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FUNCTIONAL SERVICING REPORT

FOR

ABBOTT'S RUN
STAGES 2, 3 AND 4B

MINTO COMMUNITIES INC.

CITY OF OTTAWA

PROJECT NO.: 22-1295

JANUARY 2025
1ST SUBMISSION

FUNCTIONAL SERVICING REPORT
FOR
ABBOTT'S RUN
STAGES 2, 3 AND 4B

MINTO COMMUNITIES INC.

ABBOTT'S RUN
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FUNCTIONAL SERVICING REPORT
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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has prepared this Functional Servicing Report in support Abbott's Run Stages 2, 3 and 4B development on behalf of Minto Communities.

Abbott's Run, formerly known as Kizell Lands, is a proposed development in Ottawa's Fernbank community. The community will consist of a blend of residential areas, commercial spaces, recreational facilities, and institutional sites. Abbott's Run is approximately 87.0ha and is bound by Abbott Street to the south, Iber Road to the west, Hazeldean Road to the north and Bradley Commons Subdivision to the east (Richcraft).

This report will focus on the servicing requirements for Stages 2, 3, and 4B of Abbott's Run. The approximate site and its associated boundaries are shown in figure 1.1.

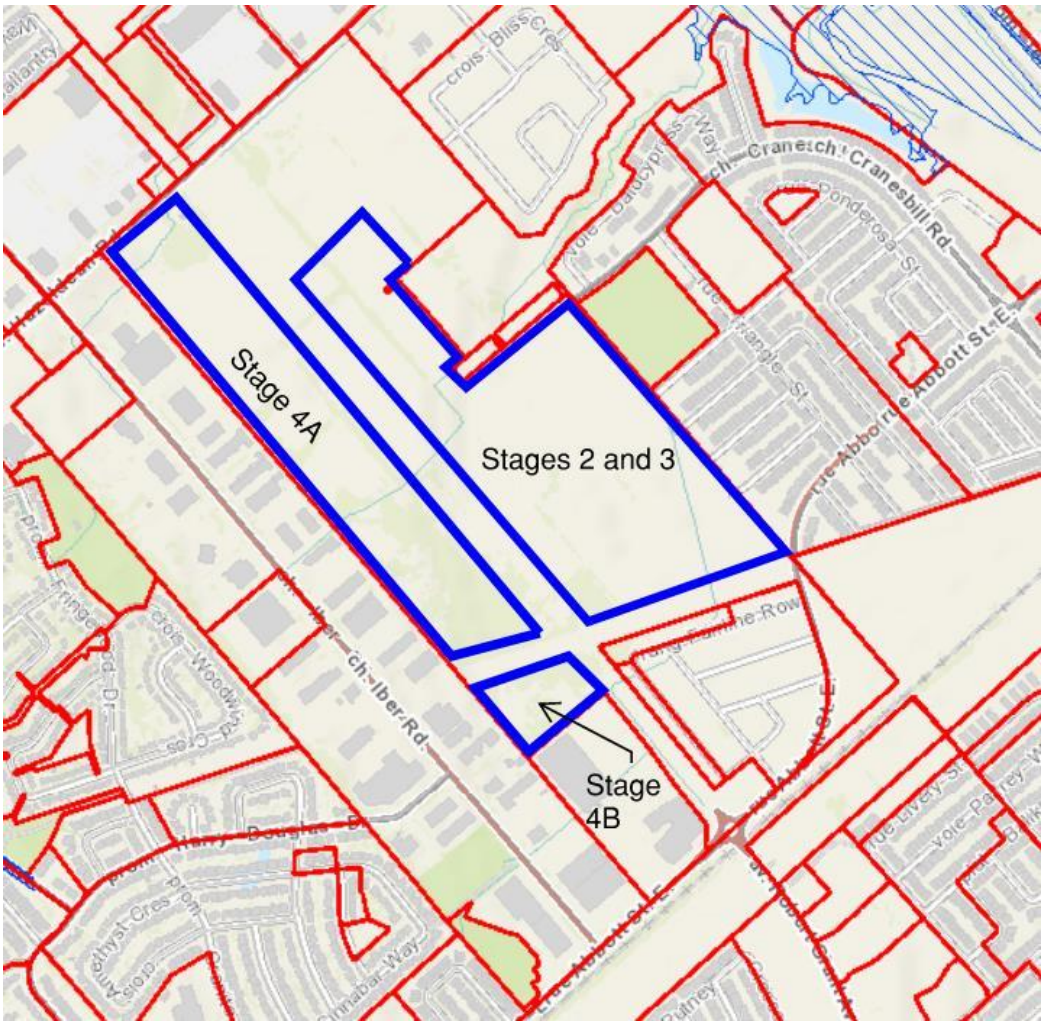

Figure 1.1 Abbott's Run Site Location

1.1 Background

An adequacy of public services report dated May 2020, was prepared by Novatech Engineering in support of a draft plan application for the Former Kizell Lands. Minto has since purchased the property and are looking to amend certain elements of the draft plan of subdivision. As the general concept plan remains relatively consistent with the draft plan approved for the Kizell property, the civil engineering strategies proposed in the Concept Servicing Report by Novatech, will be adopted. The following report builds of the work presented in the Novatech report and adjusts the strategy as required to support the updated draft plan.

The Minto concept plan, which features Stages 2, 3 and 4B are presented in figure 1.2.

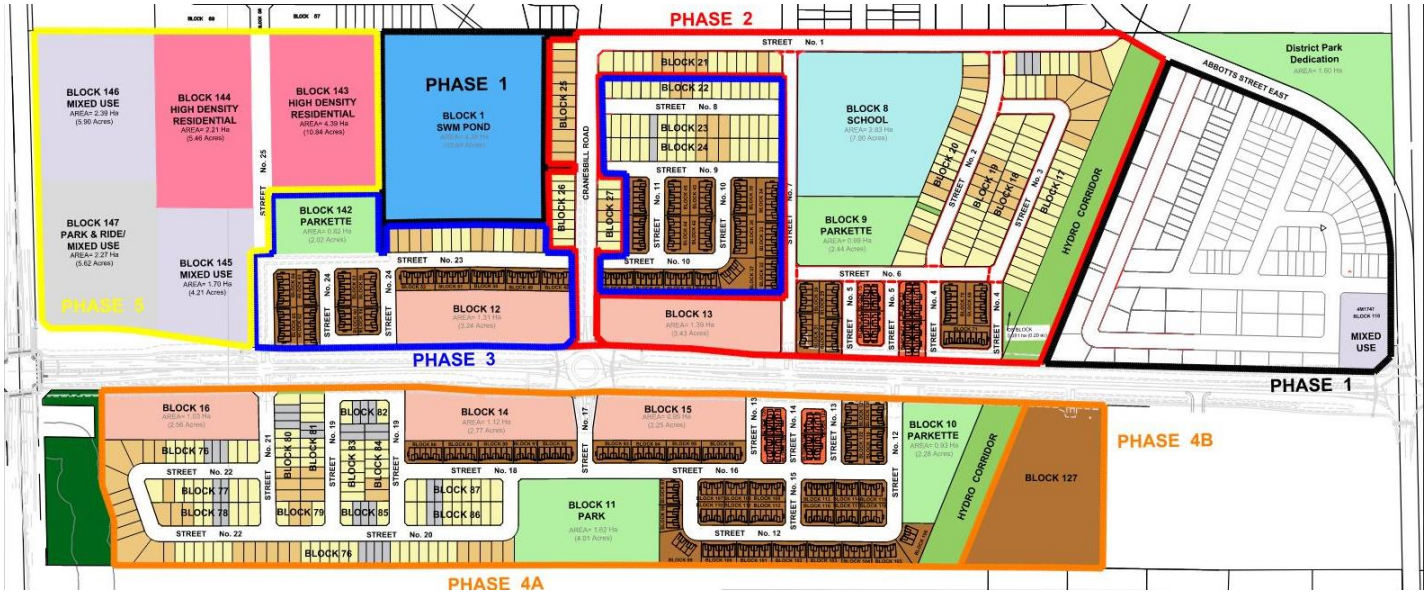

Figure 1.2 Abbott's Run Concept Plan

Table 1.1 presents the development statistics for the concept plan presented above.

Table 1.1: Minto Lans Development Statistics

Unit Type	Stage 1		Stage 2		Stage 3		Stage 4A		Stage 4B		
	Unit	Pop	Unit	Pop	Unit	Pop	Unit	Pop	Unit	Pop	
Singles	92	313	130	442	69	235	150	510	0	0	
Towns	191	515	87	235	165	446	205	554	70	189	
4-6 Storey Medium Density Condo	0	0	104	188	111	200	246	442	0	0	Stage 5 Projected Statistics
TOTAL	**283**	**828**	**321**	**795**	**346**	**881**	**601**	**1506**	**70**	**189**	**Unit** / **Pop**
											428 / **770**
Total for whole buildout: Units = 2049; Population = 4969											
Total for Stages 2, 3 and 4B: Units = 737; Population = 1865											

Stage 1 is currently under construction. Stage 4A and 5 will be part of a separate application.

Table 1.2: Kizell Lands Development Statistics

Unit Type	Unit	Pop
Singles	288	979
Towns	475	1283
Medium Density Residential	1039	1870
High Density Residential	360	648
Mixed Use Residential	460	828
Park N Ride Residential	330	540
TOTAL	**2922**	**6147**

As a point of reference, the population numbers for the previously approved Kizell lands were extracted from the Novatech report. These numbers are presented in Table 1.2. This was undertaken to compare the population projections that were previously designed for and compare them against the Minto proposed development. The exercise determined that the Kizell Lands considered 2922 units with a population of 6147, while Abbott's Run's concept plan for Stages 1, 2, 3 and 4 and projected units for stage 5 have 2049 units and a corresponding population of 4969. Given that there was a higher population considered in the approved Kizell Lands Report, the servicing strategies proposed in the 2020 approved Novatech report remain appropriate to service Abott's Run.

2.0 GUIDELINES, PREVIOUS STUDIES AND REPORTS

The following studies were utilized in the preparation of this report.

- **Ottawa Sewer Design Guidelines**
  City of Ottawa, October 2012
  (City Standards)
  - **Technical Bulletin ISDTB-2014-01**, Revisions to Ottawa Design Guidelines - Sewer
    City of Ottawa, February 5, 2014
    (ITSB-2014-01)
  - **Technical Bulletin PIEDTB-2016-01**, Revisions to Ottawa Design Guidelines – Sewer
    City of Ottawa, September 6, 2016
    (PIEDTB-2016-01)
  - **Technical Bulletin ISTB-2018-04**, Revisions to Ottawa Design Guidelines – Sewer
    City of Ottawa, June 27, 2018
    (ISTB-2018-04)
  - **Technical Bulletin ISTB-2019-02**, Revisions to Ottawa Design Guidelines – Sewer
    City of Ottawa, July 8, 2019
    (ISDTB-2019-02)

- **Ottawa Design Guidelines – Water Distribution**

City of Ottawa, July 2010
(Water Supply Guidelines)

  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010
    (ISDTB-2010-2)
  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014
    (ISDTB-2014-02)
  - **Technical Bulletin ISTB-2021-03**
    City of Ottawa, August 18, 2021
    (ISTB-2021-03)

- City of Ottawa Official Plan
  adopted by Council 2003.
  (Official Plan)

- **Stormwater Management Planning and Design Manual**
  Ministry of Environment, March 2003
  (SWMP Design Manual)

- **Erosion & Sediment Control Guidelines for Urban Construction**
  Toronto and Region Conservation Authority (TRCA), 2019
  (ECS Guidelines)

- **Fernbank Community Design Plan**
  Stantec, June 2009
  (CDP)

- **Kizell Lands – Fernbank Concept Servicing Report**
  Novatech, Revised May 29, 2020
  (Concept Servicing Report)

- **Fernbank Community – Pond 1 Stormwater Management Report**
  Novatech, Revised July 19, 2023
  (SWM Report)

- **Geotechnical Investigation**
  Paterson Group, October 7, 2022
  (PG6165-1 Revision 1)

3.0 WATER SUPPLY SERVICING

3.1 Existing Infrastructure

There are currently no municipal water services that run within the Abbott's Run development. However, there are several potential watermain connections which surround these lands. Figure 3.1 below outlines the existing watermain infrastructure surrounding Abbotts Run, outlined in red. To the north, Hazeldean Road currently has a 900mm diameter watermain which connects to the Glen Cairn Water Reservoir and Pump Station. To the south of the development is a 400mm diameter watermain that runs parallel to Abbott Street in addition to a 300mm diameter watermain that runs along Abbott Street. Additionally, there are several 200mm diameter watermain stubs to the east of Abbotts Run on Plank Street, Warrior Street, Thunderbolt Street and Honeylocust Avenue. There is also a 300mm diameter watermain stub on Cranesbill Road to the east of the subject lands.

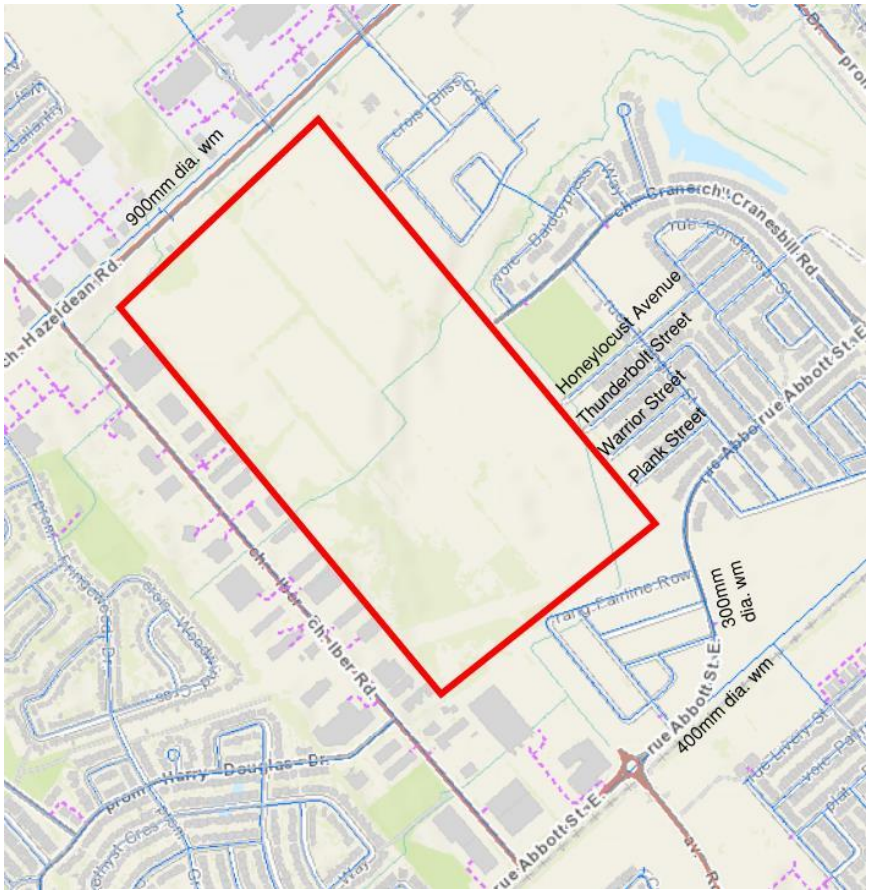

Figure 3.1 Existing Water Servicing

3.2 Kizell Lands Water Supply Servicing Design

The Novatech report proposed five connection points to existing for the new distribution system, see Figure 3.2. The same approach is proposed to service the Abbott's run development as shown on the Watermain Servicing Plan appended to this report.

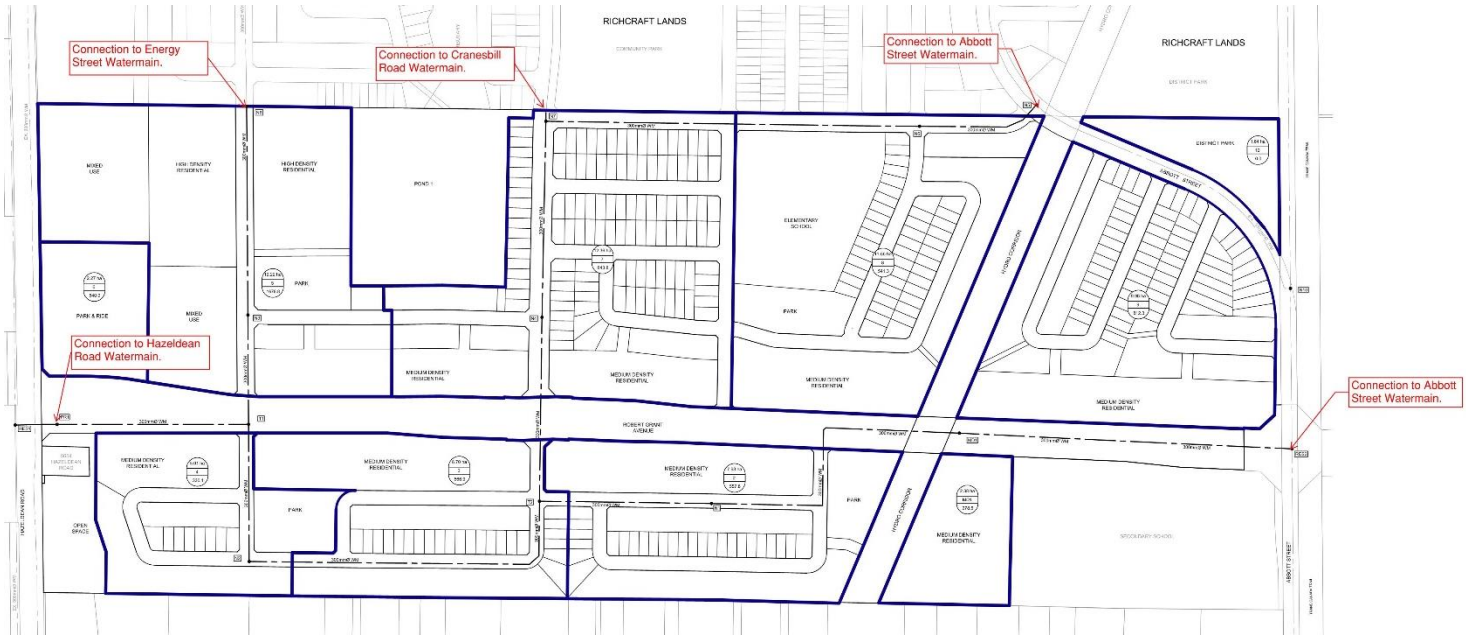

Figure 3.2 Kizell Lands Proposed Watermain

Table 3.1 outlines the design criteria which was used for 2020 Novatech report. Modelling results to support the Kizell development were extracted and are presented in the tables below. These models were created based on the previous concept plan which outlined a unit count of 2922 and a population of 6147.

Table 3.1 Watermain Design Criteria

Design Parameter	Design Criteria
Single Family Home Population	3.4 people/unit
Townhouse Population	2.7 people/unit
Medium Density/High Density/Mixed Use Population	1.8 people/unit
Medium Residential Density	65 units/ha
High Density Residential Unit Density	180 Units (Block 318), 180 Units (Block 319)
Mixed-Use Residential Unit Density	160 Units (Block 316), 300 Units (Block 317)
Park and Ride Unit Density	300 Units

Residential Demand	280 L/c/d
Institutional/Commercial Demand	28,000 L/gross ha/day
Maximum Day Demand	2.5 x Average Day
Peak Hour Demand	2.2 x Maximum Day
Institutional/Commercial Max Day	1.5 x Average Day
Institutional/Commercial Peak Hour	1.8 x Maximum Day
Fire Demand (Residential Areas)	167 L/s
Fire Demand (Institutional and Commercial Areas)	217 L/s
Maximum Pressure	690 kPa (100psi) unoccupied areas
Maximum Pressure	552 kPa (80psi) occupied areas outside of ROW
Minimum Pressure	275 kPa (40 psi) except during fire flow
Minimum Pressure (Fire)	140 kPa (20 psi)

Table 3.2 Summary of Hydraulic Model Results - Maximum Day + Fire Flow

Operating Condition	Minimum Pressure
223.35 L/s at N6	427.62 kPa (N6)

Table 3.3 Summary of Hydraulic Model Results - Peak Hour Demand

Operating Condition	Maximum Pressure	Minimum Pressure
121.13 L/s through system	577.02 (N9)	496.78 kPa (N1)

Table 3.4 Summary of Hydraulic Model Results - Maximum Pressure Check

Operating Condition	Maximum Pressure	Minimum Pressure
24.203 L/s through system	644.71 kPa (N9)	572.32 kPa (N1)

The modelling results confirm that the available flows from the existing water services are sufficient to service the lands. However, the maximum pressure assessment indicates that system pressures exceed 552 kPa (80 psi) across the subdivision. As a result, pressure-reducing valves may be necessary for all residences. Detailed modelling will be conducted at detailed design to confirm these results.

3.3 Proposed Water Supply Servicing

Stages 2, 3 and 4B will be serviced with 150mm, 200mm and 300mm diameter watermains. To ensure adequate watermain looping to the site, several connections to existing water services are proposed.

Stage 2 proposes connections at five locations. Two connections are planned at either end of Street 25: one at Robert Grant Avenue to the west and another at Energy Street to the east. Two additional connections are proposed along Cranesbill Road: one at existing Cranesbill Road to the east and another at Robert Grant Avenue to the west. The fifth and sixth connections are located at Honeylocust Street, connecting to Street 7, and Abbott Street, connecting to Street 1.

Stage 3 will connect to the proposed watermains within Stage 2.

Stage 4B proposes to have one connection to the development. This connection will stem from the 300mm watermain on Robert Grant Avenue.

The proposed connections to service the updated plan are consistent with those from the Kizell Lands strategy. The previous modelling was deemed sufficient to service Abbott's Run. For detailed water modelling and figures, refer to Appendix B. An updated detailed hydraulic analysis will be conducted at the detailed design stage.

4.0 WASTEWATER SERVICING

4.1 Existing Infrastructure

There is an existing 900mm dia. sanitary pipe within the future Robert Grant right-of-way that's tributary to the Kanata West Pump Station. Figure 4.1 shows relevant surrounding sanitary sewers that include a 300mm diameter PVC sanitary sewer on Abbott Street and a 250mm diameter PVC sanitary pipe on Energy Street that are tributary to the Hazeldean Pump Station.

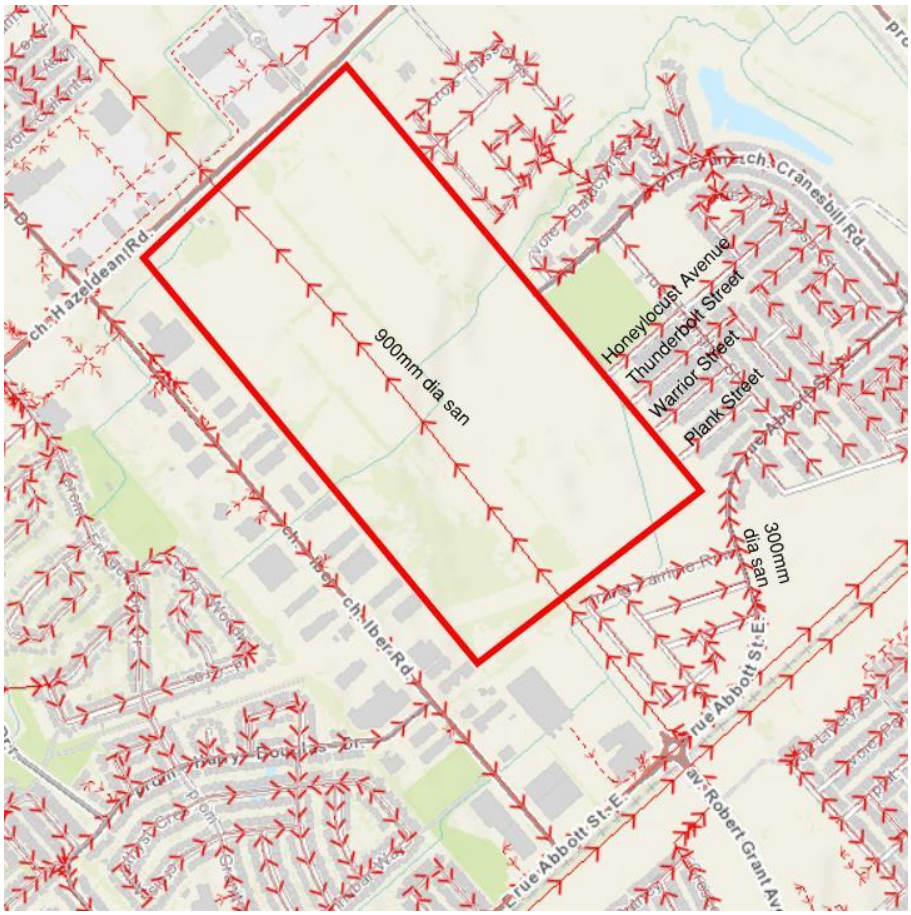

Figure 4.1 Existing Sanitary Services

Table 4.1 Sanitary Sewer Design Parameters

Design Parameter	Value
Low Density Residential	3.4 p/unit
Medium Density Residential	2.7 p/unit
High Density	2.3 p/unit
Peak Wastewater Generation per Person	280 L/p/d
Peaking Factor Applied	Harmon's Equation $P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{1/2}} \right) \times K$ K = 0.8
Institutional Flows	28,000 L/ha/day
Institutional Peaking Factor	1.0 (Contribution Area <= 20%), 1.5 (>20%)
Infiltration and Inflow Allowance	0.28 L/s/ha (wet) 0.05L/s/ha (dry) 0.33L/s/ha (total I/I)
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Service Lateral Size	135 mm dia PVC SDR 28 with a minimum slope of 1.0%
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Additional Considerations	Sewers servicing less than 10 residential connections to have a minimum gradient of 0.65%
	Where expected depth of flow is less than 1/3 pipe diameter, calculate actual flowing velocity and increase slope as required to achieve 0.6 m/s.
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012. Amended by Technical Bulletin ISTB-2018-01 (March 21, 2018)	

The table above presents the design criteria applied in the wastewater servicing design.

4.2 Proposed Wastewater Servicing

A portion of Stage 2 of Abbott's Run is proposed to outlet to the existing 300mm diameter pipe on Abbott Street. The remainder of Stage 2 is proposed to outlet to the 900mm diameter trunk on future Robert Grant Avenue which ultimately leads to the Kanata West Pump Station. Stage 4B of Abbott's Run also outlet to the 900mm diameter trunk on future Robert Grant.

The majority of sanitary flows from Abbotts Run will be directed to the 900mm diameter sanitary sewers along Robert Grant Avenue. Projected flow from the sanitary design

sheet presented in Appendix C indicate a peak flow of 553L/s for existing and proposed flows to the 900mm sewers on Robert Grant. Given that the governing pipe has 755 L/s total capacity, the sewer system has adequate capacity to support the development.

The remaining sanitary flows from the southern portions of Stage 2 will be directed to the 300mm diameter sewers along Abbott Street, which will convey these flows to the Hazeldean Pump Station. The anticipated flow from Abbotts Run into the Abbott Street sewers is 10.3 L/s. As shown in Figure 4.2, the Novatech design, outlets 2 and 3, which discharge to the Hazeldean Pump Station, were designed to accommodate flows of up to 17.4 L/s. Since the design flow from Abbotts Run is less than the previously approved design flows, it is confirmed that the Abbott Street sewers have adequate capacity. Detailed design sheets and sanitary figure are located in Appendix C.

5.0 STORMWATER CONVEYANCE

5.1 Background

Pond 1 has been designed and constructed to service most stages of the Abbott's Run development. Stages 2, 3, and 4B, the subject of this report, are tributary to the newly constructed Pond 1. Tributary drainage areas, imperviousness and pipe sizes were all coordinated between DSEL and Novatech Engineering, the Pond 1 designers during both design and construction. The Pond 1 design brief by Novatech provides the details for Pond 1. Figure 5.1 depicts the approximate boundaries of Abbott's Run against the existing stormwater conditions.

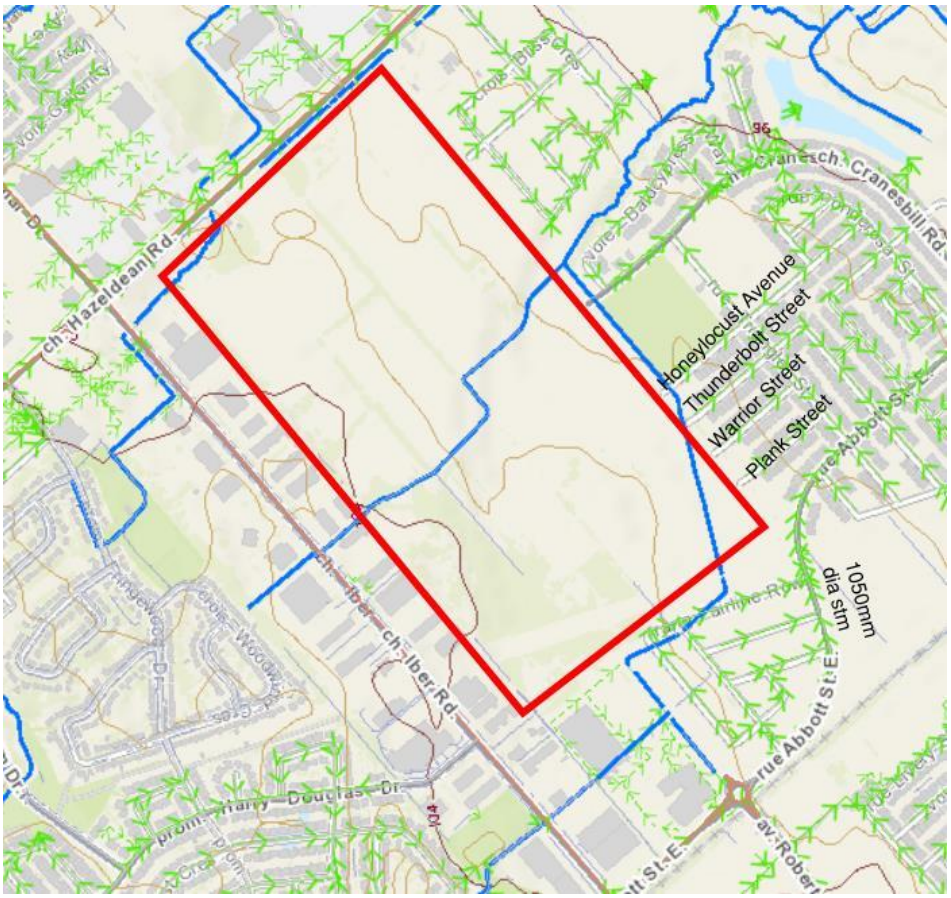

Figure 5.1 Existing Stormwater Servicing and Features

Design criteria for the major and minor systems will follow the standard City of Ottawa design parameters.

The design parameters for the storm sewers are presented below.

5.1.1 Minor System

Abbotts Run Stages 2, 3 and 4B will be serviced by a network of gravity storm sewers designed in accordance with the Ottawa Design Guidelines, including all amendments.

Table 5.1 summarizes the relevant City Standards employed in the design of the proposed storm sewer system referred to as the minor system.

Table 5.1 Storm Design Criteria

Design Parameter	Value
Minor System Design Return Period	2-Year (Local Streets), 5-Year (Collector Streets), 10-Year (Arterial Streets) – PIEDTB-2016-01
Major System Design Return Period	100-Year
Intensity Duration Frequency Curve (IDF) 5-year storm event. A = 998.071 B = 6.053 C = 0.814	$i = \frac{A}{(t_c + B)^C}$
Initial Time of Concentration	10 minutes
Rational Method	$Q = CiA$
Runoff coefficient for paved and roof areas	0.9
Runoff coefficient for landscaped areas	0.2
Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n'	0.013
Service Lateral Size	100 mm dia PVC SDR 28 with a minimum slope of 1.0%
Minimum Depth of Cover	2.0 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.8 m/s
Maximum Full Flowing Velocity	6.0 m/s (above 3.0 m/s may require protection against displacement by sudden jarring)
Clearance from 100-Year HGL	Not above ground surface in areas with sump pumps 0.30 m for USF in areas without sump pumps
Max Allowable Flow Depth on Municipal Roads	35 cm above gutter (PIEDTB-2016-01)
Extracted from Sections 5 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012	

Three inlets have been constructed for Pond 1. The minor system for Abott's Stages 2, 3 and 4B will connect to the existing inlet pipes constructed for the pond.

5.1.2 Major System

Major system flow will be directed towards Pond 1. As major overland flow is not allowed to cross Robert Grant, 1:100 year capture is provided at the intersection of Robert Grant Avenue and the entrances to the local streets for all stages.

The maximum depth of flow on local and collector streets will be designed to 0.35 m during the 100-year event. The depth of flow may extend adjacent to the right-of-way provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event (100 year + 20%). There must be at least 15 cm of vertical clearance between the spill elevation on the street and the ground elevation at the nearest building envelope.

5.1.3 Proposed Outlet – Stormwater Management (SWM) Pond

The Fernbank Community – Pond 1 was identified in the ***Fernbank Community MSS*** to service Abbotts Run. The Fernbank Community – Pond 1 has been approved and constructed. Details can be found in the ***Fernbank Community – Pond 1 Stormwater Management Report*** by Novatech dated July 19, 2023. Figures of Pond 1 are enclosed in ***Appendix E*** for reference.

5.1.3.1 Water Quality Control

Quality control is provided by Pond 1.

5.1.3.2 Water Quantity Control

Quantity control is provided by Pond 1. Total drainage area and overall imperviousness for all of Abbott's Run contribution to Pond 1 are presented in ***Table 5.2***, along with a comparison between the imperviousness that was projected as Novatech Pond 1 Design.

Table 5.2 Abbott's Run Design vs Fernbank Community Pond 1 Drainage Area

Abbotts Run Design sent to Pond 1		Design of Fernbank Community Sent to Pond 1	
Area	Imperviousness	Area	Imperviousness
72.55	70%	73.41	73%

The stormwater management (SWM) pond was originally designed and approved to provide both quality and quantity control, with a capacity exceeding the basic requirements for quality treatment. The Abbott's Run subdivision's runoff coefficient has been calculated at 70%, slightly lower than the 73% used in the pond's design. The pond requires 13,923 m^3 of storage for quality control; however, it has been designed with a significantly larger quality control capacity of 29,380 m^3. Considering the decrease in runoff, the pond can accommodate the subdivision's stormwater.

6.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate, and topography. The extent of erosion losses is exaggerated during construction where the vegetation has been removed and the top layer of soil is disturbed.

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents.

- Limit extent of exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with plastic or synthetic mulches.
- Install silt fence to prevent sediment from entering existing ditches.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.
- Install filter cloth between catch basins and frames.
- Installation of mud mats at construction accesses.
- Construction of temporary sedimentation ponds to treat water prior to outletting to existing wetlands and watercourses.
- Plan construction at proper time to avoid flooding.

A detailed erosion and sediment control plan will be prepared for Abbott's Run prior to construction to ensure there are no negative impacts on the natural areas. A preliminary erosion and sediment control plan is depicted in ***Figure 9***.

7.0 CONCLUSION

A summary of the Functional Servicing and Stormwater Management Report for Abbott's Run is as follows:

- The City of Ottawa has been pre-consulted regarding this application. Approvals will be required from the City of Ottawa, Ministry of the Environment, Conservation and Parks and Mississippi Valley Conservation Authority.
- Watermains will be designed as per the City of Ottawa guidelines and connect to existing watermains in existing Bradley Commons, Abbott Street and future Robert Grant Avenue.
- Sanitary sewers are designed as per the City of Ottawa guidelines and will discharge to existing sanitary trunk sewers within the 900mm diameter sanitary trunk along Robert Grant and the sanitary sewer along Abbot Street. The downstream infrastructure was designed with capacity for Abbott's Run.
- Storm sewers are designed as per the City of Ottawa guidelines, including the amendments.
- The storm sewers will outlet to Pond 1, where the flows will be treated for quality and quantity control prior to discharging to the Carp River West Tributary Alignment.
- Pond 1 is designed to provide quality control treatment to achieve an enhanced level of protection (80% TSS removal per MECP guidelines).
- Erosion and sediment control measures will be implemented and maintained throughout construction. The Carp River West Tributary Alignment will be protected from any negative impacts from construction.

Prepared by,
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Per: Alexandra Marchese

Reviewed by,
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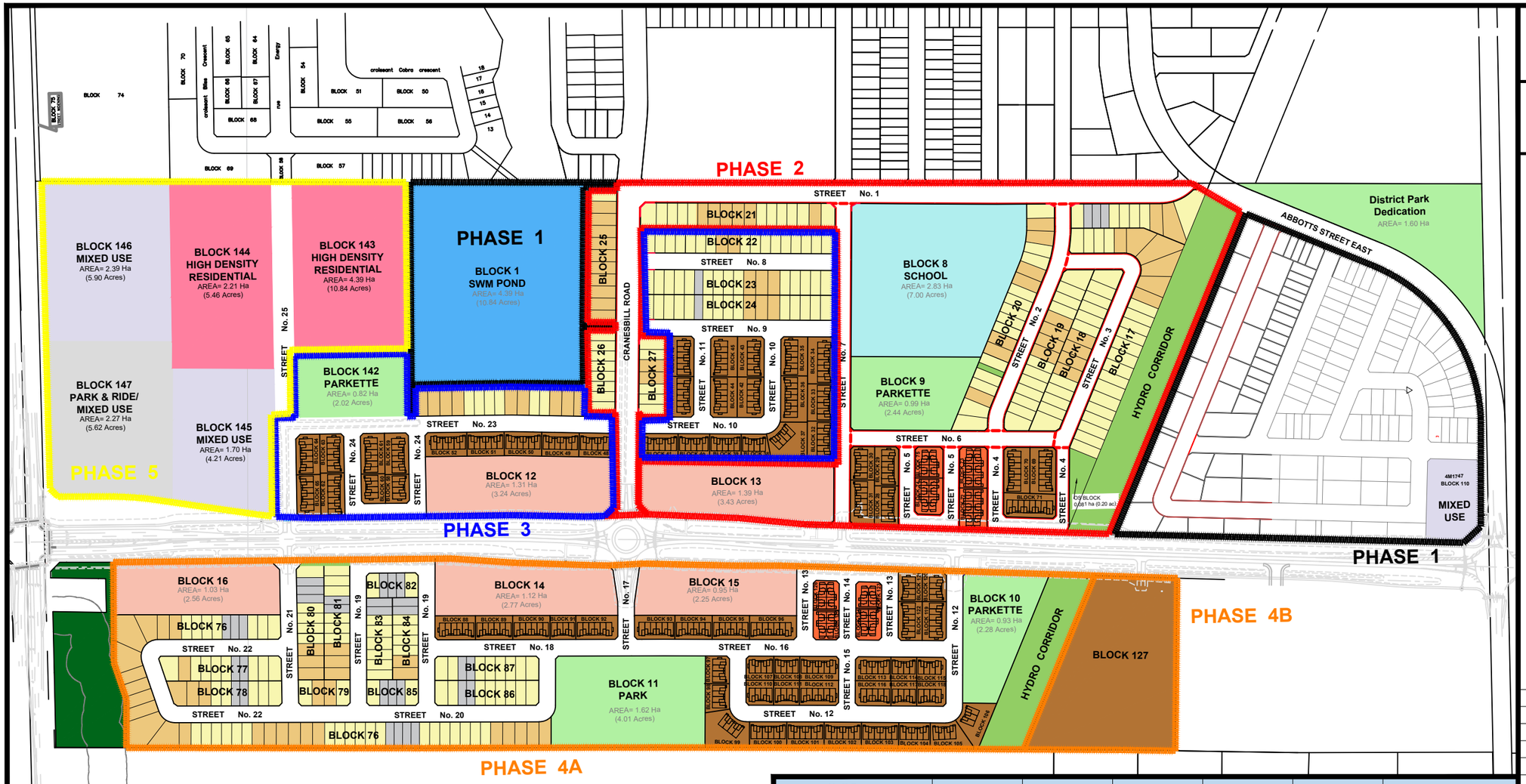
Per: Alexandre Tourigny, P.Eng.

APPENDIX A

Concept Plan



Unit Type	Phase 1	Phase 2	Phase 3	Phase 4A	Phase 4B	Total	
Singles	92	130	69	150	0	441	
Townhomes	191	87	165	205	70	718	
4-6 Storey Medium Density Condos	0	104	111	246	0	461	
High Density Residential	0	0	0	0	0	0	
Mixed Use Residential	0	0	0	0	0	0	
Total Unit Count	283	321	345	601	70	1620	
Commercial (2% of Area)	0.01 ha	0.00 ha	0.00 ha	0.00 ha	0.00 ha	0.01 ha	0.02 ac
Parkland Required ($\frac{1}{300}$ rate)	0.94 ha	1.07 ha	2.52 ha	NA	NA	4.53 ha	11.20 ac
Parkland Required ($\frac{1}{600}$ rate)	NA	NA	0.21 ha	1.00 ha	0.12 ha	1.33 ha	3.29 ac
Total Parkland Required	0.95 ha	1.07 ha	2.73 ha	1.00 ha	0.12 ha	5.87 ha	14.51 ac
Previous Parkland Dedicated	1.60 ha (District Park Dedication) + 1.74 (Landowner Parkland Agreement)					3.34 ha	8.25 ac
Current Parkland Dedicated	0.00 ha	0.99 ha	0.82 ha	2.55 ha	0.00 ha	4.36 ha	10.77 ac
Total Parkland Dedicated	NA					7.70 ha	19.02 ac

Title:

Concept Plan 34

Project:

Abbott's Run

Legend

- 28' Single Family Homes
- 30' Single Family Homes
- 36' Single Family Homes
- 43' Single Family Homes
- Executive Town Homes
- Avenue (B2B) Town Homes
- Rear Lane Town Homes
- 4-6 Storey Medium Density Condos
- High Density Residential
- Mixed Use Blocks
- Mixed Use Block / Park & Ride
- School Facilities
- Parkland
- Open Space
- Natural Feature
- Storm Water Management Pond

No.	Description	Date	By
10	Updated Lotting and Phase 4B	2025-01-20	E.H.
7	Updated table	2024-11-06	K.P.
6	Updated table and parkland	2024-09-04	E.H.
5	Updated table and parkland	2024-09-04	E.H.
4	Updated table and parkland	2024-08-02	M.M.
3	Update lotting	2024-07-22	M.M.
2	Parkland Update	2024-07-19	G.T.
1	Updated With Lotting	2024-07-16	G.T.
0	Issued For Review	2024-07-11	M.M.

Revisions

minto Communities

Drawn By: M.M.
Checked By: C.T.

Minto Communities Inc
180 Kent Street,
Ottawa, ON
K1P 0B6

North

Scale: **NTS**

APPENDIX B

Water Servicing Figure
2020 Novatech Water Modelling
Novatech Water Servicing Figure

HAZELDEAN ROAD

914Ø WATERMAIN

914Ø WATERMAIN

914Ø WATERMAIN

HAZELDEAN ROAD

914Ø WATERMAIN

IBER ROAD

STAGE 4A

STAGE 5

STAGE 3

STAGE 1

STAGE 3

STAGE 2

STAGE 4B

STAGE 1

BLOCK 146
MIXED USE

BLOCK 147
PARK & RIDE/
MIXED USE

BLOCK 145
MIXED USE

BLOCK 144
HIGH DENSITY
RESIDENTIAL

BLOCK 143
HIGH DENSITY
RESIDENTIAL

BLOCK 142
PARKETTE

BLOCK 16

BLOCK 12

BLOCK 14

BLOCK 11
PARK

BLOCK 15

BLOCK 13

BLOCK 10
PARKETTE

BLOCK 9
PARKETTE

BLOCK 8
SCHOOL

BLOCK 1
SWM POND

POND` 1 (BO)
WATER LEVELS
NWL=97.65
2-YEAR=98.44
5-YEAR=98.66
100-YEAR=99.20

300Ø WATERMAIN (B.O.)

STREET No. 22

STREET No. 21

STREET No. 19

STREET No. 20

STREET No. 18

STREET No. 17

STREET No. 16

STREET No. 13

STREET No. 14

STREET No. 15

STREET No. 12

STREET No. 23

STREET No. 24

STREET No. 25

STREET No. 11

STREET No. 10

STREET No. 9

STREET No. 8

STREET No. 1

STREET No. 7

STREET No. 6

STREET No. 5

STREET No. 4

STREET No. 2

STREET No. 3

HYDRO CORRIDOR

HYDRO CORRIDOR

ROBERT GRANT AVENUE

MANTRA STREET

BLISS CRESCENT

ENERGY STREET

SECRET STREET

COBRA STREET

BLISS STREET

CARP RIVER
WEST TRIBUTARY
ALIGNMENT

BALDCYPRESS WAY

CRANESBILL ROAD

TRIANGLE STREET

HONEYLOCUST AVENUE

THUNDERBOLT STREET

TWIST ST

WARRIOR STREET

PLANK STREET

ABBOTT STREET

LIFT STREET

HYDRO ONE TRANSMISSION LINE

200Ø WATERMAIN (B.O.)

400Ø WATERMAIN

Ex SCHOOL

Ex. GRANITE
RIDGE SWM POND
OUTLET DITCH

District Park
Dedication

MIXED USE
4 STOREY 110
UNITS/HA

LEGEND

- SUBJECT LANDS
- PROPOSED LOCAL WATERMAIN
- EXISTING WATERMAIN
- PLUG

DSEL
120 Iber Road, Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

ABBOTT'S RUN
PRELIMINARY
DESIGN
CITY OF OTTAWA

WATERMAIN SERVICING PLAN

SCALE:	1:2000	PROJECT No.:	22-1295
DATE:	JANUARY 2025	DRAWING:	05

Lucas Wilson

From: Surprenant, Eric <Eric.Surprenant@ottawa.ca>
Sent: September-29-16 8:30 AM
To: Lucas Wilson
Subject: FW: Fernbank Community - Kizell Lands: WM Boundary Conditions

Lucas,

Here are the requested boundary conditions:

Hazeldean Connection (900mm feedermain):
PKHR = 155.5m
MAX HGL = 162.4m
MXDY+Fire (167 L/s) = 155.6m
MXDY+Fire (217 L/s) = 155.6m

Abbott Street Connection (400mm watermain):
PKHR = 154.5m
MAX HGL = 162.1m
MXDY+Fire (167 L/s) = 154.5m
MXDY+Fire (217 L/s) = 153.6m

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

From: Lucas Wilson [mailto:l.wilson@novatech-eng.com]
Sent: September 26, 2016 1:44 PM
To: Surprenant, Eric
Subject: Fernbank Community - Kizell Lands: WM Boundary Conditions

Eric,

Not sure who will be assigned to this project but I thought I'd start with you. I'm looking for boundary conditions to complete a hydraulic analysis in support of Draft Plan Submission.
The site is located north of Fernbank Crossing, between Abbott Street and Hazeldean. I've included a drawing which highlights the connections at Hazeldean and Abbott Street within the extended Robert Grant ROW. I've also attached the projected water demand for the Concept Site. Please let me know if you require additional information.

Thanks,
Lucas Wilson | P.Eng.
Project Engineer
NOVATECH

Engineers, Planners & Landscape Architects | 200-240 Michael Cowpland Drive, Ottawa, ON K2M 1P6
Office 613.254.9643 x282 | **Fax** 613.254.5867 | **Email** l.wilson@novatech-eng.com

Kizell Lands
Water Demand

	Area (ha)	Units	Population	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Singles	N/A	288	979	3.173	7.933	17.453
Towns	N/A	475	1283	4.156	10.391	22.859
Medium Density Residential	15.98	1039	1870	6.059	15.148	33.325
High Density Residential	N/A	360	648	2.100	5.250	11.550
Mixed Use Residential	N/A	460	828	2.683	6.708	14.758
Mixed Use Commercial	3.26	N.A	N/A	1.056	1.585	2.853
Schools	3.23	N/A	N/A	1.047	1.570	2.826
Park	4.90	N/A	N/A	1.588	2.382	4.288
Park N' Ride Residential	N/A	300	540	1.750	4.375	9.625
Park N' Ride Commercial	1.82	N/A	N/A	0.590	0.885	1.593
Total	**29.19**	**2922**	**6147**	**24.203**	**56.227**	**121.130**

Water Demand Parameters

Singles	3.4	ppl/unit		
Towns	2.7	ppl/unit		
Medium Density Residential	1.8	ppl/unit	65	units/net ha
Mixed Use Residential	1.8	ppl/unit		
Residential Demand	280	L/c/day		
Institutional/Commercial Demand	28000	L/gross ha/day		
Residential Max Day	2.5	x Avg Day		
Residential Peak Hour	2.2	x Max Day		
Institutional/Commercial Max Day	1.5	x Avg Day		
Institutional/Commercial Peak Hour	1.8	x Max Day		
Residential Fire Flow	167	L/s		
Institutional/Commercial Fire Flow	217	L/s		

Fernbank Community - Kizell Lands: Watermain Demand

Node	Singles	Towns	Stacked Towns (ha)	Medium Density Area (ha)	High Density (Units)	Mixed Use (Units)	Institutional/Commercial Area (ha)	Total Population	Total IC Area (ha)	Average Day Residential Demand (L/s)	Average Day IC Demand (L/s)	Total Average Day Demand (L/s)	Maximum Day Residential Demand (L/s)	Maximum Day IC Demand (L/s)	Total Maximum Day Demand (L/s)	Peak Hour Residential Demand (L/s)	Peak Hour IC Demand (L/s)	Total Peak Hour Demand (L/s)	Fire Flow (L/s)
MD1				2.38				278	0.00	0.902	0.000	0.902	2.256	0.000	2.256	4.963	0.000	4.963	217
N1	26	82		2.12			0.80	558	0.80	1.808	0.259	2.067	4.520	0.389	4.908	9.943	0.700	10.643	167
N2	8	58		1.25			0.83	330	0.83	1.070	0.269	1.339	2.674	0.403	3.077	5.883	0.726	6.609	167
N3		28		1.07	360	460	4.08	1676.8	4.08	5.434	1.322	6.756	13.585	1.983	15.568	29.887	3.570	33.457	217
N4	121	57		2.38				844	0.00	2.734	0.000	2.734	6.836	0.000	6.836	15.039	0.000	15.039	167
N5								0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N/A
N6	45	58		1.98			4.04	541	4.04	1.754	1.309	3.063	4.385	1.964	6.349	9.647	3.535	13.182	217
N7								0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	167
N8								0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	167
N9								0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N/A
N10	65	115		2.40			1.64	812	1.64	2.632	0.531	3.164	6.581	0.797	7.378	14.478	1.435	15.913	N/A
PR1						300	1.82	540	1.82	1.750	0.590	2.340	4.375	0.885	5.260	9.625	1.593	11.218	167
T1								0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N/A
T2	23	77		2.40				567	0.00	1.837	0.000	1.837	4.593	0.000	4.593	10.104	0.000	10.104	167
Total	**288**	**475**	**0.0**	**15.98**	**360**	**760**	**13.21**	**6147**	**13.21**	**19.922**	**4.281**	**24.203**	**49.805**	**6.422**	**56.227**	**109.571**	**11.559**	**121.130**	

Water Demand Parameters

Singles	3.4	ppl/unit	Residential Max Day	2.5	x Avg Day	
Towns	2.7	ppl/unit	Residential Peak Hour	2.2	x Max Day	
Stacked Towns	132.3	ppl/net ha				
Medium Density Area	117	ppl/net ha	Institutional/Commercial Max Day	1.5	x Avg Day	
Mixed Use Residential	1.8	ppl/unit	Institutional/Commercial Peak Hour	1.8	x Max Day	
High Density Residential	1.8	ppl/unit				
Residential Demand	280	L/c/day	Residential Fire Flow	167	L/s	
Institutional/Commercial Demand	28000	L/gross ha/day	Institutional/Commercial Fire Flow	217	L/s	

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes - (Peak Hour)

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	4.96	154.44	51.51	505.31	73.29
Junc N1	103.78	10.64	154.42	50.64	496.78	72.05
Junc N2	103.04	6.61	154.78	51.74	507.57	73.62
Junc N3	101.61	33.46	154.98	53.37	523.56	75.94
Junc N4	102.28	15.04	154.37	52.09	511.00	74.11
Junc N5	101.45	0	154.4	52.95	519.44	75.34
Junc N6	102.27	13.18	154.37	52.1	511.10	74.13
Junc N7	101.52	0	154.37	52.85	518.46	75.20
Junc N8	100.7	0	155.17	54.47	534.35	77.50
Junc N9	96.68	0	155.5	58.82	577.02	83.69
Junc N10	102.7	15.89	154.47	51.77	507.86	73.66
Junc PR1	101.11	11.22	155.37	54.26	532.29	77.20
Junc T1	102.26	0	154.99	52.73	517.28	75.03
Junc T2	103.08	10.1	154.42	51.34	503.65	73.05
Resvr 1	155.5	-80.87	155.5	0	0.00	0.00
Resvr 2	154.5	-40.25	154.5	0	0.00	0.00

Network Table - Links - (Peak Hour)

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	11.51	0.17	0.14	0.030
Pipe 2	240	297	120	11.51	0.17	0.14	0.030
Pipe 3	406	297	120	6.54	0.09	0.05	0.033
Pipe 4	216	297	120	4.10	0.06	0.02	0.035
Pipe 5	436	297	120	29.58	0.43	0.82	0.026
Pipe 6	172	297	120	36.19	0.52	1.19	0.025
Pipe 7	242	297	120	-42.38	0.61	1.60	0.025
Pipe 8	52	297	120	-53.60	0.77	2.47	0.024
Pipe 9	576	900	120	-27.26	0.04	0.00	0.031
Pipe 10	262	297	120	-27.26	0.39	0.71	0.027
Pipe 11	137	297	120	6.20	0.09	0.05	0.033
Pipe 12	216	297	120	15.37	0.22	0.24	0.029
Pipe 13	246	297	120	0.33	0.00	0.00	0.047
Pipe 14	469	297	120	0.33	0.00	0.00	0.050
Pipe 15	283	297	120	12.85	0.19	0.18	0.030
Pipe 16	123	297	120	12.85	0.19	0.18	0.030
Pipe 17	173	400	120	-28.74	0.23	0.18	0.027
Pipe 18	472	297	120	-27.26	0.39	0.71	0.027
Pipe 19	147	297	120	-12.85	0.19	0.18	0.030

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes - (Max Pressure Check)

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	0.9	162.11	59.18	580.56	84.20
Junc N1	103.78	2.07	162.12	58.34	572.32	83.01
Junc N2	103.04	1.34	162.27	59.23	581.05	84.27
Junc N3	101.61	6.76	162.33	60.72	595.66	86.39
Junc N4	102.28	2.73	162.12	59.84	587.03	85.14
Junc N5	101.45	0	162.1	60.65	594.98	86.29
Junc N6	102.27	3.06	162.1	59.83	586.93	85.13
Junc N7	101.51	0	162.12	60.61	594.58	86.24
Junc N8	100.7	0	162.35	61.65	604.79	87.72
Junc N9	96.68	0	162.4	65.72	644.71	93.51
Junc N10	102.7	3.16	162.1	59.4	582.71	84.52
Junc PR1	101.11	2.34	162.38	61.27	601.06	87.18
Junc T1	102.26	0	162.32	60.06	589.19	85.45
Junc T2	103.08	1.84	162.14	59.06	579.38	84.03
Resvr 1	162.4	-27.38	162.4	0	0.00	0.00
Resvr 2	162.1	3.18	162.1	0	0.00	0.00

Network Table - Links - (Max Pressure Check)

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	-4.48	0.06	0.02	0.035
Pipe 2	240	297	120	-4.48	0.06	0.02	0.035
Pipe 3	406	297	120	-5.38	0.08	0.03	0.034
Pipe 4	216	297	120	7.45	0.11	0.06	0.032
Pipe 5	436	297	120	16.95	0.24	0.29	0.028
Pipe 6	172	297	120	18.29	0.26	0.34	0.028
Pipe 7	242	297	120	-15.46	0.22	0.25	0.029
Pipe 8	52	297	120	-17.80	0.26	0.32	0.028
Pipe 9	576	900	120	-9.58	0.02	0.00	0.035
Pipe 10	262	297	120	-9.58	0.14	0.10	0.031
Pipe 11	137	297	120	-2.82	0.04	0.01	0.037
Pipe 12	216	297	120	7.66	0.11	0.07	0.032
Pipe 13	246	297	120	4.93	0.07	0.03	0.034
Pipe 14	469	297	120	4.93	0.07	0.03	0.034
Pipe 15	283	297	120	-1.86	0.03	0.00	0.039
Pipe 16	123	297	120	-1.86	0.03	0.00	0.039
Pipe 17	173	400	120	-1.30	0.01	0.00	0.040
Pipe 18	472	297	120	-9.58	0.14	0.10	0.031
Pipe 19	147	297	120	1.86	0.03	0.00	0.040

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes - (Fire Flow Summary)

Fire Flow		Minimum Pressure		
Node	Flow (L/s)	Pressure (kPa)	Pressure (PSI)	Node
N10	217	497.47	72.15	N1
MD1	217	471.76	68.42	MD1
N1	167	459.89	66.70	N1
N2	167	480.98	69.76	N2
N3	217	480.30	69.66	N3
N4	167	468.53	67.95	N4
N6	217	427.62	62.02	N6
N7	167	468.92	68.01	N7
N8	167	485.01	70.34	N8
PR1	217	488.83	70.90	N1
T2	167	473.33	68.65	N1

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N1')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	152.5	49.57	486.28	70.53
Junc N1	103.78	171.91	150.66	46.88	459.89	66.70
Junc N2	103.04	3.08	154.05	51.01	500.41	72.58
Junc N3	101.61	15.57	154.85	53.24	522.28	75.75
Junc N4	102.28	6.84	152.48	50.2	492.46	71.43
Junc N5	101.45	0	153.7	52.25	512.57	74.34
Junc N6	102.27	6.35	153.44	51.17	501.98	72.81
Junc N7	101.51	0	152.81	51.3	503.25	72.99
Junc N8	100.7	0	155.11	54.41	533.76	77.42
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	154.43	51.73	507.47	73.60
Junc PR1	101.11	5.26	155.44	54.33	532.98	77.30
Junc T1	102.26	0	154.8	52.54	515.42	74.75
Junc T2	103.08	4.59	152.27	49.19	482.55	69.99
Resvr 1	155.6	-94.11	155.6	0	0.00	0.00
Resvr 2	154.5	-121.74	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'N1')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	76.72	1.11	4.79	0.023
Pipe 2	240	297	120	76.72	1.11	4.79	0.023
Pipe 3	406	297	120	74.46	1.07	4.53	0.023
Pipe 4	216	297	120	97.45	1.41	7.46	0.022
Pipe 5	436	297	120	70.20	1.01	4.06	0.023
Pipe 6	172	297	120	73.28	1.06	4.40	0.023
Pipe 7	242	297	120	-55.52	0.80	2.63	0.024
Pipe 8	52	297	120	-60.78	0.88	3.11	0.024
Pipe 9	576	900	120	-33.33	0.05	0.00	0.030
Pipe 10	262	297	120	-33.33	0.48	1.02	0.026
Pipe 11	137	297	120	-17.77	0.26	0.32	0.028
Pipe 12	216	297	120	-31.84	0.46	0.94	0.026
Pipe 13	246	297	120	-38.67	0.56	1.35	0.025
Pipe 14	469	297	120	-38.67	0.56	1.35	0.025
Pipe 15	283	297	120	45.02	0.65	1.79	0.025
Pipe 16	123	297	120	45.02	0.65	1.79	0.025
Pipe 17	173	400	120	-45.02	0.36	0.42	0.026
Pipe 18	472	297	120	-33.33	0.48	1.02	0.026
Pipe 19	147	297	120	-45.02	0.65	1.79	0.025

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N2')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.87	50.94	499.72	72.48
Junc N1	103.78	4.91	153.32	49.54	485.99	70.49
Junc N2	103.04	170.08	152.07	49.03	480.98	69.76
Junc N3	101.61	15.57	154.04	52.43	514.34	74.60
Junc N4	102.28	6.84	153.2	50.92	499.53	72.45
Junc N5	101.45	0	153.97	52.52	515.22	74.73
Junc N6	102.27	6.35	153.8	51.53	505.51	73.32
Junc N7	101.51	0	153.41	51.9	509.14	73.84
Junc N8	100.7	0	154.6	53.9	528.76	76.69
Junc N9	96.68	0	155.59	58.91	577.91	83.82
Junc N10	102.7	0	154.45	51.75	507.67	73.63
Junc PR1	101.11	5.26	155.27	54.16	531.31	77.06
Junc T1	102.26	0	153.9	51.64	506.59	73.47
Junc T2	103.08	4.59	153.09	50.01	490.60	71.16
Resvr 1	155.6	-138.72	155.6	0	0.00	0.00
Resvr 2	154.5	-77.12	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'N2')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	41.05	0.59	1.50	0.025
Pipe 2	240	297	120	41.05	0.59	1.50	0.025
Pipe 3	406	297	120	38.79	0.56	1.36	0.025
Pipe 4	216	297	120	-33.89	0.49	1.05	0.026
Pipe 5	436	297	120	-52.18	0.75	2.35	0.024
Pipe 6	172	297	120	117.89	1.70	10.62	0.021
Pipe 7	242	297	120	-84.11	1.21	5.68	0.022
Pipe 8	52	297	120	-89.37	1.29	6.36	0.022
Pipe 9	576	900	120	-49.35	0.08	0.01	0.028
Pipe 10	262	297	120	-49.35	0.71	2.12	0.024
Pipe 11	137	297	120	-33.78	0.49	1.05	0.026
Pipe 12	216	297	120	-22.89	0.33	0.51	0.027
Pipe 13	246	297	120	-29.73	0.43	0.83	0.026
Pipe 14	469	297	120	-29.73	0.43	0.83	0.026
Pipe 15	283	297	120	36.07	0.52	1.18	0.025
Pipe 16	123	297	120	36.07	0.52	1.18	0.025
Pipe 17	173	400	120	-36.07	0.29	0.28	0.026
Pipe 18	472	297	120	-49.35	0.71	2.12	0.024
Pipe 19	147	297	120	-36.07	0.52	1.18	0.025

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N4')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.48	50.55	495.90	71.92
Junc N1	103.78	4.91	152.57	48.79	478.63	69.42
Junc N2	103.04	3.08	154	50.96	499.92	72.51
Junc N3	101.61	15.57	154.83	53.22	522.09	75.72
Junc N4	102.28	173.84	150.04	47.76	468.53	67.95
Junc N5	101.45	0	152.83	51.38	504.04	73.10
Junc N6	102.27	6.35	152.27	50	490.50	71.14
Junc N7	101.51	0	150.81	49.3	483.63	70.15
Junc N8	100.7	0	155.1	54.4	533.66	77.40
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	154.35	51.65	506.69	73.49
Junc PR1	101.11	5.26	155.43	54.32	532.88	77.29
Junc T1	102.26	0	154.78	52.52	515.22	74.73
Junc T2	103.08	4.59	152.17	49.09	481.57	69.85
Resvr 1	155.6	-95.39	155.6	0	0.00	0.00
Resvr 2	154.5	-120.46	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'N4')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	53.27	0.77	2.44	0.024
Pipe 2	240	297	120	53.27	0.77	2.44	0.024
Pipe 3	406	297	120	51.01	0.74	2.25	0.024
Pipe 4	216	297	120	-46.10	0.67	1.87	0.025
Pipe 5	436	297	120	71.48	1.03	4.20	0.023
Pipe 6	172	297	120	74.56	1.08	4.54	0.023
Pipe 7	242	297	120	-56.33	0.81	2.70	0.024
Pipe 8	52	297	120	-61.59	0.89	3.19	0.024
Pipe 9	576	900	120	-33.79	0.05	0.00	0.030
Pipe 10	262	297	120	-33.79	0.49	1.05	0.026
Pipe 11	137	297	120	-18.23	0.26	0.33	0.028
Pipe 12	216	297	120	112.99	1.63	9.81	0.022
Pipe 13	246	297	120	-60.84	0.88	3.12	0.024
Pipe 14	469	297	120	-60.84	0.88	3.12	0.024
Pipe 15	283	297	120	67.19	0.97	3.75	0.023
Pipe 16	123	297	120	67.19	0.97	3.75	0.023
Pipe 17	173	400	120	-67.19	0.53	0.88	0.024
Pipe 18	472	297	120	-33.79	0.49	1.05	0.026
Pipe 19	147	297	120	-67.19	0.97	3.75	0.023

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Network Table - Nodes (Max Day + FF 'N7')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.7	50.77	498.05	72.24
Junc N1	103.78	4.91	152.99	49.21	482.75	70.02
Junc N2	103.04	3.08	154.23	51.19	502.17	72.83
Junc N3	101.61	15.57	154.92	53.31	522.97	75.85
Junc N4	102.28	6.84	151	48.72	477.94	69.32
Junc N5	101.45	0	152.18	50.73	497.66	72.18
Junc N6	102.27	6.35	151.41	49.14	482.06	69.92
Junc N7	101.51	167	149.31	47.8	468.92	68.01
Junc N8	100.7	0	155.16	54.46	534.25	77.49
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	154.29	51.59	506.10	73.40
Junc PR1	101.11	5.26	155.45	54.34	533.08	77.32
Junc T1	102.26	0	154.89	52.63	516.30	74.88
Junc T2	103.08	4.59	152.69	49.61	486.67	70.59
Resvr 1	155.6	-88.9	155.6	0	0.00	0.00
Resvr 2	154.5	-126.95	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'N7')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	46.72	0.67	1.91	0.025
Pipe 2	240	297	120	46.72	0.67	1.91	0.025
Pipe 3	406	297	120	44.47	0.64	1.74	0.025
Pipe 4	216	297	120	-39.56	0.57	1.40	0.025
Pipe 5	436	297	120	64.99	0.94	3.52	0.023
Pipe 6	172	297	120	68.07	0.98	3.84	0.023
Pipe 7	242	297	120	-52.18	0.75	2.35	0.024
Pipe 8	52	297	120	-57.44	0.83	2.80	0.024
Pipe 9	576	900	120	-31.46	0.05	0.00	0.030
Pipe 10	262	297	120	-31.46	0.45	0.92	0.026
Pipe 11	137	297	120	-15.89	0.23	0.26	0.029
Pipe 12	216	297	120	99.96	1.44	7.82	0.022
Pipe 13	246	297	120	93.12	1.34	6.86	0.022
Pipe 14	469	297	120	-73.88	1.07	4.47	0.023
Pipe 15	283	297	120	80.23	1.16	5.20	0.023
Pipe 16	123	297	120	80.23	1.16	5.20	0.023
Pipe 17	173	400	120	-80.23	0.64	1.22	0.024
Pipe 18	472	297	120	-31.46	0.45	0.92	0.026
Pipe 19	147	297	120	-80.23	1.16	5.20	0.023

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Network Table - Nodes (Max Day + FF 'N10')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	154.49	51.56	505.80	73.36
Junc N1	103.78	4.91	154.49	50.71	497.47	72.15
Junc N2	103.04	3.08	155.02	51.98	509.92	73.96
Junc N3	101.61	15.57	155.27	53.66	526.40	76.35
Junc N4	102.28	6.84	154.32	52.04	510.51	74.04
Junc N5	101.45	0	153.93	52.48	514.83	74.67
Junc N6	102.27	6.35	153.97	51.7	507.18	73.56
Junc N7	101.51	0	154.2	52.69	516.89	74.97
Junc N8	100.7	0	155.39	54.69	536.51	77.81
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	167	153.82	51.12	501.49	72.73
Junc PR1	101.11	5.26	155.53	54.42	533.86	77.43
Junc T1	102.26	0	155.27	53.01	520.03	75.42
Junc T2	103.08	4.59	154.49	51.41	504.33	73.15
Resvr 1	155.6	-60.63	155.6	0	0.00	0.00
Resvr 2	154.5	-155.22	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'N10')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	4.27	0.06	0.02	0.035
Pipe 2	240	297	120	4.27	0.06	0.02	0.035
Pipe 3	406	297	120	2.01	0.03	0.01	0.039
Pipe 4	216	297	120	2.90	0.04	0.01	0.037
Pipe 5	436	297	120	36.72	0.53	1.22	0.025
Pipe 6	172	297	120	39.80	0.57	1.42	0.025
Pipe 7	242	297	120	-34.17	0.49	1.07	0.026
Pipe 8	52	297	120	-39.43	0.57	1.40	0.025
Pipe 9	576	900	120	-21.20	0.03	0.00	0.032
Pipe 10	262	297	120	-21.20	0.31	0.44	0.028
Pipe 11	137	297	120	-5.63	0.08	0.04	0.034
Pipe 12	216	297	120	29.23	0.42	0.80	0.026
Pipe 13	246	297	120	22.40	0.32	0.49	0.027
Pipe 14	469	297	120	22.40	0.32	0.49	0.027
Pipe 15	283	297	120	-16.05	0.23	0.26	0.029
Pipe 16	123	297	120	-16.05	0.23	0.26	0.029
Pipe 17	173	400	120	-150.95	1.20	3.94	0.021
Pipe 18	472	297	120	-21.20	0.31	0.44	0.028
Pipe 19	147	297	120	16.05	0.23	0.26	0.029

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Network Table - Nodes (Max Day + FF 'T2')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.21	50.28	493.25	71.54
Junc N1	103.78	4.91	152.03	48.25	473.33	68.65
Junc N2	103.04	3.08	153.71	50.67	497.07	72.09
Junc N3	101.61	15.57	154.71	53.1	520.91	75.55
Junc N4	102.28	6.84	151.79	49.51	485.69	70.44
Junc N5	101.45	0	153.45	52	510.12	73.99
Junc N6	102.27	6.35	153.11	50.84	498.74	72.34
Junc N7	101.51	0	152.25	50.74	497.76	72.19
Junc N8	100.7	0	155.02	54.32	532.88	77.29
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	154.41	51.71	507.28	73.57
Junc PR1	101.11	5.26	155.41	54.3	532.68	77.26
Junc T1	102.26	0	154.65	52.39	513.95	74.54
Junc T2	103.08	171.59	151.5	48.42	475.00	68.89
Resvr 1	155.6	-103.03	155.6	0	0.00	0.00
Resvr 2	154.5	-112.82	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'T2')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	60.70	0.88	3.10	0.024
Pipe 2	240	297	120	60.70	0.88	3.10	0.024
Pipe 3	406	297	120	58.44	0.84	2.89	0.024
Pipe 4	216	297	120	-53.54	0.77	2.46	0.024
Pipe 5	436	297	120	79.13	1.14	5.07	0.023
Pipe 6	172	297	120	82.20	1.19	5.44	0.023
Pipe 7	242	297	120	-61.23	0.88	3.16	0.024
Pipe 8	52	297	120	-66.49	0.96	3.68	0.023
Pipe 9	576	900	120	-36.54	0.06	0.01	0.029
Pipe 10	262	297	120	-36.54	0.53	1.21	0.025
Pipe 11	137	297	120	-20.98	0.30	0.43	0.028
Pipe 12	216	297	120	-38.93	0.56	1.36	0.025
Pipe 13	246	297	120	-45.77	0.66	1.84	0.025
Pipe 14	469	297	120	-45.77	0.66	1.84	0.025
Pipe 15	283	297	120	52.12	0.75	2.34	0.024
Pipe 16	123	297	120	52.12	0.75	2.34	0.024
Pipe 17	173	400	120	-52.12	0.41	0.55	0.025
Pipe 18	472	297	120	-36.54	0.53	1.21	0.025
Pipe 19	147	297	120	-52.12	0.75	2.34	0.024

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Network Table - Nodes (Max Day + FF 'MD1')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	169.26	151.02	48.09	471.76	68.42
Junc N1	103.78	4.91	152.48	48.7	477.75	69.29
Junc N2	103.04	3.08	154.52	51.48	505.02	73.25
Junc N3	101.61	15.57	155.05	53.44	524.25	76.04
Junc N4	102.28	6.84	153.45	51.17	501.98	72.81
Junc N5	101.45	0	154.06	52.61	516.10	74.85
Junc N6	102.27	6.35	153.92	51.65	506.69	73.49
Junc N7	101.51	0	153.61	52.1	511.10	74.13
Junc N8	100.7	0	155.25	54.55	535.14	77.61
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	154.46	51.76	507.77	73.65
Junc PR1	101.11	5.26	155.48	54.37	533.37	77.36
Junc T1	102.26	0	155.03	52.77	517.67	75.08
Junc T2	103.08	4.59	153.36	50.28	493.25	71.54
Resvr 1	155.6	-79.68	155.6	0	0.00	0.00
Resvr 2	154.5	-136.17	154.5	0	0.00	0.00

Network Table - Links (Max Day + FF 'MD1')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	103.56	1.49	8.35	0.022
Pipe 2	240	297	120	103.56	1.49	8.35	0.022
Pipe 3	406	297	120	-65.70	0.95	3.60	0.023
Pipe 4	216	297	120	70.61	1.02	4.11	0.023
Pipe 5	436	297	120	55.78	0.81	2.65	0.024
Pipe 6	172	297	120	58.85	0.85	2.93	0.024
Pipe 7	242	297	120	-46.29	0.67	1.88	0.025
Pipe 8	52	297	120	-51.55	0.74	2.29	0.024
Pipe 9	576	900	120	-28.13	0.04	0.00	0.031
Pipe 10	262	297	120	-28.13	0.41	0.75	0.026
Pipe 11	137	297	120	-12.56	0.18	0.17	0.030
Pipe 12	216	297	120	-19.42	0.28	0.38	0.028
Pipe 13	246	297	120	-26.26	0.38	0.66	0.027
Pipe 14	469	297	120	-26.26	0.38	0.66	0.027
Pipe 15	283	297	120	32.61	0.47	0.98	0.026
Pipe 16	123	297	120	32.61	0.47	0.98	0.026
Pipe 17	173	400	120	-32.61	0.26	0.23	0.027
Pipe 18	472	297	120	-28.13	0.41	0.75	0.026
Pipe 19	147	297	120	-32.61	0.47	0.98	0.026

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Network Table - Nodes (Max Day + FF 'PR1')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.6	50.67	497.07	72.09
Junc N1	103.78	4.91	153.61	49.83	488.83	70.90
Junc N2	103.04	3.08	153.84	50.8	498.35	72.28
Junc N3	101.61	15.57	154.08	52.47	514.73	74.66
Junc N4	102.28	6.84	153.6	51.32	503.45	73.02
Junc N5	101.45	0	153.59	52.14	511.49	74.19
Junc N6	102.27	6.35	153.59	51.32	503.45	73.02
Junc N7	101.51	0	153.6	52.09	511.00	74.11
Junc N8	100.7	0	154.62	53.92	528.96	76.72
Junc N9	96.68	0	155.59	58.91	577.91	83.82
Junc N10	102.7	0	153.6	50.9	499.33	72.42
Junc PR1	101.11	222.26	153.93	52.82	518.16	75.15
Junc T1	102.26	0	153.94	51.68	506.98	73.53
Junc T2	103.08	4.59	153.62	50.54	495.80	71.91
Resvr 1	155.6	-263.29	155.6	0	0.00	0.00
Resvr 2	153.6	-2.56	153.6	0	0.00	0.00

Network Table - Links (Max Day + FF 'PR1')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	-0.88	0.01	0.00	0.043
Pipe 2	240	297	120	-0.88	0.01	0.00	0.045
Pipe 3	406	297	120	-3.14	0.05	0.01	0.037
Pipe 4	216	297	120	8.05	0.12	0.07	0.032
Pipe 5	436	297	120	22.39	0.32	0.49	0.027
Pipe 6	172	297	120	25.46	0.37	0.62	0.027
Pipe 7	242	297	120	7.65	0.11	0.07	0.032
Pipe 8	52	297	120	-214.61	3.10	32.20	0.020
Pipe 9	576	900	120	-48.68	0.08	0.01	0.028
Pipe 10	262	297	120	-48.68	0.70	2.06	0.024
Pipe 11	137	297	120	-33.11	0.48	1.01	0.026
Pipe 12	216	297	120	9.75	0.14	0.10	0.031
Pipe 13	246	297	120	2.91	0.04	0.01	0.037
Pipe 14	469	297	120	2.91	0.04	0.01	0.037
Pipe 15	283	297	120	3.44	0.05	0.02	0.036
Pipe 16	123	297	120	3.44	0.05	0.02	0.036
Pipe 17	173	400	120	-3.44	0.03	0.00	0.037
Pipe 18	472	297	120	-48.68	0.70	2.06	0.024
Pipe 19	147	297	120	-3.44	0.05	0.02	0.036

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Network Table - Nodes (Max Day + FF 'N3')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.3	50.37	494.13	71.67
Junc N1	103.78	4.91	153.06	49.28	483.44	70.12
Junc N2	103.04	3.08	152.66	49.62	486.77	70.60
Junc N3	101.61	232.57	150.57	48.96	480.30	69.66
Junc N4	102.28	6.84	153	50.72	497.56	72.17
Junc N5	101.45	0	153.33	51.88	508.94	73.82
Junc N6	102.27	6.35	153.25	50.98	500.11	72.54
Junc N7	101.51	0	153.08	51.57	505.90	73.37
Junc N8	100.7	0	152.36	51.66	506.78	73.50
Junc N9	96.68	0	155.58	58.9	577.81	83.80
Junc N10	102.7	0	153.58	50.88	499.13	72.39
Junc PR1	101.11	5.26	155.02	53.91	528.86	76.70
Junc T1	102.26	0	152.56	50.3	493.44	71.57
Junc T2	103.08	4.59	152.97	49.89	489.42	70.98
Resvr 1	155.6	-213.54	155.6	0	0.00	0.00
Resvr 2	153.6	-52.31	153.6	0	0.00	0.00

Network Table - Links (Max Day + FF 'N3')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	27.43	0.40	0.71	0.027
Pipe 2	240	297	120	27.43	0.40	0.71	0.027
Pipe 3	406	297	120	25.17	0.36	0.61	0.027
Pipe 4	216	297	120	-20.26	0.29	0.41	0.028
Pipe 5	436	297	120	-27.37	0.40	0.71	0.027
Pipe 6	172	297	120	-24.29	0.35	0.57	0.027
Pipe 7	242	297	120	-115.38	1.67	10.20	0.021
Pipe 8	52	297	120	-120.64	1.74	11.08	0.021
Pipe 9	576	900	120	-92.90	0.15	0.03	0.026
Pipe 10	262	297	120	-92.90	1.34	6.83	0.022
Pipe 11	137	297	120	139.67	2.02	14.53	0.021
Pipe 12	216	297	120	-11.70	0.17	0.15	0.030
Pipe 13	246	297	120	-18.53	0.27	0.35	0.028
Pipe 14	469	297	120	-18.53	0.27	0.35	0.028
Pipe 15	283	297	120	24.88	0.36	0.60	0.027
Pipe 16	123	297	120	24.88	0.36	0.60	0.027
Pipe 17	173	400	120	-24.88	0.20	0.14	0.028
Pipe 18	472	297	120	-92.90	1.34	6.83	0.022
Pipe 19	147	297	120	-24.88	0.36	0.60	0.027

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Network Table - Nodes (Max Day + FF 'N6')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153	50.07	491.19	71.24
Junc N1	103.78	4.91	152.48	48.7	477.75	69.29
Junc N2	103.04	3.08	154.04	51	500.31	72.56
Junc N3	101.61	15.57	154.85	53.24	522.28	75.75
Junc N4	102.28	6.84	150.62	48.34	474.22	68.78
Junc N5	101.45	0	147.78	46.33	454.50	65.92
Junc N6	102.27	223.35	145.86	43.59	427.62	62.02
Junc N7	101.51	0	148.98	47.47	465.68	67.54
Junc N8	100.7	0	155.11	54.41	533.76	77.42
Junc N9	96.68	0	155.6	58.92	578.01	83.83
Junc N10	102.7	0	153.07	50.37	494.13	71.67
Junc PR1	101.11	5.26	155.44	54.33	532.98	77.30
Junc T1	102.26	0	154.8	52.54	515.42	74.75
Junc T2	103.08	4.59	152.27	49.19	482.55	69.99
Resvr 1	155.6	-94.18	155.6	0	0.00	0.00
Resvr 2	153.6	-171.66	153.6	0	0.00	0.00

Network Table - Links (Max Day + FF 'N6')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	39.95	0.58	1.43	0.025
Pipe 2	240	297	120	39.95	0.58	1.43	0.025
Pipe 3	406	297	120	37.70	0.54	1.29	0.025
Pipe 4	216	297	120	-32.79	0.47	0.99	0.026
Pipe 5	436	297	120	70.28	1.01	4.07	0.023
Pipe 6	172	297	120	73.36	1.06	4.41	0.023
Pipe 7	242	297	120	-55.56	0.80	2.64	0.024
Pipe 8	52	297	120	-60.82	0.88	3.12	0.024
Pipe 9	576	900	120	-33.36	0.05	0.00	0.030
Pipe 10	262	297	120	-33.36	0.48	1.02	0.026
Pipe 11	137	297	120	-17.79	0.26	0.32	0.028
Pipe 12	216	297	120	98.48	1.42	7.61	0.022
Pipe 13	246	297	120	91.64	1.32	6.66	0.022
Pipe 14	469	297	120	91.64	1.32	6.66	0.022
Pipe 15	283	297	120	131.71	1.90	13.03	0.021
Pipe 16	123	297	120	131.71	1.90	13.03	0.021
Pipe 17	173	400	120	-131.71	1.05	3.06	0.022
Pipe 18	472	297	120	-33.36	0.48	1.02	0.026
Pipe 19	147	297	120	-131.71	1.90	13.03	0.021

Fernbank Community - Kizell Lands: Watermain Analysis

Network Table - Nodes (Max Day + FF 'N8')

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Junc MD1	102.93	2.26	153.45	50.52	495.60	71.88
Junc N1	103.78	4.91	153.34	49.56	486.18	70.51
Junc N2	103.04	3.08	153.24	50.2	492.46	71.43
Junc N3	101.61	15.57	151.96	50.35	493.93	71.64
Junc N4	102.28	6.84	153.31	51.03	500.60	72.61
Junc N5	101.45	0	153.46	52.01	510.22	74.00
Junc N6	102.27	6.35	153.41	51.14	501.68	72.76
Junc N7	101.51	0	153.35	51.84	508.55	73.76
Junc N8	100.7	217	150.14	49.44	485.01	70.34
Junc N9	96.68	0	155.57	58.89	577.71	83.79
Junc N10	102.7	0	153.59	50.89	499.23	72.41
Junc PR1	101.11	5.26	155.15	54.04	530.13	76.89
Junc T1	102.26	0	153.23	50.97	500.02	72.52
Junc T2	103.08	4.59	153.31	50.23	492.76	71.47
Resvr 1	155.6	-229.23	155.6	0	0.00	0.00
Resvr 2	153.6	-36.61	153.6	0	0.00	0.00

Network Table - Links (Max Day + FF 'N8')

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	178	297	120	18.87	0.27	0.36	0.028
Pipe 2	240	297	120	18.87	0.27	0.36	0.028
Pipe 3	406	297	120	16.61	0.24	0.28	0.029
Pipe 4	216	297	120	-11.70	0.17	0.15	0.030
Pipe 5	436	297	120	-11.67	0.17	0.15	0.030
Pipe 6	172	297	120	-8.59	0.12	0.08	0.031
Pipe 7	242	297	120	-100.82	1.46	7.95	0.022
Pipe 8	52	297	120	-106.08	1.53	8.73	0.022
Pipe 9	576	900	120	-123.15	0.19	0.05	0.024
Pipe 10	262	297	120	93.85	1.35	6.96	0.022
Pipe 11	137	297	120	109.42	1.58	9.25	0.022
Pipe 12	216	297	120	-4.56	0.07	0.03	0.035
Pipe 13	246	297	120	-11.40	0.16	0.14	0.030
Pipe 14	469	297	120	-11.40	0.16	0.14	0.030
Pipe 15	283	297	120	17.75	0.26	0.32	0.028
Pipe 16	123	297	120	17.75	0.26	0.32	0.028
Pipe 17	173	400	120	-17.75	0.14	0.07	0.029
Pipe 18	472	297	120	-123.15	1.78	11.51	0.021
Pipe 19	147	297	120	-17.75	0.26	0.32	0.028

LEGEND
AREA IN HECTARES
AREA ID
POPULATION EQUIVALENT
PROPOSED WATERMAIN AND SIZE
EXISTING / PROPOSED (BY OTHERS) WATERMAIN AND SIZE
WATER SERVICE BOUNDARY
PIPE NODE AND ID#
DOUBLE DECK LANDS
MATTAMY LANDS
RICHCRAFT LANDS
RICHCRAFT LANDS
COMMERCIAL
MIXED USE
ELEMENTARY SCHOOL
COMMUNITY PARK
DISTRICT PARK
POND 2
HYDRO CORRIDOR
CARP TRIBUTARY
MIXED USE
HIGH DENSITY RESIDENTIAL
HIGH DENSITY RESIDENTIAL
POND 1
PARK & RIDE
MIXED USE
PARK
MEDIUM DENSITY RESIDENTIAL
ELEMENTARY SCHOOL
PARK
DISTRICT PARK
ABBOTT STREET
ROBERT GRANT AVENUE
5654 HAZELDEAN ROAD
OPEN SPACE
PARK
SECONDARY SCHOOL
HAZELDEAN ROAD
ABBOTT STREET
TRANS CANADA TRAIL
IBER ROAD
300mmØ WM
EX. 300mmØ WM
EX. 400mmØ WM
EX. 600mmØ WM
2.27 ha 6 540.0
12.22 ha 5 1676.8
12.36 ha 7 843.8
11.66 ha 8 541.3
9.98 ha 9 812.3
1.64 ha 10 0.0
5.01 ha 4 330.1
6.70 ha 3 566.9
7.63 ha 2 557.8
2.38 ha MD1 278.5
N1 N2 N3 N4 N5 N6 N7 N8 N9 N10 T1 T2 PR1 MD1 RES1 RES2

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
5.	REVISED PER CITY COMMENTS	MAY 29/20	MAB
4.	DRAFT PLAN RESUBMISSION	DEC 13/19	MAB
3.	DRAFT PLAN RESUBMISSION	FEB 23/18	MAB
2.	REVISED PER CITY COMMENTS	JUL 20/17	MAB
1.	DRAFT PLAN APPLICATION	NOV 9/16	MAB

SCALE 1:2000

DESIGN LRW
CHECKED MAB
DRAWN DTD
CHECKED MAB
APPROVED JGR

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER L. R. WILSON 100160065 2020.05.29 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER M.A. BISSETT PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

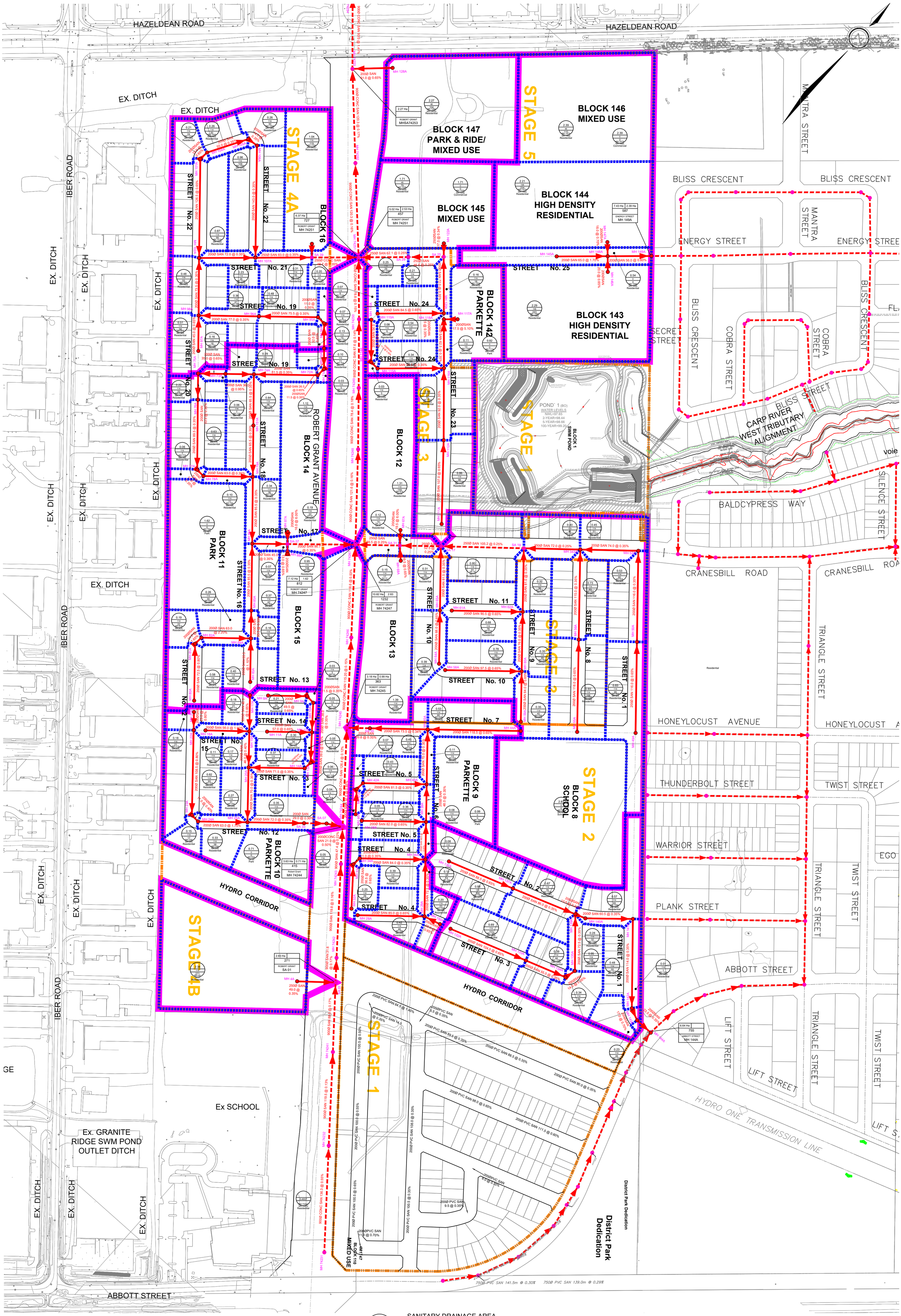
CITY OF OTTAWA
FERNBANK COMMUNITY - KIZELL LANDS

WATER DISTRIBUTION PLAN

PROJECT No. 108195-0
REV REV # 5
DRAWING No. 108195-WTR

APPENDIX C

Wastewater Servicing Figure
Sanitary Design Sheets
Novatech Sanitary Servicing Figure
Novatech Sanitary Design Sheet



LEGEND

- SITE BOUNDARY
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- SANITARY SEWER BY OTHERS
- OVERALL SANITARY DRAINAGE AREA
- SANITARY DRAINAGE BOUNDARY
- PROPOSED SANITARY MANHOLE
- EXTERNAL SANITARY MANHOLE

7.50Ha
85
638
MH UP
MH DOWN
RESIDENTIAL

- SANITARY DRAINAGE AREA
- POPULATION PER HECTARE
- TOTAL POPULATION
- UPSTREAM MANHOLE
- DOWNSTREAM MANHOLE
- TRIB TYPE

3.2 Ha | 1.4 Ha
436
MH 100A
MH 101A

- RESIDENTIAL AREA
- PARK/COMMERCIAL/INSTITUTIONAL AREA
- POPULATION
- UPSTREAM MANHOLE
- DOWNSTREAM MANHOLE

DSEL
120 Iber Road, Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

ABBOTT'S RUN
PRELIMINARY
DESIGN
CITY OF OTTAWA

SANITARY SERVICING PLAN

SCALE:	1:2000	PROJECT No.:	22-1295
DATE:	JANUARY 2025	DRAWING:	03

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
Street No. 25																											
	146A	148A	2.29		548	2.29	548	3.4	5.97		0.00		0.00		0.00	0.00	2.29	2.29	0.76	6.73	20.0	200	0.65	26.44	0.25	0.84	0.70
To STREET No. 25, Pipe 148A - 149A						2.29	548				0.00		0.00		0.00			2.29									
			2.21		529	2.21	529			2.39	2.39		0.00		0.00		4.60	4.60									
	147A	148A	2.39		185	4.60	714	3.3	7.66		2.39		0.00		0.00	1.16	2.39	6.99	2.31	11.13	18.0	200	0.70	27.44	0.41	0.87	0.83
To STREET No. 25, Pipe 148A - 149A						4.60	714				2.39		0.00		0.00			6.99									
BLOCK 2																											
	128A	74253	2.27		0	2.27	0				0.00		0.00		0.00	0.00	2.27	2.27	0.75	0.75	51.0	200	0.65	26.44	0.03	0.84	0.37
To ROBERT GRAND, Pipe 74253 - 74254						2.27	0				0.00		0.00		0.00			2.27									
BLOCK 1																											
	117A	118A				0.00					0.00		0.00	0.82	0.82	0.13	0.82	0.82	0.27	0.40	17.5	200	5.10	74.07	0.01	2.36	0.61
To STREET No. 10-23, Pipe 118A - 120A						0.00	0				0.00		0.00		0.82			0.82									
STREET No. 24																											
			0.07		6	0.07	6				0.00		0.00		0.00		0.07	0.07									
	119A	120A	0.54		42	0.61	48	3.7	0.57		0.00		0.00		0.00	0.00	0.54	0.61	0.20	0.77	84.5	200	0.65	26.44	0.03	0.84	0.37
To STREET No. 10-23, Pipe 120A - SA 25						0.61	48				0.00		0.00		0.00			0.61									
	113A	114A	0.08		7	0.08	7	3.7	0.08		0.00		0.00		0.00	0.00	0.08	0.08	0.03	0.11	54.0	200	0.65	26.44	0.00	0.84	0.20
	114A	115A	0.03		3	0.11	10	3.7	0.12		0.00		0.00		0.00	0.00	0.03	0.11	0.04	0.16	11.0	200	0.35	19.40	0.01	0.62	0.18
	115A	116A	0.34		27	0.45	37	3.7	0.44		0.00		0.00		0.00	0.00	0.34	0.45	0.15	0.59	84.5	200	0.35	19.40	0.03	0.62	0.27
To STREET No. 10-23, Pipe 116A - 118A						0.45	37				0.00		0.00		0.00			0.45									
STREET No. 25																											
	145A	148A				0.00					0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	65.0	200	1.70	42.76	0.00	1.36	0.08
Contribution From Street No. 25, Pipe 146A - 148A						2.29	548				0.00		0.00		0.00		2.29	2.29									
Contribution From Street No. 25, Pipe 147A - 148A						4.60	714				2.39		0.00		0.00		6.99	9.28									
	148A	149A	0.54		0	7.43	1262	3.2	13.03		2.39		0.00		0.00	1.16	0.54	9.82	3.24	17.43	56.0	200	0.80	29.34	0.59	0.93	0.97
Contribution From STREET No. 10-23, Pipe 120A - SA 25						2.69	212				0.00		0.00		0.82		3.51	3.51									
Contribution From STREET No. 10-23, Pipe 122A - SA 25						0.00	0				0.00		0.00		0.00		0.00	3.51									
	SA 25	SA 29				2.69	212	3.5	2.41		0.00		0.00		0.82	0.13	0.00	3.51	1.16	3.70	46.4	250	0.25	29.73	0.12	0.61	0.41
	SA 29	74251				2.69	212	3.5	2.41		0.00		0.00		0.82	0.13	0.00	3.51	1.16	3.70	63.5	250	0.25	29.73	0.12	0.61	0.41
To ROBERT GRAND, Pipe 74251 - 74252						2.69	212				0.00		0.00		0.82			3.51									
STREET No. 21																											
Contribution From STREET No.20- 22, Pipe 101A - 102A						0.87	67				0.00		0.00		0.00		0.87	0.87									
Contribution From STREET No.20- 22, Pipe 98A - 102A						2.03	159				0.00		0.00		0.00		2.03	2.90									
	102A	107A	0.23		18	3.13	244	3.5	2.76		0.00		0.00		0.00	0.00	0.23	3.13	1.03	3.79	72.0	200	0.35	19.40	0.20	0.62	0.47
Contribution From STREET No.20- 22, Pipe 106A - 107A						1.64	133				0.00		0.00		0.00		1.64	4.77									
	107A	SA 39				4.77	377	3.4	4.19		0.00		0.00		0.00	0.00	0.00	4.77	1.57	5.76	83.0	250	0.35	35.18	0.16	0.72	0.52
	SA 39	74251	0.20		16	4.97	393	3.4	4.36		0.00		0.00		0.00	0.00	0.20	4.97	1.64	6.00	48.5	250	0.35	35.18	0.17	0.72	0.53
To ROBERT GRAND, Pipe 74251 - 74252						4.97	393				0.00		0.00		0.00			4.97									

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha
Average Daily Flow =	280	l/p/day		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha
Max Res. Peak Factor =	4.00			
Commercial/Inst./Park Peak Factor =	1.50			
Institutional =	0.32	l/s/Ha		

Industrial Peak Factor = as per MOE Gra
Extraneous Flow = 0.330 l/s/
Minimum Velocity = 0.600 m/
Manning's n = (Conc) 0.013 (F
Townhouse coeff= 2.7
Single house coeff= 3.4

3

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2024-10-04
PROVINCE OF ONTARIO
SDD # 22-1295

Designed:	M.S.	PROJECT:	**Abbott's Run Stage 2-3**
Checked:	S.L.M	LOCATION:	**City of Ottawa**
Dwg. Reference:		File Ref: 22-1295	Date: 04 Oct 2024

Sheet No. 1 of 7

1295_san.xlsx

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
BLOCK 6																											
	67A	SA31	1.31		101	1.31	101	3.6	1.18		0.00		0.00		0.00	0.00	1.31	1.31	0.43	1.61	19.5	200	6.00	80.34	0.02	2.56	0.99
To CRANESBILL, Pipe SA31 - 74247						1.31	101				0.00		0.00		0.00			1.31									
	68A	SA31	1.39		333	1.39	333	3.4	3.72		0.00		0.00		0.00	0.00	1.39	1.39	0.46	4.18	19.5	200	0.65	26.44	0.16	0.84	0.61
To CRANESBILL, Pipe SA31 - 74247						1.39	333				0.00		0.00		0.00			1.39									
STREET No. 11																											
	61A	62A	0.68		53	0.68	53	3.6	0.63		0.00		0.00		0.00	0.00	0.68	0.68	0.22	0.85	90.5	200	0.65	26.44	0.03	0.84	0.38
To STREET No. 9, Pipe 62A - SA19						0.68	53				0.00		0.00		0.00			0.68									
STREET No. 10-23																											
	122A	SA 25				0.00					0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	17.0	250	0.34	34.68	0.00	0.71	0.04
To STREET No. 25, Pipe SA 25 - SA 29						0.00	0				0.00		0.00		0.00			0.00									
	58A	60A	0.78		61	0.78	61	3.6	0.72		0.00		0.00		0.00	0.00	0.78	0.78	0.26	0.98	97.5	200	0.65	26.44	0.04	0.84	0.40
To STREET No. 9, Pipe 60A - 62A						0.78	61				0.00		0.00		0.00			0.78									
	64A	65A	0.39		31	0.39	31	3.7	0.37		0.00		0.00		0.00	0.00	0.39	0.39	0.13	0.50	68.0	200	0.65	26.44	0.02	0.84	0.33
	65A	SA17	0.31		24	0.70	55	3.6	0.65		0.00		0.00		0.00	0.00	0.31	0.70	0.23	0.88	81.5	200	0.35	19.40	0.05	0.62	0.31
To CRANESBILL, Pipe SA17 - SA31						0.70	55				0.00		0.00		0.00			0.70									
	111A	112A	0.86		67	0.86	67	3.6	0.79		0.00		0.00		0.00	0.00	0.86	0.86	0.28	1.07	107.0	200	0.65	26.44	0.04	0.84	0.41
	112A	116A	0.66		51	1.52	118	3.6	1.37		0.00		0.00		0.00	0.00	0.66	1.52	0.50	1.87	92.0	200	0.35	19.40	0.10	0.62	0.39
Contribution From STREET No. 24, Pipe 115A - 116A						0.45	37				0.00		0.00		0.00		0.45	1.97									
	116A	118A	0.11		9	2.08	164	3.5	1.88		0.00		0.00		0.00	0.00	0.11	2.08	0.69	2.57	62.5	200	0.35	19.40	0.13	0.62	0.43
Contribution From BLOCK 1, Pipe 117A - 118A						0.00	0				0.00		0.00		0.82		0.82	2.90									
	118A	120A				2.08	164	3.5	1.88		0.00		0.00		0.82	0.13	0.00	2.90	0.96	2.97	7.5	200	0.35	19.40	0.15	0.62	0.44
Contribution From STREET No. 24, Pipe 119A - 120A						0.61	48				0.00		0.00		0.00		0.61	3.51									
	120A	SA 25				2.69	212	3.5	2.41		0.00		0.00		0.82	0.13	0.00	3.51	1.16	3.70	72.0	200	0.35	19.40	0.19	0.62	0.47
To STREET No. 25, Pipe SA 25 - SA 29						2.69	212				0.00		0.00		0.82			3.51									
STREET No. 9																											
	59A	60A	0.35		27	0.35	27	3.7	0.32		0.00		0.00		0.00	0.00	0.35	0.35	0.12	0.44	64.0	200	0.65	26.44	0.02	0.84	0.30
Contribution From STREET No. 10-23, Pipe 58A - 60A						0.78	61				0.00		0.00		0.00		0.78	1.13									
	60A	62A	0.35		27	1.48	115	3.6	1.33		0.00		0.00		0.00	0.00	0.35	1.48	0.49	1.82	76.0	200	0.35	19.40	0.09	0.62	0.39
Contribution From STREET No. 11, Pipe 61A - 62A						0.68	53				0.00		0.00		0.00		0.68	2.16									
	62A	SA19	0.32		25	2.48	193	3.5	2.20		0.00		0.00		0.00	0.00	0.32	2.48	0.82	3.02	81.0	200	0.35	19.40	0.16	0.62	0.45
To CRANESBILL, Pipe SA19 - SA17						2.48	193				0.00		0.00		0.00			2.48									
STREET No. 8																											
	55A	56A	0.93		72	0.93	72	3.6	0.85		0.00		0.00		0.00	0.00	0.93	0.93	0.31	1.15	118.0	200	0.65	26.44	0.04	0.84	0.42
	56A	343A	0.73		57	1.66	129	3.6	1.49		0.00		0.00		0.00	0.00	0.73	1.66	0.55	2.04	115.0	200	0.35	19.40	0.11	0.62	0.40
To CRANESBILL, Pipe 343A - SA19						1.66	129				0.00		0.00		0.00			1.66									
CRANESBILL																											
Contribution From STREET No. 1, Pipe 50A - 52A						1.36	105				0.00		0.00		0.00		1.36	1.36									
	52A	343A	0.45		35	1.81	140	3.6	1.62		0.00		0.00		0.00	0.00	0.45	1.81	0.60	2.21	74.0	200	0.35	19.40	0.11	0.62	0.41

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha				
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph			
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s	
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc)	0.013
Commercial/Inst./Park Peak Factor =	1.50				Townhouse coeff=	2.7		
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4		

Designed:	M.S.	PROJECT:	**Abbott's Run Stage 2-3**
Checked:	S.L.M	LOCATION:	**City of Ottawa**
Dwg. Reference:	3	File Ref: 22-1295	Date: 04 Oct 2024
			Sheet No. 2 of 7

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2024-10-04
PROVINCE OF ONTARIO
SDD # 22-1295

1295_san.xlsx

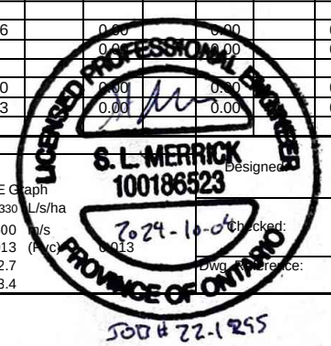
SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
Contribution From STREET No. 8, Pipe 56A - 343A						1.66	129				0.00		0.00		0.00		1.66	3.47									
	343A	SA19	0.40		31	3.87	300	3.5	3.37		0.00		0.00		0.00	0.00	0.40	3.87	1.28	4.64	72.0	250	0.25	29.73	0.16	0.61	0.44
Contribution From STREET No. 9, Pipe 62A - SA19						2.48	193				0.00		0.00		0.00		2.48	6.35									
	SA19	SA17	0.80		62	7.15	555	3.4	6.04		0.00		0.00		0.00	0.00	0.80	7.15	2.36	8.40	105.2	250	0.25	29.73	0.28	0.61	0.52
Contribution From STREET No. 10-23, Pipe 65A - SA17						0.70	55				0.00		0.00		0.00		0.70	7.85									
	SA17	SA31	0.12		10	7.97	620	3.3	6.71		0.00		0.00		0.00	0.00	0.12	7.97	2.63	9.34	52.5	250	0.25	29.73	0.31	0.61	0.54
Contribution From BLOCK 6, Pipe 67A - SA31						1.31	101				0.00		0.00		0.00		1.31	9.28									
Contribution From BLOCK 6, Pipe 68A - SA31						1.39	333				0.00		0.00		0.00		1.39	10.67									
	SA31	74247	0.15		12	10.82	1066	3.2	11.14		0.00		0.00		0.00	0.00	0.15	10.82	3.57	14.71	56.5	250	0.25	29.73	0.49	0.61	0.60
To ROBERT GRAND, Pipe 74247 - 74248						10.82	1066				0.00		0.00		0.00			10.82									
BLOCK 5																											
	87A	SA 37	1.12		268	1.12	268	3.5	3.02		0.00		0.00		0.00	0.00	1.12	1.12	0.37	3.39	16.0	200	6.00	80.34	0.04	2.56	1.27
To Street Ni. 17, Pipe SA 37 - 74247						1.12	268				0.00		0.00		0.00			1.12									
	88A	SA 37	0.95		228	0.95	228	3.5	2.59		0.00		0.00		0.00	0.00	0.95	0.95	0.31	2.90	13.0	200	0.65	26.44	0.11	0.84	0.55
To Street Ni. 17, Pipe SA 37 - 74247						0.95	228				0.00		0.00		0.00			0.95									
STREET No.20- 22																											
	101A	102A	0.87		67	0.87	67	3.6	0.79		0.00		0.00		0.00	0.00	0.87	0.87	0.29	1.08	126.5	200	0.65	26.44	0.04	0.84	0.41
To STREET No. 21, Pipe 102A - 107A						0.87	67				0.00		0.00		0.00			0.87									
	101A	104A	0.21		17	0.21	17	3.7	0.20		0.00		0.00		0.00	0.00	0.21	0.21	0.07	0.27	12.0	200	0.65	26.44	0.01	0.84	0.27
	104A	105A	0.21		21	0.42	38	3.7	0.45		0.00		0.00		0.00	0.00	0.21	0.42	0.14	0.59	55.0	200	0.35	19.40	0.03	0.62	0.27
	105A	106A	0.26		21	0.68	59	3.6	0.70		0.00		0.00		0.00	0.00	0.26	0.68	0.22	0.92	14.0	200	0.35	19.40	0.05	0.62	0.31
	106A	107A	0.96		74	1.64	133	3.6	1.54		0.00		0.00		0.00	0.00	0.96	1.64	0.54	2.08	143.0	200	0.35	19.40	0.11	0.62	0.40
To STREET No. 21, Pipe 107A - SA 39						1.64	133				0.00		0.00		0.00			1.64									
	97A	98A	0.51		40	0.51	40	3.7	0.48		0.00		0.00		0.00	0.00	0.51	0.51	0.17	0.64	45.0	200	0.65	26.44	0.02	0.84	0.35
Contribution From STREET No. 19, Pipe 96A - 98A						1.04	82				0.00		0.00		0.00		1.04	1.55									
	98A	102A	0.48		37	2.03	159	3.5	1.83		0.00		0.00		0.00	0.00	0.48	2.03	0.67	2.50	73.5	200	0.35	19.40	0.13	0.62	0.42
To STREET No. 21, Pipe 102A - 107A						2.03	159				0.00		0.00		0.00			2.03									
Contribution From STREET No. 19, Pipe 73A - 75A						0.06	5				0.00		0.00		0.00		0.06	0.06									
	75A	76A	0.22		17	0.28	22	3.7	0.26		0.00		0.00		0.00	0.00	0.22	0.28	0.09	0.36	33.5	200	0.35	19.40	0.02	0.62	0.23
	76A	77A	0.63		49	0.91	71	3.6	0.83		0.00		0.00		0.00	0.00	0.63	0.91	0.30	1.13	89.5	200	0.35	19.40	0.06	0.62	0.33
	77A	78A	0.06		5	0.97	76	3.6	0.89		0.00		0.00		0.00	0.00	0.06	0.97	0.32	1.21	11.0	200	0.35	19.40	0.06	0.62	0.34
	78A	79A	0.10		8	1.07	84	3.6	0.98		0.00		0.00		0.00	0.00	0.10	1.07	0.35	1.34	63.0	200	0.35	19.40	0.07	0.62	0.35
To STREET No. 16-18, Pipe 79A - 86A						1.07	84				0.00		0.00		0.00			1.07									
STREET No. 19																											
	73A	74A	0.16		13	0.16	13	3.7	0.16		0.00		0.00		0.00	0.00	0.16	0.16	0.05	0.21	36.0	200	0.95	31.97	0.01	1.02	0.28
To STREET No. 16-18, Pipe 74A - 151A						0.16	13				0.00		0.00		0.00			0.16									
	73A	75A	0.06		5	0.06	5	3.8	0.06		0.00		0.00		0.00	0.00	0.06	0.06	0.02	0.08	35.0	200	0.65	26.44	0.00	0.84	0.19
To STREET No.20- 22, Pipe 75A - 76A						0.06	5				0.00		0.00		0.00			0.06									
	70A	71A	0.10		8	0.10	8	3.7	0.10		0.00		0.00		0.00	0.00	0.10	0.10	0.03	0.13	26.5	200	0.65	26.44	0.00	0.84	0.22
	71A	72A	0.03		3	0.13	11	3.7	0.13		0.00		0.00		0.00	0.00	0.03	0.13	0.04	0.18	11.5	200	0.35	19.40	0.01	0.62	0.19

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha	Industrial Peak Factor = as per MOE Graph			
Average Daily Flow =	280	l/p/day			Extraneous Flow =	0.330	L/s/ha	
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Minimum Velocity =	0.600	m/s	
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Manning's n = (Conc)	0.013	(Pvc)	0.013
Max Res. Peak Factor =	4.00				Townhouse coeff=	2.7		
Commercial/Inst./Park Peak Factor =	1.50				Single house coeff=	3.4		
Institutional =	0.32	l/s/Ha						



Designed:	M.S.	PROJECT:	**Abbott's Run Stage 2-3**		
Checked:	S.L.M	LOCATION:	**City of Ottawa**		
Dwg. Reference:	3	File Ref:	22-1295	Date: 04 Oct 2024	Sheet No. 3 of 7

SDD # 22-1295

1295_san.xlsx

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
	72A	74A	0.29		23	0.42	34	3.7	0.41		0.00		0.00		0.00	0.00	0.29	0.42	0.14	0.54	81.5	200	0.35	19.40	0.03	0.62	0.27
To STREET No. 16-18, Pipe 74A - 151A						0.42	34				0.00		0.00		0.00			0.42									
	70A	94A	0.13		11	0.13	11	3.7	0.13		0.00		0.00		0.00	0.00	0.13	0.13	0.04	0.18	32.0	200	0.65	26.44	0.01	0.84	0.23
	94A	95A	0.07		6	0.20	17	3.7	0.20		0.00		0.00		0.00	0.00	0.07	0.20	0.07	0.27	11.0	200	0.35	19.40	0.01	0.62	0.21
	95A	96A	0.48		37	0.68	54	3.6	0.64		0.00		0.00		0.00	0.00	0.48	0.68	0.22	0.86	75.5	200	0.35	19.40	0.04	0.62	0.31
	96A	98A	0.36		28	1.04	82	3.6	0.96		0.00		0.00		0.00	0.00	0.36	1.04	0.34	1.30	77.0	200	0.35	19.40	0.07	0.62	0.35
To STREET No.20- 22, Pipe 98A - 102A						1.04	82				0.00		0.00		0.00			1.04									
Street Ni. 17																											
Contribution From STREET No. 16-18, Pipe 79A - 86A						2.83	223				0.00		0.00		1.62		4.45	4.45									
Contribution From STREET No. 16-18, Pipe 85A - 86A						1.96	154				0.00		0.00		0.00		1.96	6.41									
	86A	SA 37	0.07		6	4.86	383	3.4	4.25		0.00		0.00		1.62	0.26	0.07	6.48	2.14	6.65	45.0	200	0.35	19.40	0.34	0.62	0.56
Contribution From BLOCK 5, Pipe 87A - SA 37						1.12	268				0.00		0.00		0.00		1.12	7.60									
Contribution From BLOCK 5, Pipe 88A - SA 37						0.95	228				0.00		0.00		0.00		0.95	8.55									
	SA 37	74247	0.19		15	7.12	894	3.3	9.46		0.00		0.00		1.62	0.26	0.19	8.74	2.88	12.60	86.7	200	0.35	19.40	0.65	0.62	0.66
To ROBERT GRAND, Pipe 74247 - 74248						7.12	894				0.00		0.00		1.62			8.74									
STREET No. 5																											
			0.05		4	0.05	4				0.00		0.00		0.00		0.05	0.05									
	38A	39A	0.36		28	0.41	32	3.7	0.38		0.00		0.00		0.00	0.00	0.36	0.41	0.14	0.52	82.0	200	0.65	26.44	0.02	0.84	0.33
To STREET No. 6, Pipe 39A - 43A						0.41	32				0.00		0.00		0.00			0.41									
	40A	41A	0.04		4	0.04	4	3.8	0.05		0.00		0.00		0.00	0.00	0.04	0.04	0.01	0.06	32.0	200	0.65	26.44	0.00	0.84	0.17
	41A	42A	0.07		6	0.11	10	3.7	0.12		0.00		0.00		0.00	0.00	0.07	0.11	0.04	0.16	11.0	200	0.35	19.40	0.01	0.62	0.18
	42A	43A	0.43		34	0.54	44	3.7	0.52		0.00		0.00		0.00	0.00	0.43	0.54	0.18	0.70	81.5	200	0.35	19.40	0.04	0.62	0.29
To STREET No. 6, Pipe 43A - 45A						0.54	44				0.00		0.00		0.00			0.54									
STREET No. 6																											
Contribution From STREET No. 2-4, Pipe 150A - 29A						0.20	16				0.00		0.00		0.00		0.20	0.20									
Contribution From STREET No. 2-4, Pipe 28A - 29A						0.42	33				0.00		0.00		0.00		0.42	0.62									
	29A	36A	0.12		10	0.74	59	3.6	0.70		0.00		0.00		0.00	0.00	0.12	0.74	0.24	0.94	72.5	200	0.35	19.40	0.05	0.62	0.31
Contribution From STREET No. 2-4, Pipe 34A - 36A						0.69	55				0.00		0.00		0.00		0.69	1.43									
	36A	39A	0.08		7	1.51	121	3.6	1.40		0.00		0.00		0.00	0.00	0.08	1.51	0.50	1.90	48.0	200	0.35	19.40	0.10	0.62	0.39
Contribution From STREET No. 5, Pipe 38A - 39A						0.41	32				0.00		0.00		0.00		0.41	1.92									
	39A	43A	0.08		7	2.00	160	3.5	1.84		0.00		0.00	0.99	0.99	0.16	1.07	2.99	0.99	2.98	48.0	200	0.35	19.40	0.15	0.62	0.45
Contribution From STREET No. 5, Pipe 42A - 43A						0.54	44				0.00		0.00		0.00		0.54	3.53									
	43A	45A	0.11		9	2.65	213	3.5	2.42		0.00		0.00		0.99	0.16	0.11	3.64	1.20	3.78	70.0	200	0.35	19.40	0.20	0.62	0.47
To STREET No. 7, Pipe 45A - SA 35						2.65	213				0.00		0.00		0.99			3.64									
STREET No. 7																											
	44A	45A	0.53		41	0.53	41	3.7	0.49		0.00		0.00		0.00	0.00	0.53	0.53	0.17	0.66	118.5	200	0.65	26.44	0.03	0.84	0.35
Contribution From STREET No. 6, Pipe 43A - 45A						2.65	213				0.00		0.00		0.99		3.64	4.17									
	45A	SA 35				3.18	254	3.5	2.87		0.00		0.00		0.99	0.16	0.00	4.17	1.38	4.41	73.5	200	0.34	19.12	0.23	0.61	0.49
	SA 35	74245				3.18	254	3.5	2.87		0.00		0.00		0.99	0.16	0.00	4.17	1.38	4.41	20.8	200	0.35	19.40	0.23	0.62	0.50
To ROBERT GRAND, Pipe 74245 - 74246						3.18	254				0.00		0.00		0.99			4.17									

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc) 0.013
Commercial/Inst./Park Peak Factor =	1.50				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed:	M.S.	PROJECT:	Abbott's Run Stage 2-3
Checked:	S.L.M	LOCATION:	City of Ottawa
Dwg. Reference:	3	File Ref: 22-1295	Date: 04 Oct 2024

Sheet No. 4 of 7

1295_san.xlsx

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
STREET No. 13																											
	8A	9A	0.21		17	0.21	17	3.7	0.20		0.00		0.00		0.00	0.00	0.21	0.21	0.07	0.27	49.5	200	0.65	26.44	0.01	0.84	0.27
	9A	10A	0.03		3	0.24	20	3.7	0.24		0.00		0.00		0.00	0.00	0.03	0.24	0.08	0.32	11.5	200	0.35	19.40	0.02	0.62	0.22
	10A	12A	0.05		4	0.29	24	3.7	0.29		0.00		0.00		0.00	0.00	0.05	0.29	0.10	0.38	38.0	200	0.35	19.40	0.02	0.62	0.24
Contribution From STREET No., Pipe 11A - 12A						0.30	24				0.00		0.00		0.00		0.30	0.59									
	12A	13A	0.05		4	0.64	52	3.6	0.61		0.00		0.00		0.00	0.00	0.05	0.64	0.21	0.83	39.0	200	0.35	19.40	0.04	0.62	0.31
	13A	14A	0.06		5	0.70	57	3.6	0.67		0.00		0.00		0.00	0.00	0.06	0.70	0.23	0.90	10.5	200	0.35	19.40	0.05	0.62	0.31
	14A	20A	0.37		29	1.07	86	3.6	1.01		0.00		0.00		0.00	0.00	0.37	1.07	0.35	1.36	71.5	200	0.35	19.40	0.07	0.62	0.35
To STREET No. 16-18, Pipe 20A - 25A						1.07	86				0.00		0.00		0.00			1.07									
STREET No. 17																											
	11A	12A	0.30		24	0.30	24	3.7	0.29		0.00		0.00		0.00	0.00	0.30	0.30	0.10	0.39	57.0	200	0.65	26.44	0.01	0.84	0.29
To STREET No. 13, Pipe 12A - 13A						0.30	24				0.00		0.00		0.00			0.30									
	18A	19A	0.11		9	0.11	9	3.7	0.11		0.00		0.00		0.00	0.00	0.11	0.11	0.04	0.15	56.0	200	1.90	45.21	0.00	1.44	0.32
To STREET No. 16-18, Pipe 19A - 20A						0.11	9				0.00		0.00		0.00			0.11									
STREET No. 16-18																											
	83A	84A	0.40		31	0.40	31	3.7	0.37		0.00		0.00		0.00	0.00	0.40	0.40	0.13	0.50	55.5	200	1.10	34.40	0.01	1.09	0.38
Contribution From STREET No. 12, Pipe 82A - 84A						1.03	81				0.00		0.00		0.00		1.03	1.43									
	84A	85A	0.16		13	1.59	125	3.6	1.45		0.00		0.00		0.00	0.00	0.16	1.59	0.52	1.97	35.5	200	0.35	19.40	0.10	0.62	0.40
	85A	86A	0.37		29	1.96	154	3.5	1.77		0.00		0.00		0.00	0.00	0.37	1.96	0.65	2.42	85.5	200	0.35	19.40	0.12	0.62	0.42
To Street Ni. 17, Pipe 86A - SA 37						1.96	154				0.00		0.00		0.00			1.96									
Contribution From STREET No. 19, Pipe 72A - 74A						0.42	34				0.00		0.00		0.00		0.42	0.42									
Contribution From STREET No. 19, Pipe 73A - 74A						0.16	13				0.00		0.00		0.00		0.16	0.58									
	74A	151A	0.84		65	1.42	112	3.6	1.30		0.00		0.00		0.00	0.00	0.84	1.42	0.47	1.77	65.5	200	0.35	19.40	0.09	0.62	0.38
	151A	79A				1.42	112	3.6	1.30		0.00		0.00		0.00	0.00	0.00	1.42	0.47	1.77	65.5	200	0.35	19.40	0.09	0.62	0.38
Contribution From STREET No.20- 22, Pipe 78A - 79A						1.07	84				0.00		0.00		0.00		1.07	2.49									
	79A	86A	0.34		27	2.83	223	3.5	2.53		0.00		0.00	1.62	1.62	0.26	1.96	4.45	1.47	4.26	85.5	200	0.35	19.40	0.22	0.62	0.49
To Street Ni. 17, Pipe 86A - SA 37						2.83	223				0.00		0.00		1.62			4.45									
	17A	19A	0.18		14	0.18	14	3.7	0.17		0.00		0.00		0.00	0.00	0.18	0.18	0.06	0.23	46.0	200	0.65	26.44	0.01	0.84	0.26
Contribution From STREET No., Pipe 18A - 19A						0.11	9				0.00		0.00		0.00		0.11	0.29									
	19A	20A	0.17		14	0.46	37	3.7	0.44		0.00		0.00		0.00	0.00	0.17	0.46	0.15	0.59	46.0	200	0.40	20.74	0.03	0.66	0.29
Contribution From STREET No. 13, Pipe 14A - 20A						1.07	86				0.00		0.00		0.00		1.07	1.53									
	20A	25A	0.27		21	1.80	144	3.6	1.66		0.00		0.00		0.00	0.00	0.27	1.80	0.59	2.25	70.0	200	0.35	19.40	0.12	0.62	0.41
To STREET No. 12, Pipe 25A - SA33						1.80	144				0.00		0.00		0.00			1.80									
STREET No. 12																											
	80A	81A	0.58		45	0.58	45	3.7	0.53		0.00		0.00		0.00	0.00	0.58	0.58	0.19	0.73	72.5	200	0.80	29.34	0.02	0.93	0.39
	81A	82A	0.19		15	0.77	60	3.6	0.71		0.00		0.00		0.00	0.00	0.19	0.77	0.25	0.96	11.0	200	1.65	42.13	0.02	1.34	0.54
	82A	84A	0.26		21	1.03	81	3.6	0.95		0.00		0.00		0.00	0.00	0.26	1.03	0.34	1.29	63.0	200	2.20	48.65	0.03	1.55	0.66
To STREET No. 16-18, Pipe 84A - 85A						1.03	81				0.00		0.00		0.00			1.03									
	21A	22A	0.18		14	0.18	14	3.7	0.17		0.00		0.00		0.00	0.00	0.18	0.18	0.06	0.23	23.0	200	0.80	29.34	0.01	0.93	0.27
	22A	23A	0.82		64	1.00	78	3.6	0.91		0.00		0.00		0.00	0.00	0.82	1.00	0.33	1.24	108.5	200	0.80	29.34	0.04	0.93	0.46
	23A	24A	0.15		12	1.15	90	3.6	1.05		0.00		0.00		0.00	0.00	0.15	1.15	0.38	1.43	11.0	200	0.40	20.74	0.07	0.66	0.37
	24A	25A	0.33		26	1.48	116	3.6	1.35		0.00		0.00		0.00	0.00	0.33	1.48	0.49	1.83	63.0	200	1.75	43.39	0.04	1.38	0.68

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha
Average Daily Flow =	280	l/p/day		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha
Max Res. Peak Factor =	4.00			
Commercial/Inst./Park Peak Factor =	1.50			
Institutional =	0.32	l/s/Ha		

Industrial Peak Factor = as per MOE Graph
Extraneous Flow = 0.330 L/s/ha
Minimum Velocity = 0.600 m/s
Manning's n = (Conc) 0.013 (Pipe) 0.013
Townhouse coeff= 2.7
Single house coeff= 3.4

Designed:	M.S.	PROJECT:	Abbott's Run Stage 2-3
Checked:	S.L.M	LOCATION:	City of Ottawa
Dwg Reference:	3	File Ref:	22-1295
		Date:	04 Oct 2024
		Sheet No.	5 of 7

LICENCED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2024-10-04
PROVINCE OF ONTARIO

SDD # 22-1295

1295_san.xlsx

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
Contribution From STREET No. 16-18, Pipe 20A - 25A						1.80	144				0.00		0.00		0.00		1.80	3.28									
	25A	SA33	0.35		27	3.63	287	3.5	3.23		0.00		0.00	0.71	0.71	0.11	1.06	4.34	1.43	4.77	72.0	200	0.35	19.40	0.25	0.62	0.51
	SA33	SA07				3.63	287	3.5	3.23		0.00		0.00		0.71	0.11	0.00	4.34	1.43	4.77	29.0	200	0.30	17.96	0.27	0.57	0.48
	SA07	74244				3.63	287	3.5	3.23		0.00		0.00		0.71	0.11	0.00	4.34	1.43	4.77	21.0	200	0.50	23.19	0.21	0.74	0.58
To ROBERT GRAND, Pipe 74244 - 74245						3.63	287				0.00		0.00		0.71			4.34									
BLOCK 9																											
	4A	SA01	2.38		184	2.38	184	3.5	2.10		0.00		0.00		0.00	0.00	2.38	2.38	0.79	2.89	49.0	250	0.35	35.18	0.08	0.72	0.43
To ROBERT GRAND, Pipe SA01 - 74242						2.38	184				0.00		0.00		0.00			2.38									
ROBERT GRAND																											
	74231	74232				0.00					0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	136.3	900	0.55	1342.56	0.00	2.11	0.12
	74232	74241				0.00	0				0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	119.5	900	0.13	652.72	0.00	1.03	0.06
	74241	SA01				0.00	0				0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	88.5	900	0.17	746.41	0.00	1.17	0.07
Contribution From BLOCK 9, Pipe 4A - SA01						2.38	184				0.00		0.00		0.00		2.38	2.38									
	SA01	74242				2.38	184	3.5	2.10		0.00		0.00		0.00	0.00	0.00	2.38	0.79	2.89	31.7	900	0.17	746.41	0.00	1.17	0.28
	74242	74243				2.38	184	3.5	2.10		0.00		0.00		0.00	0.00	0.00	2.38	0.79	2.89	118.6	900	0.16	724.12	0.00	1.14	0.27
	74243	74244				2.38	184	3.5	2.10		0.00		0.00		0.00	0.00	0.00	2.38	0.79	2.89	47.4	900	0.22	849.11	0.00	1.33	0.30
Contribution From STREET No. 12, Pipe SA07 - 74244						3.63	287				0.00		0.00		0.71		4.34	6.72									
	74244	74245				6.01	471	3.4	5.17		0.00		0.00		0.71	0.11	0.00	6.72	2.22	7.51	126.4	900	0.12	627.11	0.01	0.99	0.33
Contribution From STREET No. 7, Pipe SA 35 - 74245						3.18	254				0.00		0.00		0.99		4.17	10.89									
	74245	74246				9.19	725	3.3	7.77		0.00		0.00		1.70	0.27	0.00	10.89	3.59	11.64	115.2	900	0.15	701.13	0.02	1.10	0.40
	74246	74247				9.19	725	3.3	7.77		0.00		0.00		1.70	0.27	0.00	10.89	3.59	11.64	118.6	900	0.53	1317.93	0.01	2.07	0.63
Contribution From CRANESBILL, Pipe SA31 - 74247						10.82	1066				0.00		0.00		0.00		10.82	21.71									
Contribution From Street Ni. 17, Pipe SA 37 - 74247						7.12	894				0.00		0.00		1.62		8.74	30.45									
	74247	74248				27.13	2685	3.0	25.99		0.00		0.00		3.32	0.54	0.00	30.45	10.05	36.57	121.6	900	0.16	724.12	0.05	1.14	0.59
	74248	74249				27.13	2685	3.0	25.99		0.00		0.00		3.32	0.54	0.00	30.45	10.05	36.57	78.4	900	0.18	768.05	0.05	1.21	0.61
	74249	74250				27.13	2685	3.0	25.99		0.00		0.00		3.32	0.54	0.00	30.45	10.05	36.57	87.6	900	0.14	677.36	0.05	1.06	0.56
	74250	74251				27.13	2685	3.0	25.99		0.00		0.00		3.32	0.54	0.00	30.45	10.05	36.57	7.9	900	0.15	701.13	0.05	1.10	0.58
Contribution From STREET No. 21, Pipe SA 39 - 74251						4.97	393				0.00		0.00		0.00		4.97	35.42									
Contribution From STREET No. 25, Pipe SA 29 - 74251						2.69	212				0.00		0.00		0.82		3.51	38.93									
	74251	74252				34.79	3290	2.9	31.20		0.00		0.00		4.14	0.67	0.00	38.93	12.85	44.72	120.3	900	0.16	724.12	0.06	1.14	0.62
	74252	74253				34.79	3290	2.9	31.20		0.00		0.00		4.14	0.67	0.00	38.93	12.85	44.72	120.3	900	0.17	746.41	0.06	1.17	0.64
Contribution From BLOCK 2, Pipe 128A - 74253						2.27	0				0.00		0.00		0.00		2.27	41.20									
	74253	74254				37.06	3290	2.9	31.20		0.00		0.00		4.14	0.67	0.00	41.20	13.60	45.47	93.0	900	1.41	2149.63	0.02	3.38	1.36
STREET No. 2-4																											
	150A	29A	0.20		16	0.20	16	3.7	0.19		0.00		0.00		0.00	0.00	0.20	0.20	0.07	0.26	22.0	200	0.65	26.44	0.01	0.84	0.26
To STREET No. 6, Pipe 29A - 36A						0.20	16				0.00		0.00		0.00			0.20									
	28A	29A	0.42		33	0.42	33	3.7	0.39		0.00		0.00		0.00	0.00	0.42	0.42	0.14	0.53	85.0	200	0.65	26.44	0.02	0.84	0.33
To STREET No. 6, Pipe 29A - 36A						0.42	33				0.00		0.00		0.00			0.42									
	136A	137A	0.88		68	0.88	68	3.6	0.80		0.00		0.00		0.00	0.00	0.88	0.88	0.29	1.09	88.5	200	0.65	26.44	0.04	0.84	0.41
			0.67		37	1.55	105				0.00		0.00		0.00		0.67	1.55									
			0.67		52	2.22	157				0.00		0.00		0.00		0.67	2.22									
	137A	139A	0.67		0	2.89	157	3.5	1.81		0.00		0.00		0.00	0.00	0.67	2.89	0.95	2.76	86.0	200	0.35	19.40	0.14	0.62	0.43

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	l/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pipe) 0.013
Commercial/Inst./Park Peak Factor =	1.50				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

S. L. MERRICK 100186523 PROFESSIONAL ENGINEER PROVINCE OF ONTARIO LICENSED

2024-10-04

SDD # 22-1295

Designed:	M.S.	PROJECT:	**Abbott's Run Stage 2-3**
Checked:	S.L.M	LOCATION:	**City of Ottawa**
Dwg. Reference:	3	File Ref: 22-1295	Date: 04 Oct 2024
			Sheet No. 6 of 7

1295_san.xlsx

SANITARY SEWER CALCULATION SHEET

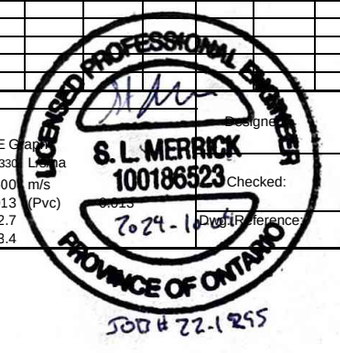
Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
	32A	33A	0.25		20	0.25	20	3.7	0.24		0.00		0.00		0.00	0.00	0.25	0.25	0.08	0.32	56.5	200	0.65	26.44	0.01	0.84	0.28
	33A	34A	0.05		4	0.30	24	3.7	0.29		0.00		0.00		0.00	0.00	0.05	0.30	0.10	0.39	11.0	200	0.35	19.40	0.02	0.62	0.24
	34A	36A	0.39		31	0.69	55	3.6	0.65		0.00		0.00		0.00	0.00	0.39	0.69	0.23	0.88	84.0	200	0.35	19.40	0.05	0.62	0.31
To STREET No. 6, Pipe 36A - 39A						0.69	55				0.00		0.00		0.00			0.69									
	132A	133A	0.89		69	0.89	69	3.6	0.81		0.00		0.00		0.00	0.00	0.89	0.89	0.29	1.10	104.0	200	0.65	26.44	0.04	0.84	0.41
	133A	134A	0.39		31	1.28	100	3.6	1.17		0.00		0.00		0.00	0.00	0.39	1.28	0.42	1.59	55.0	200	0.35	19.40	0.08	0.62	0.37
	134A	135A	0.34		27	1.62	127	3.6	1.47		0.00		0.00		0.00	0.00	0.34	1.62	0.53	2.00	14.5	200	0.35	19.40	0.10	0.62	0.40
			0.28		0	1.90	127				0.00		0.00		0.00		0.28	1.90									
			0.95		53	2.85	180				0.00		0.00		0.00		0.95	2.85									
			0.95		74	3.80	254				0.00		0.00		0.00		0.95	3.80									
	135A	139A	0.95		22	4.75	276	3.5	3.11		0.00		0.00		0.00	0.00	0.95	4.75	1.57	4.68	72.5	200	0.35	19.40	0.24	0.62	0.50
	139A	140A	0.57		44	8.21	477	3.4	5.24		0.00		0.00		0.00	0.00	0.57	8.21	2.71	7.95	13.5	200	0.35	19.40	0.41	0.62	0.59
	140A	141A				8.21	477	3.4	5.24		0.00		0.00		0.00	0.00	0.00	8.21	2.71	7.95	60.5	200	0.35	19.40	0.41	0.62	0.59
To STREET No. 1, Pipe 141A - 142A						8.21	477				0.00		0.00		0.00			8.21									
STREET No. 1																											
	49A	50A	0.83		64	0.83	64	3.6	0.75		0.00		0.00		0.00	0.00	0.83	0.83	0.27	1.03	116.0	200	0.65	26.44	0.04	0.84	0.40
	50A	52A	0.53		41	1.36	105	3.6	1.22		0.00		0.00		0.00	0.00	0.53	1.36	0.45	1.67	116.0	200	0.35	19.40	0.09	0.62	0.37
To CRANESBILL, Pipe 52A - 343A						1.36	105				0.00		0.00		0.00			1.36									
Contribution From STREET No. 2-4, Pipe 140A - 141A						8.21	477				0.00		0.00		0.00		8.21	8.21									
	141A	142A	0.48		37	8.69	514	3.4	5.62		0.00		0.00		0.00	0.00	0.48	8.69	2.87	8.49	114.0	200	0.35	19.40	0.44	0.62	0.60
	142A	143A	0.23		18	8.92	532	3.4	5.81		0.00		0.00		0.00	0.00	0.23	8.92	2.94	8.75	17.0	200	0.70	27.44	0.32	0.87	0.77
	143A	144A	0.01		1	8.93	533	3.4	5.82		0.00		0.00		0.00	0.00	0.01	8.93	2.95	8.76	23.5	200	0.35	19.40	0.45	0.62	0.60

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/Ha
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc) 0.013
Commercial/Inst./Park Peak Factor =	1.50				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	

Designed:	M.S.	PROJECT:	**Abbott's Run Stage 2-3**
Checked:	S.L.M	LOCATION:	**City of Ottawa**
Dwg. Reference:	3	File Ref: 22-1295	Date: 04 Oct 2024
			Sheet No. 7 of 7



LEGEND

- 0.33 / A1-1 / 176.0 — AREA IN HECTARES / AREA ID / POPULATION EQUIVALENT
- SANITARY CATCHMENT
- SANITARY DRAINAGE AREA (LOCAL BOUNDARY)
- 482 — PROPOSED SANITARY SEWER AND MANHOLE WITH DIRECTION OF FLOW
- 482 — EXISTING / PROPOSED (BY OTHERS) SANITARY SEWER AND MANHOLE WITH DIRECTION OF FLOW

DOUBLE DECK LANDS

MATTAMY LANDS

RICHCRAFT LANDS

RICHCRAFT LANDS

BLACKSTONE LANDS

REGIONAL LANDS

CRT LANDS

MIXED USE

MIXED USE

MIXED USE

POND 2

POND 1

CARP TRIBUTARY

HYDRO CORRIDOR

HYDRO CORRIDOR

HYDRO CORRIDOR

TRANS CANADA TRAIL

TRANS CANADA TRAIL

HAZELDEAN ROAD

HAZELDEAN ROAD

ABBOTT STREET

ABBOTT STREET

ROBERT GRANT AVENUE

ROBERT GRANT AVENUE

IBER ROAD

COMMUNITY PARK

DISTRICT PARK

DISTRICT PARK

ELEMENTARY SCHOOL

SECONDARY SCHOOL

OUTLET 4
Q_{PK} = 15.6 L/s

OUTLET 3
Q_{PK} = 1.5 L/s

OUTLET 2
Q_{PK} = 15.9 L/s

OUTLET 1
FLOW ROUTED TO STITTSVILLE DIVERSION TRUNK
Q_{PK} = 493.4 L/s

Peak Flow: 11.3 L/s
Population: 727
1.36 ha comm.
0.82 inst.
Total Area: 7.37 ha

Peak Flow: 10.7 L/s
Population: 499
ha comm. n/a
inst.3.24
Total Area: 10.95 ha

Peak Flow: 8.5 L/s
Population: 510
comm. : n/a
inst. 0.8 ha
Total Area: 7.68ha

7.5 L/S Peak Flow
Population: 460
comm: n/a
inst.: 0.83 ha
Area:6.24 ha

Peak Flow: 11.3 L/s
Population: 770
ha comm. n/a
inst. n/a
Total Area: 9.39 ha

Peak Flow: 4.2 L/s
Population: 227
ha comm. n/a
inst. 0.8
Total Area: 3.74 ha

HIGH DENSITY

HIGH DENSITY

MIXED USE

PARK & PARK

PARK

PARK

PARK

PARK

OPEN SPACE

5654 HAZELDEAN ROAD

MEDIUM DENSITY RESIDENTIAL

MEDIUM DENSITY RESIDENTIAL

MEDIUM DENSITY RESIDENTIAL

MEDIUM DENSITY RESIDENTIAL

MEDIUM DENSITY RESIDENTIAL

MEDIUM DENSITY RESIDENTIAL

MEDIUM DENSITY RESIDENTIAL

MEDIUM DENSITY RESIDENTIAL

MEDIUM DENSITY RESIDENTIAL

MEDIUM DENSITY RESIDENTIAL

STITTSVILLE DIVERSION TRUNK (BY CITY)

STITTSVILLE DIVERSION TRUNK (BY CITY)

7.21 / A4-1 / 1188.0

2.28 / A1-14 / 540.0

7.36 / A1-12 / 727.4

1.74 / A3-1 / 78.2

10.73 / A1-9 / 499.2

7.68 / A1-6 / 509.6

1.89 / A2-2 / 100.0

14.76 / A2-1 / 810.0

1.66 / A1-13 / 0.0

1.78 / A1-10 / 0.0

1.17 / A1-7 / 0.0

0.56 / A1-5 / 0.0

0.74 / A1-3b / 0.0

1.12 / A1-2 / 0.0

0.91 / A1-1 / 0.0

6.24 / A1-11 / 460.8

9.39 / A1-8 / 769.6

3.74 / A1-4 / 226.7

3.32 / A1-3a / 278.5

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
5.	REVISED PER CITY COMMENTS	MAY 29/20	MAB
4.	DRAFT PLAN RESUBMISSION	DEC 13/19	MAB
3.	DRAFT PLAN RESUBMISSION	FEB 23/18	MAB
2.	REVISED PER CITY COMMENTS	JUL. 20/17	MAB
1.	DRAFT PLAN APPLICATION	NOV. 9/16	MAB

SCALE
1:2000
1:2000
0 20 40 60 80

DESIGN LRW
CHECKED MAB
DRAWN DTD
CHECKED MAB
APPROVED JGR

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
L. R. WILSON
100160065
2020.05.29
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
M.A. BISSETT
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
FERNBANK COMMUNITY - KIZELL LANDS

SANITARY DRAINAGE AREA PLAN

PROJECT No. 108195-0
REV REV # 5
DRAWING No. 108195-SAN

M:\2008\08195\Submission\CAD\Design\108195-SAN.dwg, PLANS-B1 • May 06, 2020 - 4:09pm, dsalton

FERNBANK COMMUNITY - KIZELL LANDS
SANITARY SEWER DESIGN SHEET

AREA			RESIDENTIAL																ICI				INFILTRATION				PIPE					
			SINGLES		TOWNS		STACKED TOWNS		MEDIUM DENISTY		HIGH DENSITY		MIXED USE/ PARK & RIDE		TOTAL																	
ID	From	To	Units	Pop.	Units	Pop.	Area	Pop.	Area	Pop.	Units	Pop.	Units	Pop.	Pop.	Accum. Pop.	Peak Factor	Peak Flow (l/s)	Commercial Area (ha)	Institutional Area (ha)	Accum. Area (ha)	Peak Flow (l/s)	Total Area (ha)	Accum. Area (ha)	Infilt. Flow (l/s)	**Total Flow (l/s)**	Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q_{full} (%)
Outlet 1																																
Stittsville Diversion Trunk																										493.4						
	SA100	SA101		0.0		0.0								0.0	0.0	0	3.8	0.0			0.00	0.0	0.00	0.00	0.0	493.4	900	0.41	32	1209.3	1.84	40.8%
A1-1	SA101	SA102		0.0		0.0								0.0	0.0	0.0	3.8	0.0			0.00	0.0	0.91	0.91	0.3	493.7	900	0.41	134	1209.3	1.84	40.8%
A1-2	SA102	SA104		0.0		0.0								0.0	0.0	0.0	3.8	0.0			0.00	0.0	1.12	2.03	0.7	494.1	900	0.16	240	755.4	1.15	65.4%
A1-3	SA104	SA106		0.0		0.0			2.38	278.5				0.0	278.5	278.5	3.5	3.1	0.00		0.00	0.0	7.80	9.83	3.2	499.8	900	0.16	167	755.4	1.15	66.2%
A1-4	222	SA106	9	30.6	41	110.7			0.73	85.4				0.0	226.7	226.7	3.5	2.6		0.80	0.80	0.4	3.74	3.74	1.2	4.2	200	0.35	105	20.2	0.62	20.7%
A1-5	SA106	SA107a		0.0		0.0								0.0	0.0	505.2	3.4	5.5			0.80	0.4	0.56	14.13	4.7	504.0	900	0.16	126	755.4	1.15	66.7%
A1-6	212	SA107a	46	156.4	45	121.5			1.98	231.7				0.0	509.6	509.6	3.4	5.6		0.80	0.80	0.4	7.68	7.68	2.5	8.5	200	0.35	109	20.2	0.62	42.0%
A1-7	SA107a	SA108		0.0		0.0								0.0	0.0	1014.7	3.2	10.6			1.60	0.8	1.17	22.98	7.6	512.4	900	0.16	234	755.4	1.15	67.8%
A1-8	148	SA108	40	136.0	109	294.3			2.90	339.3				0.0	769.6	769.6	3.3	8.2			0.00	0.0	9.39	9.39	3.1	11.3	200	0.35	115	20.2	0.62	55.9%
A1-9	190	SA108	93	316.2	11	29.7			1.31	153.3				0.0	499.2	499.2	3.4	5.5		3.24	3.24	1.6	10.95	10.95	3.6	10.7	250	0.20	109	27.7	0.55	38.4%
A1-10	SA108	SA112		0.0		0.0								0.0	0.0	2283.5	3.0	22.4			4.84	2.4	1.78	45.10	14.9	533.1	900	0.16	367	755.4	1.15	70.6%
A1-11	112	SA112	8	27.2	67	180.9			2.16	252.7				0.0	460.8	460.8	3.4	5.1		0.83	0.83	0.4	6.24	6.24	2.1	7.5	200	0.75	115	29.6	0.91	25.4%
A1-12	120	SA112		0.0	70	189.0			2.14	250.4			160	288.0	727.4	727.4	3.3	7.8	1.36	0.82	2.18	1.1	7.36	7.36	2.4	11.3	250	0.25	109	31.0	0.61	36.4%
A1-13	SA112	SA114		0.0		0.0								0.0	0.0	3471.7	2.9	32.7			7.85	3.8	1.66	60.36	19.9	549.9	900	0.16	241	755.4	1.15	72.8%
A1-14	SA114	SA115		0.0		0.0							300	540.0	540.0	4011.7	2.9	37.3	1.82	2.28	11.95	5.8	2.28	62.64	20.7	557.1	900	1.42	93	2250.5	3.43	24.8%
Outlet 2																																
A2-1, A2-2	R20	R19	69	234.6	147	396.9			2.38	278.5				0.0	910	910	3.3	9.6		1.64	1.64	0.8	16.65	16.65	5.5	15.9	300	0.50	43	71.3	0.98	22.3%
Outlet 3																																
A3-1	404	R30	23	78.2		0.0								0.0	78.2	78.2	3.6	0.9			0.00	0.0	1.74	1.74	0.6	1.5	200	0.35	11	20.2	0.62	7.4%
Outlet 4																																
A4-1	604	RCAP1		0.0		0.0					360	648.0	300	540.0	1188.0	1188.0	3.2	12.3	1.90		1.90	0.9	7.21	7.21	2.4	15.6	200	1.00	4	34.2	1.06	45.7%

Design Parameters:

Avg Flow/Person =	280	l/day
Comm./Inst. Flow =	28000	l/ha/day
Infiltration =	0.33	l/s/ha
Pipe Friction n =	0.013	
Residential Peaking Factor = Harmon Equation (max 4, min 2)		
Peaking Factor Comm./Inst. =	1.5	

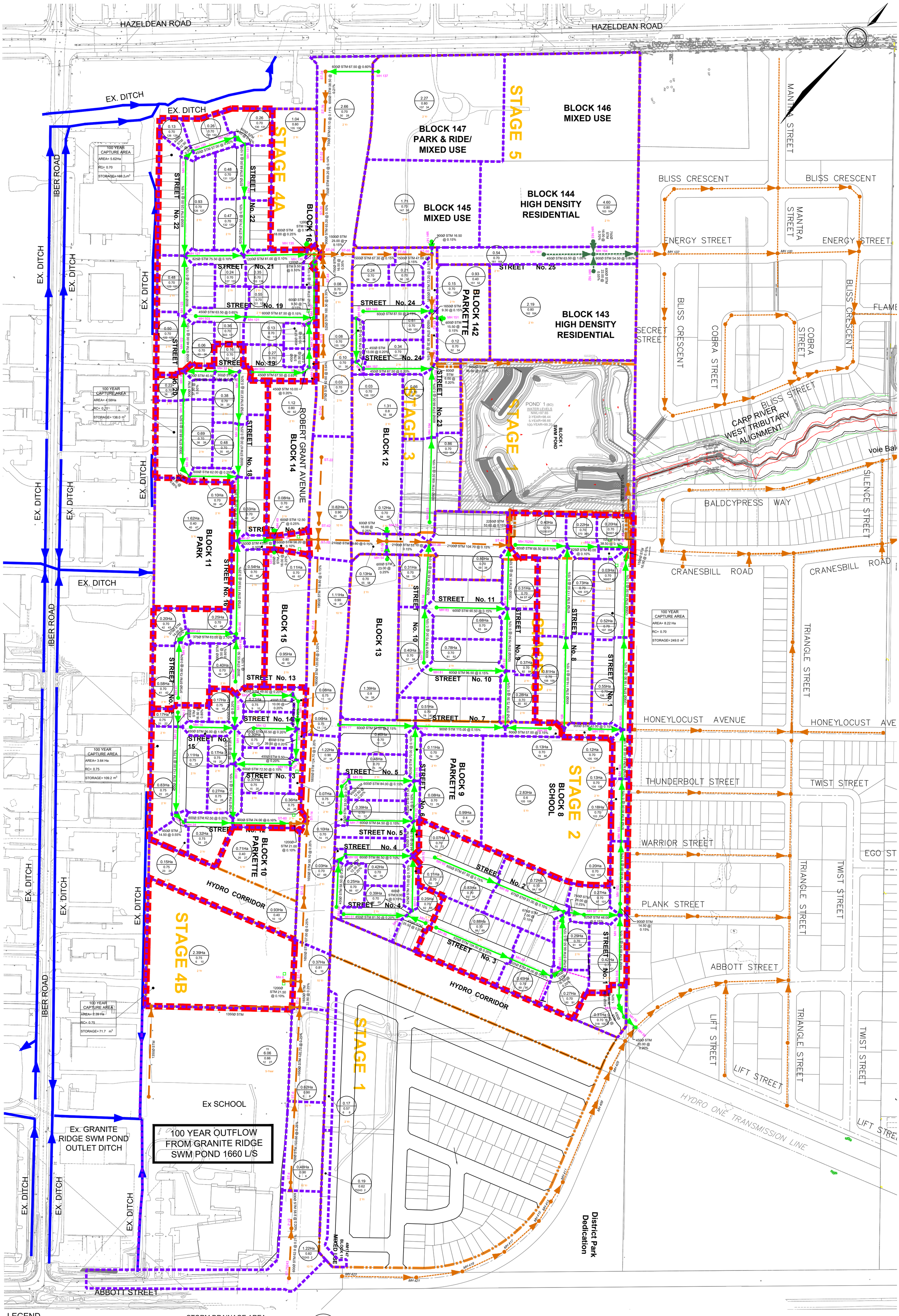
Population Density:

	ppl/unit	units/net ha
Mixed Use/HDR	1.80	85
Singles	3.40	
Towns	2.70	
Stacked Towns	2.70	49
Medium Density	1.80	65

Project: Kizell Lands (108195)
Designed: LRW
Checked: MAB
Date: December 13, 2019

APPENDIX D

Stormwater Servicing Figure
Stormwater Pond Drainage Plan
Stormwater Design Sheets



LEGEND

- SITE BOUNNDARY
- STORM PIPE
- FUTURE STORM SEWER
- EXISTING STORM SEWER
- PROPOSED STORM MANHOLE
- EXISTONG STORM MANHOLE
- STORM DRAINAGE AREA
- 100 YEAR CAPTURE AREA
- 6.07Ha / 0.55 / 150 153 / 5-YEAR — STORM DRAINAGE AREA, RUN-OFF COEFFICIENT, UPSTREAM MH/DOWNSTREAM MH, STORM FREQUENCY
- 100 YEAR INTAKE
- 100 YEAR CAPTURE AREA: AREA= 6.0 Ha; RC= 0.65; STORAGE= 170.4 m³ — CAPTURE AREA, RUN-OFF COEFFICIENT, 85% STORAGE CAPACITY

DSEL
120 Iber Road, Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

ABBOTT'S RUN
PRELIMINARY
DESIGN
CITY OF OTTAWA

STORM SERVICING PLAN

SCALE:	1:2000	PROJECT No.:	22-1295
DATE:	JANUARY 2025	DRAWING:	02

HAZELDEAN ROAD

HAZELDEAN ROAD

EX. DITCH

EX. DITCH

IBER ROAD

STAGE 4A

STREET No. 22

STREET No. 22

BLOCK 16

BLOCK 147
PARK & RIDE/
MIXED USE

STAGE 5

BLOCK 146
MIXED USE

7.33
0.79

TO ENERGY STREET

BLOCK 144
HIGH DENSITY
RESIDENTIAL

BLOCK 145
MIXED USE

MANTRA STREET

BLISS CRESCENT

BLISS CRESCENT

ENERGY STREET

ENERGY STREET

MH 122

MH 120

STREET No. 21

STREET No. 19

STREET No. 19

STREET No. 25

STREET No. 24

STREET No. 24

BLOCK 142
PARKETTE

BLOCK 143
HIGH DENSITY
RESIDENTIAL

SECRET STREET

BLISS CRESCENT

COBRA STREET

COBRA STREET

BLISS CRESCENT

FLAME

BLISS STREET

CARP RIVER
WEST TRIBUTARY
ALIGNMENT

STREET No. 20

STREET No. 18

ROBERT GRANT AVENUE
BLOCK 14

STAGE 3

BLOCK 12

STREET No. 23

POND 1 (BO)
WATER LEVELS
NWL=97.65
2-YEAR=98.44
5-YEAR=98.66
100-YEAR=99.20

BLOCK 1
SWM POND

72.55
0.70

BALDCYPRESS WAY

SILENCE STREET

CRANESBILL ROAD

CRANESBILL ROAD

STREET No. 17

BLOCK 11
PARK

STREET No. 16

BLOCK 15

STREET No. 13

STREET No. 11

STREET No. 10

BLOCK 13

STREET No. 10

STREET No. 9

STAGE 3

STREET No. 8

STREET No. 1

HONEYLOCUST AVENUE

HONEYLOCUST AVE

TRIANGLE STREET

STREET No. 14

STREET No. 7

STREET No. 12

STREET No. 15

STREET No. 13

STREET No. 5

STREET No. 6

BLOCK 9
PARKETTE

BLOCK 8
SCHOOL

STAGE 2

THUNDERBOLT STREET

TWIST STREET

STREET No. 12

BLOCK 10
PARKETTE

STREET No. 5

STREET No. 4

STREET No. 4

STREET No. 2

WARRIOR STREET

EGO ST

TRIANGLE STREET

TWIST STREET

HYDRO CORRIDOR

PLANK STREET

STREET No. 3

STREET No. 1

0.31
0.7

ABBOTT STREET

STAGE 4B

STAGE 1

LIFT STREET

LIFT STREET

TRIANGLE STREET

TWIST STREET

MH 425

HYDRO ONE TRANSMISSION LINE

Ex SCHOOL

Ex. GRANITE
RIDGE SWM POND
OUTLET DITCH

100 YEAR OUTFLOW
FROM GRANITE RIDGE
SWM POND 1660 L/S

MH 489

MH 411

MH 415

MH 413

MH 417

MH 419

MH 423

MH 421

4M1147

BLOCK 1
MIXED USE

District Park
Dedication

ABBOTT STREET

LEGEND

- SITE BOUNNDARY
- STORM PIPE
- FUTURE STORM SEWER
- EXISTING STORM SEWER
- PROPOSED STORM MANHOLE
- EXISTONG STORM MANHOLE
- STORM DRAINAGE AREA
- STORM CAPTURE AREA
- 100 YEAR INTAKE

6.07Ha / 0.55 — STORM DRAINAGE AREA
RUN-OFF COEFFICIENT

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120 Iber Road, Unit 103
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ABBOTT'S RUN
PRELIMINARY
DESIGN
CITY OF OTTAWA

STORM SERVICING PLAN

SCALE:	1:2000	PROJECT No.:	22-1295
DATE:	JANUARY 2025	DRAWING:	02

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha)																FLOW						SEWER DATA							
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year									FLOW	
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
BLOCK 1																																
	151	ST-52			0.00	0.00	0.93	0.40	1.03	1.03			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	108	600	600	CONC	0.15	15.5	237.8056	0.8411	0.3072	0.453
To STREET No. 10-23, Pipe ST-52 - ST-54						0.00				1.03				0.00				0.00	10.31														
BLOCK 2																																
	137	ST-34	2.27	0.80	5.05	5.05			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	388	600	600	CONC	0.60	67.5	475.6113	1.6821	0.6688	0.815
To ROBERT GRANT, Pipe ST-34 - ST-76						5.05				0.00				0.00				0.00	10.67														
STM BLOCK																																
Contribution From ROBERT GRANT, Pipe ST-26 - ST-44						0.00				0.00				0.00				0.00	12.64														
	ST-44	ST-28			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	12.64	67.97	92.06	107.85	157.57	0	750	750	CONC	0.35	16.5	658.6236	1.4908	0.1845	0.000
To STREET No. 21, Pipe ST-28 - ST-66						0.00				0.00				0.00				0.00	12.82														
Contribution From STREET No. 19, Pipe 30 - 119						1.03				0.00				0.00				0.00	11.82														
	119	120			0.00	1.03			0.00	0.00			0.00	0.00			0.00	0.00	11.82	70.47	95.48	111.88	163.49	73	600	600	CONC	0.15	9.5	237.8056	0.8411	0.1883	0.306
Contribution From STREET No. 19, Pipe 121 - 120						1.77				0.00				0.00				0.00	12.47														
	120	501			0.00	2.80			0.00	0.00			0.00	0.00			0.00	0.00	12.47	68.48	92.75	108.67	158.77	192	825	825	CONC	0.10	81.0	453.9246	0.8492	1.5898	0.423
To STREET No. 21, Pipe 501 - ST-28						2.80				0.00				0.00				0.00	14.06														
STREET No. 21																																
Contribution From STREET No.20- 22, Pipe 123 - 127						1.91				0.00				0.00				0.00	12.44														
Contribution From STREET No.20- 22, Pipe 126 - 127						1.81				0.00				0.00				0.00	12.48														
	127	133	0.24	0.70	0.47	4.18			0.00	0.00			0.00	0.00			0.00	0.00	12.48	68.44	92.71	108.62	158.70	286	825	825	CONC	0.10	75.5	453.9246	0.8492	1.4819	0.631
Contribution From STREET No.20- 22, Pipe 132 - 133						3.11				0.00				0.00				0.00	14.55														
			0.35	0.70	0.68	7.98			0.00	0.00			0.00	0.00			0.00	0.00															
	133	136	1.04	0.80	2.31	10.29			0.00	0.00			0.00	0.00			0.00	0.00	14.55	62.85	85.04	99.60	145.46	647	1200	1200	CONC	0.10	81.0	1232.8868	1.0901	1.2384	0.525
			-5.62	0.70	-10.94	-0.64			0.00	0.00			0.00	0.00			0.00	0.00	16.25														
					0.00	-0.64			0.00	0.00			0.00	0.00	5.62	0.70	10.94	10.94	16.25														
	136	501	0.08	0.70	0.16	-0.49			0.00	0.00			0.00	0.00			0.00	10.94	16.25	58.97	79.73	93.35	136.28	1462	1200	1200	CONC	0.10	9.5	1232.8868	1.0901	0.1452	1.186
Contribution From STM BLOCK, Pipe 120 - 501						2.80				0.00				0.00				0.00	14.06														
	501	ST-28			0.00	2.31			0.00	0.00			0.00	0.00			0.00	10.94	16.39	58.66	79.31	92.85	135.56	1618	1200	1200	CONC	0.10	11.1	1232.8868	1.0901	0.1697	1.313
Contribution From ROBERT GRANT, Pipe ST-30 - ST-28						10.22				0.00				0.00				0.00	14.94														
Contribution From STM BLOCK, Pipe ST-44 - ST-28						0.00				0.00				0.00				0.00	12.82														
	ST-28	ST-66			0.00	12.54			0.00	0.00			0.00	0.00			0.00	10.94	16.56	58.31	78.82	92.28	134.72	2204	1500	1500	CONC	0.15	25.0	2737.7609	1.5493	0.2689	0.805
To STREET No. 25, Pipe ST-66 - ST-56						12.54				0.00				0.00				10.94	16.83														
STREET No. 24																																
	149	150	0.61	0.70	1.19	1.19			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	91	600	600	CONC	0.15	87.5	237.8056	0.8411	1.7339	0.383
To STREET No. 10-23, Pipe 150 - ST-52						1.19				0.00				0.00				0.00	11.73														
	155	156	0.08	0.70	0.16	0.16			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	12	450	450	CONC	0.20	55.5	127.5033	0.8017	1.1538	0.094
	156	157	0.03	0.70	0.06	0.21			0.00	0.00			0.00	0.00			0.00	0.00	11.15	72.64	98.47	115.40	168.66	16	450	450	CONC	0.20	13.0	127.5033	0.8017	0.2703	0.122
	157	158	0.34	0.70	0.66	0.88			0.00	0.00			0.00	0.00			0.00	0.00	11.42	71.74	97.23	113.94	166.51	63	450	450	CONC	0.20	87.5	127.5033	0.8017	1.8191	0.493
To STREET No. 10-23, Pipe 158 - ST-54						0.88				0.00				0.00				0.00	13.24														
BLOCK 4																																
	162	164	2.19	0.80	4.87	4.87			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	374	600	600	CONC	0.55	22.0	455.3631	1.6105	0.2277	0.822
To STREET No. 25, Pipe 164 - 165						4.87				0.00				0.00				0.00	10.23														
	163	164	4.60	0.80	10.23	10.23			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	786	750	750	CONC	0.70	16.0	931.4344	2.1083	0.1265	0.844
To STREET No. 25, Pipe 164 - 165						10.23				0.00				0.00				0.00	10.13														
STREET No. 25																																
	161	164	0.54	0.70	1.05	1.05			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	81	450	450	CONC	1.05	63.5	292.1469	1.8369	0.5762	0.276
Contribution From BLOCK 4, Pipe 162 - 164						4.87				0.00				0.00				0.00	10.23														
Contribution From BLOCK 4, Pipe 163 - 164						10.23				0.00				0.00				0.00	10.13														
	164	165			0.00	16.15			0.00	0.00			0.00	0.00			0.00	0.00	10.58	74.66	101.24	118.67	173.46	1206	900	900	CONC	0.80	54.5	1619.1915	2.5452	0.3569	0.745

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2024-10-04
PROVINCE OF ONTARIO
SDD # 22-1295

Designed:	M.S.	PROJECT:	Abbott's Run Stage 2-3
Checked:	S.L.M.	LOCATION:	City of Ottawa
Dwg. Reference:	2	File Ref: 22-1295	Date: 04 Oct 2024
			Sheet No. SHEET 1 OF 7

1295_stm.xlsx

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW						SEWER DATA							
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of Conc.	Intensity 2 Year	Intensity 5 Year	Intensity 10 Year	Intensity 100 Year	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
Contribution From STREET No. 21, Pipe ST-28 - ST-66						12.54				0.00				0.00				10.94	16.83														
	ST-66	ST-56	0.24	0.70	0.47	13.00			0.00	0.00			0.00	0.00			0.00	10.94	16.83	57.75	78.07	91.40	133.42	2210	1500	1500	CONC	0.15	67.3	2737.7609	1.5493	0.7240	0.807
	ST-56	ST-50	0.21	0.70	0.41	13.41			0.00	0.00			0.00	0.00			0.00	10.94	17.56	56.32	76.11	89.10	130.05	2178	1500	1500	CONC	0.15	47.0	2737.7609	1.5493	0.5056	0.795
To STREET No. 10-23, Pipe ST-50 - 150						13.41				0.00				0.00				10.94	18.06														
STREET No. 11																																	
	83	84	0.68	0.70	1.32	1.32			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	102	600	600	CONC	0.15	90.5	237.8056	0.8411	1.7934	0.427
To POND INLET 2, Pipe 84 - ST40						1.32				0.00				0.00				0.00	11.79														
STREET No. 5																																	
	71	72	0.39	0.70	0.76	0.76			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	58	600	600	CONC	0.15	84.5	237.8056	0.8411	1.6745	0.245
To STREET No. 6, Pipe 72 - 76						0.76				0.00				0.00				0.00	11.67														
	73	74			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	0	450	450	CONC	0.20	33.5	127.5033	0.8017	0.6964	0.000
	74	75	0.10	0.70	0.19	0.19			0.00	0.00			0.00	0.00			0.00	0.00	10.70	74.23	100.65	117.97	172.43	14	450	450	CONC	0.20	12.5	127.5033	0.8017	0.2599	0.113
	75	76	0.48	0.70	0.93	1.13			0.00	0.00			0.00	0.00			0.00	0.00	10.96	73.32	99.40	116.50	170.27	83	600	600	CONC	0.15	84.0	237.8056	0.8411	1.6646	0.348
To STREET No. 6, Pipe 76 - 78						1.13				0.00				0.00				0.00	12.62														
STREET No. 6																																	
Contribution From STREET No. 2-4, Pipe 61 - 62						0.00				0.00				0.00				0.00	11.69														
Contribution From STREET No. 2-4, Pipe 63 - 62						0.00				0.00				0.00				0.00	10.53														
			0.25	0.70	0.49	0.49			0.00	0.00			0.00	0.00			0.00	0.00															
	62	65	0.39	0.70	0.76	1.25			0.00	0.00			0.00	0.00			0.00	0.00	11.69	70.86	96.02	112.52	164.42	88	600	600	CONC	0.15	9.0	237.8056	0.8411	0.1783	0.371
	65	70	0.11	0.70	0.21	1.46			0.00	0.00			0.00	0.00			0.00	0.00	11.87	70.29	95.24	111.60	163.08	103	825	825	CONC	0.10	70.0	453.9246	0.8492	1.3739	0.226
Contribution From STREET No. 2-4, Pipe 68 - 70						1.36				0.00				0.00				0.00	13.19														
	70	72	0.07	0.70	0.14	2.96			0.00	0.00			0.00	0.00			0.00	0.00	13.25	66.24	89.69	105.06	153.48	196	825	825	CONC	0.10	44.5	453.9246	0.8492	0.8734	0.432
Contribution From STREET No. 5, Pipe 71 - 72						0.76				0.00				0.00				0.00	11.67														
	72	76	0.08	0.70	0.16	3.87			0.00	0.00			0.00	0.00			0.00	0.00	14.12	63.93	86.51	101.33	148.00	248	825	825	CONC	0.10	51.5	453.9246	0.8492	1.0108	0.545
Contribution From STREET No. 5, Pipe 75 - 76						1.13				0.00				0.00				0.00	12.62														
	76	78	0.11	0.70	0.21	5.22			0.00	0.00			0.00	0.00			0.00	0.00	15.13	61.46	83.14	97.36	142.17	321	825	825	CONC	0.10	70.0	453.9246	0.8492	1.3739	0.706
To STREET No. 7, Pipe 78 - 80						5.22				0.00				0.00				0.00	16.50														
POND INLET 2																																	
Contribution From STREET No. 7, Pipe 78 - 80						7.10				1.10				0.00				0.00	18.24														
Contribution From STREET No. 7, Pipe 79 - 80						0.25				0.00				0.00				0.00	11.13														
	80	82	0.28	0.70	0.54	7.90			0.00	1.10			0.00	0.00			0.00	0.00	18.24	55.04	74.36	87.04	127.03	517	975	975	CONC	0.10	72.5	708.6833	0.9492	1.2730	0.729
Contribution From STREET No. 10-23, Pipe 81 - 82						1.52				0.00				0.00				0.00	11.91														
	82	84	0.37	0.70	0.72	10.14			0.00	1.10			0.00	0.00			0.00	0.00	19.52	52.82	71.33	83.48	121.81	614	1050	1050	CONC	0.10	79.5	863.5311	0.9973	1.3286	0.711
Contribution From STREET No. 11, Pipe 83 - 84						1.32				0.00				0.00				0.00	11.79														
	84	ST40	0.31	0.70	0.60	12.07			0.00	1.10			0.00	0.00			0.00	0.00	20.85	50.71	68.45	80.09	116.85	687	1350	1350	CONC	0.10	81.5	1687.8347	1.1792	1.1520	0.407
To POND INLET 2, Pipe ST40 - 87						12.07				1.10				0.00				0.00	22.00														
STREET No. 10-23																																	
	81	82	0.78	0.70	1.52	1.52			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	117	600	600	CONC	0.15	96.5	237.8056	0.8411	1.9123	0.490
To POND INLET 2, Pipe 82 - 84						1.52				0.00				0.00				0.00	11.91														
	57	58	0.40	0.70	0.78	0.78			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	60	600	600	CONC	0.15	70.5	237.8056	0.8411	1.3970	0.251
	58	ST-38	0.31	0.70	0.60	1.38			0.00	0.00			0.00	0.00			0.00	0.00	11.40	71.83	97.35	114.08	166.72	99	825	825	CONC	0.10	83.5	453.9246	0.8492	1.6389	0.219
To CRANESBILL, Pipe ST-38 - ST40						1.38				0.00				0.00				0.00	13.04														
	153	154	0.86	0.70	1.67	1.67			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	129	600	600	CONC	0.15	108.5	237.8056	0.8411	2.1501	0.541
	154	158	0.66	0.70	1.28	2.96			0.00	0.00			0.00	0.00			0.00	0.00	12.15	69.43	94.06	110.21	161.03	205	600	600	CONC	0.20	88.0	274.5943	0.9712	1.5102	0.748
Contribution From STREET No. 24, Pipe 157 - 158						0.88				0.00				0.00				0.00	13.24														
	158	ST-54			0.00	3.83			0.00	0.00			0.00	0.00			0.00	0.00	13.66	65.12	88.15	103.26	150.83	250	600	600	CONC	0.20	6.0	274.5943	0.9712	0.1030	0.909
	147	ST-50	1.71	0.70	3.33	3.33			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	256	900	900	CONC	0.15	16.5	701.1305	1.1021	0.2495	0.365

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2024-10-04
PROVINCE OF ONTARIO
SDD # 22-1295

Designed: M.S.	PROJECT: Abbott's Run Stage 2-3		
Checked: S.L.M.	LOCATION: City of Ottawa		
Dwg. Reference: 2	File Ref: 22-1295	Date: 04 Oct 2024	Sheet No. SHEET 2 OF 7

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW						SEWER DATA							
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of Conc.	Intensity 2 Year	Intensity 5 Year	Intensity 10 Year	Intensity 100 Year	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
Contribution From STREET No. 25, Pipe ST-56 - ST-50						13.41				0.00				0.00				10.94	18.06														
	ST-50	150	0.15	0.70	0.29	17.03			0.00	0.00			0.00	0.00			0.00	10.94	18.06	55.37	74.81	87.57	127.81	2341	1650	1650	CONC	0.15	72.2	3530.0106	1.6509	0.7289	0.663
Contribution From STREET No. 24, Pipe 149 - 150						1.19				0.00				0.00				0.00	11.73														
	150	ST-52			0.00	18.22			0.00	0.00			0.00	0.00			0.00	10.94	18.79	54.06	73.02	85.46	124.72	2349	1650	1650	CONC	0.15	9.3	3530.0106	1.6509	0.0939	0.665
Contribution From BLOCK 1, Pipe 151 - ST-52						0.00				1.03				0.00				0.00	10.31														
	ST-52	ST-54	0.12	0.70	0.23	18.45			0.00	1.03			0.00	0.00			0.00	10.94	18.89	53.90	72.80	85.20	124.33	2430	1650	1650	CONC	0.15	58.2	3530.0106	1.6509	0.5876	0.688
BLOCK 6																																	
	54	ST-58	1.39	0.80	3.09	3.09			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	237	600	600	CONC	0.25	23.0	307.0058	1.0858	0.3530	0.773
To CRANESBILL, Pipe ST-58 - ST-38						3.09				0.00				0.00				0.00	10.35														
	55	ST-58	1.31	0.80	2.91	2.91			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	224	600	600	CONC	0.25	16.0	307.0058	1.0858	0.2456	0.729
To CRANESBILL, Pipe ST-58 - ST-38						2.91				0.00				0.00				0.00	10.25														
BLOCK 5																																	
	48	ST-62	0.95	0.80	2.11	2.11			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	162	600	600	CONC	0.25	16.0	307.0058	1.0858	0.2456	0.529
To Unknown Road1 - 14, Pipe ST-62 - ST-20						2.11				0.00				0.00				0.00	10.25														
	49	ST-62	1.12	0.80	2.49	2.49			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	191	600	600	CONC	0.25	12.5	307.0058	1.0858	0.1919	0.623
To Unknown Road1 - 14, Pipe ST-62 - ST-20						2.49				0.00				0.00				0.00	10.19														
STREET No.20- 22																																	
	126	127	0.93	0.70	1.81	1.81			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	139	600	600	CONC	0.15	125.0	237.8056	0.8411	2.4770	0.585
To STREET No. 21, Pipe 127 - 133						1.81				0.00				0.00				0.00	12.48														
	122	123	0.50	0.70	0.97	0.97			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	75	600	600	CONC	0.15	46.0	237.8056	0.8411	0.9115	0.314
	123	127	0.48	0.70	0.93	1.91			0.00	0.00			0.00	0.00			0.00	0.00	10.91	73.47	99.61	116.75	170.63	140	600	600	CONC	0.15	77.0	237.8056	0.8411	1.5258	0.589
To STREET No. 21, Pipe 127 - 133						1.91				0.00				0.00				0.00	12.44														
	126	129	0.13	0.70	0.25	0.25			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	19	450	450	CONC	0.20	12.5	127.5033	0.8017	0.2599	0.152
	129	130	0.26	0.70	0.51	0.76			0.00	0.00			0.00	0.00			0.00	0.00	10.26	75.82	102.84	120.55	176.22	58	450	450	CONC	0.20	57.0	127.5033	0.8017	1.1850	0.451
	130	131	0.26	0.70	0.51	1.26			0.00	0.00			0.00	0.00			0.00	0.00	11.44	71.67	97.13	113.83	166.35	91	600	600	CONC	0.15	16.0	237.8056	0.8411	0.3171	0.381
	131	132	0.48	0.70	0.93	2.20			0.00	0.00			0.00	0.00			0.00	0.00	11.76	70.64	95.72	112.17	163.91	155	825	825	CONC	0.10	68.0	453.9246	0.8492	1.3347	0.342
	132	133	0.47	0.70	0.91	3.11			0.00	0.00			0.00	0.00			0.00	0.00	13.10	66.66	90.26	105.73	154.46	208	825	825	CONC	0.10	74.0	453.9246	0.8492	1.4524	0.457
To STREET No. 21, Pipe 133 - 136						3.11				0.00				0.00				0.00	14.55														
Contribution From STREET No. 19, Pipe 33 - 36						0.12				0.00				0.00				0.00	10.70														
	36	37	0.22	0.70	0.43	0.54			0.00	0.00			0.00	0.00			0.00	0.00	10.70	74.23	100.65	117.96	172.42	40	300	300	PVC	0.50	37.0	68.3778	0.9673	0.6375	0.591
	37	38			0.00	0.54			0.00	0.00			0.00	0.00			0.00	0.00	11.34	72.03	97.63	114.41	167.21	39	300	300	PVC	0.50	88.0	68.3778	0.9673	1.5162	0.574
	38	39	0.69	0.70	1.34	1.89			0.00	0.00			0.00	0.00			0.00	0.00	12.85	67.35	91.21	106.85	156.11	127	375	375	PVC	0.85	12.5	161.6464	1.4636	0.1423	0.787
	39	40	0.10	0.70	0.19	2.08			0.00	0.00			0.00	0.00			0.00	0.00	12.99	66.95	90.65	106.20	155.15	139	600	600	CONC	0.25	62.0	307.0058	1.0858	0.9517	0.454
To STREET No. 16-18, Pipe 40 - 47						2.08				0.00				0.00				0.00	13.95														
STREET No. 19																																	
	33	34	0.16	0.70	0.31	0.31			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	24	300	300	PVC	0.95	30.5	94.2522	1.3334	0.3812	0.254
To STREET No. 16-18, Pipe 34 - 35						0.31				0.00				0.00				0.00	10.38														
	33	36	0.06	0.70	0.12	0.12			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	9	300	300	PVC	0.50	40.5	68.3778	0.9673	0.6978	0.131
To STREET No.20- 22, Pipe 36 - 37						0.12				0.00				0.00				0.00	10.70														
	503	121	0.36	0.70	0.70	0.70			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	54	450	450	CONC	0.65	63.5	229.8599	1.4453	0.7323	0.234
	121	120	0.55	0.70	1.07	1.77			0.00	0.00			0.00	0.00			0.00	0.00	10.73	74.10	100.48	117.77	172.13	131	600	600	CONC	0.15	87.5	237.8056	0.8411	1.7339	0.552
To STM BLOCK, Pipe 120 - 501						1.77				0.00				0.00				0.00	12.47														
	502	32	0.27	0.70	0.53	0.53			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	40	450	450	CONC	0.65	67.5	229.8599	1.4453	0.7784	0.176
	32	31	0.03	0.70	0.06	0.58			0.00	0.00			0.00	0.00			0.00	0.00	10.78	73.94	100.25	117.50	171.74	43	450	450	CONC	0.20	10.0	127.5033	0.8017	0.2079	0.339
	31	30	0.10	0.70	0.19	0.78			0.00	0.00			0.00	0.00			0.00	0.00	10.99	73.21	99.26	116.33	170.02	57	450	450	CONC	0.65	23.5	229.8599	1.4453	0.2710	0.248

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2024-10-04
PROVINCE OF ONTARIO
SDD # 22-1295

Designed: M.S.	PROJECT: Abbott's Run Stage 2-3		
Checked: S.L.M.	LOCATION: City of Ottawa		
Dwg. Reference: 2	File Ref: 22-1295	Date: 04 Oct 2024	Sheet No. SHEET 3 OF 7

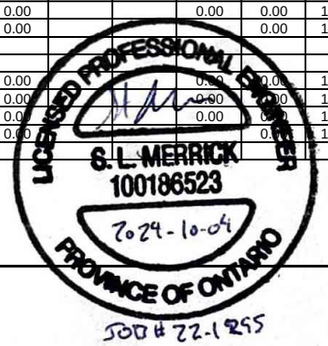
STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW						SEWER DATA							
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
	30	119	0.13	0.70	0.25	1.03			0.00	0.00			0.00	0.00			0.00	0.00	11.26	72.29	97.99	114.84	167.83	75	450	450	CONC	0.30	33.0	156.1591	0.9819	0.5602	0.477
To STM BLOCK, Pipe 119 - 120						1.03				0.00				0.00				0.00	11.82														
Unknown Road1 - 14																																	
Contribution From STREET No. 16-18, Pipe 40 - 47						4.71				1.80				0.00				0.00	14.94														
Contribution From STREET No. 16-18, Pipe 46 - 47						3.83				0.00				0.00				0.00	13.13														
	47	ST-62	0.08	0.70	0.16	8.70			0.00	1.80			0.00	0.00			0.00	0.00	14.94	61.92	83.77	98.10	143.25	690	1500	1500	CONC	0.20	47.0	3161.2940	1.7889	0.4379	0.218
Contribution From BLOCK 5, Pipe 48 - ST-62						2.11				0.00				0.00				0.00	10.25														
Contribution From BLOCK 5, Pipe 49 - ST-62						2.49				0.00				0.00				0.00	10.19														
			-4.58	0.70	-8.91	4.39			0.00	1.80			0.00	0.00			0.00	0.00	17.89														
					0.00	4.39			0.00	1.80			0.00	0.00	4.58	0.70	8.91	8.91	17.89														
	ST-62	ST-20	0.11	0.70	0.21	4.60			0.00	1.80			0.00	0.00			0.00	8.91	17.89	55.69	75.24	88.07	128.55	1538	1500	1500	CONC	0.10	56.2	2235.3724	1.2650	0.7405	0.688
To CRANESBILL, Pipe ST-20 - ST-58						4.60				1.80				0.00				8.91	18.63														
STREET No. 13																																	
	9	10	0.21	0.75	0.44	0.44			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	34	450	450	CONC	0.20	49.5	127.5033	0.8017	1.0291	0.264
	10	11	0.08	0.75	0.17	0.60			0.00	0.00			0.00	0.00			0.00	0.00	11.03	73.07	99.05	116.09	169.67	44	450	450	CONC	0.20	10.0	127.5033	0.8017	0.2079	0.347
	11	13			0.00	0.60			0.00	0.00			0.00	0.00			0.00	0.00	11.24	72.36	98.08	114.95	167.99	44	450	450	CONC	0.20	35.5	127.5033	0.8017	0.7380	0.343
Contribution From STREET No., Pipe 12 - 13						0.63				0.00				0.00				0.00	11.15														
	13	14	0.06	0.75	0.13	1.36			0.00	0.00			0.00	0.00			0.00	0.00	11.97	69.97	94.80	111.08	162.32	95	450	450	CONC	0.20	39.5	127.5033	0.8017	0.8212	0.744
	14	15	0.07	0.75	0.15	1.50			0.00	0.00			0.00	0.00			0.00	0.00	12.80	67.51	91.43	107.11	156.48	101	450	450	CONC	0.20	9.5	127.5033	0.8017	0.1975	0.795
	15	20	0.37	0.75	0.77	2.27			0.00	0.00			0.00	0.00			0.00	0.00	12.99	66.95	90.65	106.20	155.15	152	600	600	CONC	0.15	72.5	237.8056	0.8411	1.4367	0.640
To STREET No. 16-18, Pipe 20 - 25						2.27				0.00				0.00				0.00	14.43														
STREET No.																																	
	12	13	0.30	0.75	0.63	0.63			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	48	450	450	CONC	0.20	55.5	127.5033	0.8017	1.1538	0.377
To STREET No. 13, Pipe 13 - 14						0.63				0.00				0.00				0.00	11.15														
	16	19	0.11	0.75	0.23	0.23			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	18	450	450	CONC	1.90	56.0	392.9917	2.4710	0.3777	0.045
To STREET No. 16-18, Pipe 19 - 20						0.23				0.00				0.00				0.00	10.38														
STREET No. 16-18																																	
	44	45	0.40	0.70	0.78	0.78			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	60	300	300	PVC	1.10	55.5	101.4206	1.4348	0.6447	0.589
	45	46			0.00	0.78			0.00	0.00			0.00	0.00			0.00	0.00	10.64	74.42	100.91	118.27	172.87	58	300	300	PVC	0.60	5.5	74.9041	1.0597	0.0865	0.773
Contribution From STREET No. 12, Pipe 43 - 46						2.00				0.00				0.00				0.00	11.44														
	46	47	0.54	0.70	1.05	3.83			0.00	0.00			0.00	0.00			0.00	0.00	11.44	71.68	97.15	113.84	166.37	275	675	675	CONC	0.25	119.0	420.2941	1.1745	1.6887	0.654
To Unknown Road1 - 14, Pipe 47 - ST-62						3.83				0.00				0.00				0.00	13.13														
Contribution From STREET No. 19, Pipe 33 - 34						0.31				0.00				0.00				0.00	10.38														
	34	35	0.38	0.70	0.74	1.05			0.00	0.00			0.00	0.00			0.00	0.00	10.38	75.37	102.22	119.82	175.15	79	375	375	PVC	0.50	67.0	123.9771	1.1225	0.9948	0.639
	35	40	0.48	0.70	0.93	1.98			0.00	0.00			0.00	0.00			0.00	0.00	11.38	71.90	97.45	114.20	166.89	143	600	600	CONC	0.25	67.0	307.0058	1.0858	1.0284	0.465
Contribution From STREET No.20- 22, Pipe 39 - 40						2.08				0.00				0.00				0.00	13.95														
			0.33	0.70	0.64	4.71			0.00	0.00			0.00	0.00			0.00	0.00															
	40	47			0.00	4.71	1.62	0.40	1.80	1.80			0.00	0.00			0.00	0.00	13.95	64.37	87.13	102.05	149.06	460	750	750	CONC	0.30	82.0	609.7669	1.3802	0.9902	0.755
To Unknown Road1 - 14, Pipe 47 - ST-62						4.71				1.80				0.00				0.00	14.94														
	18	19	0.17	0.75	0.35	0.35			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	27	450	450	CONC	0.20	42.5	127.5033	0.8017	0.8835	0.214
Contribution From STREET No., Pipe 16 - 19						0.23				0.00				0.00				0.00	10.38														
	19	20	0.17	0.75	0.35	0.94			0.00	0.00			0.00	0.00			0.00	0.00	10.88	73.57	99.75	116.90	170.87	69	450	450	CONC	0.20	46.0	127.5033	0.8017	0.9563	0.541
Contribution From STREET No. 13, Pipe 15 - 20						2.27				0.00				0.00				0.00	14.43														
	20	25	0.27	0.75	0.56	3.77			0.00	0.00			0.00	0.00			0.00	0.00	14.43	63.15	85.44	100.07	146.15	238	675	675	CONC	0.15	75.5	325.5584	0.9098	1.3831	0.732
To STREET No. 12, Pipe 25 - 26						3.77				0.00				0.00				0.00	15.81														
STREET No. 12																																	
	41	42	0.58	0.70	1.13	1.13			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	87	375	375	PVC	0.80	73.0	156.8200	1.4199	0.8569	0.553
	42	43	0.20	0.70	0.39	1.52			0.00	0.00			0.00	0.00			0.00	0.00	10.86	73.66	99.87	117.06	171.09	112	375	375	PVC	1.30	14.0	199.9071	1.8100	0.1289	0.559
	43	46	0.25	0.70	0.49	2.00			0.00	0.00			0.00	0.00			0.00	0.00	10.99	73.22	99.26	116.33	170.02	147	375	375	PVC	2.10	63.0	254.0775	2.3005	0.4564	0.578
To STREET No. 16-18, Pipe 46 - 47						2.00				0.00				0.00				0.00	11.44														

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s



Designed: M.S.	PROJECT:	Abbott's Run Stage 2-3	
Checked: S.L.M.	LOCATION:	City of Ottawa	
Dwg. Reference: 2	File Ref: 22-1295	Date: 04 Oct 2024	Sheet No. SHEET 4 OF 7

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW						SEWER DATA							
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of Conc.	Intensity 2 Year	Intensity 5 Year	Intensity 10 Year	Intensity 100 Year	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
	21	22	0.17	0.75	0.35	0.35			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	27	450	450	CONC	0.80	18.5	255.0067	1.6034	0.1923	0.107
	22	23	0.83	0.75	1.73	2.09			0.00	0.00			0.00	0.00			0.00	0.00	10.19	76.07	103.19	120.96	176.82	159	450	450	CONC	0.75	112.0	246.9092	1.5525	1.2024	0.642
	23	24	0.15	0.75	0.31	2.40			0.00	0.00			0.00	0.00			0.00	0.00	11.39	71.83	97.36	114.10	166.74	172	450	450	CONC	0.55	14.5	211.4404	1.3295	0.1818	0.815
	24	25	0.32	0.75	0.67	3.06			0.00	0.00			0.00	0.00			0.00	0.00	11.58	71.24	96.54	113.13	165.33	218	600	600	CONC	0.20	62.5	274.5943	0.9712	1.0726	0.795
Contribution From STREET No. 16-18, Pipe 20 - 25						3.77				0.00				0.00				0.00	15.81														
	25	ST-60	0.36	0.75	0.75	7.59			0.00	0.00			0.00	0.00			0.00	0.00	15.81	59.91	81.02	94.87	138.51	455	900	900	CONC	0.10	74.0	572.4707	0.8999	1.3706	0.794
			-3.64	0.75	-7.59	0.00			0.00	0.00			0.00	0.00			0.00	0.00	17.58														
					0.00	0.00			0.00	0.00			0.00	0.00	3.64	0.75	7.59	7.59	17.58														
	ST-60	ST-14			0.00	0.00	0.71	0.40	0.79	0.79			0.00	0.00			0.00	7.59	17.58	56.27	76.04	89.02	129.93	1046	1200	1200	CONC	0.10	21.0	1232.8868	1.0901	0.3211	0.848
To ROBERT GRANT, Pipe 27 - ST-16						0.00				0.79				0.00				7.59	17.90														
BLOCK 9																																	
	6	ST-10			0.00	0.00			0.00	0.00			0.00	0.00	2.39	0.75	4.98	4.98	10.00	76.81	104.19	122.14	178.56	890	1200	1200	CONC	0.10	21.5	1232.8868	1.0901	0.3287	0.722
To ROBERT GRANT, Pipe ST-10 - ST-12						0.00				0.00				0.00				4.98	10.33														
ROBERT GRANT																																	
	ST-24	ST-26			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	0	375	375	PVC	0.64	92.6	140.2641	1.2700	1.2152	0.000
	ST-26	ST-44			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	11.22	72.43	98.18	115.06	168.16	0	525	525	CONC	0.35	100.3	254.4283	1.1753	1.4223	0.000
To STM BLOCK, Pipe ST-44 - ST-28						0.00				0.00				0.00				0.00	12.64														
Contribution From BLOCK 2, Pipe 137 - ST-34						5.05				0.00				0.00				0.00	10.67														
	ST-34	ST-76			0.00	5.05			0.00	0.00			0.00	0.00			0.00	0.00	10.67	74.33	100.79	118.13	172.67	375	600	600	CONC	0.21	38.5	281.3754	0.9952	0.6448	1.334
	ST-76	ST-32			0.00	5.05			0.00	0.00			0.00	0.00			0.00	0.00	11.31	72.10	97.73	114.53	167.38	364	750	750	CONC	0.11	60.1	369.2322	0.8358	1.1985	0.986
	ST-32	ST-30			0.00	5.05			0.00	0.00			0.00	0.00			0.00	0.00	12.51	68.34	92.56	108.45	158.45	345	750	750	CONC	0.14	69.2	416.5501	0.9429	1.2232	0.828
	ST-30	ST-28	2.66	0.70	5.18	10.22			0.00	0.00			0.00	0.00			0.00	0.00	13.74	64.92	87.88	102.94	150.36	664	900	900	CONC	0.10	65.2	572.4707	0.8999	1.2076	1.160
To STREET No. 21, Pipe ST-28 - ST-66						10.22				0.00				0.00				0.00	14.94														
			0.19	0.62	0.33	0.33			0.00	0.00			0.00	0.00			0.00	0.00															
	ST-75243	ST-2			0.00	0.33			0.00	0.00	1.22	0.82	2.78	2.78			0.00	0.00	10.00	76.81	104.19	122.14	178.56	365	600	600	CONC	0.21	62.9	281.3754	0.9952	1.0534	1.297
	ST-2	ST-4			0.00	0.33			0.00	0.00			0.00	2.78			0.00	0.00	11.05	72.98	98.94	115.95	169.47	346	600	600	CONC	0.20	58.8	274.5943	0.9712	1.0091	1.261
	ST-4	ST-6			0.00	0.33			0.00	0.00	0.48	0.90	1.20	3.98			0.00	0.00	12.06	69.70	94.43	110.64	161.67	463	750	750	CONC	0.25	103.6	556.6385	1.2600	1.3704	0.833
			0.17	0.57	0.27	0.60			0.00	0.00			0.00	3.98			0.00	0.00															
	ST-6	ST-8			0.00	0.60			0.00	0.00	0.62	0.90	1.55	5.53			0.00	0.00	13.43	65.73	88.99	104.24	152.27	616	1050	1050	CONC	0.25	120.7	1365.3626	1.5768	1.2758	0.451
	ST-8	ST-10			0.00	0.60			0.00	0.00	0.37	0.81	0.83	6.37			0.00	0.00	14.71	62.46	84.51	98.97	144.54	667	1650	1650	CONC	0.25	32.9	4557.2242	2.1313	0.2573	0.146
Contribution From BLOCK 9, Pipe 6 - ST-10						0.00				0.00				0.00				4.98	10.33														
	ST-10	ST-12	0.93	0.40	1.03	1.63			0.00	0.00			0.00	6.37			0.00	4.98	14.97	61.85	83.67	97.98	143.08	1438	1650	1650	CONC	0.25	107.0	4557.2242	2.1313	0.8367	0.315
					0.00	1.63	6.06	0.66	11.12	11.12			0.00	6.37			0.00	4.98	15.00														
					0.00	1.63	0.00	0.00	0.00	11.12			0.00	6.37			0.00	4.98						1660									
	ST-12	ST-14			0.00	1.63			0.00	11.12			0.00	6.37			0.00	4.98	15.80	59.94	81.05	94.90	138.57	3954	1650	1650	CONC	0.20	95.1	4076.1052	1.9063	0.8315	0.970
Contribution From STREET No. 12, Pipe 26 - 27						0.00				0.79				0.00				7.59	17.90														
	ST-14	ST-16			0.00	1.64			0.00	11.91	1.22	0.90	3.05	9.42			0.00	12.57	17.90	55.67	75.21	88.04	128.50	5091	1800	1800	CONC	0.20	124.7	5140.6126	2.0201	1.0288	0.990
	ST-16	ST-18			0.00	1.64			0.00	11.91			0.00	9.42			0.00	12.57	18.93	53.81	72.68	85.07	124.14	4975	1800	1800	CONC	0.20	120.0	5140.6126	2.0201	0.9900	0.968
	ST-18	ST-20			0.00	1.64			0.00	11.91	1.11	0.90	2.78	12.20			0.00	12.57	19.92	52.16	70.42	82.41	120.24	5100	1950	1950	CONC	0.15	118.8	5511.1783	1.8454	1.0730	0.925
To CRANESBILL, Pipe ST-20 - ST-58						1.64				11.91				12.20				12.57	21.00					1660									
POND INLET 2																																	
Contribution From POND INLET 2, Pipe 84 - ST40						12.07				1.10				0.00				0.00	22.00														
Contribution From CRANESBILL, Pipe ST-38 - ST40						15.67				13.71				14.25				21.48	23.10					1660									
	ST40	87			0.00	27.73			0.00	14.81			0.00	14.25			0.00	21.48	23.10	47.52	64.10	74.98	109.36	7345	2250	2250	CONC	0.15	45.0	8071.8338	2.0301	0.3694	0.910
STREET No. 8																																	
	108	109	0.81	0.70	1.58	1.58			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	121	600	600	CONC	0.15	116.0	237.8056	0.8411	2.2987	0.509
	109	370	0.73	0.70	1.42	3.00			0.00	0.00			0.00	0.00			0.00	0.00	12.30	68.98	93.44	109.48	159.96	207	675	675	CONC	0.15	117.5	325.5584	0.9098	2.1526	0.635
To CRANESBILL, Pipe 370 - 369						3.00				0.00				0.00				0.00	14.45														
CRANESBILL																																	
	75250	370	0.40	0.70	0.78	0.78			0.00	0.00			0.00	0.00				0.00	10.00	76.81	104.19	122.14	178.56	60	600	600	CONC	0.15	66.5	237.8056	0.8411	1.3178	0.251

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2024-10-04
PROVINCE OF ONTARIO
SDD # 22-1295

Designed: M.S.	PROJECT: Abbott's Run Stage 2-3		
Checked: S.L.M.	LOCATION: City of Ottawa		
Dwg. Reference: 2	File Ref: 22-1295	Date: 04 Oct 2024	Sheet No. SHEET 5 OF 7

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha) 2 YEAR				AREA (Ha) 5 YEAR				AREA (Ha) 10 YEAR				AREA (Ha) 100 YEAR				FLOW						SEWER DATA							
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
Contribution From STREET No. 8, Pipe 109 - 370						3.00				0.00				0.00				0.00	14.45														
	370	369	0.22	0.70	0.43	4.20			0.00	0.00			0.00	0.00			0.00	0.00	14.45	63.09	85.37	99.99	146.03	265	825	825	CONC	0.10	40.0	453.9246	0.8492	0.7851	0.584
			0.03	0.70	0.06	4.26			0.00	0.00			0.00	0.00			0.00	0.00															
	369	ST46	0.20	0.70	0.39	4.65			0.00	0.00			0.00	0.00			0.00	0.00	15.24	61.22	82.80	96.96	141.59	285	1050	1050	CONC	0.10	38.5	863.5311	0.9973	0.6434	0.330
To POND INLET 3, Pipe ST46 - 118						4.65				0.00				0.00				0.00	15.88														
Contribution From ROBERT GRANT, Pipe ST-18 - ST-20						1.64				11.91				12.20				12.57	21.00					1660									
Contribution From Unknown Road1 - 14, Pipe ST-62 - ST-20						4.60				1.80				0.00				8.91	18.63														
			0.13	0.70	0.25	6.49			0.00	13.71			0.00	12.20			0.00	21.48															
	ST-20	ST-58			0.00	6.49			0.00	13.71	0.82	0.90	2.05	14.25			0.00	21.48	21.00	50.48	68.14	79.73	116.31	6556	2100	2100	CONC	0.15	87.5	6715.3752	1.9388	0.7522	0.976
Contribution From BLOCK 6, Pipe 54 - ST-58						3.09				0.00				0.00				0.00	10.35														
Contribution From BLOCK 6, Pipe 55 - ST-58						2.91				0.00				0.00				0.00	10.25														
	ST-58	ST-38	0.12	0.70	0.23	12.73			0.00	13.71			0.00	14.25			0.00	21.48	21.75	49.38	66.63	77.96	113.72	6756	2100	2100	CONC	0.15	53.1	6715.3752	1.9388	0.4565	1.006
Contribution From STREET No. 10-23, Pipe 58 - ST-38						1.38				0.00				0.00				0.00	13.04														
	ST-38	ST40	0.80	0.70	1.56	15.67			0.00	13.71			0.00	14.25			0.00	21.48	22.20	48.73	65.76	76.93	112.21	6832	2100	2100	CONC	0.15	104.7	6715.3752	1.9388	0.9000	1.017
To POND INLET 2, Pipe ST40 - 87						15.67				13.71				14.25				21.48	23.10					1660									
STREET No. 7																																	
			0.12	0.70	0.23	0.23			0.00	0.00			0.00	0.00			0.00	0.00															
	105	106			0.00	0.23	2.83	0.60	4.72	4.72			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	510	900	900	CONC	0.15	42.0	701.1305	1.1021	0.6351	0.727
To STREET No. 1, Pipe 106 - 107						0.23				4.72				0.00				0.00	10.64														
	79	80	0.13	0.70	0.25	0.25			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	19	600	600	CONC	0.15	57.0	237.8056	0.8411	1.1295	0.082
To POND INLET 2, Pipe 80 - 82						0.25				0.00				0.00				0.00	11.13														
	77	78	0.46	0.70	0.90	0.90			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	69	600	600	CONC	0.15	97.5	237.8056	0.8411	1.9321	0.289
Contribution From STREET No. 6, Pipe 76 - 78						5.22				0.00				0.00				0.00	16.50														
			0.51	0.70	0.99	7.10			0.00	0.00			0.00	0.00			0.00	0.00															
	78	80			0.00	7.10	0.99	0.40	1.10	1.10			0.00	0.00			0.00	0.00	16.50	58.43	78.99	92.48	135.02	502	900	900	CONC	0.15	115.0	701.1305	1.1021	1.7391	0.716
To POND INLET 2, Pipe 80 - 82						7.10				1.10				0.00				0.00	18.24														
STREET No. 2-4																																	
	61	62			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	0	450	450	CONC	0.20	81.5	127.5033	0.8017	1.6943	0.000
To STREET No. 6, Pipe 62 - 65						0.00				0.00				0.00				0.00	11.69														
	63	62			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	0	450	450	CONC	0.20	25.5	127.5033	0.8017	0.5301	0.000
To STREET No. 6, Pipe 62 - 65						0.00				0.00				0.00				0.00	10.53														
	93	94	0.83	0.70	1.62	1.62			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	124	600	600	CONC	0.15	87.5	237.8056	0.8411	1.7339	0.522
	94	95	0.72	0.70	1.40	3.02			0.00	0.00			0.00	0.00			0.00	0.00	11.73	70.73	95.85	112.31	164.12	213	675	675	CONC	0.15	91.0	325.5584	0.9098	1.6671	0.655
	66	67	0.25	0.70	0.49	0.49			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	37	450	450	CONC	0.20	58.5	127.5033	0.8017	1.2162	0.293
	67	68	0.03	0.70	0.06	0.54			0.00	0.00			0.00	0.00			0.00	0.00	11.22	72.43	98.18	115.06	168.16	39	450	450	CONC	0.20	12.5	127.5033	0.8017	0.2599	0.310
	68	70	0.42	0.70	0.82	1.36			0.00	0.00			0.00	0.00			0.00	0.00	11.48	71.57	96.99	113.66	166.11	97	600	600	CONC	0.15	86.5	237.8056	0.8411	1.7141	0.410
To STREET No. 6, Pipe 70 - 72						1.36				0.00				0.00				0.00	13.19														
	88	89	0.88	0.70	1.71	1.71			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	132	525	525	CONC	0.20	104.0	192.3297	0.8885	1.9509	0.684
	89	90	0.45	0.70	0.88	2.59			0.00	0.00			0.00	0.00			0.00	0.00	11.95	70.05	94.91	111.21	162.50	181	525	525	CONC	0.25	56.0	215.0311	0.9933	0.9396	0.843
	90	91	0.27	0.70	0.53	3.11			0.00	0.00			0.00	0.00			0.00	0.00	12.89	67.24	91.06	106.67	155.84	209	600	600	CONC	0.20	16.5	274.5943	0.9712	0.2832	0.762
	91	92	0.29	0.70	0.56	3.68			0.00	0.00			0.00	0.00			0.00	0.00	13.17	66.44	89.96	105.39	153.95	244	675	675	CONC	0.15	66.5	325.5584	0.9098	1.2183	0.751
	92	95			0.00	3.68			0.00	0.00			0.00	0.00			0.00	0.00	14.39	63.24	85.57	100.22	146.38	233	675	675	CONC	0.15	7.0	325.5584	0.9098	0.1282	0.714
	95	97			0.00	6.69			0.00	0.00			0.00	0.00			0.00	0.00	14.52	62.92	85.14	99.71	145.63	421	750	750	CONC	0.25	26.0	556.6385	1.2600	0.3439	0.757
	97	101	0.27	0.70	0.53	7.22			0.00	0.00			0.00	0.00			0.00	0.00	14.86	62.09	84.00	98.37	143.66	448	825	825	CONC	0.15	46.0	555.9418	1.0400	0.7372	0.806
To STREET No. 1, Pipe 101 - 102						7.22				0.00				0.00				0.00	15.60														
STREET No. 1																																	
	318	100	0.31	0.70	0.60	0.60			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	46	450	450	CONC	1.50	26.0	349.1823	2.1955	0.1974	0.133
	100	99			0.00	0.60			0.00	0.00			0.00	0.00				0.00	10.20	76.06	103.16	120.93	176.77	46	450	450	CONC	2.60	16.0	459.7198	2.8905	0.0923	0.100

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2024-10-04
PROVINCE OF ONTARIO
500 # 22-1295

Designed: M.S.	PROJECT:	Abbott's Run Stage 2-3	
Checked: S.L.M.	LOCATION:	City of Ottawa	
Dwg. Reference: 2	File Ref: 22-1295	Date: 04 Oct 2024	Sheet No. SHEET 6 OF 7

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha) 2 YEAR				5 YEAR				10 YEAR				100 YEAR				FLOW						SEWER DATA							
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
	99	98			0.00	0.60			0.00	0.00			0.00	0.00			0.00	0.00	10.29	75.71	102.69	120.37	175.95	46	450	450	CONC	0.20	20.0	127.5033	0.8017	0.4158	0.358
	318	101	0.42	0.70	0.82	0.82			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	63	600	600	CONC	0.15	89.5	237.8056	0.8411	1.7735	0.264
Contribution From STREET No. 2-4, Pipe 97 - 101						7.22				0.00				0.00				0.00	15.60														
	101	102			0.00	8.04			0.00	0.00			0.00	0.00			0.00	0.00	15.60	60.38	81.66	95.62	139.63	485	900	900	CONC	0.15	14.5	701.1305	1.1021	0.2193	0.692
	102	103	0.20	0.70	0.39	8.43			0.00	0.00			0.00	0.00			0.00	0.00	15.82	59.90	81.00	94.84	138.48	505	975	975	CONC	0.10	80.0	708.6833	0.9492	1.4047	0.712
	103	104	0.18	0.70	0.35	8.78			0.00	0.00			0.00	0.00			0.00	0.00	17.23	56.97	77.00	90.14	131.57	500	975	975	CONC	0.10	80.0	708.6833	0.9492	1.4047	0.706
	104	106	0.13	0.70	0.25	9.03			0.00	0.00			0.00	0.00			0.00	0.00	18.63	54.34	73.41	85.92	125.39	491	975	975	CONC	0.10	63.0	708.6833	0.9492	1.1062	0.692
Contribution From STREET No. 7, Pipe 105 - 106						0.23				4.72				0.00				0.00	10.64														
	106	107	0.55	0.70	1.07	10.33			0.00	4.72			0.00	0.00			0.00	0.00	19.74	52.46	70.84	82.90	120.96	876	1200	1200	CONC	0.10	118.0	1232.8868	1.0901	1.8041	0.711
	107	355	0.52	0.70	1.01	11.35			0.00	4.72			0.00	0.00			0.00	0.00	21.54	49.68	67.04	78.44	114.42	880	1200	1200	CONC	0.10	99.5	1232.8868	1.0901	1.5213	0.714
			-8.22	0.70	-16.00	-4.65			0.00	4.72			0.00	0.00			0.00	0.00	16.26														
					0.00	-4.65			0.00	4.72			0.00	0.00	8.22	0.70	16.00	16.00	16.26														
	355	ST46			0.00	-4.65			0.00	4.72			0.00	0.00			0.00	16.00	23.06	47.58	64.18	75.08	109.49	1833	1500	1500	CONC	0.15	16.0	2737.7609	1.5493	0.1721	0.670
To POND INLET 3, Pipe ST46 - 118						-4.65				4.72				0.00				16.00	23.23														
POND INLET 3																																	
Contribution From STREET No. 1, Pipe 355 - ST46						-4.65				4.72				0.00				16.00	23.23														
Contribution From CRANESBILL, Pipe 369 - ST46						4.65				0.00				0.00				0.00	15.88														
	ST46	118			0.00	0.00			0.00	4.72			0.00	0.00			0.00	16.00	23.23	47.35	63.87	74.71	108.96	2044	1500	1500	CONC	0.10	80.5	2235.3724	1.2650	1.0606	0.915

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

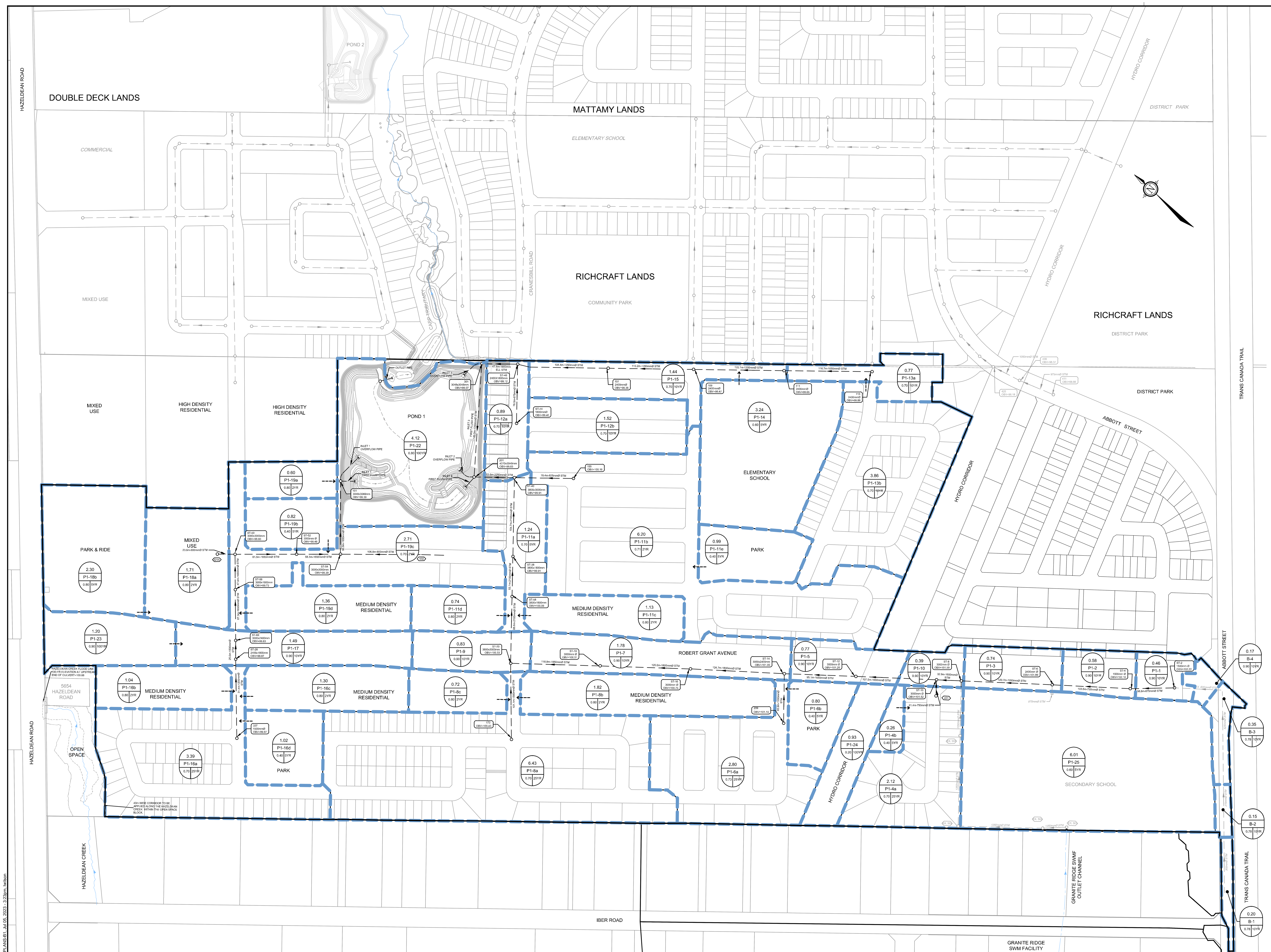
Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2024-10-04
PROVINCE OF ONTARIO
SUB # 22-1295

Designed: M.S.	PROJECT:	Abbott's Run Stage 2-3	
Checked: S.L.M.	LOCATION:	City of Ottawa	
Dwg. Reference: 2	File Ref: 22-1295	Date: 04 Oct 2024	Sheet No. SHEET 7 OF 7

APPENDIX E

Novatech Pond 1 Drawings
Novatech Pond 1 Design Sheet



LEGEND

0.24 ha	AREA (hectares)
P1-1	AREA ID: P1 = POND 1
2YR	MINOR SYSTEM DESIGN STORM
0.65	RUN-OFF COEFFICIENT
	STORM CATCHMENT
	STORM DRAINAGE AREA (LOCAL BOUNDARY)
100	PROPOSED STORM MANHOLE & SEWER WITH DIRECTION OF FLOW
100	FUTURE / EXISTING STORM MANHOLE & SEWER WITH DIRECTION OF FLOW
	MINOR FLOW DIRECTION

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
5.	CITY SUBMISSION	JUL 19/23	MAB
4.	REVISIONS PER CITY COMMENTS	APR 26/23	MAB
3.	ISSUED FOR TENDER	JAN 17/23	MAB
2.	CITY SUBMISSION	JAN 9/23	MAB
1.	CITY SUBMISSION	OCT 4/22	MAB

SCALE 1:2000

1:2000
0 20 40 60 80

DESIGN LRW
CHECKED MAB
DRAWN DTD
CHECKED MAB
APPROVED JGR

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER L. R. WILSON 100160065 PROVINCE OF ONTARIO

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CITY OF OTTAWA
ABBOTT'S RUN SUBDIVISION - POND 1

STORM DRAINAGE AREA PLAN (POST DEVELOPMENT)

PROJECT No. 122039
REV REV # 5
DRAWING No. 122039-STM

D07-16-16-0020 PLAN #17320

Fernbank Community - Pond 1
SWMF Design Critera

Required storage Volumes (Quality)

Drainage Area	**73.41**	ha
% Impervious:	**73%**	
Enhanced protection (80% TSS removal):		
Treatment Volume	230	m^3/ha
Extended Detention Storage:	80	m^3/ha required
	5,873	m^3 required
	6,750	m^3 provided
	91.9	m^3/ha provided
Perm Pool:	190	m^3/ha required
	13,923	m^3 required
	26,514	m^3 provided
	361.2	m^3/ha provided
Extended Detention:	67.97	L/s average
	169.93	L/s max (2.5 x avg)
	170.00	L/s max (350mm orifice)

(% impervious was calculated as the average imperviousness for the drainage areas tributary to the SWM facility)

Velocity Check:		
Top Width =	18.20	m
Forebay Side Slopes =	3	:1
Bottom Width =	11	m
Flow Area =	17.52	m^2
Average Velocity =	**0.11**	**m/s**

** Must be less than 0.15m/s

Required Forebay Length and width (Inlet 1)

Parameters:

Length to width ratio of forebay, r =	5.0:1	
Peak outflow rate during 25 mm storm, Q	0.170	m^3/s (24hr ext. det)
Target particle size =	150	µm
Settling velocity, V_s =	0.0003	m/s

Forebay Settling Length, Dist

$$Dist = \sqrt{\frac{rQ_P}{V_S}}$$

= 53 m

Check Dispersion Length, Dist $_2$

Desired velocity in forebay, V_f =	0.5	m/s
Inlet flow rate , Q_{25mm} =	1.990	m^3/s
Depth in forebay, d =	1.2	m

$$Dist_2 = \frac{8Q}{dV_f}$$

= 27 m

Therefore, the settling length of 53 m governs the design.

Required Length	**= 53 m**
Provided Length	**= 53 m**

Minimum Forebay width:

Length of Forebay, L =	53	m
Minimum width, W =	L/5	
W =	10.6	m

Required Width	**= 10.6 m**
Provided Width	**= 11.0 m**

Fernbank Community - Pond 1
SWMF Design Critera

Required storage Volumes (Quality)

Drainage Area	**73.41**	ha
% Impervious:	**73%**	
Enhanced protection (80% TSS removal):		
Treatment Volume	230	m^3/ha
Extended Detention Storage:	80	m^3/ha required
	5,873	m^3 required
	6,750	m^3 provided
	91.9	m^3/ha provided
Perm Pool:	190	m^3/ha required
	13,923	m^3 required
	26,514	m^3 provided
	361.2	m^3/ha provided
Extended Detention:	67.97	L/s average
	169.93	L/s max (2.5 x avg)
	170.00	L/s max (350mm orifice)

(% impervious was calculated as the average imperviousness for the drainage areas tributary to the SWM facility)

Velocity Check:		
Top Width =	23.50	m
Forebay Side Slopes =	3	:1
Bottom Width =	14.5	m
Flow Area =	28.5	m^2
Average Velocity =	**0.148**	**m/s**

** Must be less than 0.15m/s

Required Forebay Length and width (Inlet 2)

Parameters:

Length to width ratio of forebay, r = 5.0:1

Peak outflow rate during 25 mm storm, C 0.170 m^3/s (24hr ext. det)

Target particle size = 150 µm

Settling velocity, V_s = 0.0003 m/s

Forebay Settling Length, Dist

$$Dist = \sqrt{\frac{rQ_P}{V_S}}$$

= 53 m

Check Dispersion Length, Dist $_2$

Desired velocity in forebay, V_f = 0.5 m/s

Inlet flow rate , Q_{25mm} = 4.208 m^3/s

Depth in forebay, d = 1.50 m

$$Dist_2 = \frac{8Q}{dV_f}$$

= 45 m

Therefore, the settling length of 53 m governs the design.

Required Length	**= 53 m**
Provided Length	**= 53 m**

Minimum Forebay width:

Length of Forebay, L = 53 m

Minimum width, W = L/5

W = 10.6 m

Required Width	**= 10.6 m**
Provided Width	**= 14.5 m**

Fernbank Community - Pond 1
SWMF Design Critera (Inlet 1)

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Sediment Loading Estimate

Table 6.3 - MOE SWM Planning & Design Manual

Catchment Imperviousness	Annual Loading (kg/ha)	Wet Density (kg/m³)	Annual Loading (m³/ha)
	50	1,230	0.05
35%	770	1,230	0.6
55%	2,300	1,230	1.9
70%	3,495	1,230	2.8
85%	4,680	1,230	3.8

Catchment Area:	18.94	ha
% Impervious:	77%	
Annual Sediment Loading:	4,048	kg/ha/yr
	3.29	m^3/ha/yr
	62.3	m^3/yr

Sediment Removal Efficiency:	80%	
	49.87	m^3/yr

Sediment Accumulation:		
10yrs	499	m^3

Forebay Volume:	766	m^3
@ depth:	1.20	m

(Depth to top of Forebay Berm)

City of Ottawa-average precipitation and TSS data

Drainage Area:	18.9	ha
Runoff Coefficient:	0.74	
Estimate Influent TSS Level (max):	250	mg/L
(Long-term average):	150	mg/L
Sediment Density:	1,230	kg/m^3
Total Annual Precipitation:	907	mm
Total Annual Rain (Ice Free Period):	686	mm
Total Annual Runoff:	126,950	m^3
Runoff during Ice-free period:	96,017	m^3
Max Annual TSS Loading:	31,737	kg
(total precipitation)	25.8	m^3/yr
Max Annual TSS Loading:	24,004	kg
(precipitation during ice-free period)	19.5	m^3/yr
Average Annual TSS Loading:	19,042	kg
(total precipitation)	15.5	m^3/yr
Average Annual TSS Loading:	14,403	kg
(precipitation during ice-free period)	11.7	m^3/yr

Target 80% TSS Removal:		
Max:	20.6	m^3/yr
Min:	9.4	m^3/yr

Sediment Accumulation:		
10yrs	206	m^3

Fernbank Community - Pond 1
SWMF Design Critera (Inlet 2)

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Sediment Loading Estimate

Table 6.3 - MOE SWM Planning & Design Manual

Catchment Imperviousness	Annual Loading (kg/ha)	Wet Density (kg/m³)	Annual Loading (m³/ha)
	50	1,230	0.05
35%	770	1,230	0.6
55%	2,300	1,230	1.9
70%	3,495	1,230	2.8
85%	4,680	1,230	3.8

Catchment Area:	50.35	ha
% Impervious:	70%	
Annual Sediment Loading:	3,495	kg/ha/yr
	2.84	m^3/ha/yr
	143.1	m^3/yr

Sediment Removal Efficiency:	80%	
	114.45	m^3/yr

Sediment Accumulation:		
10yrs	1145	m^3

Forebay Volume:	1225	m^3
@ depth:	1.50	m

(Depth to top of Forebay Berm)

City of Ottawa-average precipitation and TSS data

Drainage Area:	50.4	ha
Runoff Coefficient:	0.69	
Estimate Influent TSS Level (max):	250	mg/L
(Long-term average):	150	mg/L
Sediment Density:	1,230	kg/m^3
Total Annual Precipitation:	907	mm
Total Annual Rain (Ice Free Period):	686	mm
Total Annual Runoff:	315,105	m^3
Runoff during Ice-free period:	238,327	m^3
Max Annual TSS Loading:	78,776	kg
(total precipitation)	64.0	m^3/yr
Max Annual TSS Loading:	59,582	kg
(precipitation during ice-free period)	48.4	m^3/yr
Average Annual TSS Loading:	47,266	kg
(total precipitation)	38.4	m^3/yr
Average Annual TSS Loading:	35,749	kg
(precipitation during ice-free period)	29.1	m^3/yr

Target 80% TSS Removal:		
Max:	51.2	m^3/yr
Min:	23.3	m^3/yr

Sediment Accumulation:		
10yrs	512	m^3

Fernbank Community - Pond 1
SWMF Design Critera

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SWM Facility - Stage-Storage-Discharge

Stage	Elevation (m)	Stage (m)	Total Volume (m^3)	Outflow (L/s)*		
				Orifice 1	Weir 1	Total
NWL	97.55	0.00	29,380	0	0	0
Extended Det.	97.85	0.30	36,167	92	0	92
2-year	98.32	0.77	47,700	201	1,719	1,920
5-year	98.53	0.98	52,970	233	2,992	3,225
10-year	98.66	1.11	56,035	251	3,890	4,141
100-year	99.04	1.49	66,251	298	6,927	7,225

**Approximate outflows have been calculated based on the equations below*
Actual outflows, based on the Ultimate PCSWMM model are provided in the body of the SWM report

Orifice 1

Quantity	1	
C	0.61	
Diameter	350	mm
Area	0.0962	m^2
Invert	97.55	m
C/L	97.725	m

Q orifice = C x A x (2 x g x H)(1/2)

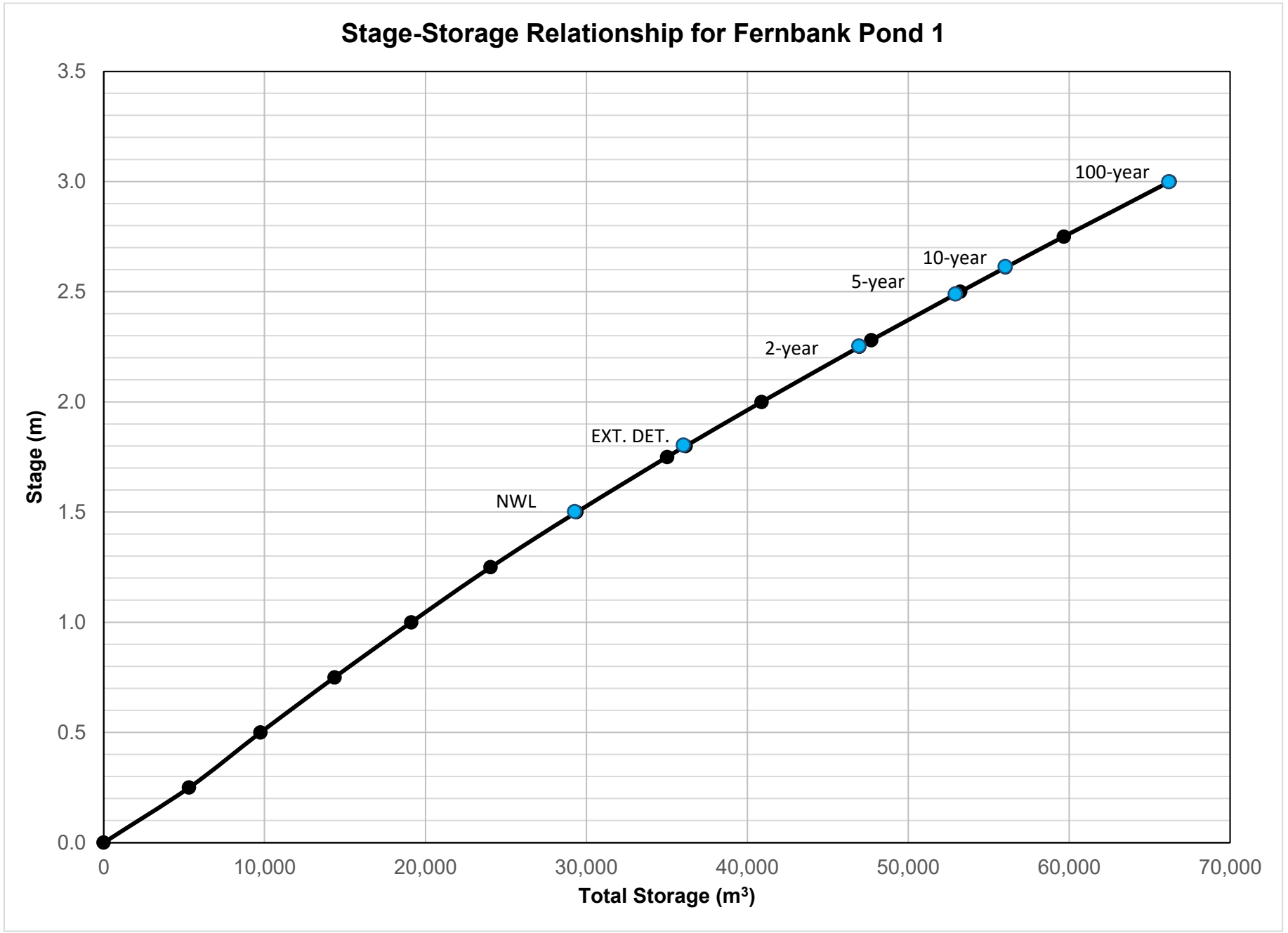
Extended Detention Draw-Down Time

Ex. Det Volume =	6,787	m^3
Flow Rate =	91.9	L/s
Time =	**20.5**	**hours**

Broad Crested Weir 1

$Q\ (m^3/s) = C \times L \times H^{(3/2)}$

Weir Coefficeint	1.84
Bottom Width (m)	2.9
Bottom of Weir Elevation (m)	97.85


Stage-Storage Relationship for Fernbank Pond 1
Stage (m)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Total Storage (m³)
100-year
10-year
5-year
2-year
EXT. DET.
NWL

Fernbank Community - Pond 1
SWM Facility Stage-Storage Table

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Stage	Elevation (m)	Active Volume (m^3)	Total Stage (m)	Total Volume (m^3)	Area (m^2)
Bottom	**96.05**	**-**	**0.00**	**0**	**16,832**
	96.30	-	0.25	5,303	17,446
	96.55	-	0.50	9,746	18,079
	96.80	-	0.75	14,346	18,720
	97.05	-	1.00	19,107	19,380
	97.30	-	1.25	24,045	20,253
NWL	**97.55**	**29,380**	**1.50**	**29,380**	**22,002**
	97.80	-	1.75	35,014	23,043
ED	**97.85**	**6,788**	**1.80**	**36,167**	**23,209**
	98.05	-	2.00	40,879	23,901
	98.30	-	2.25	46,959	24,724
2-year	**98.32**	**18,320**	**2.27**	**47,700**	**24,807**
5-year	**98.53**	**23,590**	**2.48**	**52,970**	**25,383**
	98.55	-	2.50	53,224	25,410
10-year	**98.66**	**26,656**	**2.61**	**56,035**	**25,709**
	98.80	-	2.75	59,664	24,724
100-year	**99.04**	**36,872**	**2.99**	**66,251**	**26,666**

Fernbank Community - Pond 1
Drawdown Calculation

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Calculations per MOE Stormwater Planning & Design Manual (2003)
Page 4-58, Equation 4.10: Drawdown Time

$$t = \frac{2A_p}{CA_o(2g)^{0.5}}(h_1{}^{0.5} - h_2{}^{0.5})$$

Ap =	23,248	m^2		
C =	0.62			
Ao =	0.096	m^2		
g =	9.8	$2g^{0.5}$ =	4.427189	
h1 =	97.85	m		**0.3 m**
h2 =	97.55	m		**0 m**

2Ap =	46,496
Cao(2g)^0.5 =	0.2635
H1^0.5-h2^0.5 =	0.5477

Drawdown time =	96646	seconds
=	**27**	**hours**

The developer would be responsible for initiation of any monitoring programs and the associated costs until such time as the City accepts ownership of the associated SWM facilities and/or watercourses. Continuation of the monitoring program would then become the responsibility of the City. It is anticipated that monitoring would be an open-ended program as part of an ongoing adaptive management strategy.

6.3 SWM Criteria - Carp River Subwatershed

Stormwater management criteria for the Fernbank Community lands tributary to the Carp River subwatershed have been developed based on the recommendations of the Carp River Subwatershed Study, the recommendations of the Carp River 3rd Party Review, and input from MVC:

- The proposed stormwater management strategy will need to adhere to all applicable policies and guidelines of Mississippi Valley Conservation; the City of Ottawa, MOE, and other approvals agencies.

Quality Control / Fish Habitat

- Level 2 - Normal protection for lands tributary to the Carp River (70% long term TSS removal);
- End-of-pipe SWM facilities are to provide extended detention storage for both baseflow enhancement and water quality control;
- The proposed development must have no adverse impacts on downstream fish habitat;
- The Carp River and the West Tributary have been classified as tolerant warmwater fish communities (Type 3 Communities), based on classifications from the *Carp River Watershed / Subwatershed Study*. Temperature mitigation measures are to be incorporated into all proposed SWM facilities, with the goal of ensuring that the temperature of discharged stormwater does not exceed the following target values:
    - Maximum Discharge Temperature = 25ºC
    - Preferred Discharge Temperature = 22ºC

Quantity Control

- Increases in runoff volume resulting from development are not to exceed an additional 40,000 m^3 above existing conditions for the 100-year event;
- All development within the Fernbank Community tributary to the Carp River accommodate a per hectare share of the 85,600 m3 deficit volume identified in the Third Party Review until data is available to confirm the model.
- The proposed development must not result in any increase in downstream flood risk in the Carp River. Any proposed increases in flood elevations will need to be reviewed to ensure that they do not represent an increase in flood risk. Provided this criterion is met, the following design criteria are to be applied to proposed SWM facilities:
    - For SWM Facilities outletting directly to the Carp River, peak flow control is not required for major storm events (> 10 year event).
    - For SWM facilities outletting to tributaries of the Carp River, peak flow control is required for all storms up to the 100-year event.
    - **Pre-Development Peak Flow targets are listed in Table 4-2.**

Erosion control / Fluvial Geomorphology

- Continuous hydrologic modeling should be used to demonstrate that the proposed development will not result in an adverse change to the geomorphology of the Carp River West Tributary. The number of exceedences of the erosion thresholds established by the fluvial geomorphic analysis should not increase under post-development conditions.
    - **Critical flow (Erosion) targets for watercourses are listed in Table 3-7.**

Table 8-2: Existing vs. Post-Development Peak Flows

Location		Peak Flow (m^3/s)					
		2yr	5yr	10yr	25yr	50yr	100yr
Jock River Subwatershed (24 hr SCS Distribution)							
Monahan Drain @ Terry Fox Drive	Existing	1.21	1.88	2.42	3.06	3.58	**4.29**
	Post (Uncontrolled)	6.99	10.3	12.5	15.5	17.8	**20.4**
	Post (Controlled)	1.16	1.86	2.49	3.07	3.56	**4.27**
	Post (With BMPs)	1.09	1.76	2.34	2.97	3.44	**4.13**
Flewellyn Drain @ Fernbank Road	Existing	1.13	1.76	2.29	2.90	3.39	**4.06**
	Post (Uncontrolled)	3.78	5.69	7.11	8.74	10.28	**12.15**
	Post (Controlled)	1.13	1.67	2.39	2.90	3.23	**3.70**
	Post (With BMPs)	1.09	1.61	2.36	2.88	3.21	**3.67**
Faulkner Tributary @ Fernbank Road	Existing	0.48	0.76	0.98	1.25	1.46	**1.75**
	Post (Uncontrolled)	1.67	2.46	3.05	3.82	4.41	**5.30**
	Post (Controlled)	0.28	0.45	0.66	1.04	1.34	**1.74**
	Post (With BMPs)	0.27	0.42	0.61	0.96	1.26	**1.67**
Carp River Subwatershed (12 hr SCS Distribution)							
Carp River West Tributary Pond 1	Existing	1.71	2.67	3.32	4.25	4.77	**5.43**
	Post (Uncontrolled)	4.71	7.16	8.79	10.49	10.82	**12.53**
	Post (Controlled)	1.50	2.34	4.60	4.89	5.09	**5.41**
	Post (With BMPs)	1.44	2.18	4.39	4.84	5.02	**5.31**
Fernbank north of West Tributary Areas 3536 pre-development Pond 2 out post-development	Existing	0.36	0.66	**0.87**	1.18	1.35	1.58
	Post (Uncontrolled)	1.17	1.76	**2.15**	2.41	2.41	2.86
	Post (Controlled)	0.34	0.60	**0.89**	2.41	2.41	2.77
	Post (With BMPs)	0.32	0.53	**0.68**	2.13	2.23	2.66
Hazeldean Creek @ Carp River Pond 3	Existing	1.09	1.85	**2.37**	3.12	3.54	4.08
	Post (Uncontrolled)	3.79	5.80	**7.13**	8.50	8.50	8.50
	Post (Controlled)	0.53	1.13	**1.57**	5.71	8.50	8.50
	Post (With BMPs)	0.50	1.09	**1.54**	6.38	6.77	8.50

Table 8-3: Existing vs. Post-Development Runoff Volumes

Location		Runoff Volume (ha.m)					
		2yr	5yr	10yr	25yr	50yr	100yr
Jock River Subwatershed (24 hr SCS Distribution)							
Monahan Drain Ponds 6,7,8	Existing	5.31	6.94	10.33	12.95	15.10	18.05
	Post (no BMPs)	7.05	9.74	11.56	13.86	15.72	18.28
	Post (With BMPs)	6.65	9.30	11.10	13.38	15.22	17.75
Flewellyn Drain Pond 5	Existing	3.52	4.60	6.85	8.59	10.01	11.97
	Post (no BMPs)	4.45	6.19	7.37	8.86	10.07	11.73
	Post (With BMPs)	4.13	5.84	7.00	8.48	9.67	11.31
Faulkner Drain Tributary Pond 4	Existing	1.09	1.42	2.11	2.65	3.09	3.69
	Post (no BMPs)	1.99	2.76	3.28	3.94	4.47	5.20
	Post (With BMPs)	1.86	2.61	3.13	3.78	4.31	5.03
Carp River Subwatershed (12 hr SCS Distribution)							
Carp Tributary Headwater Pond 1	Existing	3.72	5.66	6.97	8.86	9.91	11.27
	Post (Uncontrolled)	4.70	6.66	7.96	9.82	10.84	12.21
	Post (With BMPs)	4.56	6.50	7.80	9.65	10.67	12.02
Carp North Pond 2	Existing	0.44	0.76	1.00	1.34	1.53	1.79
	Post (Uncontrolled)	0.79	1.10	1.31	1.61	1.77	2.00
	Post (With BMPs)	0.75	1.06	1.27	1.56	1.73	1.95
Carp South Pond 3	Existing	1.46	2.40	3.03	3.95	4.47	5.13
	Post (Uncontrolled)	2.62	3.72	4.45	5.49	6.09	6.84
	Post (With BMPs)	2.54	3.65	4.40	5.48	6.06	6.85

Pre vs. Post Development Runoff Volumes to Carp River (100 year event)

Pre and post-development runoff volumes to the Carp River for the 100-year storm event have been calculated based on the results of the analysis (refer to **Table 8-4**). This analysis has been completed to demonstrate that the proposed development will meet the following criterion.

- Increases in runoff volume resulting from development are not to exceed an additional 40,000 m^3 above existing conditions for the 100-year event;

Table 8-4: 100yr Runoff Volumes to Carp River

Development Condition	100yr Runoff Volume (m3)				
	Pond 1	Pond 2	Pond 3	Total	Increase
Pre-Development	112,700	17,900	51,300	181,900	-
Post-Development (no BMPs)	122,100	20,000	68,400	210,500	**28,600**
Post-Development (with BMPs)	120,200	19,500	68,500	208,200	**26,300**

Fernbank Community - Pond 1 (Minto Lands): Storm Sewer Design Sheet (Rational Method)

LOCATION			AREA											FLOW									PROPOSED SEWER									
Location	From Node	To Node	Park N' Ride	Arterial Road ROW	Abbott Street ROW	Mixed Use	High Density / Medium Block	Low Density	Schools	Park	Hydro Corridor	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr)					Peak Flow	Total Peak Flow (Q) (L/s)	Pipe	Size		Grade	Length	Capacity	Full Flow Velocity	Time of Flow	Q/Qfull
																	2yr	5yr	10yr	25yr	100yr			Type	Nominal (mm)	Actual (mm)	(%)	(m)	(l/s)	(m/s)	(min.)	(%)
			0.80	0.90	0.76	0.80	0.80	0.70	0.60	0.40	0.20	(ha)										(L/s)										
POND 1: Inlet 1																																
P1-16, P1-17, P1-23	ST-28	ST-66					2.34					2.34	0.80	5.20	5.20	15.00	61.77					321.4	**1974.2**	CONC	1500	1524	0.15	25.0	2979.6	1.58	0.26	66.3%
										1.02		1.02	0.40	1.13	1.13	15.00		83.56				94.8										
				1.49								1.49	0.90	3.73	3.73	15.00			97.9			364.8										
								3.39				3.39	0.70	6.60	6.60	15.00				115.8		764.1										
				1.20								1.20	0.90	3.00	3.00	15.00					142.9	429.0										
P1-18b	ST-66	ST-56										0.00		0.00	5.20	15.00	61.77					321.4	**2401.6**	CONC	1650	1676	0.15	67.3	3839.4	1.69	0.67	62.6%
			2.30									2.30	0.80	5.12	6.25	15.00		83.56				522.2										
												0.00		0.00	3.73	15.00			97.9			364.8										
												0.00		0.00	6.60	15.00				115.8		764.1										
												0.00		0.00	3.00	15.00					142.9	429.0										
P1-19d	ST-56	ST-50					1.36					1.36	0.80	3.02	8.23	15.00	61.77					508.3	**2588.4**	CONC	1650	1676	0.15	47.0	3839.4	1.69	0.46	67.4%
												0.00		0.00	6.25	15.00		83.56				522.2										
												0.00		0.00	3.73	15.00			97.9			364.8										
												0.00		0.00	6.60	15.00				115.8		764.1										
												0.00		0.00	3.00	15.00					142.9	429.0										
P1-18a	ST-50	ST-52				1.71						1.71	0.80	3.80	12.03	15.00	61.77					743.2	**2823.3**	CONC	1650	1676	0.15	81.5	3839.4	1.69	0.81	73.5%
												0.00		0.00	6.25	15.00		83.56				522.2										
												0.00		0.00	3.73	15.00			97.9			364.8										
												0.00		0.00	6.60	15.00				115.8		764.1										
												0.00		0.00	3.00	15.00					142.9	429.0										
P1-19b	ST-52	ST-54										0.00		0.00	12.03	15.00	61.77					743.2	**2899.5**	CONC	1650	1676	0.15	58.3	3839.4	1.69	0.58	75.5%
										0.82		0.82	0.40	0.91	7.16	15.00		83.56				598.4										
												0.00		0.00	3.73	15.00			97.9			364.8										
												0.00		0.00	6.60	15.00				115.8		764.1										
												0.00		0.00	3.00	15.00					142.9	429.0										
P1-19c	ST-54	101						2.71				2.71	0.70	5.27	17.31	15.00	61.77					1068.9	**3225.2**	CONC	1650	1676	0.15	96.9	3839.4	1.69	0.96	84.0%
												0.00	0.00	0.00	7.16	15.00		83.56				598.4										
												0.00	0.00	0.00	3.73	15.00			97.9			364.8										
												0.00		0.00	6.60	15.00				115.8		764.1										
												0.00		0.00	3.00	15.00					142.9	429.0										

Q = 2.78 AIR

WHERE : Q = PEAK FLOW IN LITRES PER SECOND (L/s)
A = AREA IN HECTARES (ha)
I = RAINFALL INTENSITY IN MILLIMETERS PER HOUR (mm/hr)
R = WEIGHTED RUNOFF COEFFICIENT

Q = (1/n) A R^(2/3)So^(1/2)

WHERE :

Q = CAPACITY (L/s)
n = MANNING COEFFICIENT OF ROUGHNESS (0.013)
A = FLOW AREA (m^2)

Project: Fernbank Pond 1 (122039)
Designed: LRW
Checked: MAB
Date: June 26 2023

Fernbank Community - Pond 1 (Minto Lands): Storm Sewer Design Sheet (Rational Method)

LOCATION			AREA											FLOW										PROPOSED SEWER									
Location	From Node	To Node	Park N' Ride	Arterial Road ROW	Abbott Street ROW	Mixed Use	High Density / Medium Block	Low Density	Schools	Park	Hydro Corridor	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr)					Peak Flow	Total Peak Flow (Q) (L/s)	Pipe	Size		Grade	Length	Capacity	Full Flow Velocity	Time of Flow	Q/Qfull
																	2yr	5yr	10yr	25yr	100yr			Type	Nominal (mm)	Actual (mm)	(%)	(m)	(l/s)	(m/s)	(min.)	(%)
			0.80	0.90	0.78	0.80	0.80	0.70	0.60	0.40	0.20	(ha)										(L/s)										
POND 1: Inlet 2																																	
												0.00		0.00	0.00	10.00						0.0										
												0.00		0.00	0.00	10.00						0.0										
B-1	*433*	*435*			0.20							0.20	0.86	0.48	0.48	10.00			122.1			58.4	**58.4**	CONC	300	300	1.00	85.0	100.9	1.38	1.02	57.9%
												0.00		0.00	0.00	10.00						0.0										
												0.00		0.00	0.00	10.00						0.0										
												0.00		0.00	0.00	11.02						0.0										
												0.00		0.00	0.00	11.02						0.0										
B-2	*435*	*437*			0.15							0.15	0.77	0.32	0.80	11.02			116.1			92.8	**92.8**	CONC	375	375	0.30	105.0	100.2	0.88	1.99	92.6%
												0.00		0.00	0.00	11.02						0.0										
												0.00		0.00	0.00	11.02						0.0										
												0.00		0.00	0.00	13.02						0.0										
												0.00		0.00	0.00	13.02						0.0										
B-3	*437*	*439*			0.35							0.35	0.75	0.73	1.53	13.02			106.1			162.2	**162.2**	CONC	525	525	0.18	80.9	190.3	0.85	1.58	85.2%
												0.00		0.00	0.00	13.02						0.0										
												0.00		0.00	0.00	13.02						0.0										
												0.00		0.00	0.00	14.60						0.0										
												0.00		0.00	0.00	14.60						0.0										
B-4	*439*	ST-2		0.17								0.17	0.90	0.43	1.95	14.60			99.4			194.3	**194.3**	CONC	600	600	0.20	63.5	286.5	0.98	1.08	67.8%
												0.00		0.00	0.00	14.60						0.0										
												0.00		0.00	0.00	14.60						0.0										
												0.00		0.00	0.00	15.68						0.0										
												0.00		0.00	0.00	15.68						0.0										
P1-1	ST-2	ST-4		0.39				0.07				0.46	0.87	1.11	3.07	15.68			95.4			292.4	**292.4**	CONC	675	686	0.20	58.8	409.5	1.07	0.91	71.4%
												0.00		0.00	0.00	15.68						0.0										
												0.00		0.00	0.00	15.68						0.0										
												0.00		0.00	0.00	16.59						0.0										
												0.00		0.00	0.00	16.59						0.0										
P1-2	ST-4	ST-6		0.48				0.10				0.58	0.87	1.40	4.46	16.59			92.2			411.4	**411.4**	CONC	750	762	0.20	103.6	541.9	1.15	1.50	75.9%
												0.00		0.00	0.00	16.59						0.0										
												0.00		0.00	0.00	16.59						0.0										
												0.00	0.00	0.00	0.00	18.09						0.0										
									6.01			6.01	0.60	10.02	10.02	18.09		74.7				749.3										
P1-3, P1-25	ST-6	ST-8		0.61				0.13				0.74	0.86	1.78	6.24	18.09			87.5			546.0	**1295.3**	CONC	1050	1067	0.25	120.7	1486.7	1.61	1.25	87.1%
												0.00		0.00	0.00	18.09						0.0										
												0.00		0.00	0.00	18.09						0.0										
Granite Ridge/Industrial Park																							**2652.0**										
												0.00	0.00	0.00	0.00	19.34						0.0										
Granite Ridge/Industrial Park	ST-8	ST-10										0.00		0.00	10.02	19.34		71.7				719.1	**3895.1**	CONC	1650	1676	0.20	32.9	4433.4	1.95	0.28	87.9%
												0.00		0.00	6.24	19.34			84.0			524.0										
												0.00		0.00	0.00	19.34						0.0										
												0.00		0.00	0.00	19.34						0.0										
												0.00	0.00	0.00	0.00	19.62						0.0										
										0.26		0.26	0.40	0.29	10.31	19.62		71.1				733.2										
P1-4, P1-10	ST-10	ST-12		0.37				0.02				0.39	0.89	0.96	7.21	19.62			83.2			599.5	**4390.9**	CONC	1650	1676	0.25	107.0	4956.7	2.18	0.82	88.6%
								2.12				2.12	0.70	4.13	4.13	19.62				98.4		406.1										
												0.00		0.00	0.00	19.62						0.0										
												0.00	0.00	0.00	0.00	20.44						0.0										
												0.00		0.00	10.31	20.44		69.3				714.7										
P1-5, P1-24	ST-12	ST-14		0.68				0.09				0.77	0.88	1.88	9.08	20.44			81.1			736.5	**4560.2**	CONC	1650	1676	0.26	95.1	5054.8	2.22	0.71	90.2%
												0.00		0.00	4.13	20.44				95.9		395.7										
											0.93	0.93	0.20	0.52	0.52	20.44					118.3	61.2										
												0.00	0.00	0.00	0.00	21.15						0.0										
										0.80		0.80	0.40	0.89	11.20	21.15		67.81				759.8										
P1-6	ST-14	ST-16										0.00		0.00	9.08	21.15			79.3			720.7	**5112.8**	CONC	1800	1830	0.20	124.7	5604.6	2.06	1.01	91.2%
								2.80				2.80	0.73	5.68	9.81	21.15				93.9		920.5										
												0.00		0.00	0.52	21.15					115.8	59.9										

Fernbank Community - Pond 1 (Minto Lands): Storm Sewer Design Sheet (Rational Method)

LOCATION			AREA										FLOW								Total Peak Flow (Q) (L/s)	PROPOSED SEWER								
Location	From Node	To Node	Park N' Ride	Arterial Road ROW	Abbott Street ROW	Mixed Use	High Density / Medium Block	Low Density	Schools	Park	Hydro Corridor	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr) 2yr	5yr	10yr	25yr	100yr	Peak Flow		Pipe	Size Nominal	Size Actual	Grade	Length	Capacity	Full Flow Velocity	Time of Flow	Q/Qfull
			0.80	0.90	0.78	0.80	0.80	0.70	0.60	0.40	0.20	(ha)										(L/s)		Type	(mm)	(mm)	(%)	(m)	(l/s)	(m/s)	(min.)	(%)
												0.00		0.00	0.00	22.16						0.0									
												0.00		0.00	11.20	22.16		65.8				737.6									
	ST-16	ST-18										0.00		0.00	9.08	22.16			77.0			699.6	5040.8	CONC	1800	1830	0.20	120.0	5604.6	2.06	0.97	89.9%
												0.00		0.00	9.81	22.16				91.1		893.5									
												0.00		0.00	0.52	22.16					112.4	58.1									
												0.00		0.00	0.00	23.13						0.0									
												0.00		0.00	11.20	23.13		64.1				717.6									
P1-7	ST-18	ST-20		1.66				0.12				1.78	0.89	4.39	13.47	23.13			74.9			1009.3	5304.5	CONC	1950	1981	0.15	118.8	5996.4	1.88	1.05	88.5%
												0.00		0.00	9.81	23.13				88.6		869.1									
												0.00		0.00	0.52	23.13					109.3	56.5									
							4.41					4.41	0.80	9.81	9.81	24.18	46.15					452.6									
												0.00		0.00	11.20	24.18		62.24				697.3									
P1-8, P1-9, P1-11c&d	ST-20	ST-58		0.83								0.83	0.90	2.08	15.55	24.18			72.8			1131.7	6909.9	CONC	2100	2134	0.17	88.6	7784.5	2.11	0.70	88.8%
								6.43				6.43	0.70	12.51	22.32	24.18				86.1		1921.4									
												0.00		0.00	0.52	24.18					106.2	54.9									
												0.00	0.00	0.00	9.81	24.88	45.31					444.4									
												0.00		0.00	11.20	24.88		61.1				684.4									
	ST-58	ST-38										0.00		0.00	15.55	24.88			71.4			1110.7	6831.0	CONC	2100	2134	0.17	53.1	7784.5	2.11	0.42	87.8%
												0.00		0.00	22.32	24.88				84.5		1885.7									
												0.00		0.00	0.52	24.88					104.2	53.9									
												0.00	0.00	0.00	9.81	25.30	44.82					439.6									
								1.24				1.24	0.70	2.41	13.62	25.30		60.4				822.7									
P1-11a	ST-38	ST-40										0.00		0.00	15.55	25.30			70.7			1098.5	6931.0	CONC	2100	2134	0.17	104.7	7784.5	2.11	0.83	89.0%
												0.00		0.00	22.32	25.30				83.6		1864.9									
												0.00		0.00	0.52	25.30					103.0	53.3									
								6.20				6.20	0.71	12.24	22.05	26.13	43.89					967.5									
										0.99		0.99	0.40	1.10	14.72	26.13		59.2				870.6									
P1-11	ST-40	201										0.00		0.00	15.55	26.13			69.2			1075.4	7443.1	CONC	2250	2286	0.15	53.6	8784.9	2.07	0.43	84.7%
												0.00		0.00	22.32	26.13				81.8		1825.5									
												0.00		0.00	0.52	26.13					100.8	52.1									

Q = 2.78 AIR

WHERE : Q = PEAK FLOW IN LITRES PER SECOND (L/s)
A = AREA IN HECTARES (ha)
I = RAINFALL INTENSITY IN MILLIMETERS PER HOUR (mm/hr)
R = WEIGHTED RUNOFF COEFFICIENT

Q = (1/n) A R^(2/3)So^(1/2)

WHERE :

Q = CAPACITY (L/s)
n = MANNING COEFFICIENT OF ROUGHNESS (0.013)
A = FLOW AREA (m^2)

Project: Fernbank Pond 1 (122039)
Designed: LRW
Checked: MAB
Date: June 26 2023

Fernbank Community - Pond 1 (Minto Lands): Storm Sewer Design Sheet (Rational Method Fixed Tc of 15 min)

LOCATION			AREA											FLOW										PROPOSED SEWER									
Location	From Node	To Node	Park N' Ride	Arterial Road ROW	Abbott Street ROW	Mixed Use	High Density / Medium Block	Low Density	Schools	Park	Hydro Corridor	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr)					Peak Flow	Total Peak Flow (Q) (L/s)	Pipe	Size		Grade	Length	Capacity	Full Flow Velocity	Time of Flow	Q/Qfull
																	2yr	5yr	10yr	25yr	100yr			Type	Nominal (mm)	Actual (mm)	(%)	(m)	(l/s)	(m/s)	(min.)	(%)
			0.80	0.90	0.78	0.80	0.80	0.70	0.60	0.40	0.20	(ha)										(L/s)										
POND 1: Inlet 2																																	
B-1	433	435			0.20							0.00		0.00	0.00	15.00						0.0	**46.8**	CONC	300	300	1.00	85.0	100.9	1.38	1.02	46.4%
												0.00		0.00	0.00	15.00						0.0										
												0.20	0.86	0.48	0.48	15.00			97.9			46.8										
												0.00		0.00	0.00	15.00						0.0										
												0.00		0.00	0.00	15.00						0.0										
B-2	435	437										0.00		0.00	0.00	15.00						0.0	**78.2**	CONC	375	375	0.30	105.0	100.2	0.88	1.99	78.1%
												0.00		0.00	0.00	15.00						0.0										
					0.15							0.15	0.77	0.32	0.80	15.00			97.9			78.2										
												0.00		0.00	0.00	15.00						0.0										
												0.00		0.00	0.00	15.00						0.0										
B-3	437	439										0.00		0.00	0.00	15.00						0.0	**149.6**	CONC	525	525	0.18	80.9	190.3	0.85	1.58	78.6%
												0.00		0.00	0.00	15.00						0.0										
					0.35							0.35	0.75	0.73	1.53	15.00			97.9			149.6										
												0.00		0.00	0.00	15.00						0.0										
												0.00		0.00	0.00	15.00						0.0										
B-4	439	ST-2										0.00		0.00	0.00	15.00						0.0	**191.2**	CONC	600	600	0.20	63.5	286.5	0.98	1.08	66.8%
												0.00		0.00	0.00	15.00						0.0										
				0.17								0.17	0.90	0.43	1.95	15.00			97.9			191.2										
												0.00		0.00	0.00	15.00						0.0										
												0.00		0.00	0.00	15.00						0.0										
P1-1	ST-2	ST-4										0.00		0.00	0.00	15.00						0.0	**300.0**	CONC	675	686	0.20	58.8	409.5	1.07	0.91	73.3%
												0.00		0.00	0.00	15.00						0.0										
				0.39				0.07				0.46	0.87	1.11	3.07	15.00			97.9			300.0										
												0.00		0.00	0.00	15.00						0.0										
												0.00		0.00	0.00	15.00						0.0										
P1-2	ST-4	ST-6										0.00		0.00	0.00	15.00						0.0	**436.6**	CONC	750	762	0.20	103.6	541.9	1.15	1.50	80.6%
												0.00		0.00	0.00	15.00						0.0										
				0.48				0.10				0.58	0.87	1.40	4.46	15.00			97.9			436.6										
												0.00		0.00	0.00	15.00						0.0										
												0.00		0.00	0.00	15.00						0.0										
P1-3, P1-25	ST-6	ST-8										0.00	0.00	0.00	0.00	15.00						0.0	**1448.3**	CONC	1050	1067	0.25	120.7	1486.7	1.61	1.25	97.4%
									6.01			6.01	0.60	10.02	10.02	15.00		83.6				837.6										
				0.61				0.13				0.74	0.86	1.78	6.24	15.00			97.9			610.7										
												0.00		0.00	0.00	15.00						0.0										
												0.00		0.00	0.00	15.00						0.0										
Granite Ridge/Industrial Park																							**2652.0**										
Granite Ridge/Industrial Park	ST-8	ST-10										0.00	0.00	0.00	0.00	15.00						0.0	**4100.3**	CONC	1650	1676	0.20	32.9	4433.4	1.95	0.28	92.5%
												0.00		0.00	10.02	15.00		83.6				837.6										
												0.00		0.00	6.24	15.00			97.9			610.7										
												0.00		0.00	0.00	15.00						0.0										
												0.00		0.00	0.00	15.00						0.0										
P1-4, P1-10	ST-10	ST-12								0.26		0.26	0.40	0.29	10.31	15.00		83.6				861.8	**4696.7**	CONC	1650	1676	0.25	107.0	4956.7	2.18	0.82	94.8%
				0.37				0.02				0.39	0.89	0.96	7.21	15.00			97.9			705.1										
								2.12				2.12	0.70	4.13	4.13	15.00				115.8		477.9										
												0.00		0.00	0.00	15.00						0.0										
												0.00		0.00	0.00	15.00						0.0										
P1-5, P1-24	ST-12	ST-14										0.00		0.00	10.31	15.00		83.6				861.8	**4954.3**	CONC	1650	1676	0.26	95.1	5054.8	2.22	0.71	98.0%
				0.68				0.09				0.77	0.88	1.88	9.08	15.00			97.9			888.7										
												0.00		0.00	4.13	15.00				115.8		477.9										
											0.93	0.93	0.20	0.52	0.52	15.00					142.9	73.9										
P1-6	ST-14	ST-16										0.00	0.00	0.00	0.00	15.00						0.0	**5686.8**	CONC	1800	1830	0.20	124.7	5604.6	2.06	1.01	101.5%
										0.80		0.80	0.40	0.89	11.20	15.00		83.56				936.1										
												0.00		0.00	9.08	15.00			97.9			888.7										
								2.80				2.80	0.73	5.68	9.81	15.00				115.8		1136.0										
												0.00		0.00	0.52	15.00					142.9	73.9										

Fernbank Community - Pond 1 (Minto Lands): Storm Sewer Design Sheet (Rational Method Fixed Tc of 15 min)

LOCATION			AREA										FLOW									PROPOSED SEWER									
Location	From Node	To Node	Park N' Ride	Arterial Road ROW	Abbott Street ROW	Mixed Use	High Density / Medium Block	Low Density	Schools	Park	Hydro Corridor	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr)					Peak Flow	Total Peak Flow (Q) (L/s)	Pipe	Size		Grade	Length	Capacity	Full Flow Velocity	Time of Flow	Q/Qfull
																	2yr	5yr	10yr	25yr	100yr			Type	Nominal (mm)	Actual (mm)	(%)	(m)	(l/s)	(m/s)	(min.)	(%)
			0.80	0.90	0.78	0.80	0.80	0.70	0.60	0.40	0.20	(ha)										(L/s)									
												0.00		0.00	0.00	15.00						0.0									
												0.00		0.00	11.20	15.00		83.6				936.1									
	ST-16	ST-18										0.00		0.00	9.08	15.00			97.9			888.7	5686.8	CONC	1800	1830	0.20	120.0	5604.6	2.06	0.97	101.5%
												0.00		0.00	9.81	15.00				115.8		1136.0									
												0.00		0.00	0.52	15.00					142.9	73.9									
												0.00		0.00	0.00	15.00						0.0									
												0.00		0.00	11.20	15.00		83.6				936.1									
P1-7	ST-18	ST-20		1.66				0.12				1.78	0.89	4.39	13.47	15.00			97.9			1318.0	6116.0	CONC	1950	1981	0.15	118.8	5996.4	1.88	1.05	102.0%
												0.00		0.00	9.81	15.00				115.8		1136.0									
												0.00		0.00	0.52	15.00					142.9	73.9									
							4.41					4.41	0.80	9.81	9.81	15.00	61.77					605.8									
												0.00		0.00	11.20	15.00		83.56				936.1									
P1-8, P1-9, P1-11c&d	ST-20	ST-58		0.83								0.83	0.90	2.08	15.55	15.00			97.9			1521.2	8374.4	CONC	2100	2134	0.17	88.6	7784.5	2.11	0.70	107.6%
								6.43				6.43	0.70	12.51	22.32	15.00				115.8		2585.4									
												0.00		0.00	0.52	15.00					142.9	73.9									
												0.00	0.00	0.00	9.81	15.00	61.77					605.8									
												0.00		0.00	11.20	15.00		83.6				936.1									
	ST-58	ST-38										0.00		0.00	15.55	15.00			97.9			1521.2	8374.4	CONC	2100	2134	0.17	53.1	7784.5	2.11	0.42	107.6%
												0.00		0.00	22.32	15.00				115.8		2585.4									
												0.00		0.00	0.52	15.00					142.9	73.9									
												0.00	0.00	0.00	9.81	15.00	61.77					605.8									
								1.24				1.24	0.70	2.41	13.62	15.00		83.6				1137.8									
P1-11a	ST-38	ST-40										0.00		0.00	15.55	15.00			97.9			1521.2	8576.0	CONC	2100	2134	0.17	104.7	7784.5	2.11	0.83	110.2%
												0.00		0.00	22.32	15.00				115.8		2585.4									
												0.00		0.00	0.52	15.00					142.9	73.9									
								6.20				6.20	0.71	12.24	22.05	15.00	61.77					1361.7									
										0.99		0.99	0.40	1.10	14.72	15.00		83.6				1229.7									
P1-11	ST-40	201										0.00		0.00	15.55	15.00			97.9			1521.2	9423.9	CONC	2250	2286	0.15	53.6	8784.9	2.07	0.43	107.3%
												0.00		0.00	22.32	15.00				115.8		2585.4									
												0.00		0.00	0.52	15.00					142.9	73.9									

Q = 2.78 AIR WHERE : Q = PEAK FLOW IN LITRES PER SECOND (L/s)
A = AREA IN HECTARES (ha)
I = RAINFALL INTENSITY IN MILLIMETERS PER HOUR (mm/hr)
R = WEIGHTED RUNOFF COEFFICIENT

Q = (1/n) A R^(2/3)So^(1/2) WHERE : Q = CAPACITY (L/s)
n = MANNING COEFFICIENT OF ROUGHNESS (0.013)
A = FLOW AREA (m^2)

Project: Fernbank - Pond 1 (122039)
Designed: LRW
Checked: MAB
Date: June 26 2023

Fernbank Community - Pond 1 (Minto Lands): Storm Sewer Design Sheet (Rational Method)

LOCATION			AREA											FLOW									PROPOSED SEWER									
Location	From Node	To Node	Park N' Ride	Arterial Road ROW	Abbott Street ROW	Mixed Use	High Density / Medium Block	Low Density	Schools	Park	Hydro Corridor	Total Area	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration	Rain Intensity (mm/hr)					Peak Flow	Total Peak Flow (Q) (L/s)	Pipe	Size		Grade	Length	Capacity	Full Flow Velocity	Time of Flow	Q/Qfull
																	2yr	5yr	10yr	25yr	100yr			Type	Nominal (mm)	Actual (mm)	(%)	(m)	(l/s)	(m/s)	(min.)	(%)
			0.80	0.90	0.76	0.80	0.80	0.70	0.60	0.40	0.20	(ha)										(L/s)										
POND 1: Inlet 3																																
P1-13	113	111										0.00	0.00	0.00	0.00	15.00						0.0	**881.6**	CONC	1050	1067	0.20	116.7	1329.8	1.44	1.35	66.3%
												0.00	0.00	0.00	0.00	15.00						0.0										
								4.63				4.63	0.70	9.01	9.01	15.00			97.85			881.6										
												0.00	0.00	0.00	0.00	15.00						0.0										
												0.00	0.00	0.00	0.00	15.00						0.0										
P1-14	111	109										0.00	0.00	0.00	0.00	15.00						0.0	**1333.2**	CONC	1200	1220	0.15	120.1	1646.2	1.36	1.47	81.0%
									3.24			3.24	0.60	5.40	5.40	15.00		83.56				451.6										
												0.00		0.00	9.01	15.00			97.9			881.6										
												0.00		0.00	0.00	15.00						0.0										
												0.00	0.00	0.00	0.00	15.00						0.0										
P1-15	109	ST-46										0.00	0.00	0.00	0.00	15.00						0.0	**1607.4**	CONC	1350	1372	0.10	233.7	1838.4	1.20	3.23	87.4%
												0.00	0.00	0.00	5.40	15.00		83.56				451.6										
								1.44				1.44	0.70	2.80	11.81	15.00			97.9			1155.8										
												0.00	0.00	0.00	0.00	15.00						0.0										
												0.00	0.00	0.00	0.00	15.00						0.0										
P1-12	ST-46	301										0.00	0.00	0.00	0.00	15.00						0.0	**2066.3**	CONC	1500	1524	0.10	79.6	2432.9	1.95	0.68	84.9%
												0.00	0.00	0.00	0.00	15.00		83.6				451.6										
								2.41				2.41	0.70	4.69	16.50	15.00			97.85			1614.8										
												0.00	0.00	0.00	0.00	15.00						0.0										
												0.00	0.00	0.00	0.00	15.00						0.0										

Q = 2.78 AIR WHERE : Q = PEAK FLOW IN LITRES PER SECOND (L/s)
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Q = (1/n) A R^(2/3)So^(1/2) WHERE : Q = CAPACITY (L/s)
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Project: Fernbank Pond 1 (122039)
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LICENSED PROFESSIONAL ENGINEER
L. R. WILSON
100160065
2023.07.19
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects