4,199 m<sup>3</sup>



# Ultimate Conditions - Sanitary Collection

- ▶ Shortfall of 1,750 m<sup>3</sup>/d treatment capacity at WWTP
- ▶ No manholes flood(i.e. to surface elevations) under peak flows (modeled)
- ▶ 19 manholes surcharge under peak flow conditions (modeled)





# Evaluation Process

As part of the final evaluation process, “short listed” alternative solutions will be ranked against one another in relative terms for each of the evaluation criteria presented below.

## Natural Environment Impacts:

- ▶ Impacts of the option to vegetation, wildlife & the Natural Environment; and
- ▶ Surface/groundwater quality and quantity implications;

## Social/Cultural Environment Impacts:

- ▶ Land Use & Archaeological Considerations (Including First Nations);
- ▶ Required Inter-Municipal agreements & infrastructure
- ▶ Visual landscape/aesthetic impacts and Interruption to residents.

## Technical/Operational Considerations:

- ▶ Difficulty to construct/implement the Option relative to other alternatives; and
- ▶ Operation & Maintenance Efficiency;

## Economic Impacts:

- ▶ Capital/construction costs, flexibility & phasing;
- ▶ Long term/operation & maintenance cost burden



# Evaluation Process

- ▶ Preliminary screening of servicing options for this IMP included a high-level review of all alternative solutions against these criteria within the context of the background information and calculations presented herein.
- ▶ Any solution which does not satisfy one or more of these criteria (i.e. options which could clearly not be implemented due to prohibitive costs, detrimental environmental effects, or inability to meet the technical criteria such as satisfying the projected servicing demands) were eliminated without further detailed analysis.
- ▶ Alternative solutions that appeared to be feasible within the context of these criteria were selected as potential “short-listed” alternative solutions and evaluated further in terms of their relative advantages and disadvantages within each evaluation criteria category.

Screening Question	Screening Decision By Answer	
	Pass	Fail
1. Can the proposed solution satisfy the Class EA Problem Statement?	Proceed	Eliminate
2. Does the solution have detrimental environmental, social, technical or economic impacts (i.e. prohibitive costs, agreement or land requirements, or technical difficulty)?	Proceed	Eliminate
3. Can impacts associated with the solution be mitigated?	Proceed	Eliminate

# Long List of Servicing Strategies Water Supply & Treatment

Servicing Strategy Alternative	Description
Option W-1 - Do Nothing	<ul style="list-style-type: none"> <li>Maintain the status quo.</li> </ul>
Option W-2 - Increase Current PTTW and Well Capacity to Supply Ultimate Demand	<ul style="list-style-type: none"> <li>New Well (Same Location), Expanded Treatment, Booster Pumps, Storage and Fire Protection</li> </ul>
Option W-3 - Use New Tecumseth-Collingwood Trunk Main for All Supply	<ul style="list-style-type: none"> <li>Booster Pumps, Storage and Fire Protection, Watermain Network, Connection to New Tecumseth Main.</li> </ul>
Option W-4 - Maximize Use of Current Well (Increase PTTW) for Near Term Growth, Connect to New Tecumseth Main for Ultimate Build Out	<ul style="list-style-type: none"> <li>New Pumps, Expanded Treatment, Storage and Fire Protection, Watermain Network, Connection to New Tecumseth Main.</li> </ul>
Option W-5 - Maximize Use of Current Well (Increase PTTW) for Near Term Growth, Construct New Well in New Location for Ultimate Build Out	<ul style="list-style-type: none"> <li>New Well (New Location), Expanded Treatment, Booster Pumps, Storage and Fire Protection, Watermain Network.</li> </ul>
Option W-6 - Water Conservation - Construct Reclaimed Water System to Reduce Demand Within the Community	<ul style="list-style-type: none"> <li>Reclamation and Disinfection system at WWTP, Booster Pumps, Storage and Fire Protection, Second Watermain Network</li> </ul>

### Angus IMP Water Supply Shortlisted Options & Rankings

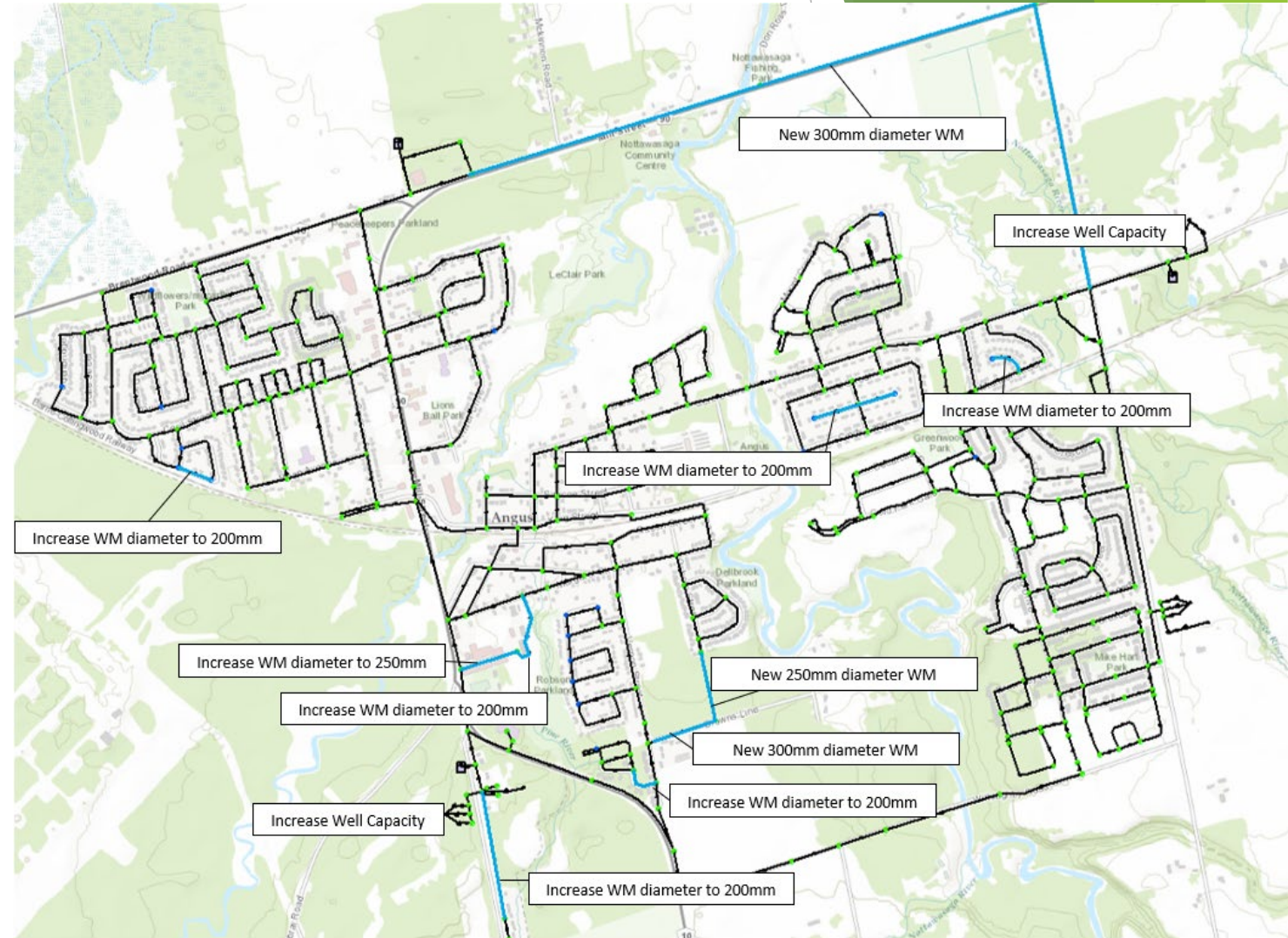
Evaluation Criteria	Option W-2	Option W-4	Option W-5
	Increase Current PTTW & Well Capacity to Supply Ultimate Demand (Approx 40 L/s)	Maximize Use of Current Well (Increase PTTW) for Near Term Growth, Connect to New Tecumseth Main for Ultimate Build Out	Maximize Use of Current Wells (Increase PTTW) & Construct New Well in New Location for Ultimate Build-out (Approx 40 L/s)
<b>Natural Environment Impacts</b>			
Impacts of the option to vegetation, wildlife & the Natural Environment	Minimal impacts due to maximizing use of existing systems. No disturbance to new areas.	Similar impacts to Option W-2 as connection to Regional watermain is already available.	Slightly higher impact than W-2 due to disturbance of a new site for new well construction and potential WM work depending on selected location.
Surface/groundwater quality implications	Impacts (and available capacity) will need to be confirmed via Hydro-G study and pump tests.	Similar GW impact to Option W-2, SW impacts limited to increased takings at the Collingwood WTP	Requires same studies as W-2 plus additional location and testing for new site to confirm impacts.
<b>Natural Environment Overall Rating</b>			
<b>Social / Cultural Environment Impacts</b>			
Land Use & Archaeological Considerations (Including First Nations)	No known Archaeological issues with proposed servicing alternative due to use of existing sites.	No known Archaeological issues with proposed servicing alternative due to use of existing sites.	Archaeological study will be required for any new well site. Higher land use requirement due to additional well site.
Visual landscape/Aesthetic impacts, Traffic impacts & interruption to residents	Minimal impacts due to maximizing use of existing systems. No disturbance to new areas.	Minimal impacts due to maximizing use of existing systems. No disturbance to new areas.	Higher impact than WW-2 due to use of an additional well site. Site location will determine resident impact.
Required Intermunicipal Agreements & Infrastructure	No Intermunicipal Infrastructure or Agreements Required.	Intermunicipal Water Supply Sharing Agreements & infrastructure Required.	No Intermunicipal Infrastructure or Agreements Required.
<b>Social / Cultural Environment Overall Rating</b>			
<b>Technical/Operational Considerations</b>			
Difficulty to construct or implement the Option relative to other alternatives	Least complicated option - Expansion of existing facilities at current locations will be required.	In addition to W-2 requirements this Option will be reliant on Collingwood WTP Upgrades. Most complicated option from technical perspective.	Same technical requirements as Option W-2 in addition to construction of a new well at new location.
Operation & Maintenance Efficiency	Most efficient from maintenance perspective.	Partial reliance on Collingwood WTP & transmission main will add operational/maintenance complexity.	Same maintenance requirements as W-2 plus maintenance on an additional well system.
<b>Technical/Operational Considerations Rating</b>			
<b>Economic Impacts</b>			
Capital/construction costs	Initial study requirements estimated to be approximately \$40,000. Estimated capital cost of \$2.1 Million, subject to testing results.	Study requirements will be similar to Option W-2, capital requirements will likely be higher due to Town of Collingwood connection charges in addition to well maximization.	Initial study requirements estimated to be approximately \$90,000 (incl. W-2 studies). Capital costs estimated to be \$3.4 Million, subject to testing results.
Long term/operation & maintenance cost burden	Maintenance costs will be scaled up proportionally from existing conditions based on increased flow.	More costly maintenance than Option W-2 due to maintenance of Regional (Collingwood - New Tec) supply system in addition to Angus wells.	More costly maintenance than Option W-2 due to addition of an additional physical well site.
Payment structure, cost recovery options for Municipality, Phasing Flexibility	Cost recovery and phasing will likely be development based.	Cost recovery and phasing will be more complicated due to inter-municipal infrastructure. Higher water system costs and lower flexibility.	Cost recovery and phasing will likely be development based.
<b>Economic Ranking</b>			
<b>Overall Ranking:</b>	<b>MOST PREFERRED OPTION</b>	<b>LESS PREFERRED OPTION</b>	<b>LESS PREFERRED OPTION</b>

# Preliminary Preferred Alternative: Water Supply

## Increase PTTW & Well Capacity to Supply Ultimate Demand: Option W-2

The recommended overall preferred alternative solution for water supply in Angus includes the following components:

- Preliminary hydrogeological investigation to confirm ability to increase PTTW
- Increase total well capacity by 40 L/s across existing well sites to supply ultimate demand (Option W-2)
- Dependent on results of hydrogeological study, a Schedule 'B' addendum to the IMP may be required prior to implementation. Water quality implications (i.e. chlorine contact time) should be reviewed and confirmed as part of this process also.



# Long List of Servicing Strategies

## Water Storage & Fire Flow

Servicing Strategy Alternative	Description
Option WS-1 - Do Nothing	<ul style="list-style-type: none"><li>• Maintain the status quo.</li></ul>
Option WS-2 - Storage at Single Location	<ul style="list-style-type: none"><li>• Construct a storage system (elevated, in-ground or at grade) at a single site, preferably at (or adjacent to) an existing reservoir location</li></ul>
Option WS-3 - Storage at Two (2) Locations	<ul style="list-style-type: none"><li>• Construct two (2) storage systems (elevated, in-ground or at grade) located at two (2) sites, preferably at (or adjacent to) existing municipal well locations in the Southwest (1) and Northwest (1) areas of Angus.</li></ul>
Option WS-4 - Storage at Three (3) Locations	<ul style="list-style-type: none"><li>• Construct three (3) storage systems (elevated, in-ground or at grade) located at three (3) sites, preferably at (or adjacent to) existing municipal well locations in the Southwest (1), Northwest (1) and Northeast (1) areas of Angus.</li></ul>

### Angus IMP Water Storage & Fire Flow Shortlisted Alternative Servicing Strategies

Evaluation Criteria	<u>Servicing Strategy WS-3</u>	<u>Servicing Strategy WS-4</u>
	4,200 m <sup>3</sup> of New Storage across Two (2) Locations (SW & NW Angus)	4,200 m <sup>3</sup> of New Storage across Three (3) Locations (NE, SW, NW Angus)
<b>Natural Environment Impacts</b>		
Impacts of the option to vegetation, wildlife & the Natural Environment	Moderate impacts due to construction at one new site, retrofits at one existing site and 1.7 km of watermain upgrades.	Slightly less impact due to two (2) existing facility retrofits in lieu of watermain upgrades. Storage at one new site still required as well.
Surface/groundwater quality implications	Minimum impact expected except for construction dewatering. Slightly higher impacts due to substantial watermain replacements.	Minimum impact expected except for construction dewatering.
<b>Natural Environment Overall Rating</b>		
<b>Social / Cultural Environment Impacts</b>		
Land Use & Archaeological Considerations (Including First Nations)	New property required for Northeast storage site. Some property impacts for retrofit site.	New property required for Northeast storage site. Some property impacts for two (2) retrofit sites.
Visual landscape/Aesthetic impacts, Traffic impacts & interruption to residents	Significant potential for interruption to residents due to 1.7 km WM replacement requirement. Limited visual impacts, subject to ultimate site selection.	Limited visual or traffic impacts, subject to ultimate site selection.
<b>Social / Cultural Environment Overall Rating</b>		
<b>Technical/Operational Considerations</b>		
Difficulty to construct or implement the Option relative to other alternatives	Higher difficulty due to length of watermain replacement, two (2) storage sites (1 retrofit)	Moderate difficulty due to three (3) storage sites (2 retrofit), no major watermain replacements.
Water Supply Security	Slightly less redundancy due to two larger facilities. No external supply concerns.	Slightly more redundancy due to presence of three smaller facilities. No external supply concerns.
Operation & Maintenance Efficiency	Slightly more efficient due to use of only two (2) storage facilities (larger pumps & reservoirs).	Slightly less efficient for maintenance due to three (3) total storage facilities (smaller pumps & reservoirs).
<b>Technical/Operational Considerations Rating</b>		
<b>Economic Impacts</b>		
Capital/construction costs	Storage Costs estimated to be \$6-8 Million plus \$2.6 Million for Watermain replacements	Storage Costs estimated to be \$8-10 Million. No major watermain replacements required.
Long term/operation & maintenance cost burden	Lower life cycle costs due to less facilities.	Slightly higher life cycle cost due to third facility.
Cost Recovery & Phasing Flexibility	Less flexible due to watermain requirements and two (2) potential phases.	Higher flexibility due to three (3) potential phases and limited watermain upgrade requirements.
<b>Economic Ranking</b>		
<b>Overall Ranking:</b>	<b>LESS PREFERRED OPTION</b>	<b>MOST PREFERRED OPTION</b>

# Preliminary Preferred Alternative: Water Storage

## 4,200 m<sup>3</sup> of Storage across Three (3) Locations: Option WS-4

The recommended overall preferred servicing strategy for water storage in Angus includes the following components:

- Increase available storage by 4,200 m<sup>3</sup> over 3 locations (NW, NE and SW Angus)
- Add storage systems at or adjacent to existing locations where possible to reduce costs (SW, NE Angus)
- Precise storage locations and elevations/type (in-ground, at-grade, elevated) will need to be confirmed through a Schedule 'B' Class EA Process and detailed design process prior to implementation (also subject to final municipal fire flow standards update)





# Long List of Servicing Strategies (Wastewater)

Servicing Strategy	Description
Option WWT-1 - Do Nothing	<ul style="list-style-type: none"> <li>Maintain the status quo.</li> </ul>
Option WWT-2 - Expand Existing Wastewater Treatment Plant	<ul style="list-style-type: none"> <li>Through upgrades to existing WWTP, expand capacity and continue discharge to Nottawasaga River</li> </ul>
Option WWT-3 - Transport Effluent to Georgian Bay for Treatment, Discharge to Georgian Bay	<ul style="list-style-type: none"> <li>Construct a forcemain system between Angus and Collingwood/Wasaga Beach and treat/discharge effluent using existing infrastructure located within that municipality</li> </ul>
Option WWT-4 - Transport Effluent to Alliston for Treatment, Discharge to Nottawasaga River	<ul style="list-style-type: none"> <li>Construct a forcemain system between Angus and Alliston and treat/discharge effluent using existing infrastructure located within that municipality</li> </ul>
Option WWT-5 - Development Specific WWTP's	<ul style="list-style-type: none"> <li>This option would involve construction of individual WWTP's for each new development Area.</li> </ul>
Option WWT-6 - Second Community Conventional WWTP, Surface Disposal	<ul style="list-style-type: none"> <li>Construct a new municipal conventional WWTP in Angus with surface water disposal to one of the major watercourses</li> </ul>
Option WWT-7 - Second Community WWTP, Subsurface Disposal	<ul style="list-style-type: none"> <li>Construct a new municipal WWTP in Angus, with subsurface disposal</li> </ul>
Option WWT-8 - New Community WWTP (Decommissioning Existing WWTP)	<ul style="list-style-type: none"> <li>Construct new municipal WWTP in Angus to treat all flows, decommission the existing WWTP</li> </ul>
Option WWT-9 - Second Community Modular MBR WWTP, Surface Water Discharge	<ul style="list-style-type: none"> <li>Construct a new municipal modular MBR WWTP in Angus with surface water disposal to one of the major watercourses</li> </ul>

Angus IMP Wastewater Treatment & Discharge Shortlisted Options & Rankings			
Evaluation Criteria	Option WWT – 2	Option WWT - 6	Option WWT - 9
	Expand Existing Wastewater Treatment Plant (Approx 1,750 m³/d)	Second Community WWTP (Conventional), Surface Water Discharge (Approx 1,750 m³/d)	Second Community WWTP (Modular), Surface Water Discharge (Approx 1,750 m³/d)
<b>Natural Environment Impacts</b>			
Impacts of the option to vegetation, wildlife & the Natural Environment	Minimal impacts due to minimal construction footprint (limited to vicinity of the existing site).	Slightly higher impact than WWT-2 due to increased footprint associated with a second WWTP site.	Slightly higher impact than WWT-2 due to increased footprint associated with a second WWTP site, less impact than WWT-6.
Surface/groundwater (GW) quality implications	Limited surface water impact due to use of existing facility and discharge location. Verification of impacts required via Assimilative Capacity Study (ACS). MBR treatment assumed. Minimal GW impact aside from onsite construction.	Slightly higher GW impact during construction than WWT-2 due to larger footprint of a new conventional facility vs. retrofit. Slightly higher surface water impact due to use of a new discharge location, subject to verification via ACS.	Slightly lower GW impact during construction than WWT-6 due to smaller footprint of a modular facility vs. conventional. Slightly higher surface water impact due to use of a new discharge location, subject to verification via ACS.
<b>Natural Environment Overall Rating</b>			
<b>Social / Cultural Environment Impacts</b>			
Land Use & Archaeological Considerations (Including First Nations)	No known Archaeological as work limited to existing disturbed site. Minimal additional land requirements.	Archaeological investigation required for any new site selected. Moderate to high land requirements to facilitate new WWTP	Archaeological investigation required for any new site selected. Moderate land requirements to facilitate new WWTP (Less than WWT-6).
Visual landscape/Aesthetic impacts, Traffic impacts & interruption to residents	Lowest impact to residents due to retrofit work being contained to existing site.	Greater construction Impacts due to lengthier construction of new WWTP at a new site.	Slightly less impact than WWT-6 due to smaller footprint of modular WWTP.
Required Intermunicipal Agreements & Infrastructure	No intermunicipal approvals required.	No intermunicipal approvals required.	No intermunicipal approvals required.
<b>Social / Cultural Environment Overall Rating</b>			
<b>Technical/Operational Considerations</b>			
Difficulty to construct or implement the Option relative to other alternatives	Lowest difficulty subject to confirmation via Schedule 'C' Class EA	Higher difficulty due to requirement for siting and construction of a new WWTP.	Higher difficulty due to requirement for siting and construction of a new WWTP. Modular construction slightly less difficult vs. WWT-6
Operation & Maintenance Efficiency	Maintenance will be similar to existing conditions, scaled up for higher flows.	Higher maintenance burden due to operation of two (2) separate WWTP facilities.	Higher maintenance burden due to operation of two (2) separate WWTP facilities.
<b>Technical/Operational Considerations Rating</b>			
<b>Economic Impacts</b>			
Capital/construction costs	Capital Cost of Option is expected to be approximately \$8.0-10.5 Million	Capital Cost of Option is expected to be approximately \$22-26 Million	Capital Cost of Option is expected to be approximately \$13-16 Million
Long term/operation & maintenance cost burden	Moderate ongoing maintenance costs associated with current MBR WWTP.	Highest ongoing maintenance burden due to operation of a second complex MBR WWTP.	Moderate to High ongoing maintenance burden to operation of a second WWTP.
Payment structure, cost recovery options for Municipality, Phasing Flexibility	No significant phasing or cost recovery challenges (development driven). Expansion can be completed as needed subject to results of Schedule 'C' EA.	Initial phase will require high capital outlay for a new WWTP. Subsequent phases an option to aid in cost recovery (development driven). Schedule 'C' EA required.	Relatively flexible option due to the nature of modular design vs. conventional design (development driven). Schedule 'C' EA required.
<b>Economic Ranking</b>			
<b>Overall Ranking:</b>	<b>MOST PREFERRED OPTION</b>	<b>LESS PREFERRED OPTION</b>	<b>LESS PREFERRED OPTION</b>

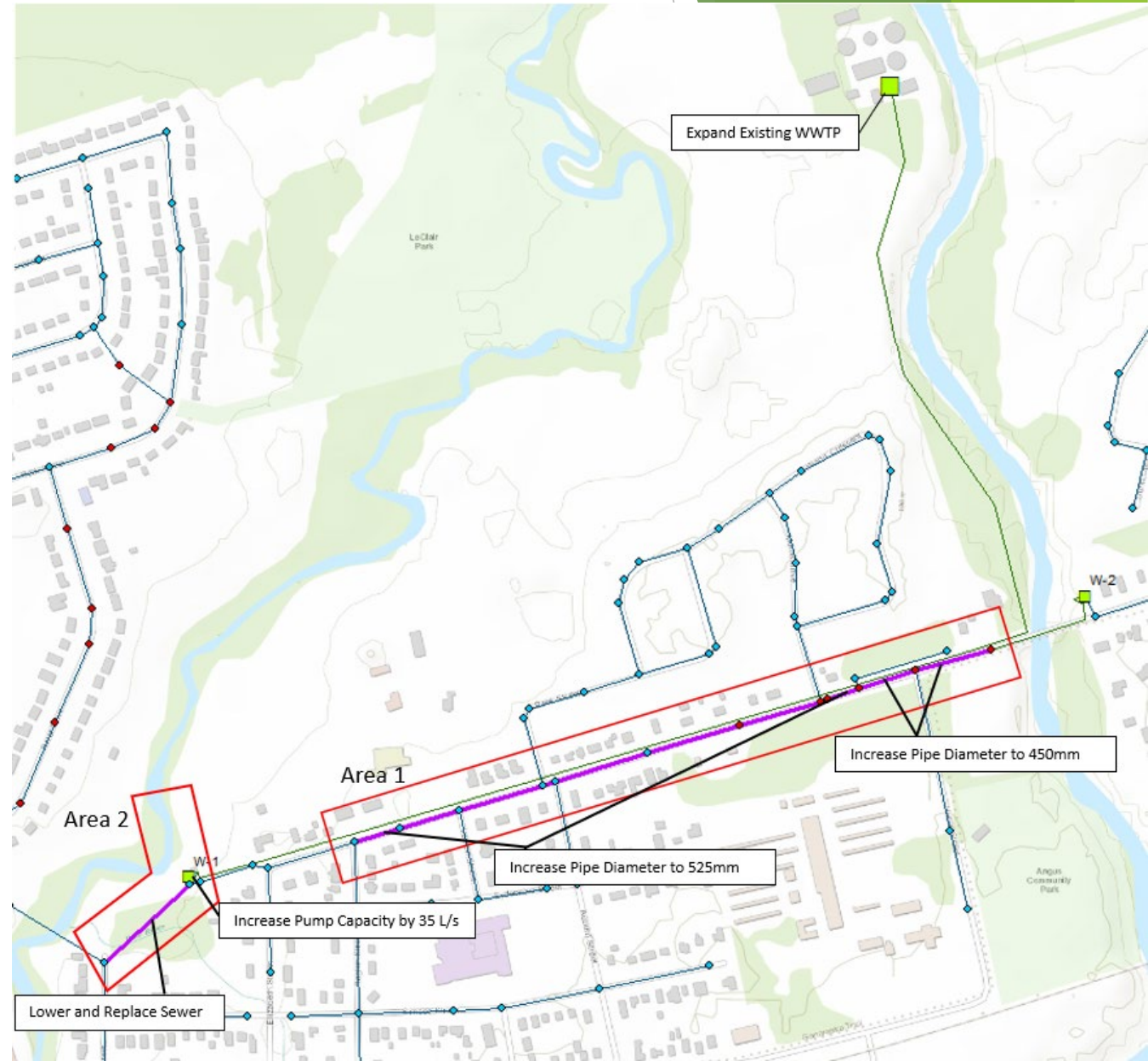
# Preliminary Preferred Alternative: Wastewater

## Expand Existing WWTP:

### Option WWT-2

The recommended preferred alternative solution for wastewater servicing in Angus includes the following components:

- Complete a Schedule 'C' Class EA for expansion of the existing WWTP prior to implementation (including updated Assimilative Capacity Study)
- Expand the Angus WWTP by approx. 1,750 m<sup>3</sup>/d (Option WWT-2)
- Upgrade gravity sewers that are above 100% capacity (Est. Cost \$1.5 Million)
- Increase pumping capacity at SPS 1 by 35 L/s (Est. Cost \$3.5 Million)

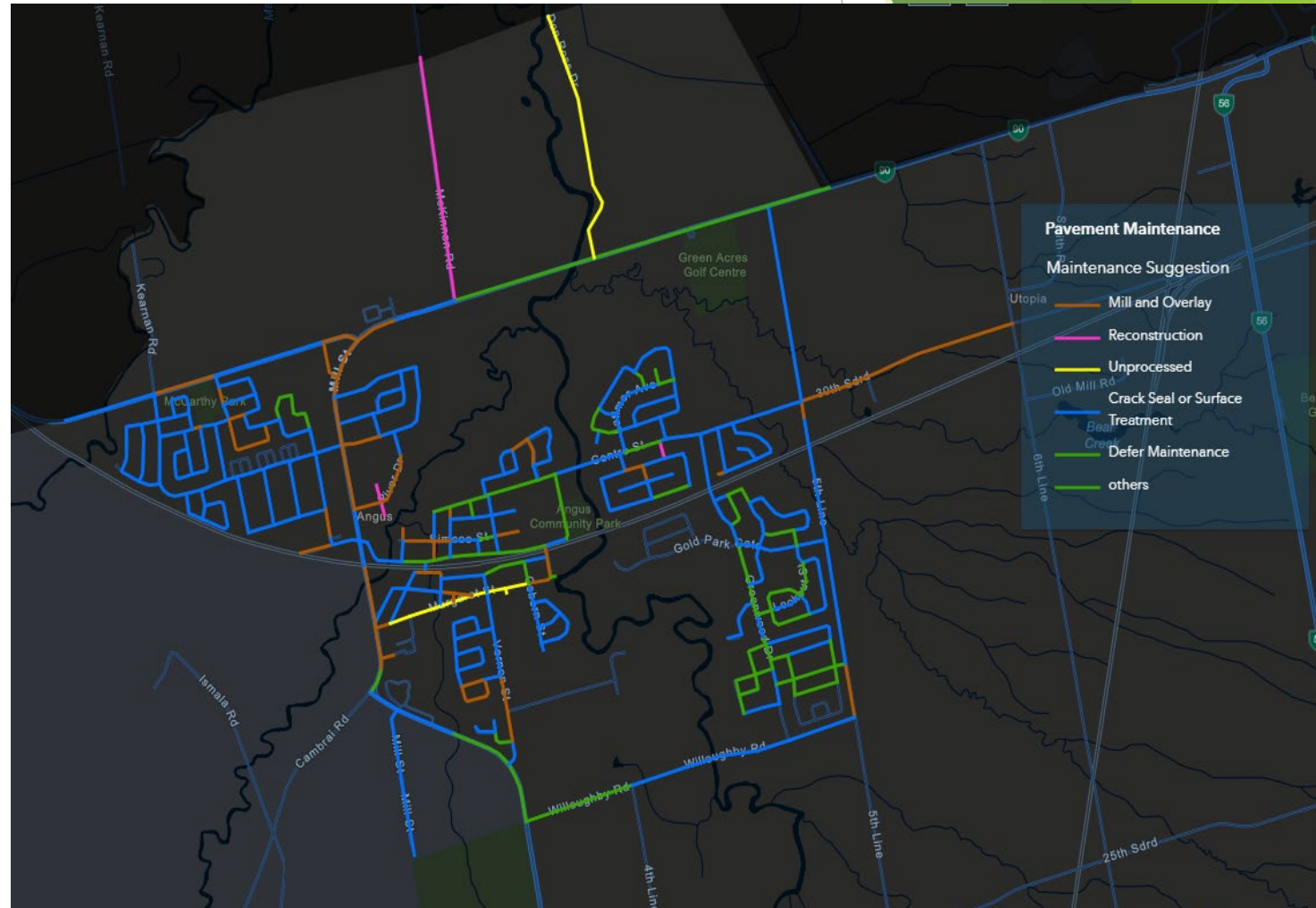


# Preliminary Preferred Alternative: Road Maintenance

## Initiate Maintenance Program per Streetlogix Software Modelling

The recommended preferred servicing strategy for transportation in Angus includes the following components:

- Implement a road maintenance program as identified by the Streetlogix model to improve average road conditions to a PCI of 85 in the next 10 years (Est. \$3.6 Million)
- Reconstruct highest priority roads within the next 2 years, as identified by Streetlogix
- Continue to maintain and update software as projects are completed to ensure maintenance budgeting and project identification is up-to-date



# Asset Management Costs

- ▶ In addition to infrastructure upgrades, on-going asset management budgeting is required to ensure continued levels of service (lifecycle costing)
- ▶ Potential costing efficiencies may be identified in future EA's for proposed servicing strategies. Condition assessments should also be completed for major infrastructure (i.e. WWTP) to confirm estimated backlog & ongoing costs

Replacement Timeline	Sanitary Costs	Water Costs	SWM Costs	Total
Backlog	\$ 11,614,619.00	\$ 1,283,412.00	\$ 1,160,000.00	\$ 14,058,031.00
0-5 years	\$ 1,589,831.00	\$ 1,003,614.00	\$ -	\$ 2,593,445.00
6-10 years	\$ 2,146,881.00	\$ 1,375,810.00	\$ -	\$ 3,522,691.00
11-25 years	\$ 13,366,906.00	\$ 4,002,423.00	\$ 1,427,677.00	\$ 18,797,006.00
Total	\$ 28,718,237.00	\$ 7,665,259.00	\$ 2,587,677.00	\$ 38,971,173.00

# Next Steps

- Incorporate PIC and Agency comments into the Final Design Concept Selection;
- Finalize Implementation Strategy & Mitigation Measures for preferred Design Concept
- Finalize the Environmental Summary Report and Publish Notice of Study Completion; and,
- Place the Class EA Summary Report on file with the MECP and Township for public review and comment for a period of 30 days.
- If no Part II Order Requests are received during the ESR 30 day review period , the Class EA would be concluded and the project would proceed to the next stage of approvals following the 30 day review period. This stage would include the following initial steps:
- Initiate hydrogeological investigation for final Water Supply Solution
- Completion of Schedule 'C' Class EA for final Sewage System and Wastewater Treatment Plant (WWTP) and Discharge Solution;
- Implement final WWTP and Discharge Solution in accordance with Schedule 'C' Class EA; and,
- Completion of Schedule 'B' Class EA addendum for final Water Storage Solution
- Implement final Water Supply and Storage solutions in accordance with Schedule 'B' Class EA
- Implement Road Maintenance Program in accordance with Streetlogix software
- Consider completing a detailed SWM Master Plan with Updated Hydraulic Model

# THANK YOU FOR ATTENDING

Please direct any comments via email to the project representatives within 10 business days of this PIC

**Josh Maitland, P. Eng.**  
**Consultant Project Manager**  
Greenland Consulting Engineers  
120 Hume Street  
Collingwood, Ontario L9Y 1V5  
Email: [jmaitland@grnland.com](mailto:jmaitland@grnland.com)

**Michael Mikael, P.Eng.**  
**Manager of Public Works**  
Township of Essa  
5786 Simcoe County Road 21  
Utopia, ON L0M1T0  
Email: [mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)







**Appendix A-3**

Public Comments  
and Responses



**From:** [Kirsten McFarlane](#)  
**To:** [Melissa Haw](#)  
**Cc:** [Josh Maitland](#); [Michael Mikael](#)  
**Subject:** RE: Angus Infrastructure Master Plan EA PIC  
**Date:** Wednesday, July 27, 2022 1:09:00 PM  
**Attachments:** [Angus IMP PIC Presentation 07-14-22 - FINAL.pdf](#)  
[image002.jpg](#)  
[image003.jpg](#)

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Hi Melissa,

The slides are attached. Let me know if you have any issues.

Sincerely,

**Kirsten McFarlane**

Environmental Analyst

Tel: (705) 444-8805 ext. 267



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**From:** Melissa Haw <Melissa.Haw@rjburnside.com>  
**Sent:** Wednesday, July 27, 2022 8:47 AM  
**To:** Kirsten McFarlane <kmcfarlane@grnland.com>  
**Cc:** Josh Maitland <jmaitland@grnland.com>; Michael Mikael <mmikael@essatownship.on.ca>  
**Subject:** RE: Angus Infrastructure Master Plan EA PIC

Hi Kirsten,

The PIC slides themselves would also work! The only thing I can find on the town website is the notice for the PIC and not the PIC slides themselves.

Thanks,

**Melissa Haw**  
Engineering Assistant

R.J. Burnside & Associates Limited | [www.rjburnside.com](http://www.rjburnside.com)  
Office: +1 800-265-9662 Direct: +1 705-797-4362

---

**From:** Kirsten McFarlane <[kmcfarlane@grnland.com](mailto:kmcfarlane@grnland.com)>  
**Sent:** Wednesday, July 27, 2022 8:40 AM  
**To:** Melissa Haw <[Melissa.Haw@rjburnside.com](mailto:Melissa.Haw@rjburnside.com)>  
**Cc:** Josh Maitland <[jmaitland@grnland.com](mailto:jmaitland@grnland.com)>  
**Subject:** RE: Angus Infrastructure Master Plan EA PIC

Hi Melissa,

The report has not been posted yet. The slides for the PIC are on the Township website, but the report will not be made available until after the public comment period is over and we have finished all internal edits. Sorry for any confusion.

Sincerely,

**Kirsten McFarlane**

Environmental Analyst

Tel: (705) 444-8805 ext. 267



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**From:** Melissa Haw <[Melissa.Haw@rjburnside.com](mailto:Melissa.Haw@rjburnside.com)>  
**Sent:** Wednesday, July 27, 2022 7:54 AM  
**To:** Kirsten McFarlane <[kmcfarlane@grnland.com](mailto:kmcfarlane@grnland.com)>  
**Subject:** FW: Angus Infrastructure Master Plan EA PIC

Hi Kirsten,

I noticed that Josh is away until August 2, is there any way you could help me out with the below?

Thanks,

**Melissa Haw**  
Engineering Assistant

R.J. Burnside & Associates Limited | [www.rjburnside.com](http://www.rjburnside.com)  
Office: +1 800-265-9662 Direct: +1 705-797-4362

---

**From:** Melissa Haw

**Sent:** Friday, July 22, 2022 12:00 PM

**To:** Josh Maitland <[jmaitland@grnland.com](mailto:jmaitland@grnland.com)>; Michael Mikael <[mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)>

**Subject:** Angus Infrastructure Master Plan EA PIC

Hi Josh & Michael,

I attended the PIC on July 14<sup>th</sup> and during the presentation it was mentioned that the preliminary report was available online, however I am unable to locate the report... would you mind pointing me in the right direction?

Sorry for the inconvenience,

**From:** [Wes Crown](#)  
**To:** [Kirsten McFarlane](#); [Michael Mikael](#)  
**Cc:** [Colleen Healey](#); [Aimee Powell](#)  
**Subject:** RE: IMP Presentation Deck  
**Date:** Wednesday, July 27, 2022 3:17:20 PM  
**Attachments:** [image001.jpg](#)  
[image003.jpg](#)

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Thank you !

Wes

**WESLEY R. CROWN**, BES, RPP, MCIP | Associate

I am currently working remotely and it is best to reach me at [wcrown@mhbcplan.com](mailto:wcrown@mhbcplan.com) or 705-534-4635

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**From:** Kirsten McFarlane [mailto:[kmcfarlane@grnland.com](mailto:kmcfarlane@grnland.com)]

**Sent:** July 27, 2022 2:36 PM

**To:** Michael Mikael <[mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)>; Wes Crown <[wcrown@mhbcplan.com](mailto:wcrown@mhbcplan.com)>

**Cc:** Colleen Healey <[chealey@essatownship.on.ca](mailto:chealey@essatownship.on.ca)>; Aimee Powell <[apowell@essatownship.on.ca](mailto:apowell@essatownship.on.ca)>

**Subject:** RE: IMP Presentation Deck

Hi Wes,

The slide deck from the Angus IMP PIC is attached. Please let me know if there any issues the attachment.

Sincerely,

**Kirsten McFarlane**

Environmental Analyst

Tel: (705) 444-8805 ext. 267



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**From:** Michael Mikael <[mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)>  
**Sent:** Wednesday, July 27, 2022 2:33 PM  
**To:** Wes Crown <[wcrown@mhbcplan.com](mailto:wcrown@mhbcplan.com)>  
**Cc:** Colleen Healey <[chealey@essatownship.on.ca](mailto:chealey@essatownship.on.ca)>; Aimee Powell <[apowell@essatownship.on.ca](mailto:apowell@essatownship.on.ca)>; Kirsten McFarlane <[kmcfarlane@grnland.com](mailto:kmcfarlane@grnland.com)>  
**Subject:** RE: IMP Presentation Deck

Hi Kristen, Can you please share the IMP presentation with Wes ?.

Hi Wes, I am hoping to RFP the TMP within the next two weeks and perhaps the DC's schedules will be ready by mid 2023 at this point

Thanks

**Michael Mikael, P.Eng**

Manager of Public Works

Township of Essa

[mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)

705-424-9917 ext. 135

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**From:** Wes Crown <[wcrown@mhbcplan.com](mailto:wcrown@mhbcplan.com)>  
**Sent:** July 27, 2022 2:30 PM  
**To:** Michael Mikael <[mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)>  
**Cc:** Colleen Healey <[chealey@essatownship.on.ca](mailto:chealey@essatownship.on.ca)>; Aimee Powell <[apowell@essatownship.on.ca](mailto:apowell@essatownship.on.ca)>  
**Subject:** IMP Presentation Deck

Hi Michael,

I know how busy you are, so if there is a spot I can download the Angus IMP presentation deck, please let me know. Or if you could email it to me that would be very helpful.

Can you also give me a sense of timing for the TMP as well?

Thanks in advance,

*Wes*

**WESLEY R. CROWN**, BES, RPP, MCIP | Associate

I am currently working remotely and it is best to reach me at [wcrown@mhbcplan.com](mailto:wcrown@mhbcplan.com) or 705-534-4635

**MHBC** Planning, Urban Design & Landscape Architecture

113 Collier Street | Barrie | ON | L4M 1H2 | T 705 728 0045 x 235 | F 705 728 2010 | [wcrown@mhbcplan.com](mailto:wcrown@mhbcplan.com)

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**[EXTERNAL]**

**From:** [Kirsten McFarlane](#)  
**To:** [jmdegasperis@tacc.com](mailto:jmdegasperis@tacc.com)  
**Cc:** [Josh Maitland](#); [Michael Mikael](#)  
**Subject:** FW: Notice of Public Information Centre - Angus Infrastructure Master Plan  
**Date:** Tuesday, August 2, 2022 10:26:00 AM  
**Attachments:** [image002.jpg](#)  
[Angus IMP PIC Presentation 07-14-22 - FINAL.pdf](#)  
[image001.jpg](#)  
[image003.png](#)

---

Good Morning Julian,

The slides from the PIC presentation for the Angus Infrastructure Master Plan are attached.

Sincerely,

**Kirsten McFarlane**

Environmental Analyst

Tel: (705) 444-8805 ext. 267



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**From:** Josh Maitland <[jmaitland@grnland.com](mailto:jmaitland@grnland.com)>  
**Sent:** Tuesday, August 2, 2022 10:17 AM  
**To:** Kirsten McFarlane <[kmcfarlane@grnland.com](mailto:kmcfarlane@grnland.com)>  
**Cc:** Michael Mikael <[mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)>  
**Subject:** FW: Notice of Public Information Centre - Angus Infrastructure Master Plan

Hi Kirsten,

Can you please send the final slide deck to Julian below (same which you provided to the other requester)?

Sincerely,

**Josh Maitland, P.Eng.**

Project Manager



(705) 790 6300 (Mobile)



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**From:** Julian De Gasperis <[jmdegasperis@tacc.com](mailto:jmdegasperis@tacc.com)>

**Sent:** July 29, 2022 12:41 PM

**To:** Josh Maitland <[jmaitland@grnland.com](mailto:jmaitland@grnland.com)>; [mmikael@essatownship.on.ca](mailto:mmikael@essatownship.on.ca)

**Subject:** Notice of Public Information Centre - Angus Infrastructure Master Plan

Hello can you please share information from this meeting?

Best regards,

**Julian De Gasperis** M.B.A., P.L.E.  
Director, Land Development



600 Applewood Crescent  
Vaughan, ON L4K 4B4

**t** 905.760.7300

**f** 905.669.9600

**e** [jmdegasperis@tacc.com](mailto:jmdegasperis@tacc.com)

[taccdevelopments.com](http://taccdevelopments.com)

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## **Appendix B**

Model Development

Supporting Data



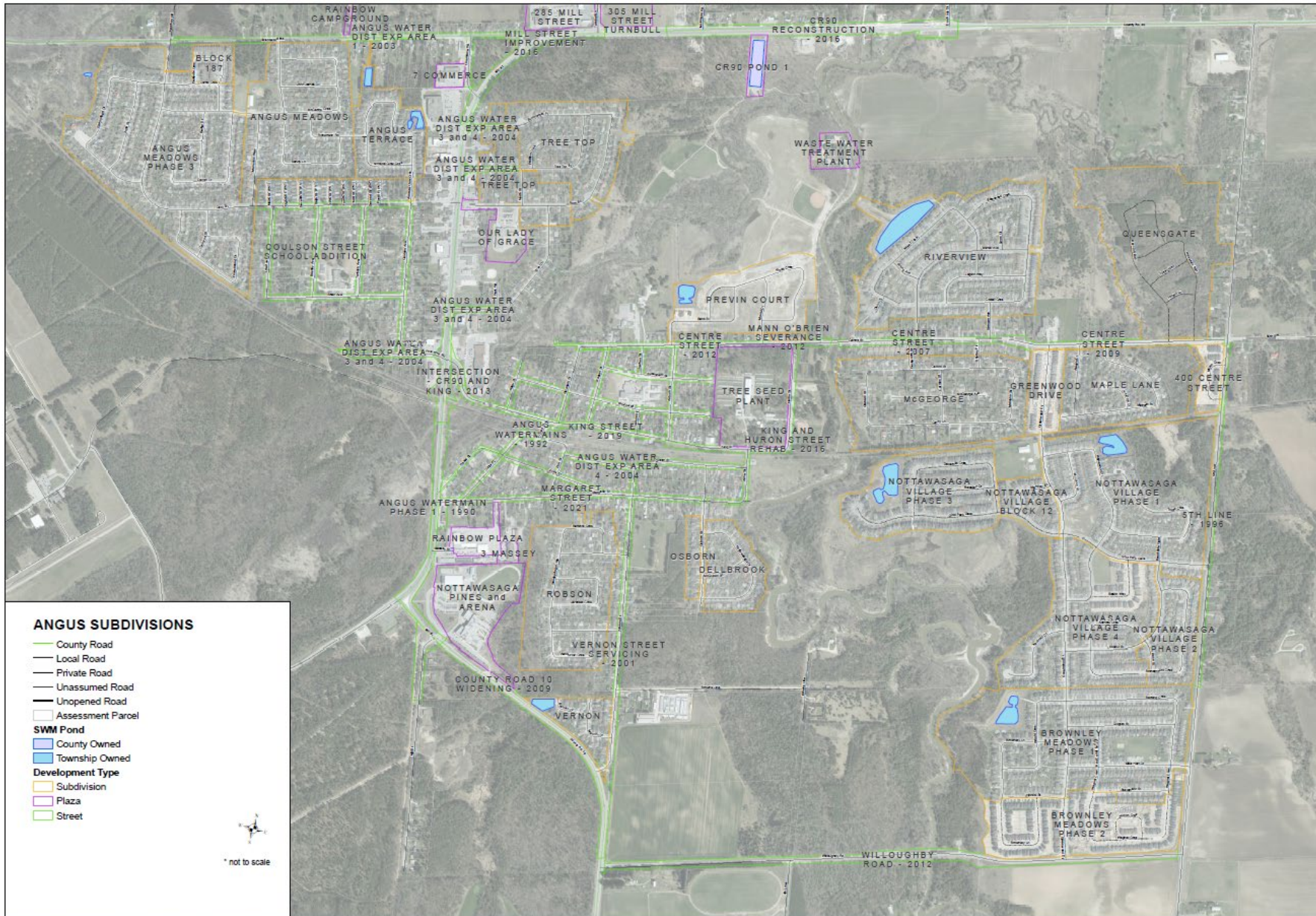


Figure 1 As Built Drawings Provided by Essa Township

**B-1 Pump Stations**

**a. Sewage Pumping Station No. 1**

- 2 x Flygt (Model CT3231) submersible pumps on Variable Frequency Drives (VFDs)
- 159 Liters/second at 31.8 meters Total Dynamic Head (TDH)
- 90 hp / 1150 rpm / 600 volts / 3 phase / 60 hz
- a wetwell/drywell type pumping station located at 131 Elizabeth Street

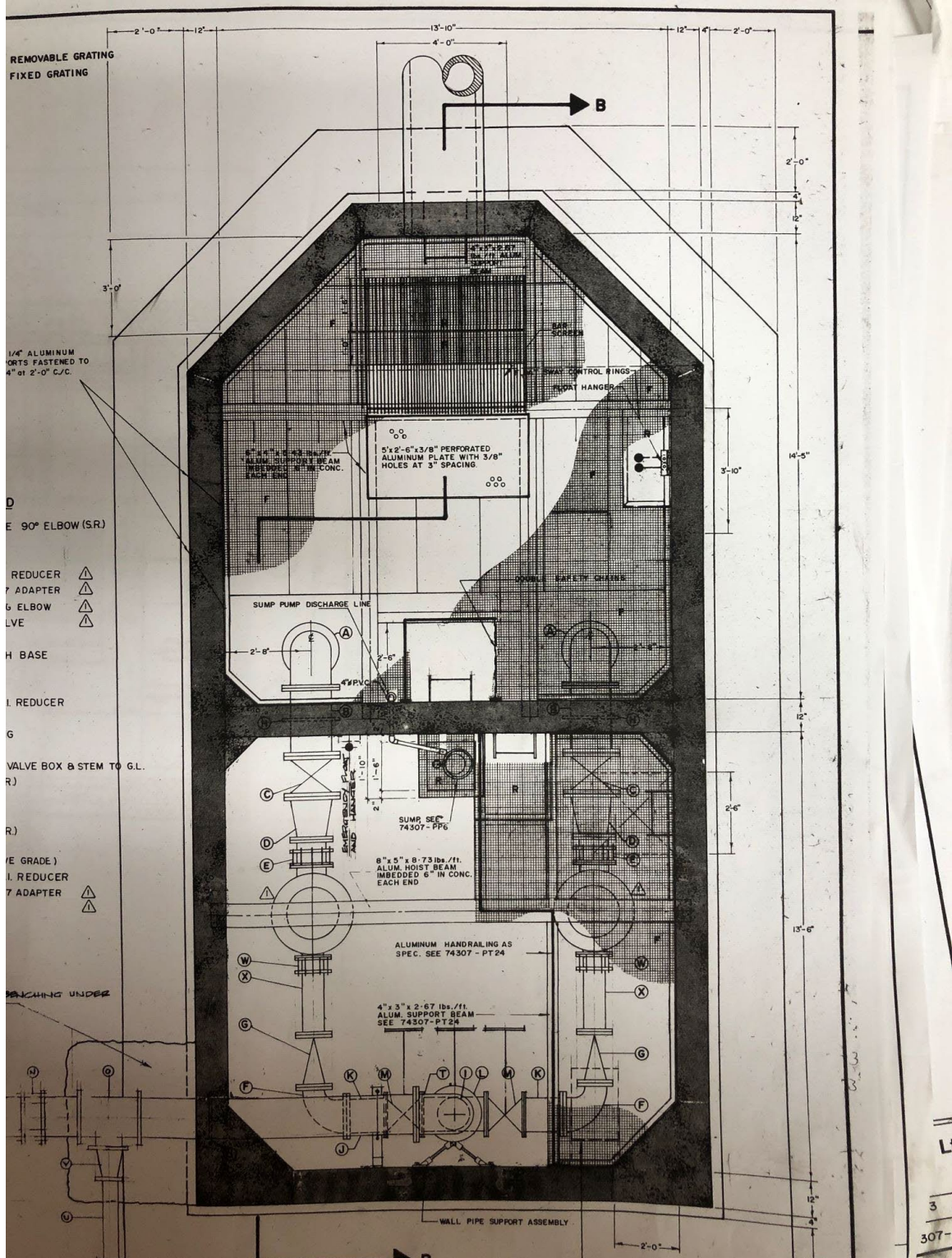


Figure 2 SPS 1 Design Cross Section A

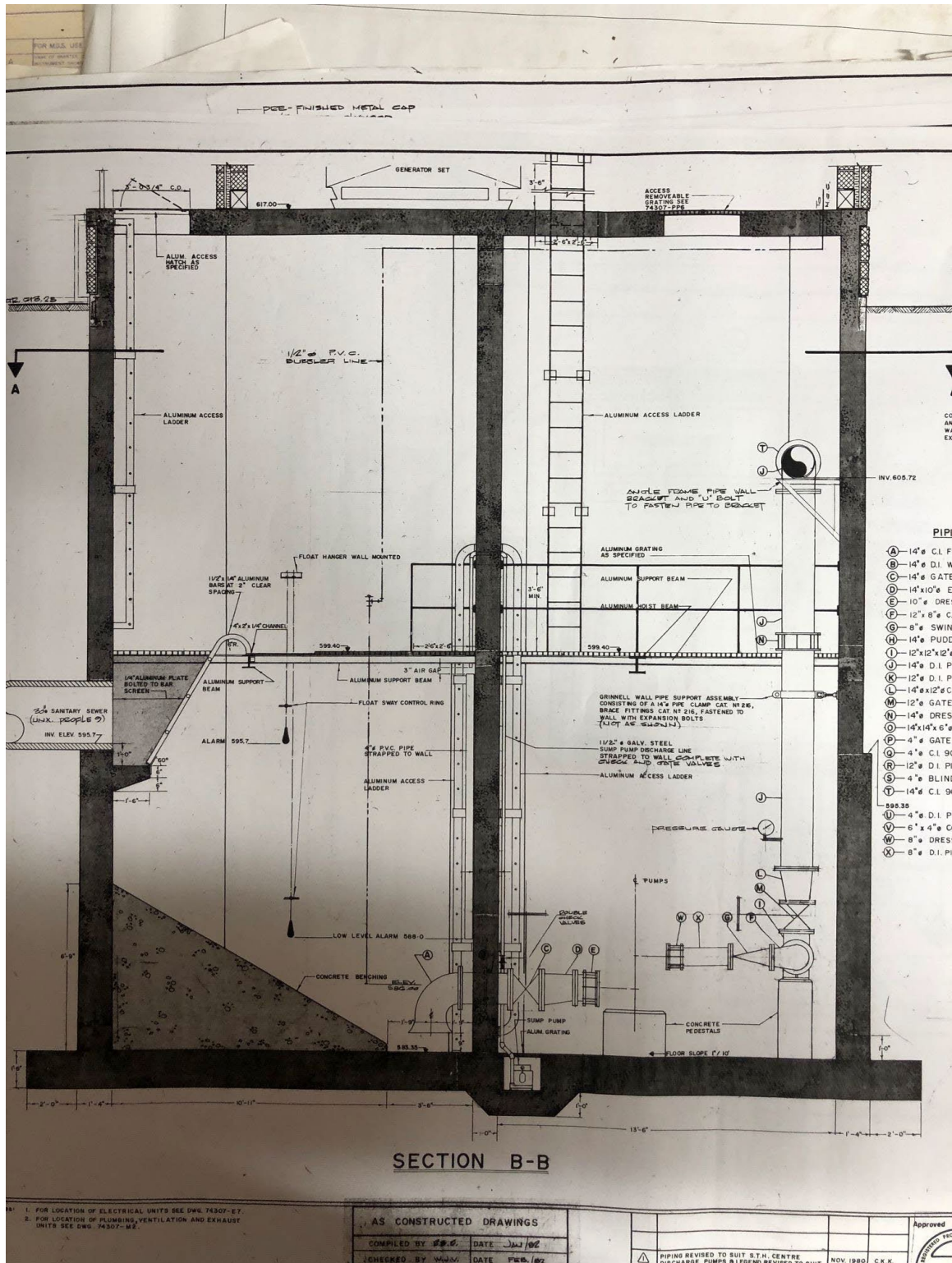


Figure 3 SPS 1 Design Cross Section B

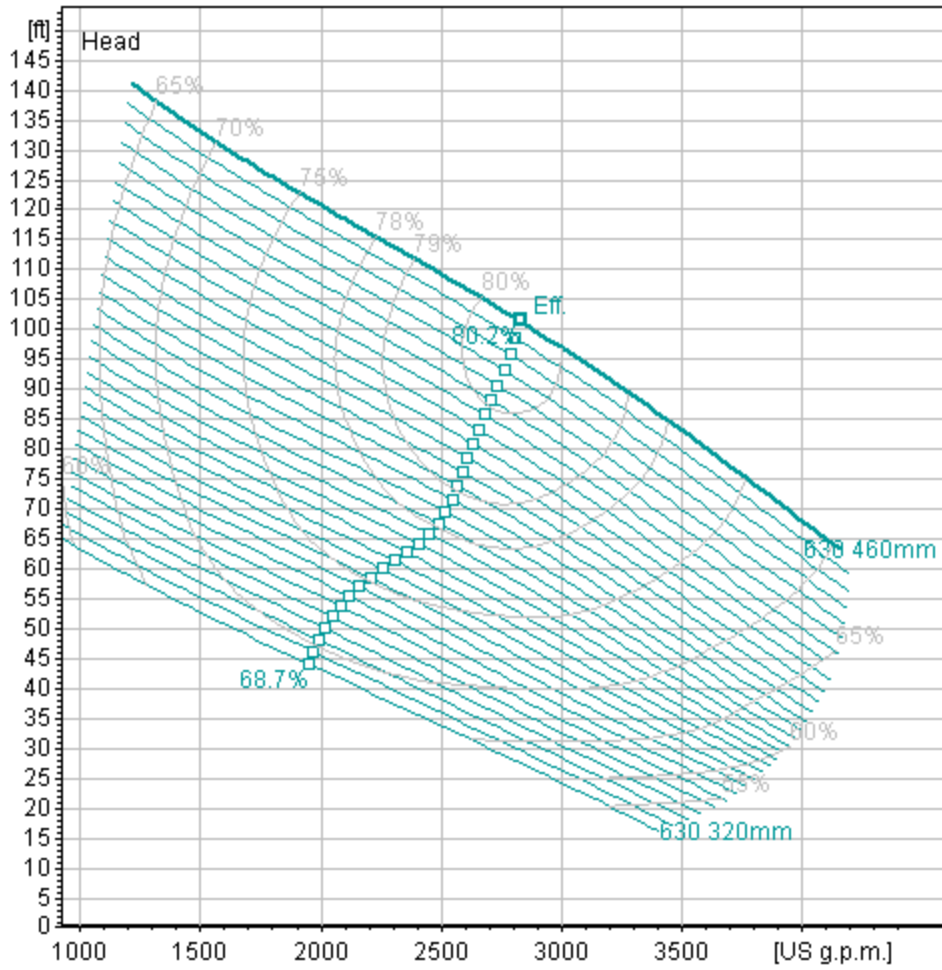


Figure 4 SPS 1 Pump Performance Curve (Imperial)



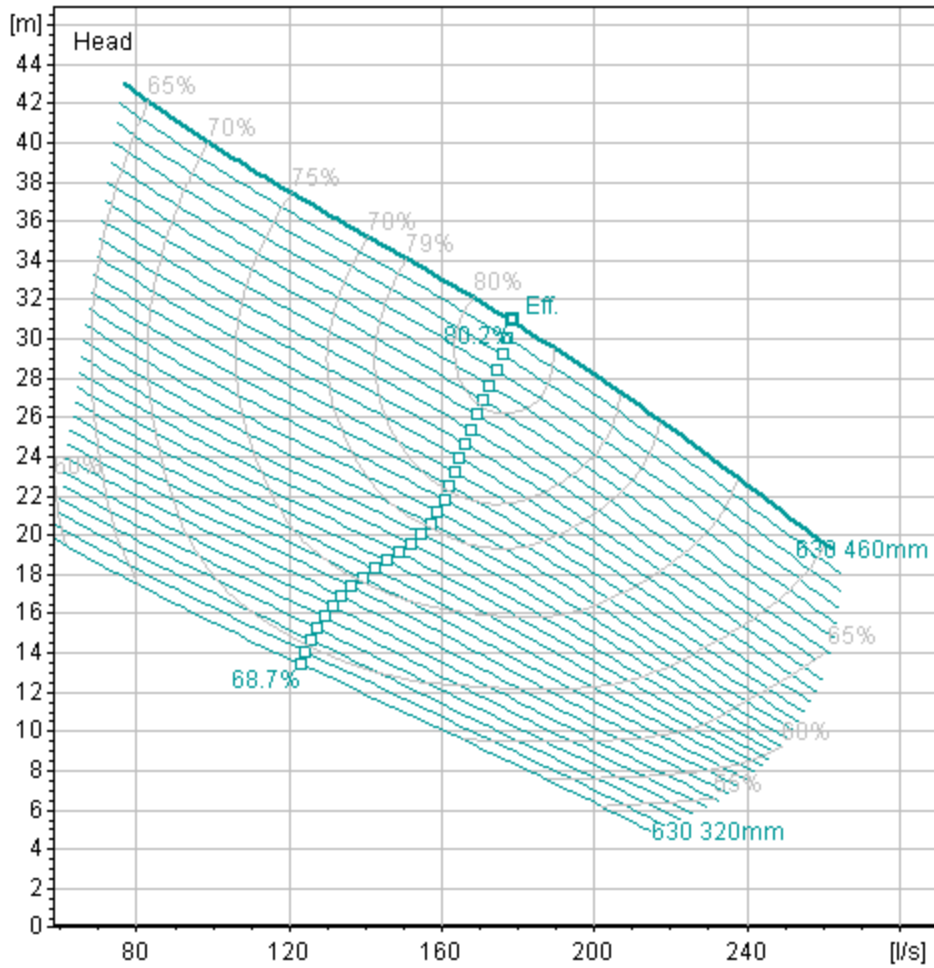


Figure 5 SPS 1 Pump Performance Curve (Metric)

**b. Sewage Pumping Station No. 2**

- 2 x Flygt (Model NP3202) non-clogging submersible pumps on VFDs
- 89.8 Liters/second at 27.8 meters TDH
- 60 hp / 1775 rpm / 600 volts / 3 phase / 60 hz
- a 3.0 m x 4.0 m x 9.0 m deep wetwell type pumping station located at 19 Centre Street,

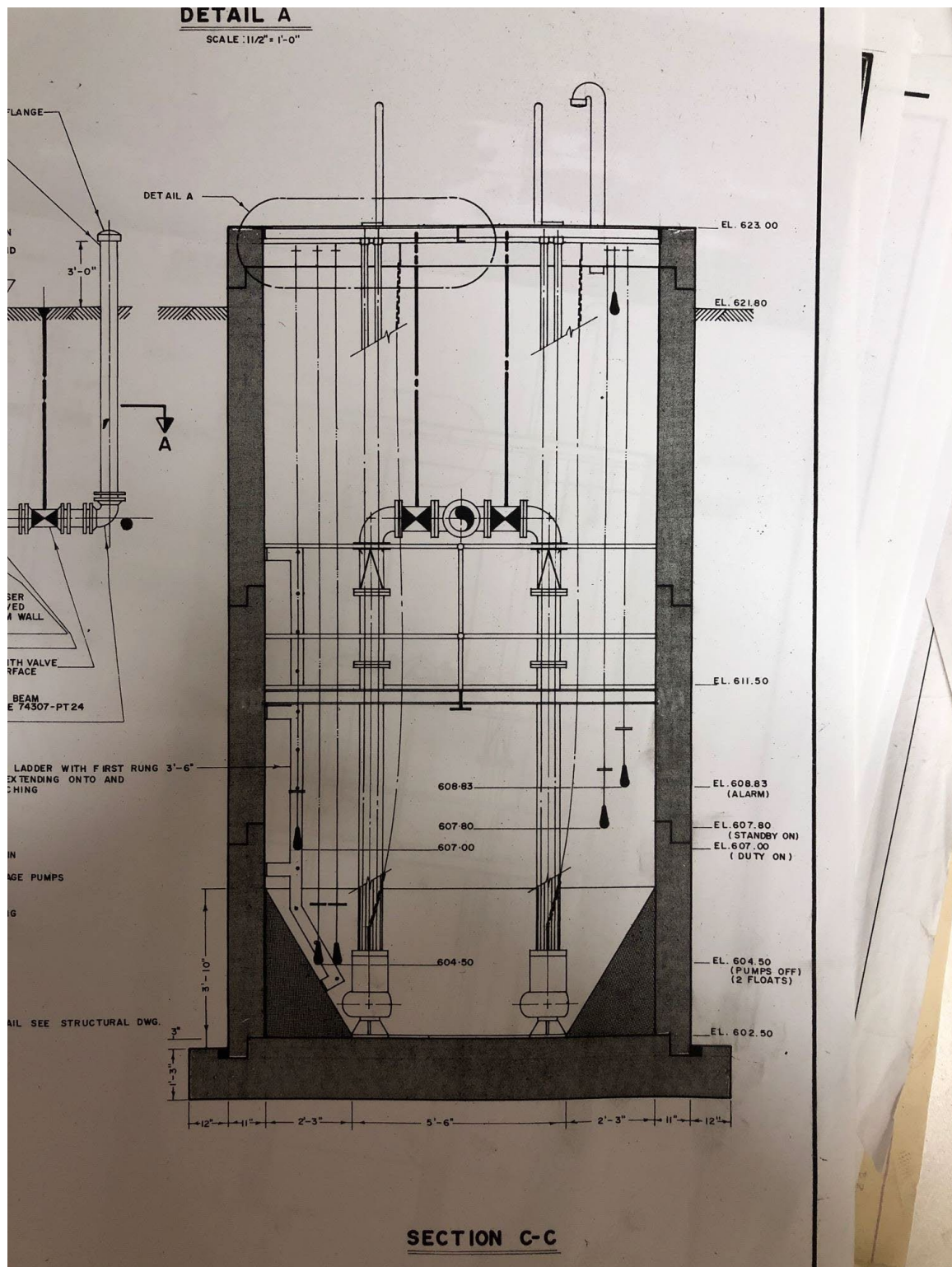


Figure 6 SPS 2 Design Cross Section C

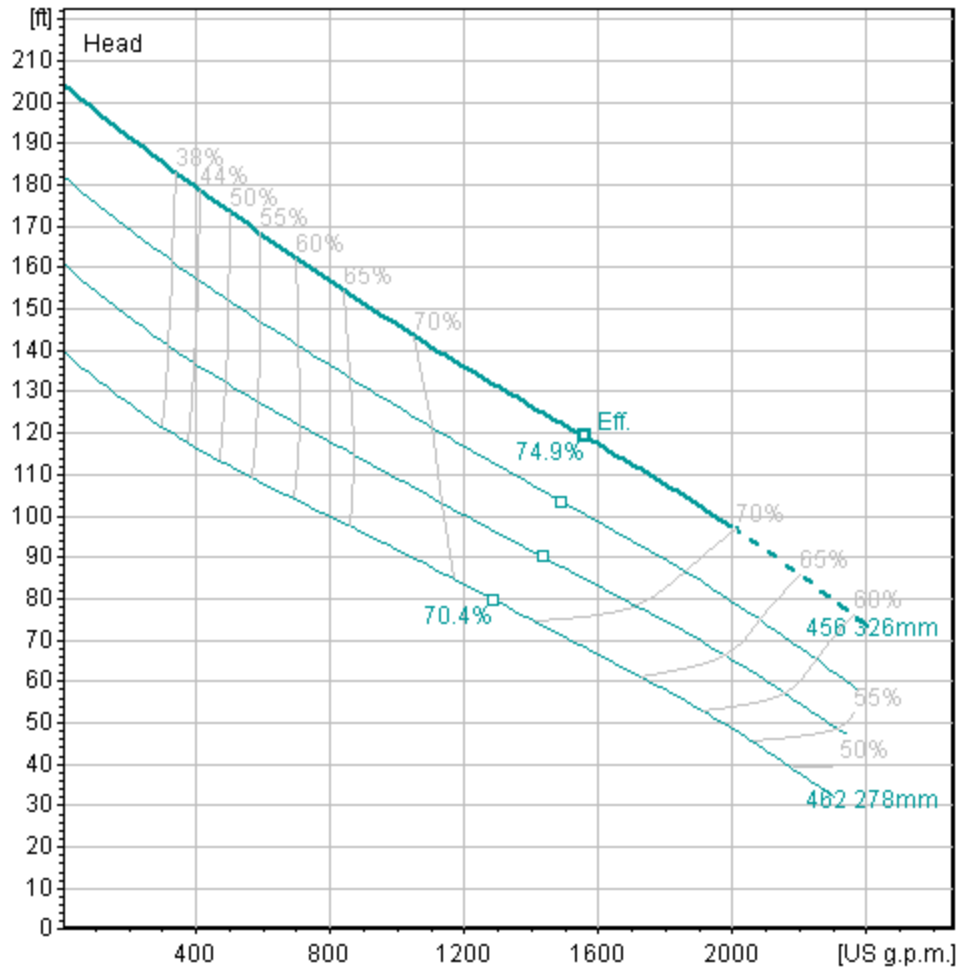


Figure 7 SPS 2 Pump Performance Curve (Imperial)

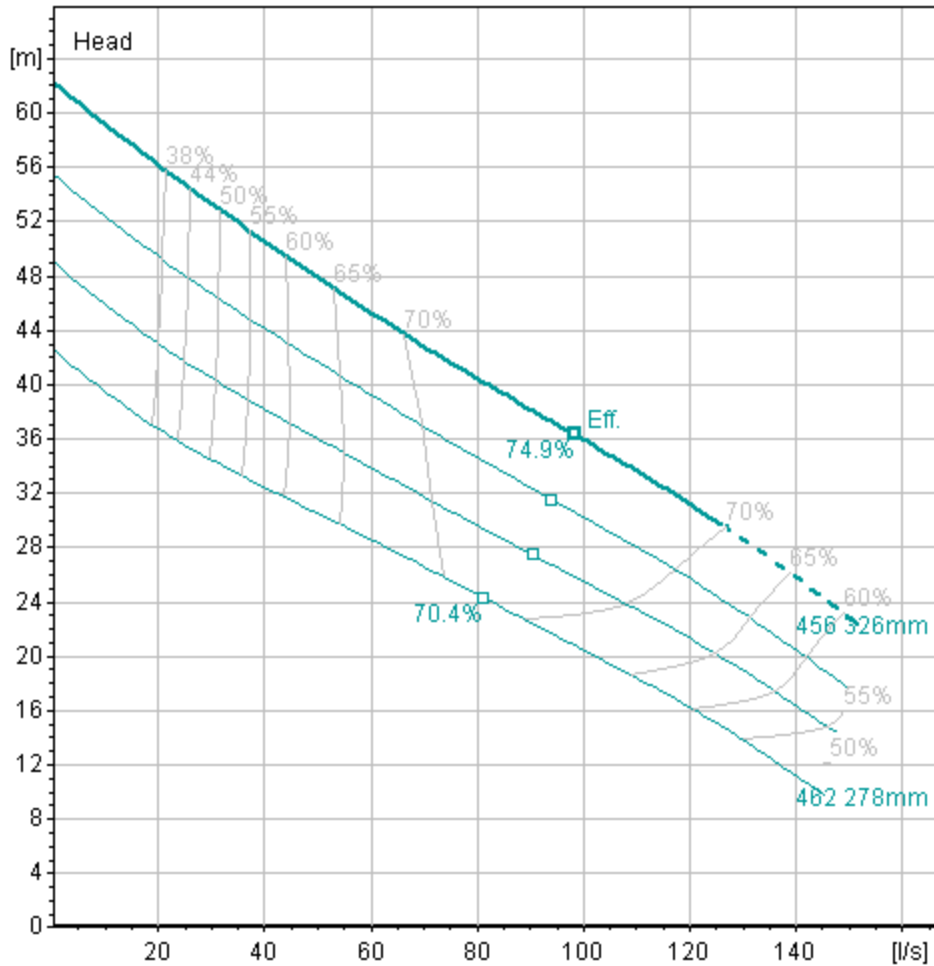


Figure 8 SPS 2 Pump Performance Curve (Metric)

**c. Sewage Pumping Station No. 3**

- 2 x GSW Barnes (Model 4 SHE-505) submersible pumps
- 37.0 Liters/second at 6.4 meters TDH
- 7.5 hp / 1750 rpm / 600 volts / 3 phase / 60 hz
- a 3.0 m diameter wetwell type pumping station located at Mill Street and Commerce Road

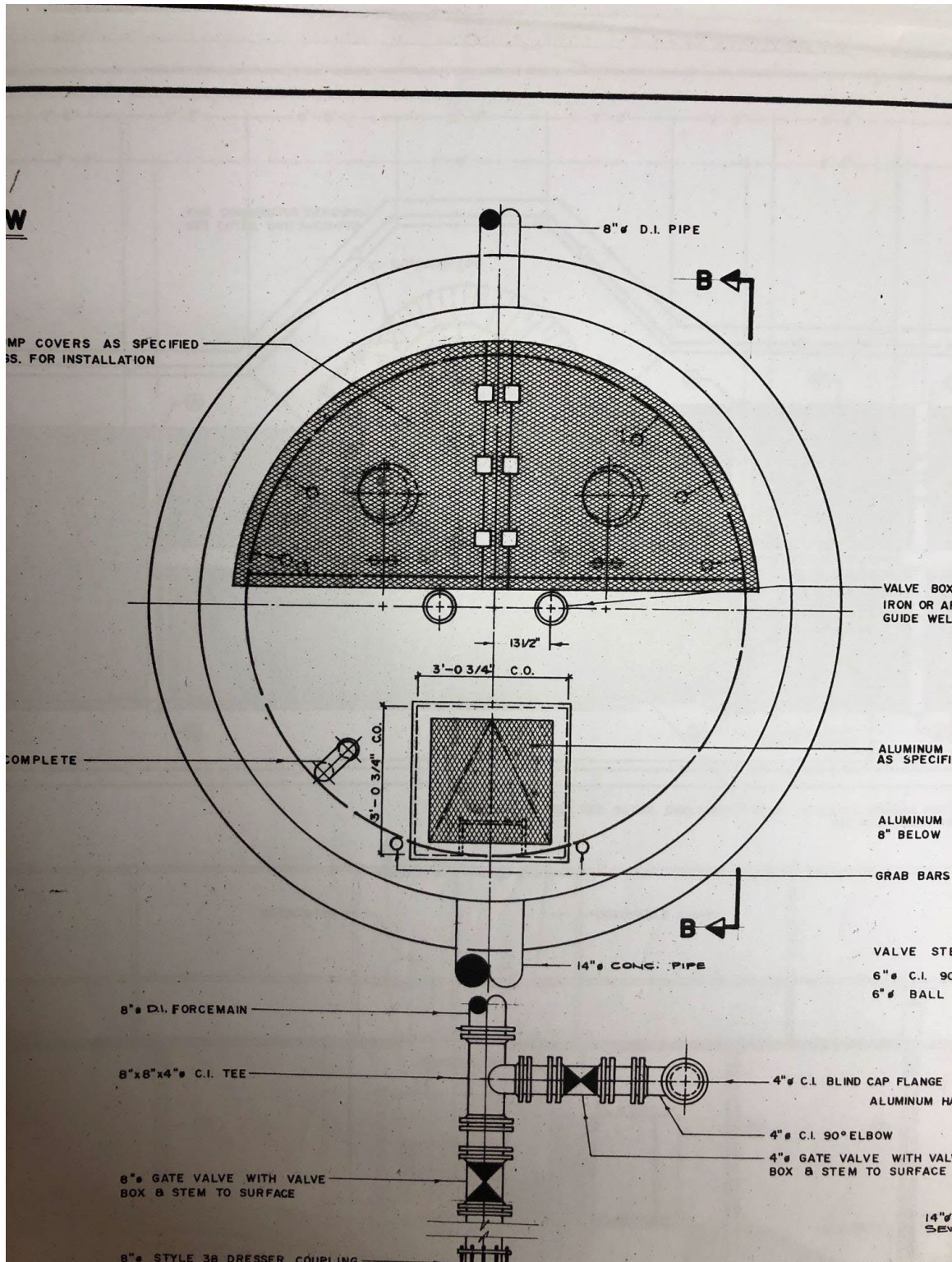


Figure 9 SPS 3 Design Cross Section B

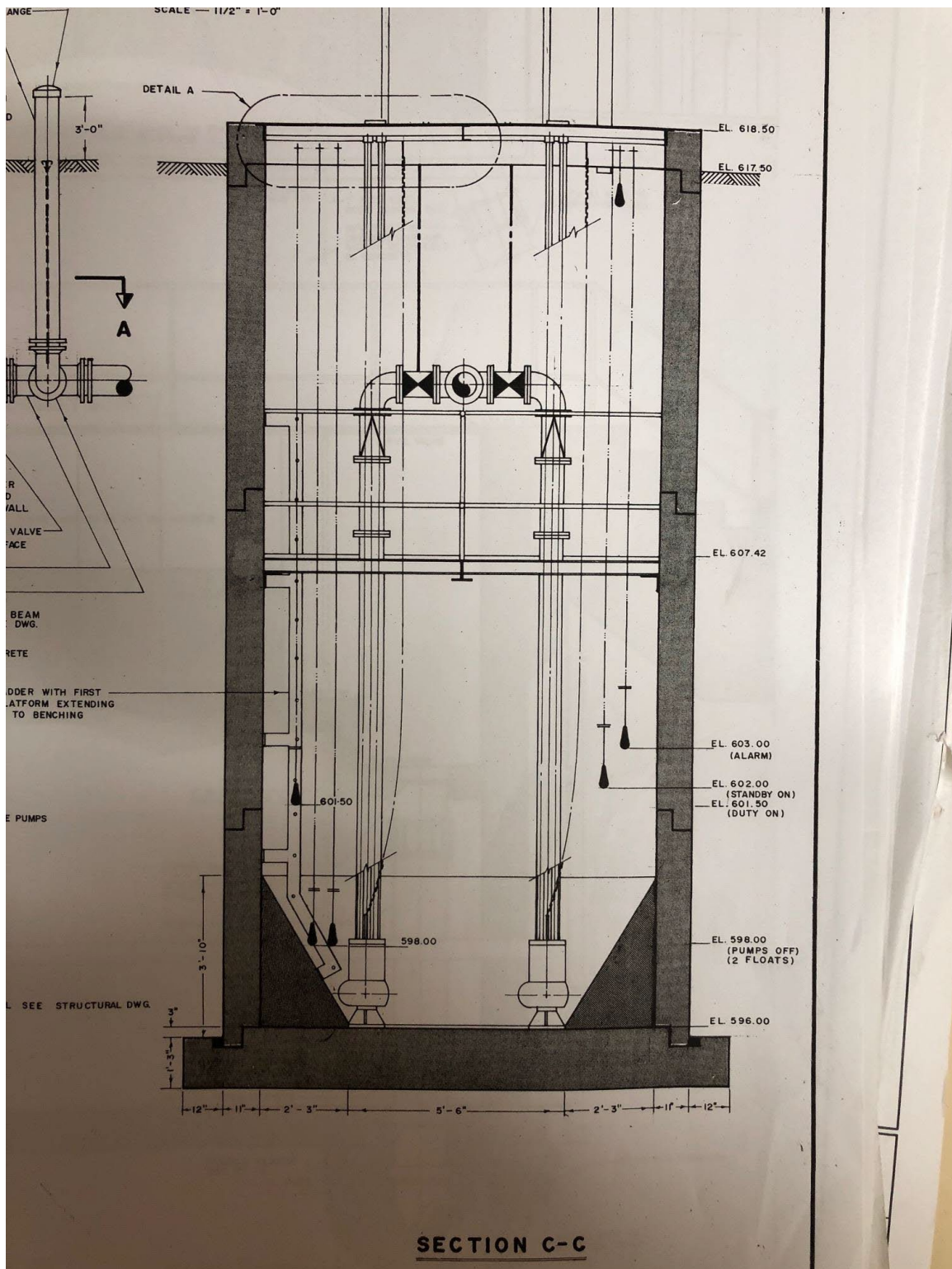


Figure 10 SPS 3 Design Cross Section C

**d. Sewage Pumping Station 305 Mill Street**

- 2 x Flygt (Model DP3068) submersible pumps
- 3.6 Liters/second at 8.2 meters TDH
- 2.4 hp / 208 volts / 3 phase / 60 hz
- a 1.5 m diameter wetwell type pumping station located at 305 Mill Street.

## SANITARY PUMPING STATION DESIGN NOTES

1. THE PROPOSED SPS WILL CONSIST OF A PREFABRICATED WET WELL EQUIPPED WITH TWO SUBMERSIBLE SEWAGE PUMPS, ACCESS LADDERS, LANDING, AND CHAIN HOIST. PLAN AND ELEVATION VIEWS OF THE SPS ARE AS SHOWN ON THIS DRAWING.

2. PUMP SELECTION

THE PUMPS' DUTY POINT WILL BE 3.6 L/s AT 8.2 M TOTAL DYNAMIC HEAD (TDH). EACH PUMP WILL BE EQUIPPED WITH A 1.8 KW CONSTANT SPEED MOTOR. THE PUMPS WILL OPERATE IN AN ALTERNATING DUTY/STANDBY CONFIGURATION TO PROVIDE 100% STANDBY CAPACITY. THE PUMPS WERE SELECTED BASED ON THE DESIGN FLOWS AND SYSTEM-HEAD CURVE DEVELOPED FOR THE 50 mm DIAMETER FORCEMAIN. THEY ARE SUMMARIZED BELOW.

MODEL: FLYGT DP-3068  
CAPACITY: ONE PUMP - 3.6 L/S AT 8.2 M TDH (60 HZ)  
MODEL: 1.8 KW (2.4 HP)  
ELECTRICAL SERVICE: 208 V / 3  $\phi$  / 60 HZ  
IMPELLER DIAMETER: 145 mm

3. WET WELL SIZING AND OPERATING VOLUMES

THE WET WELL WILL CONSIST OF A PRE-FABRICATED CYLINDRICAL FIBERGLASS WET WELL 1.5 m IN DIAMETER AND 5.14 m DEEP, PROVIDING AN INTERNAL AREA OF 1.8 m<sup>2</sup>.

AS SHOWN IN TABLE 1, THIS WET WELL DESIGN MEETS THE MOE DESIGN GUIDELINES FOR A MINIMUM CYCLE TIME OF 10 MINUTES FOR EACH PUMP, OR AN OPERATING VOLUME IN CUBIC METRES EQUAL TO 15% OF THE PUMP CAPACITY IN LITRES PER SECOND, AND A FILL TIME AT THE AVERAGE DAILY DESIGN FLOW BELOW 30 MINUTES.

TABLE 1: WET WELL VOLUMES AND OPERATING DEPTHS

SURFACE PLAN AREA (m <sup>2</sup> )	AVERAGE DAILY DESIGN FLOW (L/s)	FIRM PUMPING CAPACITY (L/s)	OPERATING VOLUME (L)	OPERATING DEPTH (m)	FILL TIME (min)
1.8	1.3	3.6	540	0.3	6

4. WET WELL LEVEL AND CONTROL SETTINGS

IN ORDER TO ADEQUATELY SIZE THE WET WELL, THE FOLLOWING OPERATING LEVELS AND CONTROLS WERE CALCULATED BASED ON THE CAPACITY OF THE SPS. THEY WILL BE REFINED WITH THE OPERATORS.

TOP OF THE WET WELL	188.28m
PROPOSED FINISHED GRADE	188.00m
OUTLET SEWER INVERT	186.40m
INLET SEWER INVERT - PIPE 1	184.41m
INLET SEWER INVERT - PIPE 2	184.41m
HIGH LEVEL ALARM	184.21m
START DUTY PUMP	184.06m
STOP DUTY PUMP	183.75m
LOW LEVEL ALARM/PUMP LOCKOUT	183.71m
BOTTOM OF WET WELL	183.14m

THE TOTAL DEPTH OF THE WET WELL BELOW GRADE WILL BE 5.14 m. IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY REQUIREMENTS, A "SHAFT" GREATER THAN 6 M DEEP MUST HAVE LANDING/REST PLATFORMS AT LEAST EVERY 4.5 m. ALTHOUGH THE WET WELL WILL BE LESS THAN 6 m DEEP, IT IS PROPOSED TO PROVIDE ONE PLATFORM AT ELEVATION 185.00m.

TWO FLOAT SWITCHES HARD-WIRED TO THE PUMP MOTOR STARTERS, LOCATED AT THE HIGH AND LOW LEVELS, WILL MONITOR THE LIQUID LEVEL IN THE WET WELL.

THE WET WELL WILL BE EQUIPPED WITH AUTOMATIC MECHANICAL VENTILATION FOR USE WHEN ACCESS TO THE WET WELL IS NECESSARY. ACCESS WILL BE PROVIDED BY WAY OF LADDERS.



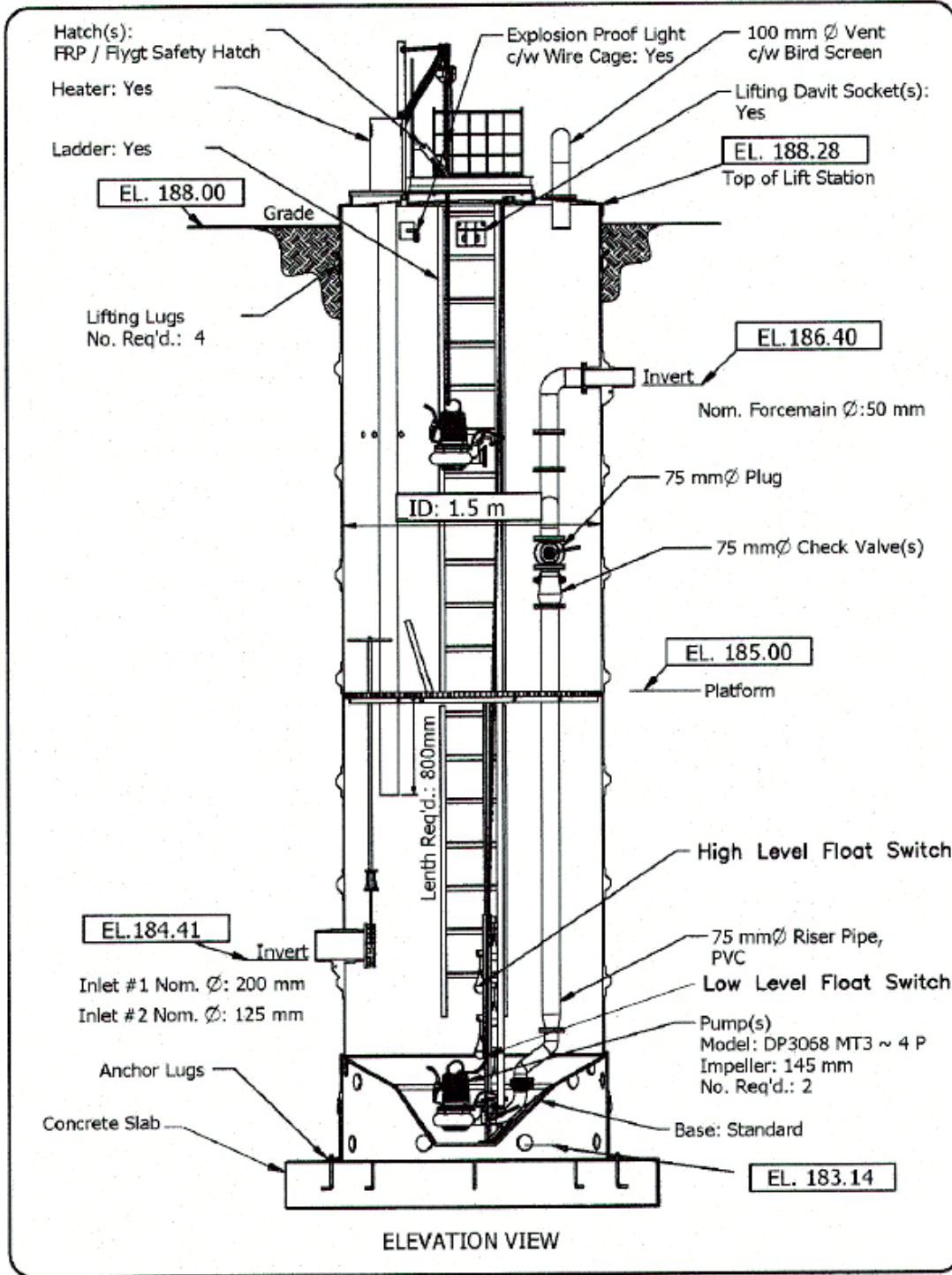


Figure 11 SPS 305 Mill St Design Cross Section

## DP 3068 MT 3Ph 470

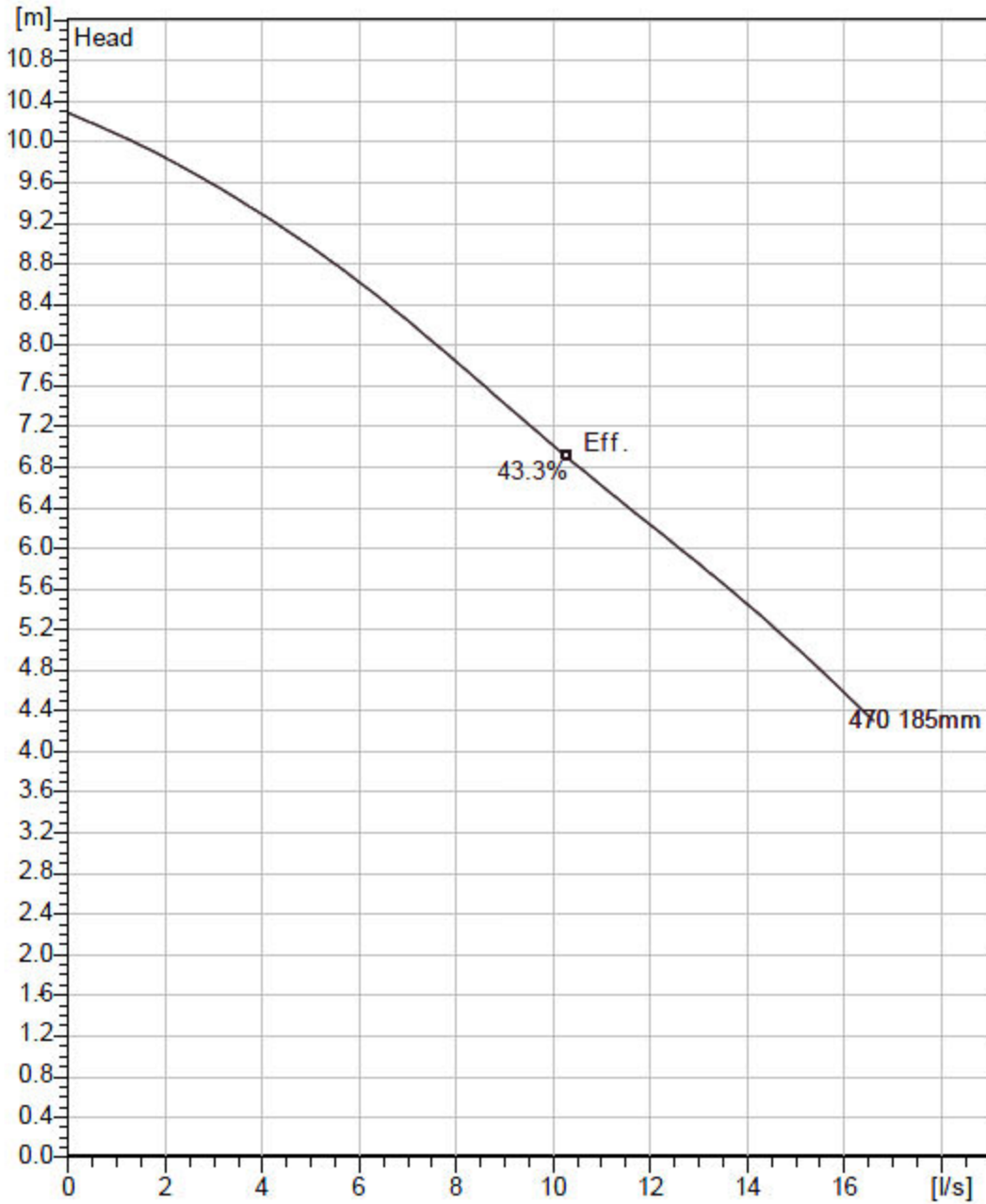


Figure 12 SPS 305 Mill St Pump Performance Curve (Metric)

**B-2 Sanitary Flow Data**

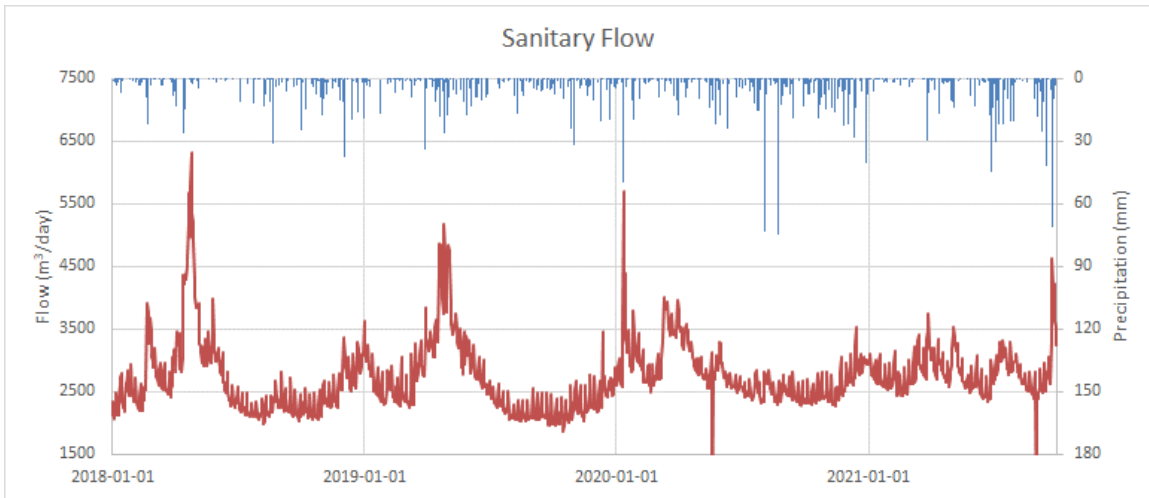


Figure 13 Sanitary Flow Data – 2018-2021

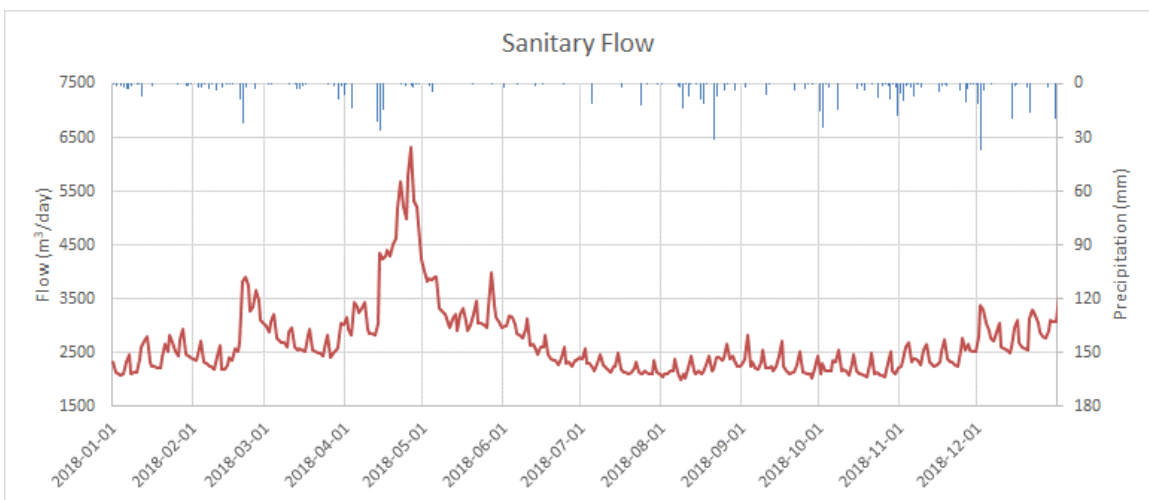


Figure 14 Sanitary Flow Data - 2018

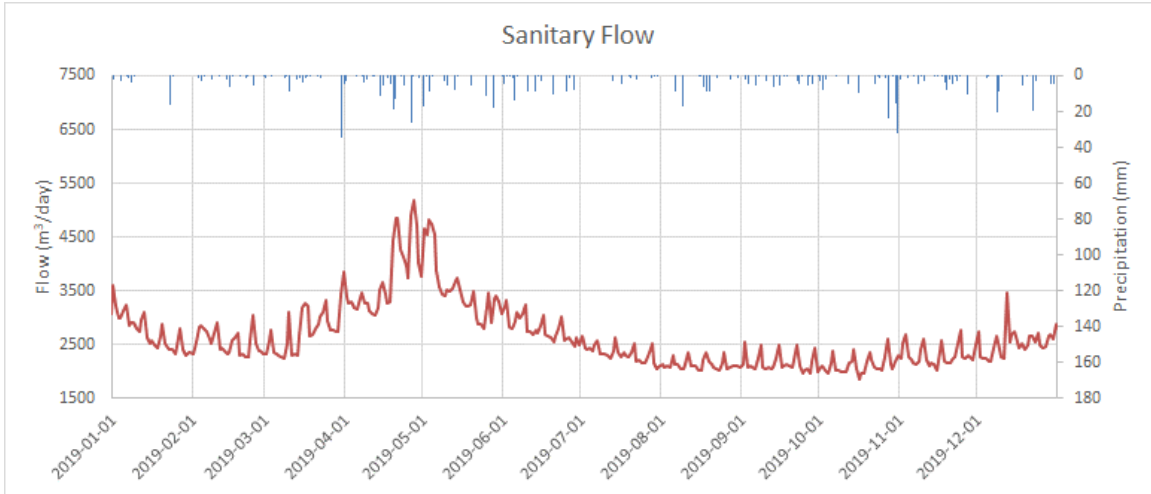


Figure 15 Sanitary Flow Data - 2019

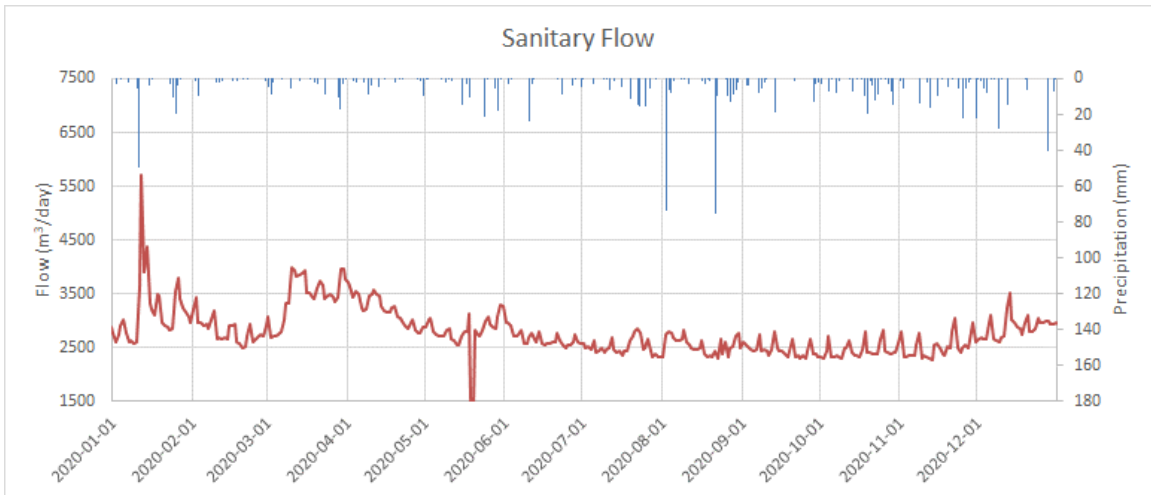


Figure 16 Sanitary Flow Data - 2020

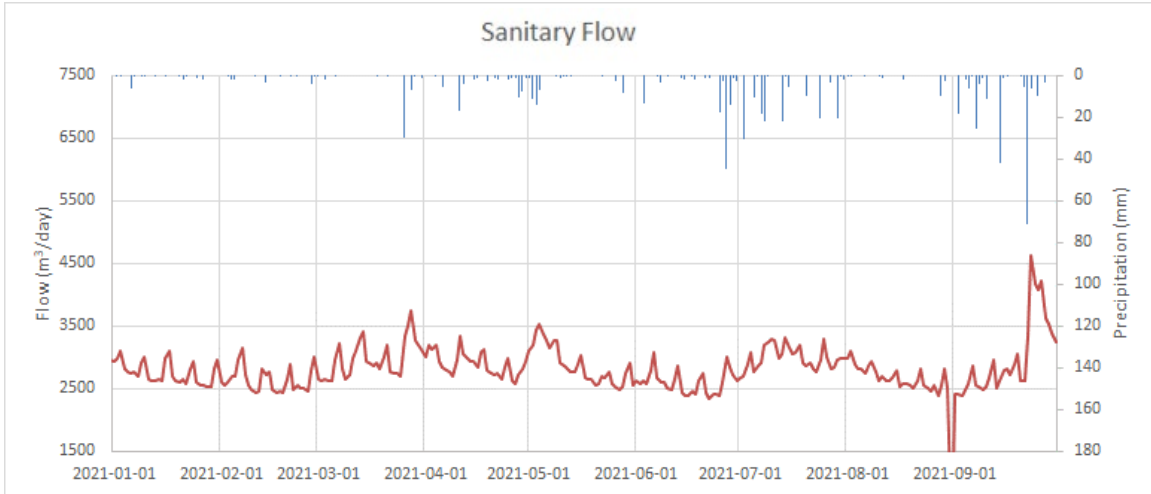


Figure 17 Sanitary Flow Data - 2021

## **Appendix C**

Existing Conditions Water

Model Results



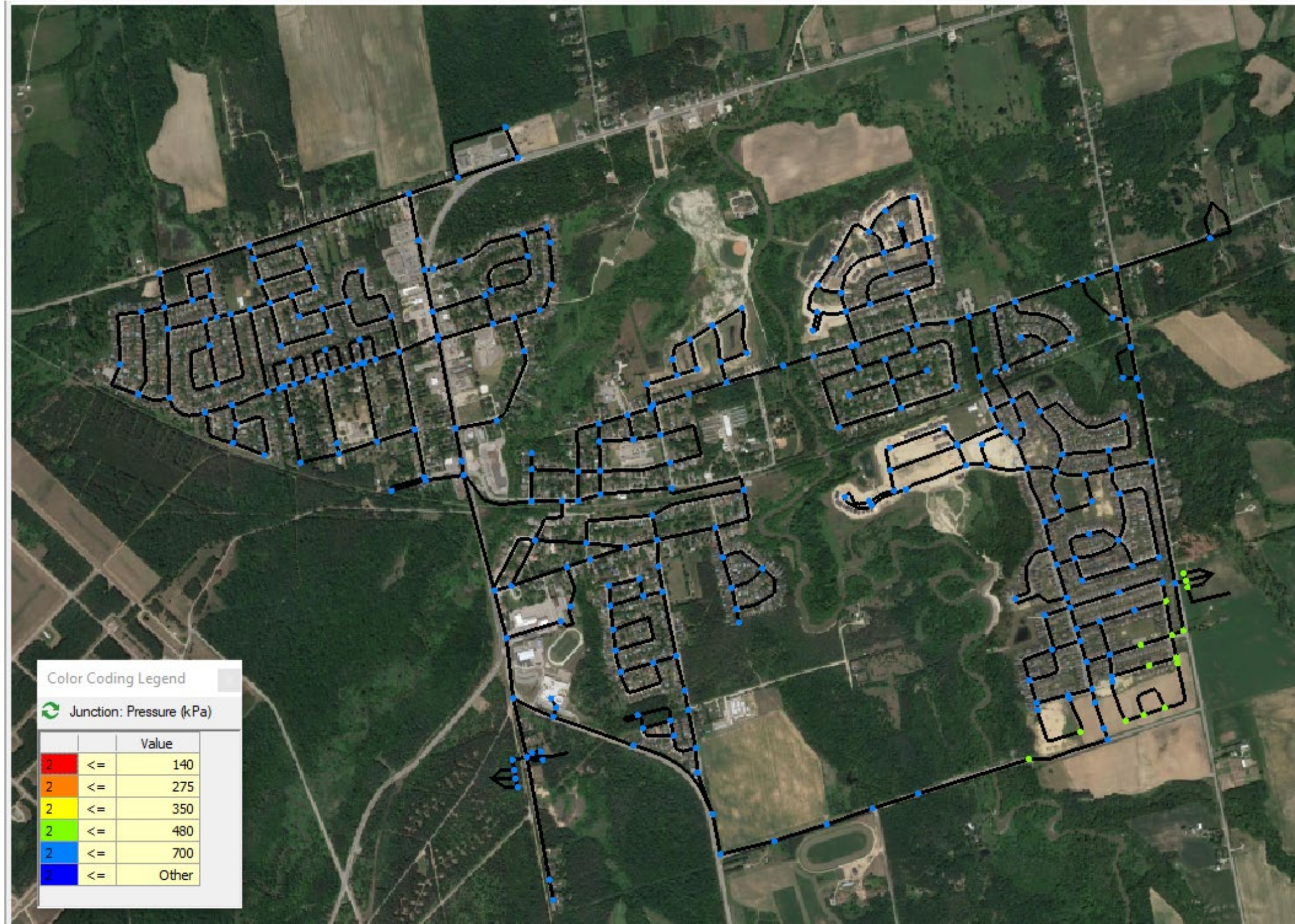


Figure 1 Existing Conditions, ADD Scenario



Figure 2 Existing Conditions, MDD Scenario



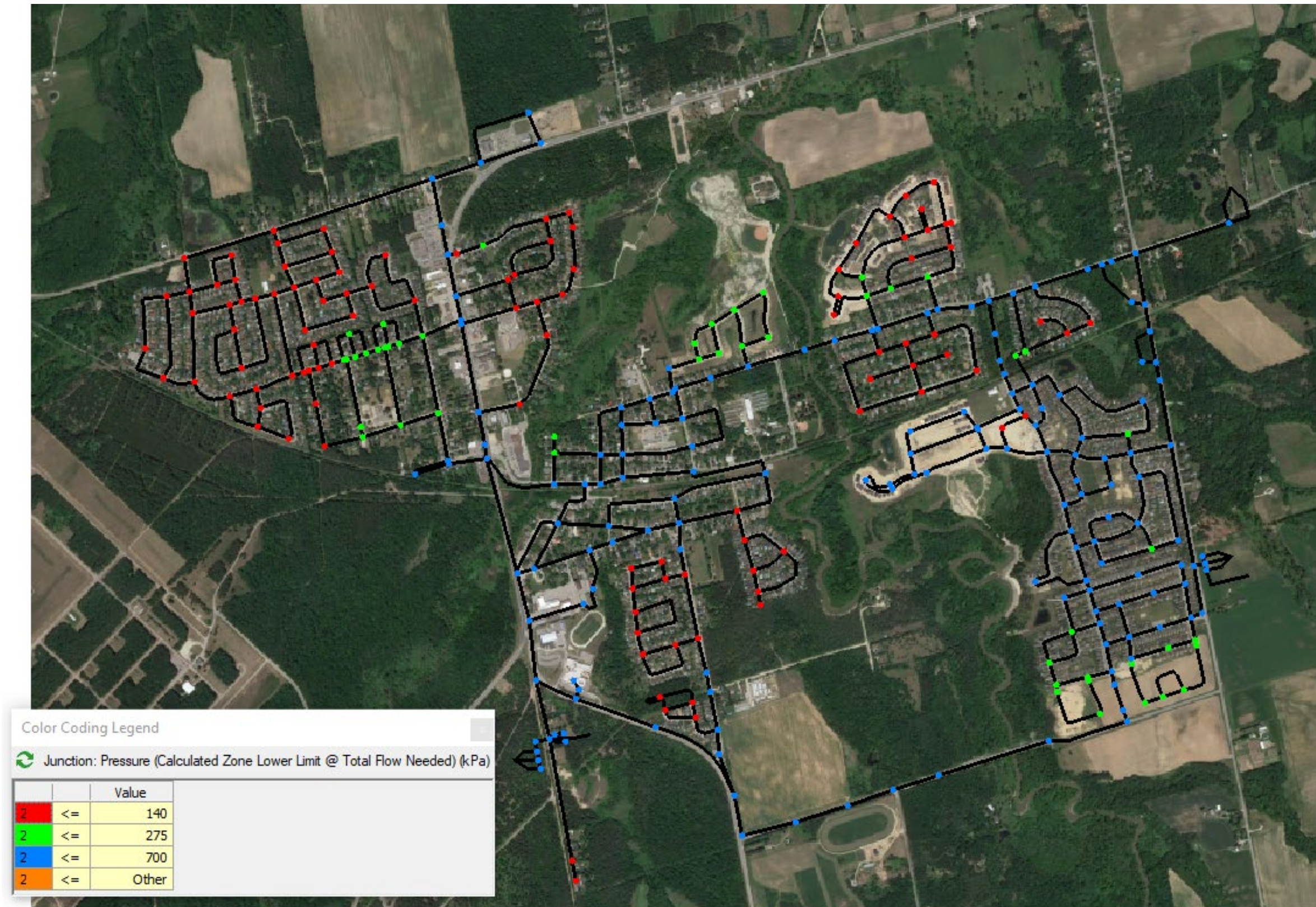


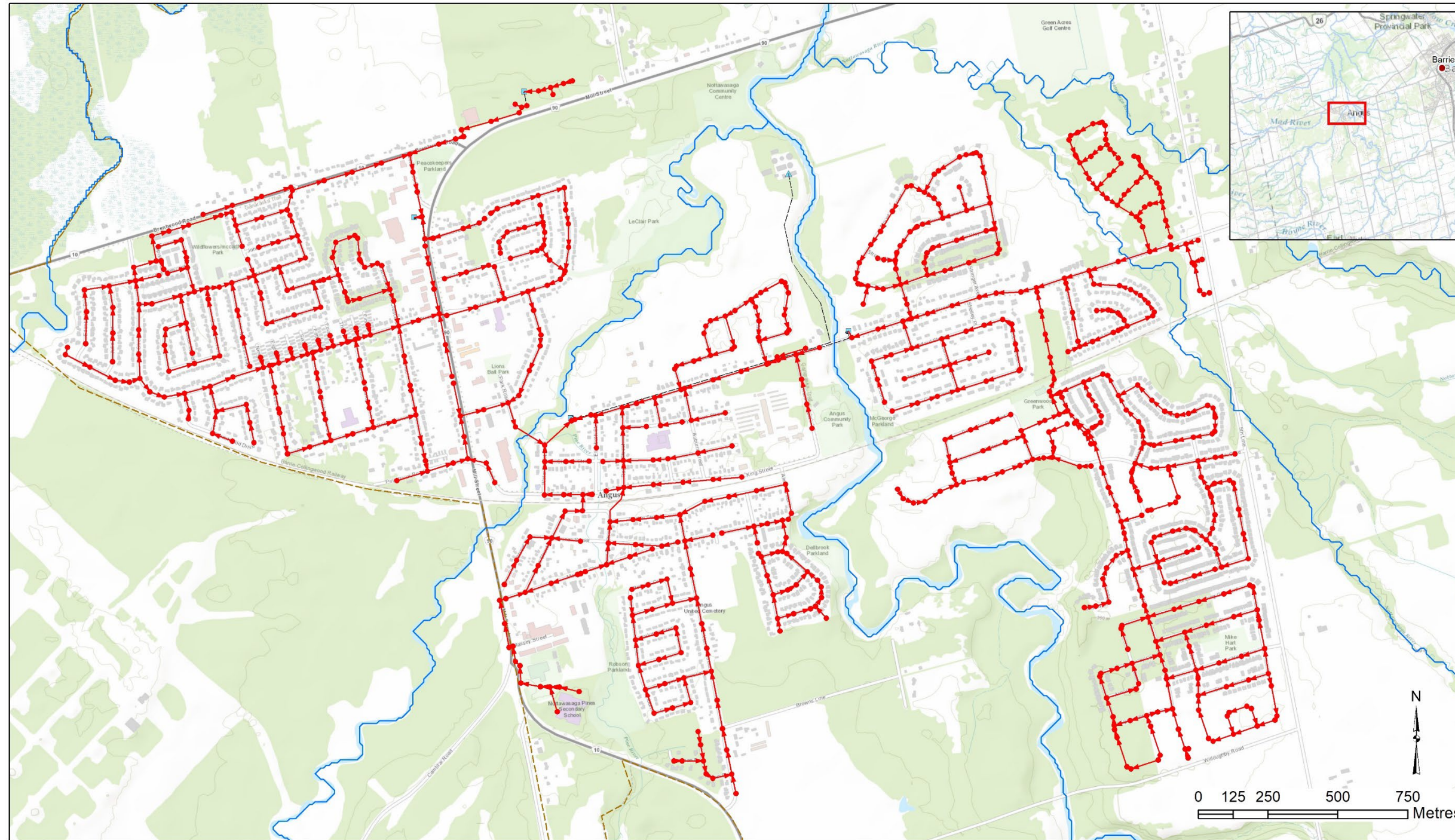
Figure 3 Existing Conditions, Fire Flow Scenario

## **Appendix D**

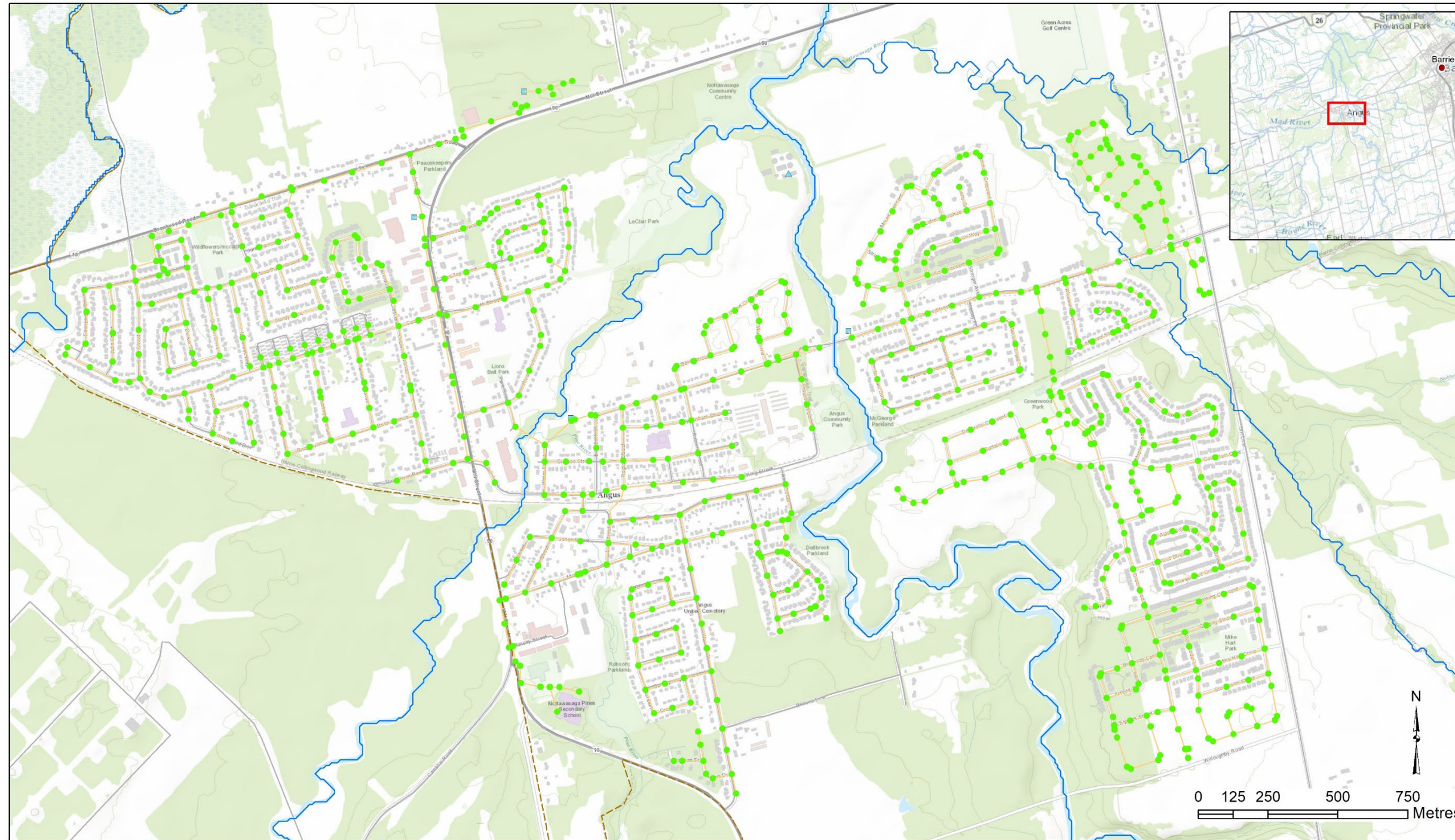
Existing Conditions

Sanitary Model Results





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									SCALE HOR 1:12,500 VERT	FIGURE NO
									DESIGN G. YANG DRAWN G. YANG	SHEET NO
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BENCH MARKS

NO	REVISIONS	DATE	APPROVED

\_\_\_\_\_  
 NVCA ENGINEER

**Legend**

- Stream
- Municipal
- None Flooding
- Flooding MH

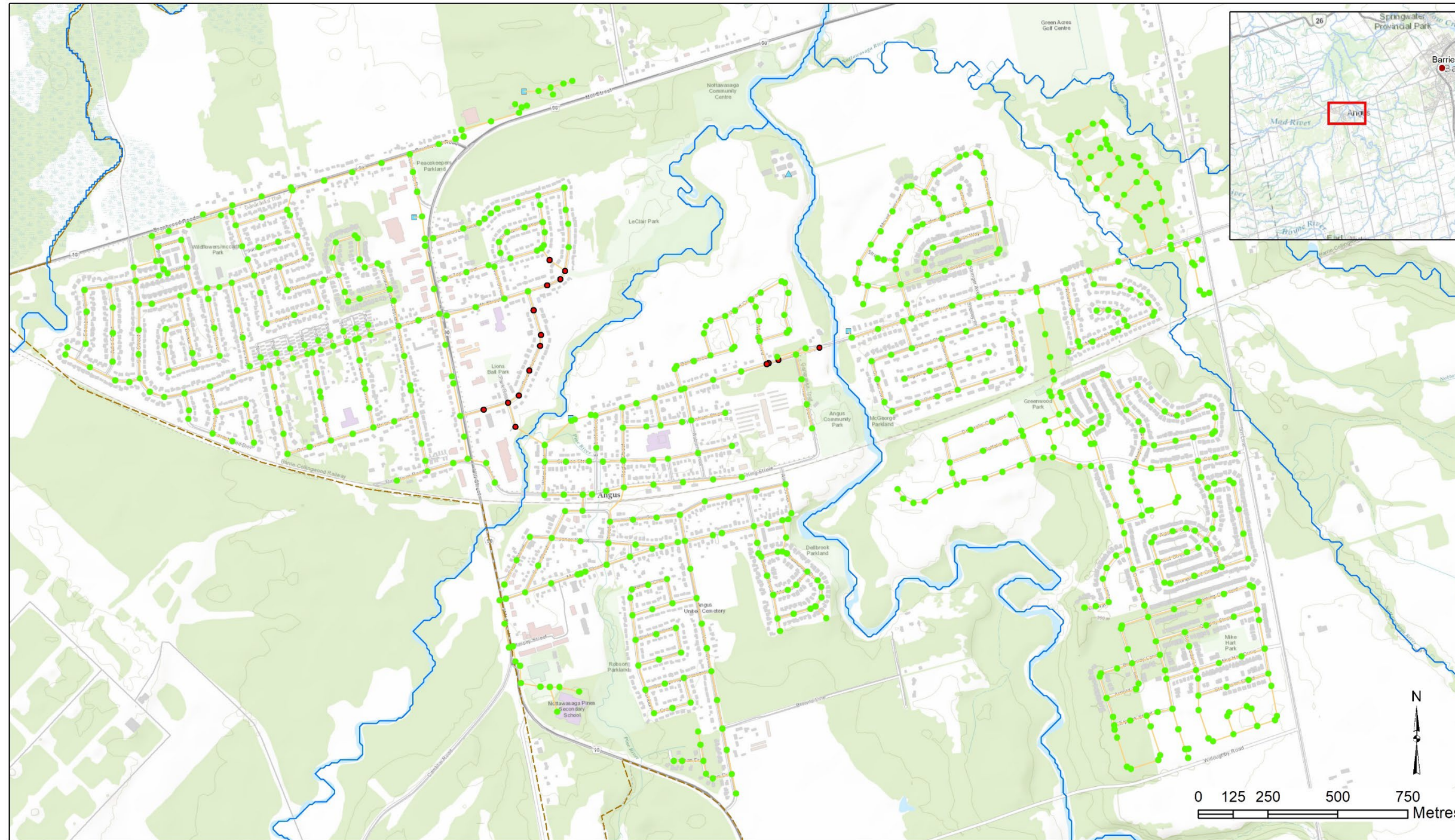
**ANGUS**

MH FLOODING

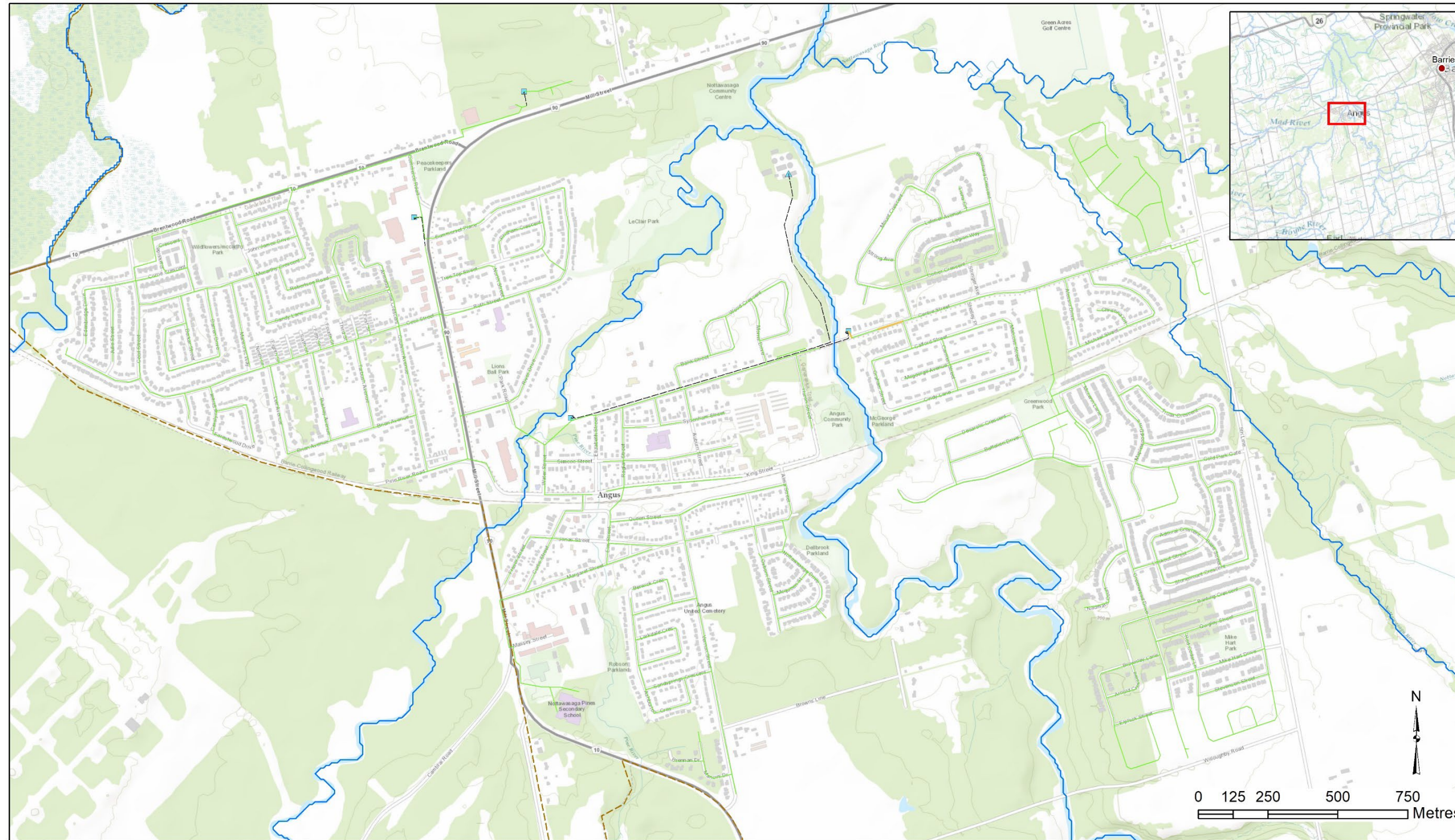


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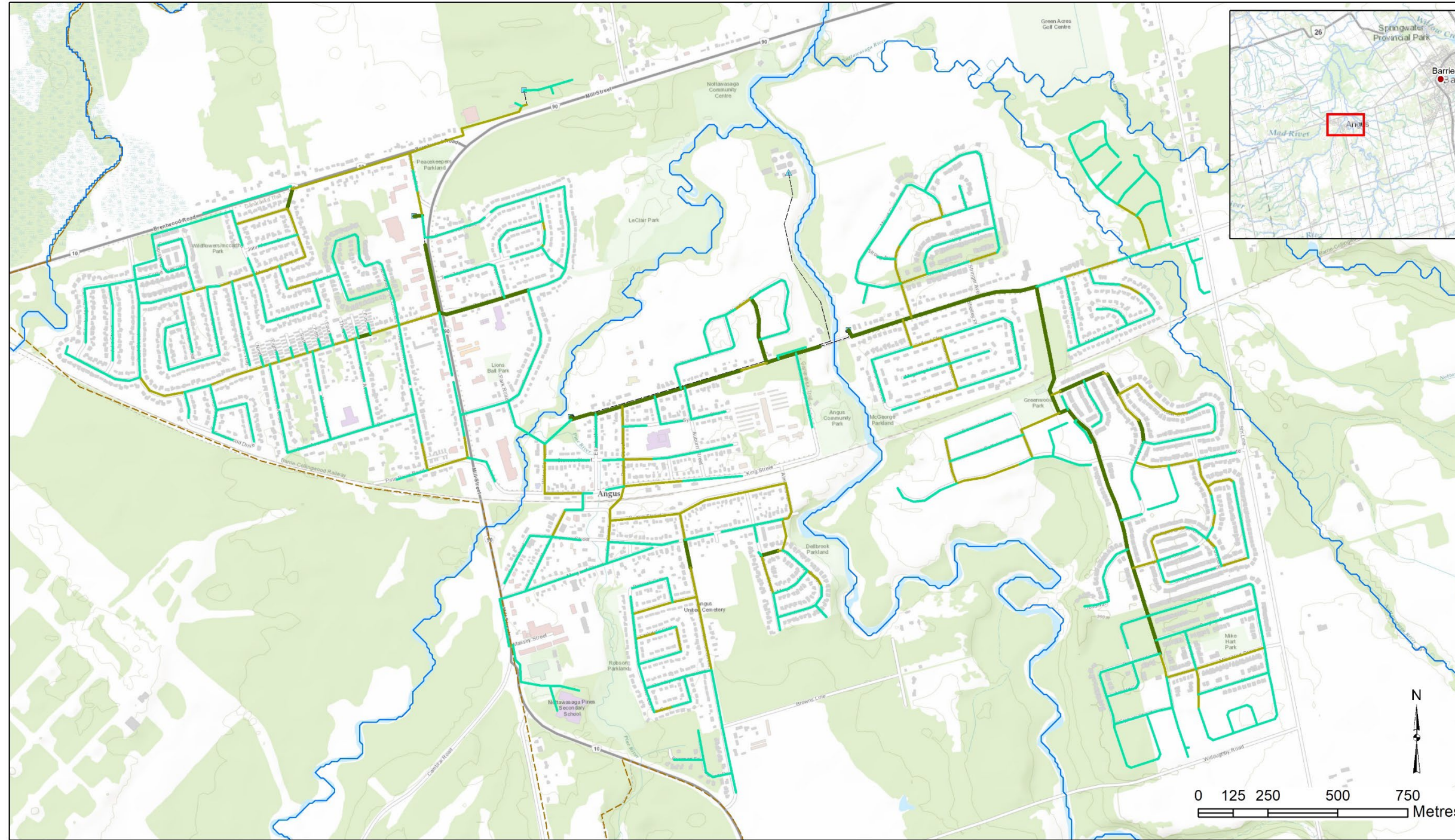
TOWNSHIP OF ESSA		FIGURE NO
SCALE HOR 1:12,500	VERT	
DESIGN G. YANG	DRAWN G. YANG	SHEET NO
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		DESIGN	G. YANG	DRAWN	G. YANG						SHEET NO						
		REVIEWED	J. M.	DATE	May 2022						4202						

# **Appendix E**

Existing Conditions

Stormwater Model Parameters

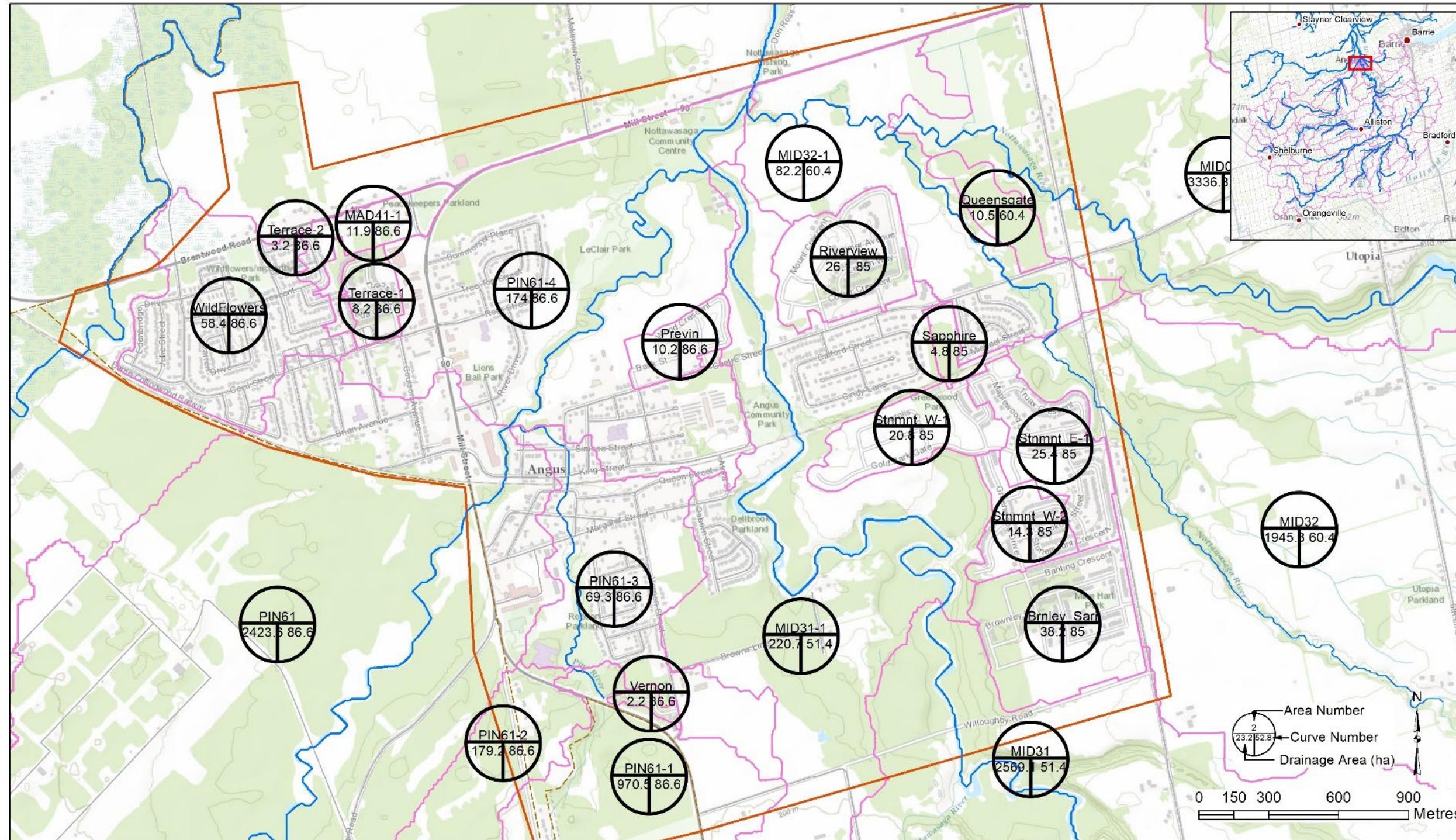




Table 1 Nottawasaga River Matched Flow and Adjusted Parameters – Match HMS Catchment

Name	PCSWMM					VO5 Catchment	
	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Peak Runoff (m <sup>3</sup> /s)	ID	Peak Flow
BOY01	2365.27	4731	5000	0.62	9.08	BOY01	9.1
BOY02	1445.62	3614	4000	0.63	9.06	BOY02	8.8
BOY03	1978.47	4397	4500	0.70	24.22	BOY03	23.1
BOY04	2531.44	3468	7300	1.15	11.68	BOY04	11.1
BOY11	1558.97	3118	5000	1.28	8.58	BOY11	8.6
BOY21	2743.93	2287	12000	0.80	5.29	BOY21	5
BOY22	4459.83	2973	15000	0.74	6.55	BOY22	6.2
BOY23	2285.83	3265	7000	1.51	10.73	BOY23	10.4
BOY24	2668.7	4448	6000	1.53	14.06	BOY24	14.2
BOY31	179.43	598	3000	0.91	1.42	BOY31	1.1
BOY33	1781.58	1782	10000	0.91	18.5	BOY33	18.6
INN01	2491.12	3559	7000	1.43	15.3	INN01	15.5
INN010	3164.62	3596	8800	1.23	10.35	INN010	10.4
INN011	3368.27	5433	6200	0.83	18.97	INN011	18.9
INN012	2527.26	5377	4700	1.11	18.31	INN012	18.2
INN02	1841.52	2455	7500	1.21	6.55	INN02	6.5
INN03	3398.6	3237	10500	1.10	10.87	INN03	10.6
INN04	3838.1	4515	8500	0.87	24.42	INN04	24
INN05	1694.6	2259	7500	0.63	5.39	INN05	5.1
INN06	1812.4	3021	6000	1.06	8.8	INN06	8.8
INN07	2333.4	2745	8500	0.84	7.3	INN07	7.1
INN08	2779.5	3474	8000	0.95	9.2	INN08	9
INN09	3205.6	2375	13500	1.07	8	INN09	7.9
INN11	3210.4	7466	4300	1.30	27.4	INN11	27.3
INN12	1592.6	4084	3900	1.20	21.19	INN12	21.3
INN13	2596.2	2360	11000	1.11	6.87	INN13	6.9
INN21	2863.0	4405	6500	0.56	9.76	INN21	9.5
INN22	2651.8	4143	6400	0.52	11.13	INN22	11.3
INN31	2930.0	3573	8200	1.08	10.78	INN31	10.5
INN32	812.7	1161	7000	0.65	2.93	INN32	2
MID01	2115.4	1763	12000	0.76	4.3	MID01	2.4
MID010	3482.2	4353	8000	1.04	10.2	MID010	10.1
MID011	3335.6	2690	12400	0.63	10.35	MID011	10.5
MID11	2557.09	2131	12000	0.56	5.46	MID11	5.1
MID12	3148.25	2624	12000	0.39	4.64	MID12	3.5
MID13	1587.24	1587	10000	0.47	2.62	MID13	1
MID21	1090.83	1283	8500	0.52	2.56	MID21	2.2

Name	PCSWMM					VO5 Catchment	
	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Peak Runoff (m <sup>3</sup> /s)	ID	Peak Flow
MID22	2007.85	2008	10000	0.87	5.35	MID22	5.3
MID23	4103.8	3420	12000	0.81	12.94	MID23	12.5
MID24	2032.83	1694	12000	0.49	3.12	MID24	1.2
MID31	2977.28	2290	13000	0.38	5.39	MID31	5.4
MID32	1982.98	1803	11000	0.50	2.8	MID32	1.4
PIN01	2258.96	5647	4000	0.94	17.14	PIN01	17.2
PIN02	1811.75	1812	10000	1.97	11.01	PIN02	10.3
PIN03	2005.37	5730	3500	1.51	21.85	PIN03	21.3
PIN21	4291.48	3065	14000	1.40	10.04	PIN21	9.7
PIN22	2721.67	2722	10000	1.83	10.33	PIN22	10.6
PIN31	3617.85	4020	9000	1.69	3.3	PIN31	3.1
PIN41	2437.84	2032	12000	0.71	4.33	PIN41	2
PIN42	2715.13	2263	12000	0.75	2.97	PIN42	2.9
PIN43	1510.92	1511	10000	0.66	2.01	PIN43	0.7
PIN44	3310.23	2546	13000	0.67	6.13	PIN44	5.5
PIN51	24.87	276	900	2.40	0.31	PIN51	0
PIN52	4238.6	6055	7000	1.80	14.99	PIN52	15.2
PIN61	3824.03	4025	9500	0.57	40.78	PIN61	40.6
UPP01	3060.04	6120	5000	0.93	21.9	UPP01	21.3
UPP02	3191.65	2128	15000	0.46	4.14	UPP02	1.4
UPP03	4341.86	2895	15000	0.95	4.61	UPP03	4
UPP04	3688.66	2837	13000	1.63	14.71	UPP04	14.1
UPP05	1506.67	1507	10000	1.52	4.02	UPP05	2.3
UPP06	2569.57	2855	9000	1.97	16.15	UPP06	15.9
UPP07	4054.4	3119	13000	1.93	11.3	UPP07	10.8
UPP08	3031.22	2526	12000	1.19	7.6	UPP08	7.1
UPP11	5334.09	3556	15000	1.36	6.55	UPP11	6
UPP12	2834.83	2362	12000	1.49	4.8	UPP12	4.7
UPP21	1221.51	1527	8000	0.74	3.18	UPP21	2.6
Outlet (RMIN01)	173135.2				487.5		487.1



<p><b>GENERAL NOTES</b></p> <p>1. ALL WORK SHALL BE DONE PRIOR TO CONSTRUCTION.</p> <p>2. THE ENGINEER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.</p> <p>3. THE ENGINEER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.</p> <p>4. THE ENGINEER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.</p> <p>5. THE ENGINEER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.</p>	<p><b>BENCH MARKS</b></p>	NO	REVISIONS	DATE	APPROVED	<p><b>Legend</b></p> <ul style="list-style-type: none"> <li>Stream</li> <li>Subcatchments</li> <li>Study Area</li> <li>Municipal</li> </ul>	<p><b>ANGUS</b></p> <p><b>DRAINAGE AREA</b></p>	<p><b>GREENLAND</b> Consulting Engineers 120 Howe Street Collingwood, Ontario, L9Y 1V3 Tel: (705) 444-8805 Fax: (705) 441-5182 E-mail: greenland@greenland.com Website: www.greenland.com</p>	<p><b>TOWNSHIP OF</b> <b>ESSA</b></p>	
		SCALE HOR: 1:15,000 VERT <td>DESIGN: G. YANG</td> <td>DRAWN: G. YANG</td> <td>FIGURE NO:</td>	DESIGN: G. YANG	DRAWN: G. YANG	FIGURE NO:					
REVIEWED: J. M.	DATE: Jul 2021	SHEET NO:	4202							

Figure 1 Angus SWM Catchments

Table 1 Angus Updated Model Flow - Updated Catchment (100yr24hrSCS)

Name	PCSWMM					
	Area (ha)	Flow Length (m)	Curve Number	Slope (%)	Imperviousness (%)	Peak Runoff (m <sup>3</sup> /s)
MAD41-1	11.93	719	86.578	0.5	15	0.2
Terrace-2	3.21	373	86.578	0.5	65	0.65
WildFlowers-1	58.36	1589	86.578	0.5	60	5.61
MID011	3340.87	12400	61.078	0.63	27.92	10.37
Brnley_Sarj-1	38.18	1472	85	0.5	65	3.99
MID31	2569.15	12076	51.44	0.38	25.33	4.22
MID31-1	221.19	3543	51.44	0.5	20	0.92
Riverview-1	26.07	1217	85	0.5	65	3.03
Sapphire-1	4.77	521	85	0.5	65	0.84
Stnmnt_W-1	20.80	1087	85	0.5	65	2.57
Stnmnt_W-2	14.26	900	85	0.5	65	1.94
MID32	1945.75	10896	60.364	0.5	5.814	2.63
MID32-1	88.07	2318	60.364	0.5	10	0.44
Stnmnt_E-1	25.42	1245	85	0.5	65	2.92
PIN61	2423.63	7563	86.578	0.57	48.39	25.73
PIN61-1	970.54	4786	86.578	0.57	10	8.69
PIN61-2	179.23	2057	86.578	0.57	20	3.82
PIN61-3	69.30	1279	86.578	0.57	50	6.92
PIN61-4	183.65	2082	86.578	0.57	40	5.95
Terrace-1	8.22	441	86.578	0.57	65	1.6
Vernon-1	2.21	229	86.578	0.57	65	0.55
Outlet (RMIN01)	173146.67					505.3

## **Appendix F**

Ultimate Conditions

Water Model Results





Figure 1 Ultimate Conditions ADD Scenario



Figure 2 Ultimate Conditions MDD Scenario

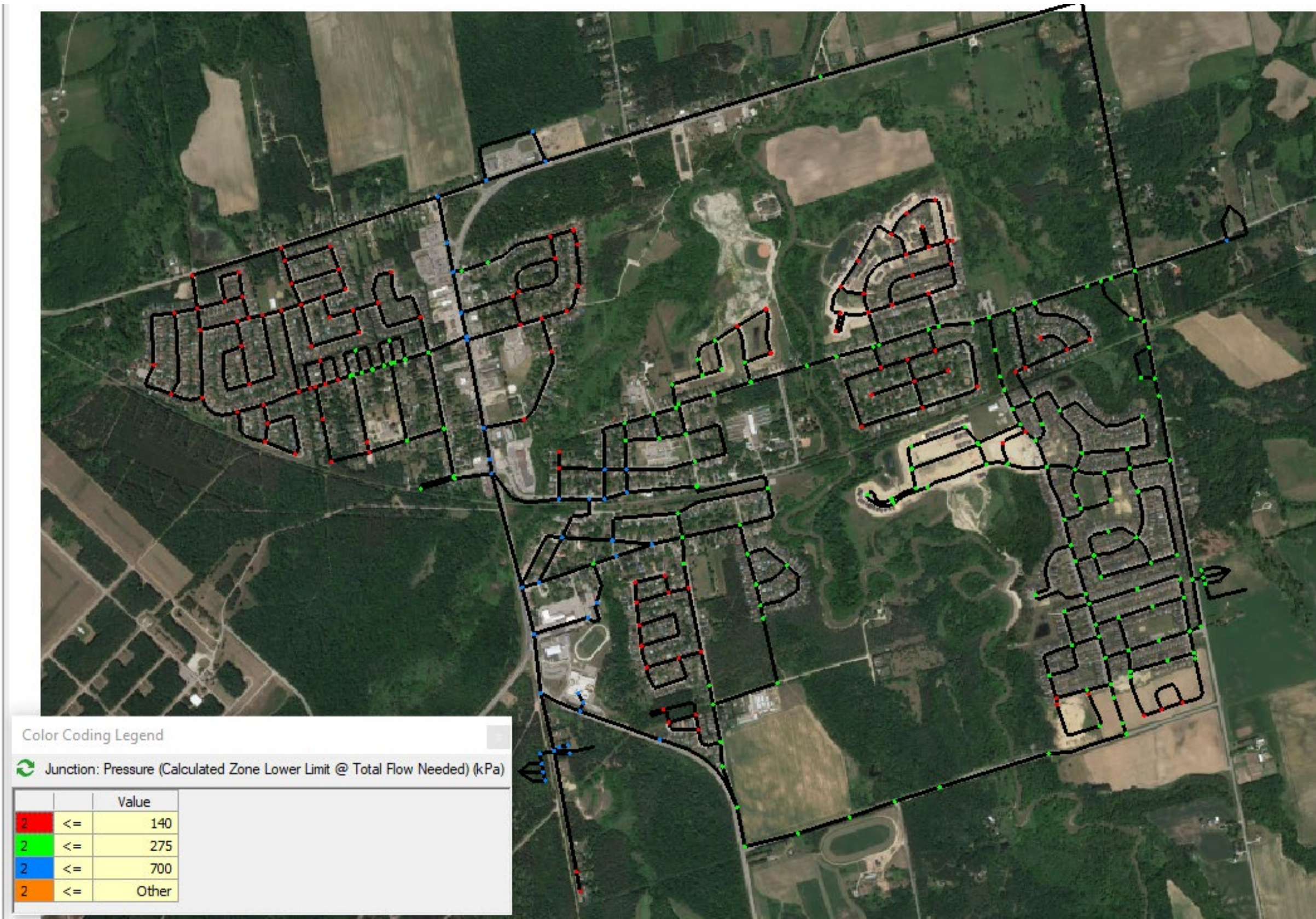


Figure 3 Ultimate Conditions Fire Flow Scenario

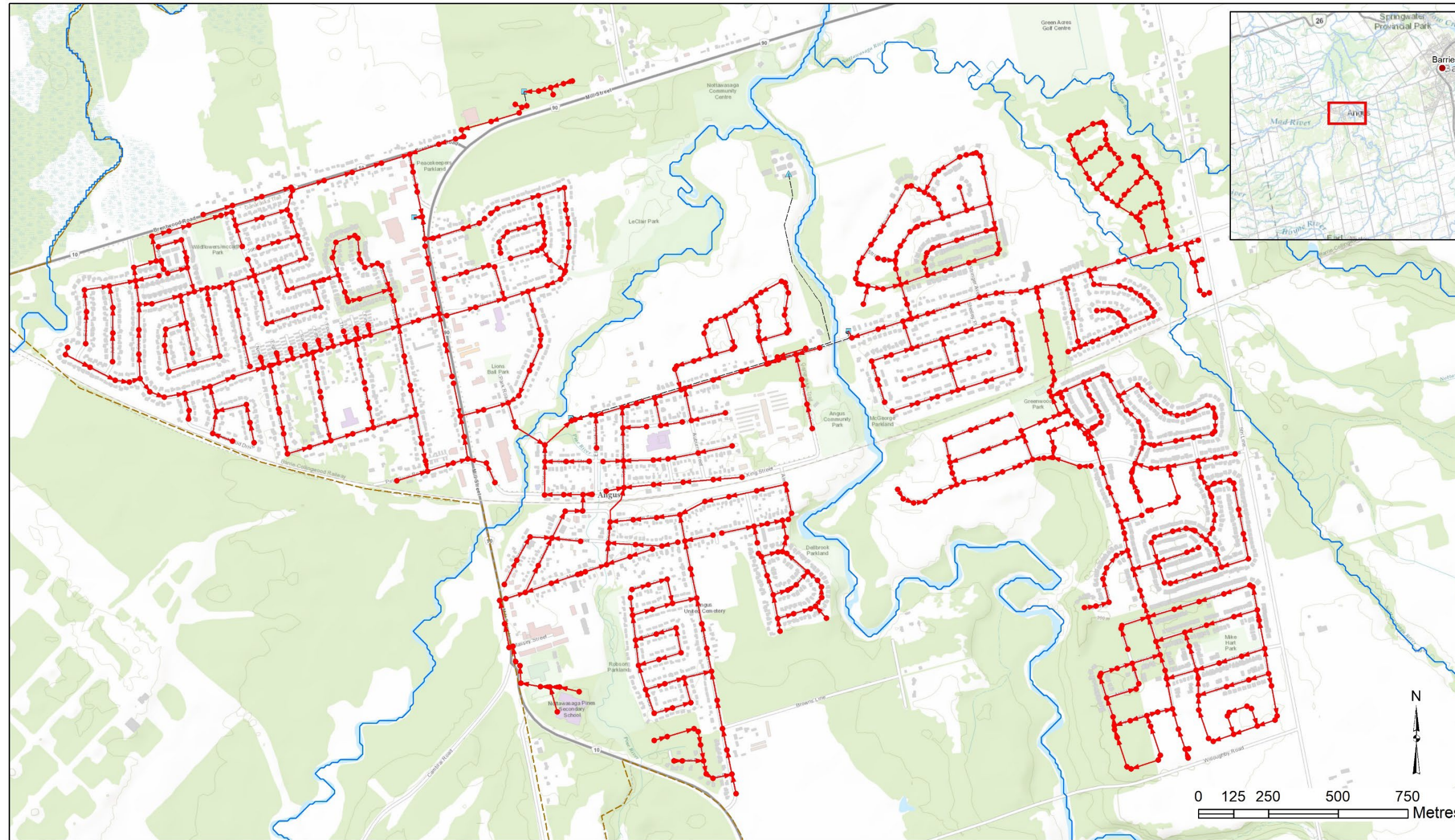


## **Appendix G**

Ultimate Conditions

Sanitary Model Results





**GENERAL NOTES**  
 1. THE DRAWINGS ARE TO BE USED ONLY FOR CONSTRUCTION.  
 2. DO NOT SCALE DRAWINGS.  
 3. REPORT ALL DISCREPANCIES OF ERRORS, OMISSIONS OR DISCREPANCIES TO THE ARCHITECT OR DESIGN ENGINEER AS APPLICABLE.  
 4. USE ONLY LATEST REVISED DRAWINGS OR THOSE THAT ARE MARKED TESTED FOR CONSTRUCTION.  
 5. THE DRAWINGS ARE THE PROPERTY OF GREENLAND CONSULTING ENGINEERS. CHECKS, REVISES AND REVISIONS ARE TO BE OBTAINED ON COMPLETION OF THE PROJECT. ANY UNAUTHORIZED USE IS PROHIBITED.

BENCH MARKS

NO	REVISIONS	DATE	APPROVED

\_\_\_\_\_  
 NVCA ENGINEER

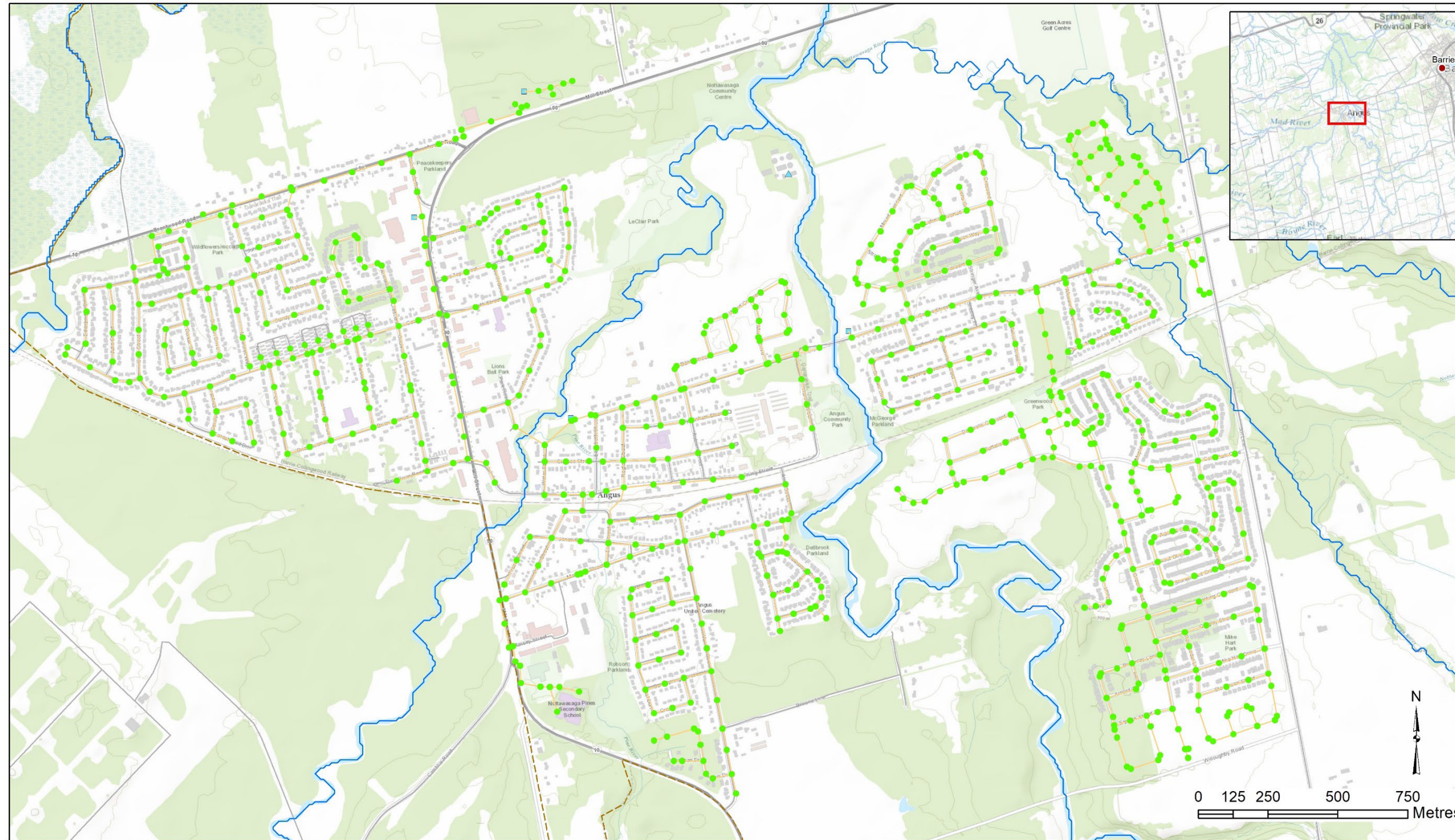
**Legend**  
 • Sanitary Manhole  
 — Sanitary Sewer  
 --- Force Main  
 — Stream  
 — Municipal

**ANGUS**  
 PROPOSED SANITARY SEWER



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 Website: www.griland.com

TOWNSHIP OF ESSA		FIGURE NO
SCALE HOR 1:12,500	VERT	
DESIGN G. YANG	DRAWN G. YANG	SHEET NO
REVIEWED J. M	DATE Jul 2021	4202



**GENERAL NOTES**  
 1. THE DRAWINGS ARE FOR INFORMATION ONLY AND ARE NOT TO BE USED FOR CONSTRUCTION.  
 2. DO NOT SCALE DRAWINGS.  
 3. REPORT ALL DISCREPANCIES OF ERRORS, OMISSIONS OR DISCREPANCIES TO THE ARCHITECT OR DESIGN ENGINEER AS APPLICABLE.  
 4. USE ONLY LATEST REVISED DRAWINGS OR THOSE THAT ARE MARKED TESTED FOR CONSTRUCTION.  
 5. THE DRAWINGS ARE THE PROPERTY OF GREENLAND CONSULTING ENGINEERS. CHECKS, REVISES AND REVISIONS WILL BE RETURNED UPON COMPLETION OF THE PROJECT. ANY UNAUTHORIZED USE IS PROHIBITED.

BENCH MARKS

NO	REVISIONS	DATE	APPROVED

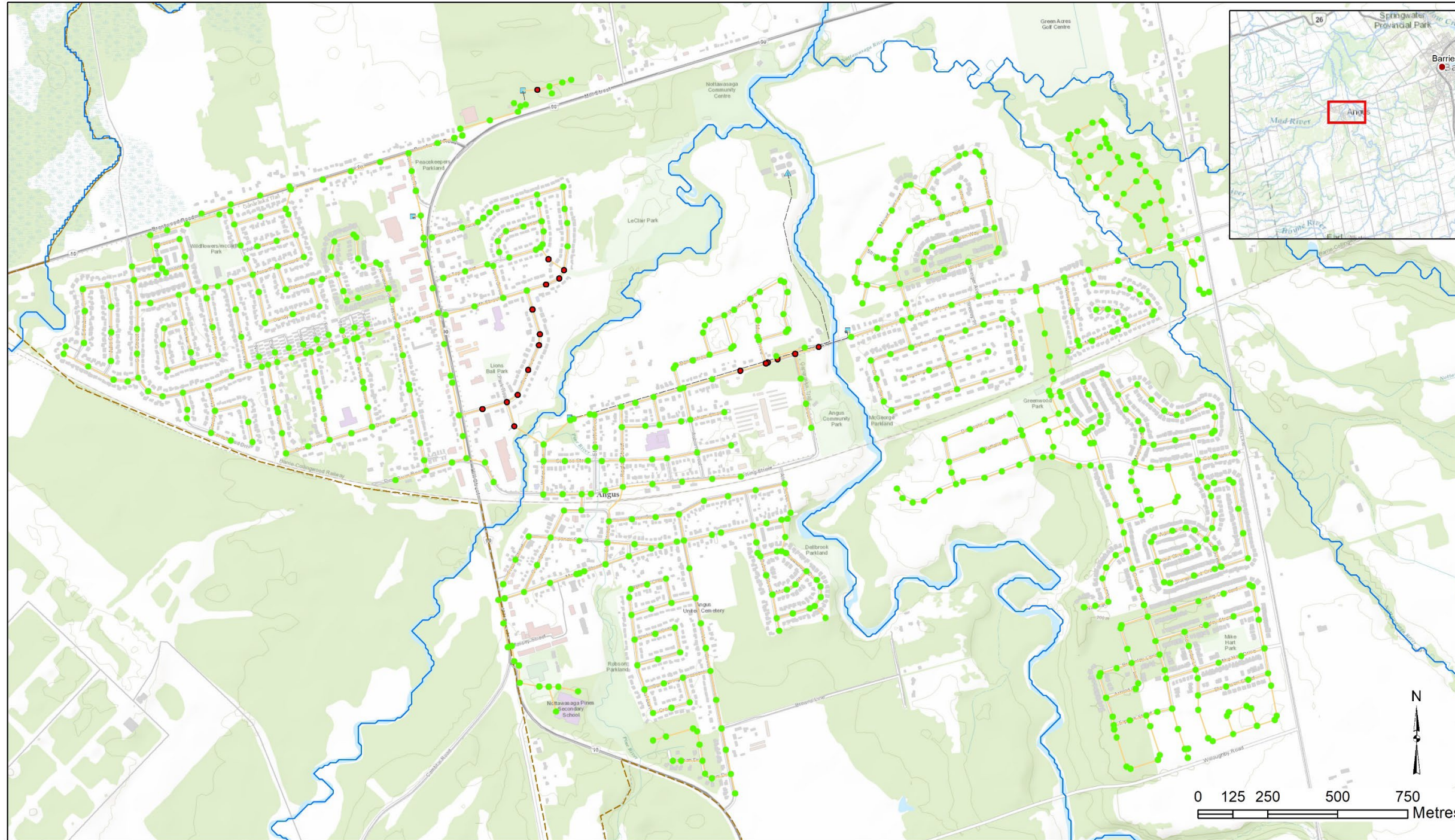
\_\_\_\_\_  
 NVCA ENGINEER

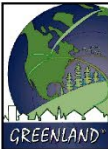
**Legend**  
 Stream  
 Municipal  
 None Flooding  
 Flooding MH

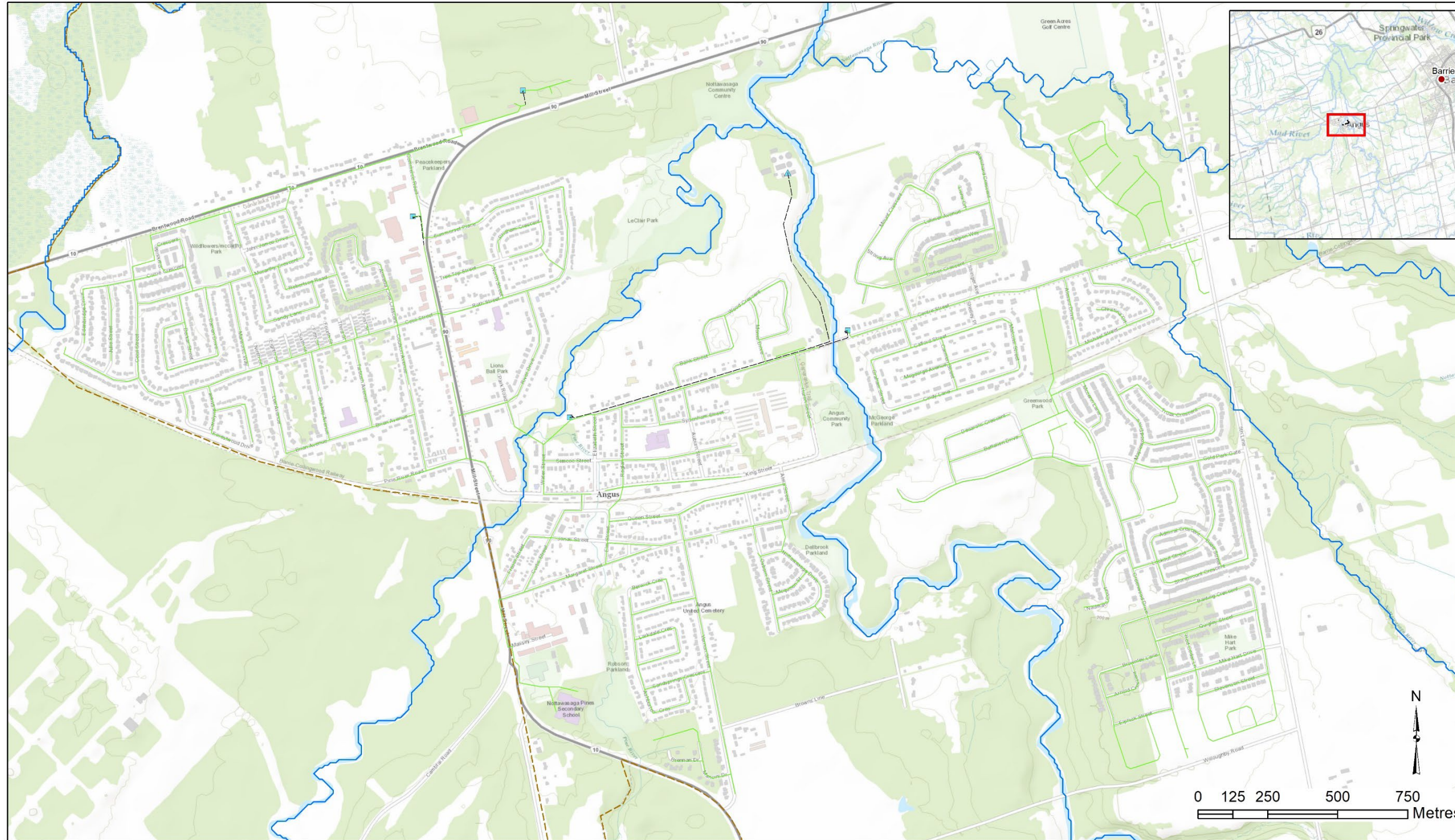
**ANGUS**  
 MH FLOODING (PROPOSED)

**GREENLAND** Consulting Engineers  
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 E-mail: greenland@gnland.com  
 Website: www.gnland.com

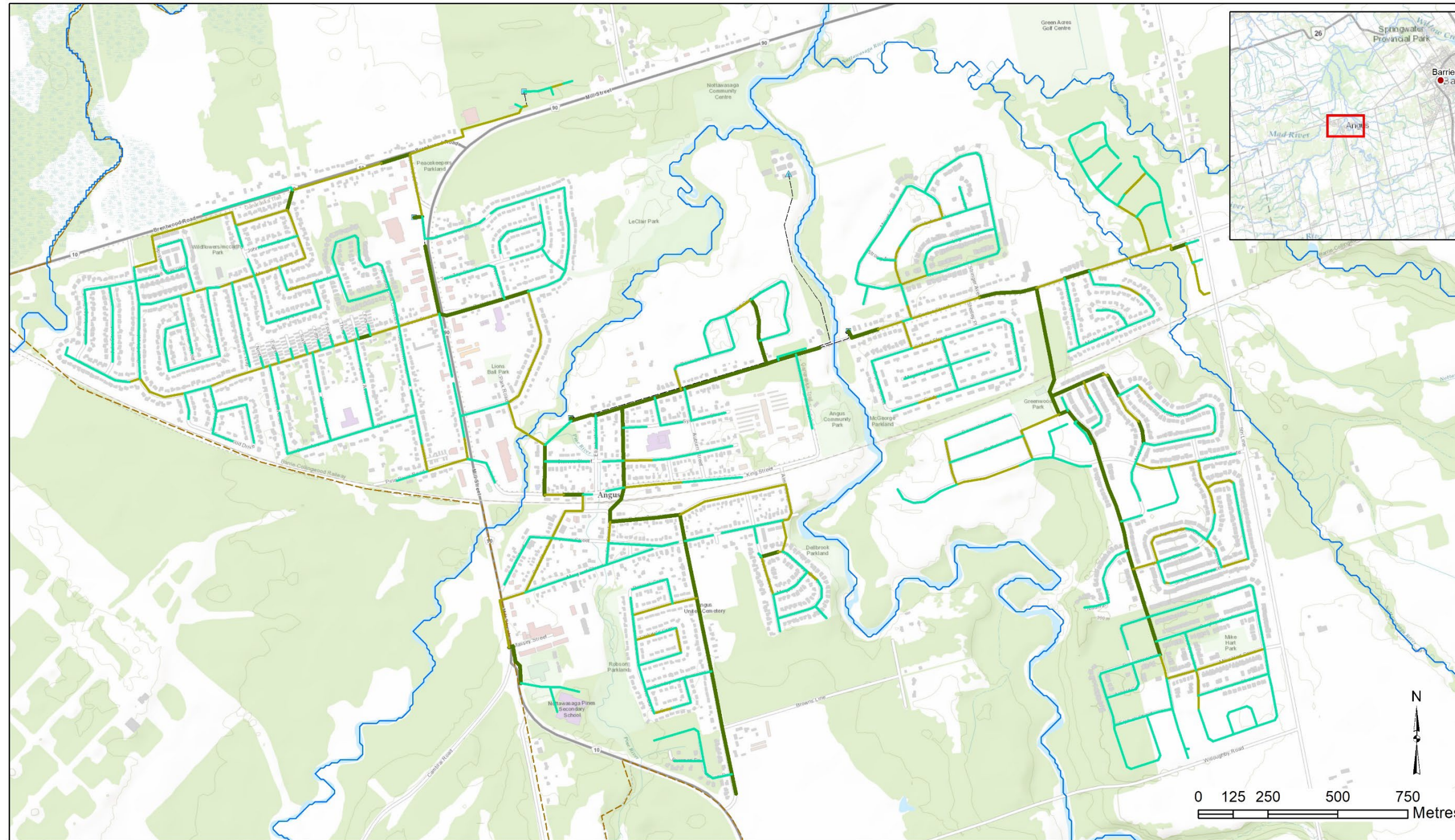
TOWNSHIP OF ESSA		FIGURE NO
SCALE HOR 1:12,500	VERT	
DESIGN G. YANG	DRAWN G. YANG	SHEET NO
REVIEWED J. M.	DATE May 2022	4202



<b>GENERAL NOTES</b> 1. THE DRAWINGS ARE TO BE USED ONLY PRIOR TO CONSTRUCTION. 2. DO NOT SCALE DRAWINGS. 3. REPORT ALL DISCREPANCIES OF ERRORS, OMISSIONS OR DISCREPANCIES TO THE ARCHITECT OR DESIGN ENGINEER AS APPLICABLE. 4. USE ONLY LATEST REVISED DRAWINGS OR THOSE THAT ARE MARKED TESTED FOR CONSTRUCTION. 5. THE DRAWINGS ARE THE PROPERTY OF GREENLAND CONSULTING ENGINEERS. CHECK FOR ANY AND ALL REVISIONS OR CORRECTIONS UPON COMPLETION OF THE PROJECT. ANY UNAUTHORIZED USE IS PROHIBITED.	<b>BENCH MARKS</b> [Blank]	NO	REVISIONS	DATE	APPROVED	<b>Legend</b> — Stream — Municipal ● None Surcharging ● Surcharging MH	<b>ANGUS</b>  MH SURCHARGING (PROPOSED)	 GREENLAND® Consulting Engineers 120 Hume Street Collingwood, Ontario, L9Y 1V5 Tel: (705) 444-8805 Fax: (705) 444-5482 E-mail: greenland@gnland.com Website: www.gnland.com	<b>TOWNSHIP OF ESSA</b>			
											SCALE HOR 1:12,500 VERT	FIGURE NO
											DESIGN G. YANG DRAWN G. YANG	SHEET NO
											REVIEWED J. M DATE May 2022	4202
NVCA ENGINEER												



<b>GENERAL NOTES</b> 1. ALL WORK SHALL BE COMPLETED PRIOR TO CONSTRUCTION. 2. DO NOT SCALE DRAWINGS. 3. REPORT ALL DISCREPANCIES OF ERRORS, OMISSIONS OR DISCREPANCIES TO THE ARCHITECT OR DESIGN ENGINEER AS APPLICABLE. 4. USE ONLY LATEST REVISED DRAWINGS OR THOSE THAT ARE MARKED TESTED FOR CONSTRUCTION. 5. THE DRAWINGS ARE THE PROPERTY OF GREENLAND CONSULTING ENGINEERS AND SHALL BE RETURNED ON COMPLETION OF THE PROJECT. ANY UNAUTHORIZED USE IS PROHIBITED.	<b>BENCH MARKS</b> (Empty table)	NO	REVISIONS	DATE	APPROVED	<b>Legend</b> Stream Velocity — Municipal 0.0 - 2.99 3.0 - 4.0 4.0 - 6.0 6.0 - 7.0	<b>ANGUS</b>  HIGH VELOCITY (PROPOSED)	GREENLAND® Consulting Engineers 120 Hume Street Collingwood, Ontario, L9Y 1V5 Tel: (705) 444-8805 Fax: (705) 444-5482 E-mail: greenland@gnland.com Website: www.gnland.com	<b>TOWNSHIP OF ESSA</b>	
		SCALE HOR 1:12,500 VERT	FIGURE NO							
		DESIGN G. YANG DRAWN G. YANG	SHEET NO							
		REVIEWED J. M. DATE May 2022	4202							
		NVCA ENGINEER								



<b>GENERAL NOTES</b> 1. ALL WORK SHALL BE COMPLETED PRIOR TO CONSTRUCTION. 2. DO NOT SCALE DRAWINGS. 3. REPORT ALL DISCREPANCIES OF ERRORS, OMISSIONS OR DISCREPANCIES TO THE ARCHITECT OR DESIGN ENGINEER AS APPLICABLE. 4. USE ONLY LATEST REVISED DRAWINGS OR THOSE THAT ARE MARKED TESTED FOR CONSTRUCTION. 5. THE DRAWINGS ARE THE PROPERTY OF GREENLAND CONSULTING ENGINEERS. NO PART OF THIS DRAWING IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT THE WRITTEN PERMISSION OF GREENLAND CONSULTING ENGINEERS. ANY UNAUTHORIZED USE IS PROHIBITED.	<b>BENCH MARKS</b> (Empty table)	NO	REVISIONS	DATE	APPROVED	<b>Legend</b> Stream Velocity — Stream 0.0 - 0.30 — Municipal 0.30 - 0.59 — >= 0.60	<b>ANGUS</b>  LOW VELOCITY (PROPOSED)	GREENLAND® Consulting Engineers 120 Hume Street Collingwood, Ontario, L9Y 1V5 Tel: (705) 444-8805 Fax: (705) 444-5482 E-mail: greenland@gnland.com Website: www.gnland.com	<b>TOWNSHIP OF ESSA</b>	
		SCALE HOR 1:12,500 VERT	FIGURE NO							
		DESIGN G. YANG DRAWN G. YANG	SHEET NO							
		REVIEWED J. M. DATE May 2022	4202							
		NVCA ENGINEER								