



Functional Servicing and Stormwater Management Report

3089 Greenfield Road

Township of North Dumfries (Ayr), Ontario

Submitted by:

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A handwritten signature in blue ink, which appears to read "Sarah Primmer". The signature is fluid and cursive.

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- Appendix E SWM Facility Calculations and MIDUSS Modeling Files
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1. Introduction

This report has been prepared by GEI Consultants Canada Ltd. (GEI) to document the service design and stormwater management system design for the proposed development at 3089 Greenfield Road in the Township of North Dumfries (Ayr).

The Owner is required to have a Professional Engineer design a stormwater management system and have the said Engineer supervise and certify that the stormwater management system was installed in accordance with the approvals given under Section 41 of the Planning Act.

The topographic survey was completed by GEI Consultants Canada Ltd. on December 11, 2024. The Site Plan was prepared by Martin Simmons Sweers Architects (dated May 8, 2026). The existing and proposed site details are provided on the drawings prepared by GEI.

The site is bound by single-detached residential buildings and Greenfield Road to the north, and forested lands to the east, south, and west. At this time the intent of the Owner is to develop the 1.76 ha site to a commercial building and event venue space with associated landscaping, driveway and parking areas.

2. Site Grading

As illustrated on the topographic survey completed for the proposed development, the site generally slopes in the north to south direction. Based on existing contour elevations, the centerline road elevations range approximately 301.50 to 294.0masl on Greenfield Road. The grade and elevations of the site are controlled by the elevation of the existing road centerline, which will provide driveway access to the site via the undeveloped right of way. The site will be graded to match the existing elevations along the property limits.

3. Site Services

3.1. Water Supply

Under existing conditions, the closest watermain to the site ends at the southern intersection of Northumberland Street and Greenfield Road, approximately 650m southeast of the site. Drinking water supply is proposed via the extension of a 200mm watermain from the existing watermain northwest along Northumberland Street and, eastwards along Greenfield Road, and then southwards along the unopened right-of-way to the easterly boundary of 3089 Greenfield Road West. See Figure A and B in Appendix D for the proposed servicing concept options.

Anticipated water demands from the site are calculated below:

Table 1. Anticipated Water Demands from Site

	Anticipated Water Demand
Average Day Demand ¹ (28 m ³ /ha/day @ 1.76ha)	0.57 L/s
Minimum Hour ¹ Factor=0.4	0.22 L/s
Maximum Day ¹ Factor=2.75	1.57 L/s
Peak Hour ¹ Factor= 4.13	2.35 L/s

¹MECP Design Guidelines for Drinking-Water Systems, 2016

We estimate the fire flow demand for the proposed development with noncombustible construction is 83 L/s, per the FUS approach and assuming ordinary construction and a sprinklered system. A copy of the fire flow demands has been included in Appendix A.

The combined maximum day plus fire flow demand is 84.57 L/s. The Region of Waterloo has provided modelling results for a simulation showing the extension of this proposed watermain, which is included in Appendix B. Modelling results show that a maximum of 85.3 L/s could be provided while maintaining the minimum design pressure of 140 kPa at all nodes within the pressure zone. As such, there will be sufficient flow in the new watermain to meet the demands of the development. For greater resiliency, a 300mm watermain on Northumberland Street and Greenfield Road could be considered in lieu of the 200mm watermain.

3.2. Sanitary Service

There are currently no sanitary sewers along Greenfield Road north of the site. The existing sanitary sewer system terminates at the southern intersection of Northumberland Street and Greenfield Road, approximately 650m southeast of the site. The following is a summary of the anticipated sanitary sewer design flows for the proposed development:

Table 2. Anticipated Sanitary Design Flow

	Anticipated Sanitary Design Flow
Site Area = 1.76 ha Peak Factor = 2.5 Infiltration Rate= 0.25 L/s/ha General Flow = Commercial (0.5 L/s/ha)	2.64 L/s

Notes:

- 1) General Commercial Flow (0.5 L/s/ha) and infiltration rate (0.25 l/s/ha) are based on Region of Waterloo and Area Municipalities Design Guidelines and Supplemental Specifications for Municipal Services (2026)

To provide sanitary service to the site, the option of extending the existing gravity sanitary sewer to the site was investigated, and determined not feasible in the Servicing Strategy Technical Memo prepared by GEI Consultants Canada Ltd., dated September 5, 2024 and provided in Appendix C. Therefore, a pumping station is proposed on site. The design and actual location of the pumping station will be determined in the detailed design stage.

The proposed sanitary servicing consists of extension of a +/-100mm sanitary forcemain from the existing sanitary manhole, northwards along Northumberland Road, eastwards along Greenfield Road, and then southwards along the unopened right of way to a private sewage pumping station at 3089 Greenfield Road. A drawing showing the servicing concept has been provided in Appendix D. As part of the detailed design we will work with the Region of Waterloo to confirm the sanitary servicing strategy.

Any MECP approvals (including but not limited to ECA and CLI-ECA) required for the proposed sanitary servicing option, including any associated pumping station and forcemain infrastructure, will be obtained during the detailed design stage. All works shall be designed in accordance with the latest MECP Design Guidelines for Sewage Works and applicable municipal standards prior to construction.

3.3. Storm Service

Storm services for the site will be provided via on-site storm sewers conveying flows to the proposed SWMF. Flows from the site will be controlled, as identified in Section 4.

4. Stormwater Management Design

4.1. Stormwater Management Criteria

A summary of the stormwater management design criteria to be applied to the development as per the Township of North Dumfries and GRCA are as follows:

- Control peak runoff flows pre-development levels for the 2-year through 100-year design storm events.
- On-site retention of the first 5mm of runoff.
- Retain stormwater on-site (Retention) to the extent practical to ensure post-development infiltration volumes on an annual basis meet pre-development rates.
- Water quality control:
 - Provide Enhanced Level water quality treatment (80% TSS removal).
 - Control post-development total phosphorus annual loading to pre-development levels.

The site does not fall into a special policy area based on the Stormwater Management Guiding Principles (Township of Ayr).

The Chicago Rainfall Distribution parameters, intensity and depth of rainfall for the 2, 5, 10, 20, 50 and 100-year design storm events were obtained from the IDF curve data provided in the Ayr Stormwater Management Guiding Principles report (Appendix G; Prepared by IBI Group, 2022), and are as follows:

Table 3. IDF Curve Parameters (Chicago Rainfall Distribution)

	2-Year	5-Year	10-Year	20-Year	50-Year	100-Year
a =	829.7	1066.2	1233.8	1421.0	1578.3	1732.2
b =	11.3	11.2	11.2	11.5	11.1	11.1
c =	0.820	0.818	0.818	0.822	0.817	0.817
r =	0.35	0.35	0.35	0.35	0.35	0.35
Duration (min)	180	180	180	180	180	180
Total Rainfall Depth (mm)	33.50	43.52	50.36	56.73	64.79	71.11

The Regional Storm was also simulated to assess flows based on the GRCA floodplain policy (further explained in Section 5).

4.2. Hydrologic Model

According to the Draft “Scoped” Hydrogeological Assessment Technical Memo by Chung & Vander Dolen Engineering Limited (CVD; dated May 26, 2025), the site soils consists of sand and silt to sandy silt fill, underlain by fine granular deposits and sandy silt till. This soil type falls within Hydrological Soil Group B. Therefore, following infiltration parameters were used in the runoff calculations:

Table 4. Horton Infiltration Parameters

	Impervious Areas	Pervious Areas
Maximum Infiltration Rate	0 mm/hr	200 mm/hr
Minimum Infiltration Rate	0 mm/hr	13 mm/hr
Lag Constant	0.05 hr	0.25 hr
Depression Storage	1.5 mm	5.0 mm

The hydrologic model MIDUSS V2.25 was used to create the runoff hydrographs for existing and post-development conditions, and to route the flows through the proposed storage structures.

4.3. Existing Condition Drainage Areas

For analysis purposes, the existing site area was modelled as three (3) drainage catchments (see Figure No.1). The existing conditions modelling output is included in Appendix E.

Catchment 10 (1.76ha, 20% Impervious) represents the site which consists of an abandoned mill building, with an associated driveway, and landscaped and forested area. Runoff generated from this catchment sheetflows overland to the southern end of the site, discharging to the existing tributary at the southern corner of the site, and ultimately the Nith River.

Catchment 20 (0.22ha, 0% Impervious) represents the unopened right of way northeast to the site which consists of forested area, a portion of which is slope valley area as identified by the GRCA. Runoff generated from this catchment sheetflows overland in the southern direction, discharging to the existing tributary at the southern corner of the site, and ultimately the Nith River.

Catchment 30 (0.54ha, 17% Impervious) represents an external drainage area to the site, consisting of rooftops and backyards of the residential buildings fronting Greenfield Road, forested area, and some slope valley area as identified by the GRCA. Runoff generated from this catchment sheetflows overland in the southern direction to Catchment 10, discharging to the existing tributary at the southern corner of the site, and ultimately the Nith River.

Peak runoff flows for the 2-year through 100-year design storms under existing conditions are summarized in Table 5.

Table 5. Existing Condition Flow Rates

	2-Year	5-Year	10-Year	20-Year	50-Year	100-Year	Regional
Catchment 10	0.062 m ³ /s	0.081 m ³ /s	0.094 m ³ /s	0.107 m ³ /s	0.124 m ³ /s	0.137 m ³ /s	0.187 m ³ /s
Catchment 20	0.000 m ³ /s	0.000 m ³ /s	0.000 m ³ /s	0.000 m ³ /s	0.000 m ³ /s	0.004 m ³ /s	0.022 m ³ /s
Catchment 30	0.016 m ³ /s	0.022 m ³ /s	0.025 m ³ /s	0.029 m ³ /s	0.033 m ³ /s	0.036 m ³ /s	0.048 m ³ /s
Total	0.078 m³/s	0.103 m³/s	0.119 m³/s	0.136 m³/s	0.157 m³/s	0.173 m³/s	0.221 m³/s

4.4. Allowable Release Rates

The post-development flows are to be attenuated to the pre-development peak flows. Allowable release rates are presented in Table 6.

Table 6. Allowable Release Rates

	2-Year	5-Year	10-Year	20-Year	50-Year	100-Year
Total Allowable Release Rate	0.078 m³/s	0.103 m³/s	0.119 m³/s	0.136 m³/s	0.157 m³/s	0.173 m³/s

4.5. Post-Development Analysis

For analysis purposes, the site was modelled as three (3) drainage catchments (see Figure No.2). The post-development modelling output is included in Appendix E.

Catchment 100 (1.76ha, 47% Impervious) represents the proposed development consisting of the renovated mill building with additions, associated driveways, parking lot area, and landscaped areas, and proposed SWMF. Runoff generated will be conveyed via proposed catchbasins and storm sewers to the SWMF, discharging to the existing tributary at the southern corner of the site, and ultimately the Nith River.

Catchment 200 (0.22ha, 36% Impervious) represents the right of way northeast to the site which consists of a driveway entrance to the site and associated landscaped area. Runoff generated from this catchment sheetflows overland in the southern direction, directed via the proposed road and grading to Catchment 100. Flows are controlled via the SWMF before discharging to the existing tributary at the southern corner of the site, and ultimately the Nith River.

Catchment 300 (0.54ha, 17% Impervious) represents an external drainage area to the site, consisting of rooftops and backyards of the residential buildings fronting Greenfield Road, forested area, and some slope valley area as identified by the GRCA. Runoff generated from this catchment sheetflows overland in the southern direction to Catchment 100. Flows are controlled via the SWMF before discharging to the existing tributary at the southern corner of the site, and ultimately the Nith River.

The proposed SWMF is designed as a wetland and consists of a permanent pool depth of 0.3m with storage volume of 124.0m³, a forebay volume of 112.8m³, and an active storage volume of 327.9m³. The facility consists of a ditch inlet catchbasin control grate, a 220mm orifice at the outlet (at 284.55m), and a 450mm outlet pipe discharging flows to the existing downstream tributary. A 10m overflow weir is proposed at 285.45m.

4.5.1. Routing

The Hydrologic model MIDUSS was used to create the 2-100-year design storm and regional storm runoff hydrographs and to route the hydrographs. A copy of the modelling results of the post-development analysis is appended.

The results of the routing analysis are as follows:

Table 7. SWM Facility Storage/Stage/Discharge Capacities

	Available Capacity			Actual Capacity Used		
	Peak Flow m ³ /s	Storage Volume m ³	Storage Elevation m	Peak Flow m ³ /s	Storage Volume m ³	Storage Elevation m
Orifice Invert	0.000	0.0	284.55	---	---	---
Bottom of Active Storage/ DCB Control Gate	0.009	0.0	285.27	---	---	---
2-Year	---	---	---	0.078	125.6	285.363
5-Year	---	---	---	0.087	170.2	285.394
10-Year	---	---	---	0.088	206.0	285.419
Weir	0.090	251.5	285.45	---	---	---
20-Year	---	---	---	0.090	241.9	285.443
50-Year	---	---	---	0.119	274.2	285.465
100-Year	---	---	---	0.172	285.3	285.480
Regional Storm				0.205	326.6	285.499
Overflow	0.253	327.9	285.50	---	---	---

A summary of the post-development peak flow from the site for all design storm events are provided in the table below. Flows produced from the 10-year through 100-year design storms flow over the weir to the existing tributary. The regional storm is conveyed safely via the proposed SWM facility, without overflows.

Table 8. Summary of Post-Development Peak Flow Rates

	2-Year	5-Year	10-Year	20-Year	50-Year	100-Year	Regional
Total: Catchments 100, 200 and 300 (Controlled)	0.078 m ³ /s	0.087 m ³ /s	0.088 m ³ /s	0.090 m ³ /s	0.119 m ³ /s	0.172 m ³ /s	0.205 m ³ /s

Table 9. Summary of Post-Development Peak Flow Rates

	2-Year	5-Year	10-Year	20-Year	50-Year	100-Year
Total: Catchments 100, 200 and 300 (Controlled)	0.078 m ³ /s	0.087 m ³ /s	0.088 m ³ /s	0.090 m ³ /s	0.119 m ³ /s	0.172 m ³ /s
Allowable Release Rates	0.078 m³/s	0.103 m³/s	0.119 m³/s	0.136 m³/s	0.157 m³/s	0.173 m³/s

The peak flow rates for the 2-year through 100-year design storms are attenuated to the allowable release rates for total discharge from the site. Therefore, the proposed post-development flow rates meet the stormwater management criteria.

4.5.2. Erosion Control and Water Balance

Based on the Ayr Stormwater Management Guiding Principles (IBI Group, 2022), erosion control requirements include retention of the first 5mm of runoff on site. Results of the “Scoped” Hydrogeological Assessment for the Proposed Mill Redevelopment (Chung & Vander Doelen Engineering Ltd., dated May 26, 2025) showed initial spring water levels at BH3 reaching a depth 284.88m (2.03m below ground surface) at the southern end of the site near the proposed SWM facility. The bottom depth of the proposed facility is 284.97m (and 283.97m for the forebay and fire storage areas, which are all proposed to have an impermeable liner). Retention of runoff on site for infiltration would require at least a 1m separation from the bottom of a proposed facility to the high groundwater levels, and therefore could not be included as part of the SWM facility design. Relatively high groundwater levels at the middle and northern areas of the site (0.59m to 1.02m below ground surface) make it difficult to incorporate an infiltration gallery or structure that would still require 1m separation from the high groundwater level.

A monthly Thornwaite-Mather water budget was completed to demonstrate the pre-development and post-development infiltration volumes. The stormwater management criteria includes retention of stormwater on-site to the extent practical. Due to the high groundwater levels above, stormwater retention was not proposed on site.

The precipitation and temperature values were taken from Environment Canadian Climate Normals 1991-2020 Data (Kitchener/Waterloo composite station data). The average annual precipitation is estimated to be 850.6 mm.

Therefore, based on the annual infiltration rates, the existing annual average recharge occurring within the 2.52-hectare catchment area (site and external drainage area) is estimated to be 2,275 m³. Under post-development conditions, the annual average groundwater recharge is estimated to be 2,036 m³.

Under existing conditions, the annual average runoff from the area is estimated to be 6,927 m³. As a result of the proposed development the impervious area (paved surfaces) of the site increases, the annual potential evapotranspiration for impervious surfaces decreases and the runoff from the site increases. The runoff from the site under post-development conditions is estimated to be 9,200 m³ per year.

In summary, the estimated recharge and runoff volume for the site are as follows:

Table 10: Summary of Recharge and Runoff Volumes

	Existing Condition	Post-Development Condition	Percent Change
Total Estimated Recharge Volume	2,275 m ³	2,036 m ³	-10.5%
Total Estimated Runoff Volume	6,927 m ³	9,200 m ³	+32.8%

As noted above, the reduction in infiltration under post-development conditions is approximately 239m³, or 10.5%, annually. It was noted that the site falls within a significant groundwater recharge area. Although there is reduction in recharge volume, the estimated decrease is relatively low compared to the size of the area that contributes to the aquifer, and is not anticipated to have a negative impact to the receiving aquifer. In addition, there will be natural infiltration that occurs over time at the bottom of the SWMF permanent pool, however this could not be accounted for due to the minimum separation for high groundwater not being achievable.

The water budget is summarized in Appendix F.

4.5.3. Water Quality Treatment

Water quality treatment is provided for the proposed development via the SWM facility and proposed forebay. The SWM facility size was designed based on Table 3.2 of the MECP 2003 Stormwater Management Planning and Design Manual (rev. 2026) for wetlands. The total drainage area to the facility is 2.52ha with an imperviousness of 41%. To provide Enhanced level protection (80% total suspended solids [TSS] removal) for a drainage area with imperviousness of 55%, 40 m³/ha of extended detention volume is required and 65 m³/ha of permanent pool volume is required. This equates to at least 100.8 m³ of extended detention volume and 163.8m³ of permanent pool volume for the site. The proposed facility provides 327.87m³ of extended detention volume and 1052.8m³ of permanent pool volume (including the forebay) to effectively provide Enhanced level treatment.

The forebay has also been designed to meet the MECP criteria. The length to width ratio is 3.1:1, with a settling velocity is 0.0003 m/s and average flow velocity of 0.03 m/s, providing adequate capacity to provide additional quality control. A forebay sizing table has been included in Appendix E.

To assess total phosphorus (TP) based on the Ayr stormwater management criteria, the Low Impact Development Treatment Train Tool (LID TTT; developed by Lake Simcoe Region Conservation Authority, Credit Valley Conservation, and Toronto Conservation Authority) was used. The pre-development scenario was modelled as one catchment, with default TP event mean concentrations set for different land cover types. The post-development scenario was also modelled as one catchment with default TP event mean concentrations set for different land cover types, and the proposed SWM facility providing 60% TP removal which is the default value in the LID TTT tool. This removal rate is a conservative estimate for constructed wetlands which has a median removal efficiency of 77% based on the Phosphorus Loading Tool Final Report by Hutchinson Environmental Sciences Ltd. (October 2014; the NVCA TP tool was used in the Ayr Stormwater Management Guiding Principles report). The pre-

development average concentration and annual TP load leaving the site is 0.23 mg/l and 1.474 kg respectively. The post-development average concentration and annual TP load leaving the site is 0.1 mg/l and 1.028 kg respective. Therefore, TP loads are proposed to be treated to levels less than pre-development conditions. Results from the LID TTT tool have been presented in Appendix G.

5. GRCA Floodplain Policy

Based on the Pre-Consultation comments by the GRCA (dated September 25, 2024), the proposed parking lot at the west side of the property, and proposed SWMF would need to comply with the commercial/industrial policies for the One-Zone floodplain policy area. These policies are listed below:

- Parking Lot development may be permitted in accordance with the policies in Section 7.1.2-7.1.3 – General Policies, and where it can be demonstrated that :
 - a) There is not feasible alternative site outside the Riverine Flooding Hazard
 - b) The site is not subject to frequent flooding
 - c) Ingress and egress are “dry” where this standard can be practically achieved or floodproofed to an elevation which is practical and feasible, but not less than “safe”
 - d) Floodproofing is undertaken to the extent practical, where floodproofing to the elevation of the Regulatory Flood is not technically feasible and
 - e) There is no risk of structural failure due to hydrostatic/dynamic pressures.
- SWM Facilities may be permitted within the Riverine Flooding Hazard but outside of the riparian zone or effective flow area, whichever is greater, in accordance with the policies in Sections 7.1.2-7.1.3 - General Policies, if there is no feasible alternative site outside the Riverine Flooding Hazard and where it can be demonstrated that:
 - a) there is no loss of flood storage,
 - b) natural erosion and sedimentation processes within the receiving watercourse are not impacted,
 - c) where unavoidable, intrusions on hydrologic functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore functions,
 - d) facilities are excavated with minimal berming, Special Policy Areas and floodplain flow regimes for a range of rainfall events including the Regional Storm are maintained, and all excavated material is removed from the Riverine Flooding Hazard,
 - e) design and maintenance performance requirements as determined by the GRCA for the receiving watercourse are met and the effect of the floodplain flow regime on the intended function of the facility is incorporated into the siting and design.

The proposed parking lot development has been designed to comply with these GRCA policies. A relatively small southern corner of the parking lot falls within the GRCA regulatory floodline elevation. This is necessary in order to provide access for delivery vehicles and to provide adequate circulation for parked cars. We note that this portion of the site is already a gravel area, accessible by vehicles, and thus is not introducing a new feature into the floodplain. The arrangement of the site is limited by the existing building structure, due to the fact that this development involves additions and renovations to an existing building rather than completely new buildings, however, the parking and driving areas within the floodplain have been limited as much as feasible. This area is at the very fringe of the floodplain, suggesting that the site is not subject to frequent flooding. Minor flows at this location will be captured by the proposed catchbasins and conveyed to the SWMF, while major flows at this location would be directed away from the parking lot area and towards the southeast end of the site. Floodproofing

measures include grading to minimize flooding against the building, where feasible. Structural floodproofing measures will be addressed by others.

The proposed SWMF has been designed to comply with these GRCA policies as well. A different location for the SWMF was not feasible because in order to collect all the stormwater runoff from the site, the pond needed to be lower than the Regional Flood elevation. To assess the potential loss in flood storage, existing and proposed conditions flood storage volumes were calculated based on the GRCA regulatory floodline elevation of 286.60m. Under existing conditions, the flood storage under this elevation on site is 3,775 m³. Under proposed conditions, the flood storage under this elevation is 6057 m³, mainly due to the addition of the SWMF within the floodplain area. Therefore, flood storage is not lost under the proposed conditions for this development.

The water quantity and quality control provided by SWMF, to existing condition levels and enhanced level water quality control, are proposed to mitigate impacts to natural erosion and sedimentation processes, and existing hydrologic function. Furthermore, the regional storm event can be safely conveyed via the facility with a discharge rate of 0.205 m³/s, controlled to below the pre-development flow rate of 0.221 m³/s.. Because of the additional volume, the addition of the SWMF and the parking areas into the floodplain should not have a negative impact of the flood elevation. The SWMF forebay will have an impermeable liner due to high groundwater levels noted on the site, to ensure high groundwater levels do not interfere with the ability of the pond to provide quality control.

All excavated material will be removed from the delineated Riverine Flooding Hazard area.

6. Erosion and Sediment Control Plan

A silt fence is to be installed along the perimeter of the site. The silt fence serves to minimize the opportunity for sediment to leave the site. The on-site catch basins are to have silt sacs placed under the grate until all on-site construction has been completed.

Upon completion of the grading, any area not subject to active construction within 30 days will be topsoiled and hydroseeded as per OPSS. PROV 804.

Inspection and maintenance of all silt fencing will start after installation is complete. The silt fence will be inspected on a weekly basis during active construction or after a rainfall event of 13 mm or greater. Maintenance will be carried out, within 48 hours, on any part of the silt fence found to need repair.

Once construction and landscaping has been substantially completed, the silt fence will be removed, any accumulated sediment will be removed, and the landscaping will be completed.

7. Maintenance Plan

To ensure that the stormwater management system continues to function as designed and constructed, we recommend that the following inspections and maintenance activities be completed on an annual basis:

1. Is there any indication of a spill (i.e. frothy water, oily sheen on the water)? If yes, investigate, inform the appropriate agencies and complete the necessary clean-up and restoration.
2. Inspect all orifice plates, and flow control devices. Remove and dispose of any accumulated sediment, trash/litter, debris (i.e. sediment, garbage, leaves, etc.).
3. Inspect all catch basins, and manholes. Remove and dispose of any accumulated sediment, trash/litter, debris (i.e. sediment, garbage, leaves, etc.).
4. Inspect all swales and overflow locations. Remove and dispose of any accumulated sediment, trash/litter, debris (i.e. sediment, garbage, leaves, etc.).

Please note that any structures identified during the annual inspection to be worn, missing or damaged are to be repaired or replaced within 48 hours.

8. Conclusions

In summary,

1. Site access for the proposed development will be provided via Greenfield Road and the grading of the development is controlled by these access routes.
2. Water supply for the proposed development will be provided via extension of a 200mm diameter watermain from the existing watermain at the southern intersection of Greenfield Road and Northumberland Road to the property.
3. Sanitary service for the development will be provided via extension of a 200mm diameter sanitary sewer pipe from the existing sanitary sewer at the southern intersection of Greenfield Road and Northumberland Road to the property. The proposed sanitary servicing strategy requires a private sanitary pumping station and sanitary sewer forcemain.
4. Storm service for the development will be provided via proposed storm sewers that discharging to the proposed SWM facility and ultimately to the downstream receiving tributary.
5. The post-development condition peak flow rates have been attenuated to less than the allowable release rates for the 2 through 100-year design storm events with proposed SWM facilities.
6. Quality control is provided by the proposed SWM facility, achieving Enhanced level protection (80% TSS treatment) and controlling TP loads to less than pre-development TP levels.
7. 5mm retention is not provided on site due to high groundwater levels.
8. GRCA criteria for a parking lot and SWM facility within the One-Zone floodplain policy area have been met.
9. Prior to construction, a silt fence will be installed along the property boundary in all locations where runoff will discharge from the site to adjacent lands. This will minimize the transport of sediment off-site during the construction period.

Figures


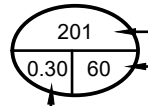
Figure 1 Pre-Development Catchment Figure

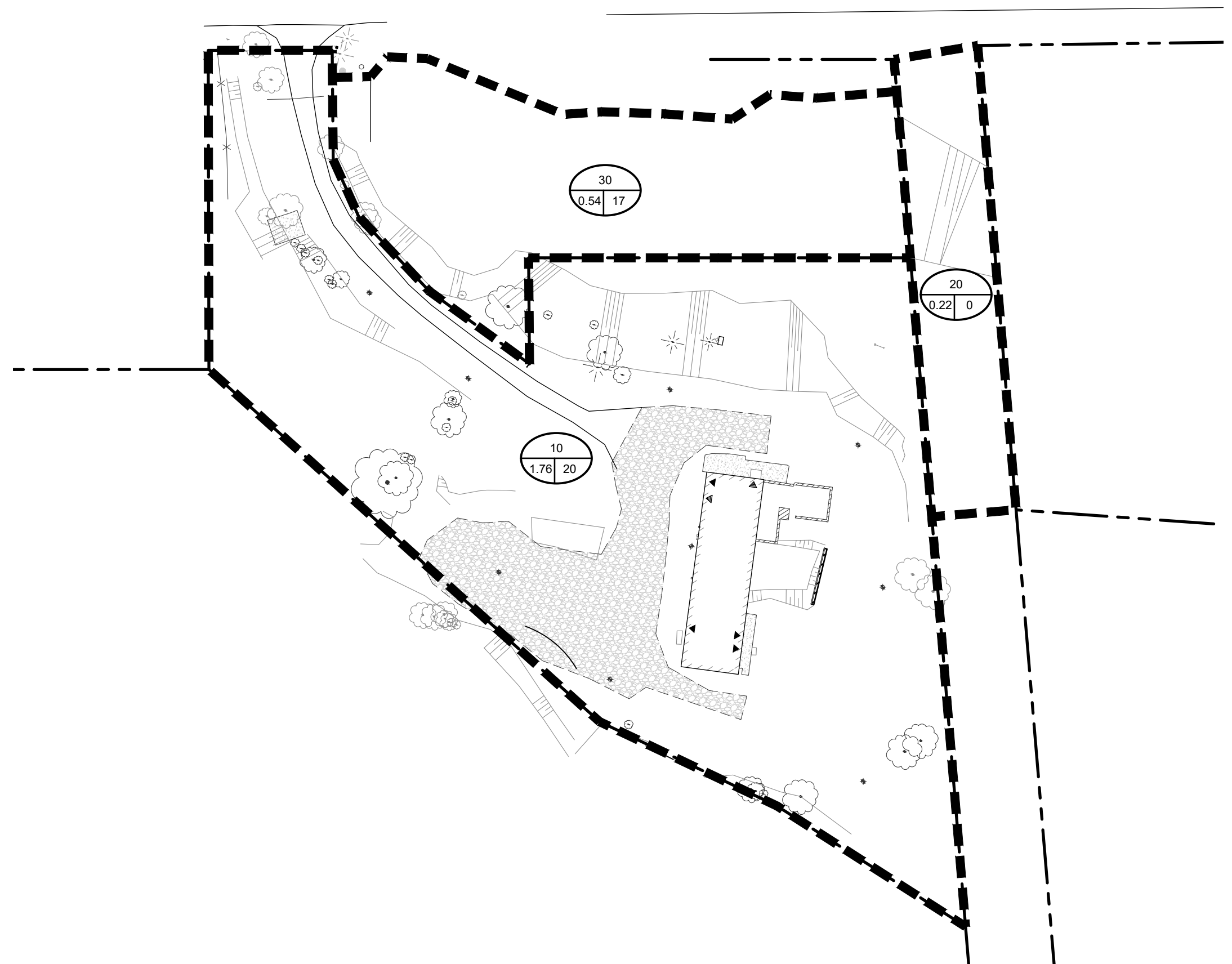
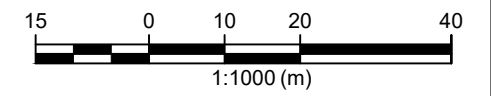
Figure 2 Post-Development Catchment Figure

3089 GREENFIELD ROAD
TOWNSHIP OF NORTH DUMFRIES
(AYR)



LEGEND

-  DRAINAGE AREA BOUNDARY
-  CATCHMENT NUMBER
PERCENT IMPERVIOUS
CATCHMENT AREA IN HECTARES



PRE-DEVELOPMENT
DRAINAGE AREA
FIGURE

Figure No. 1




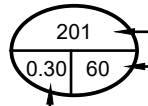
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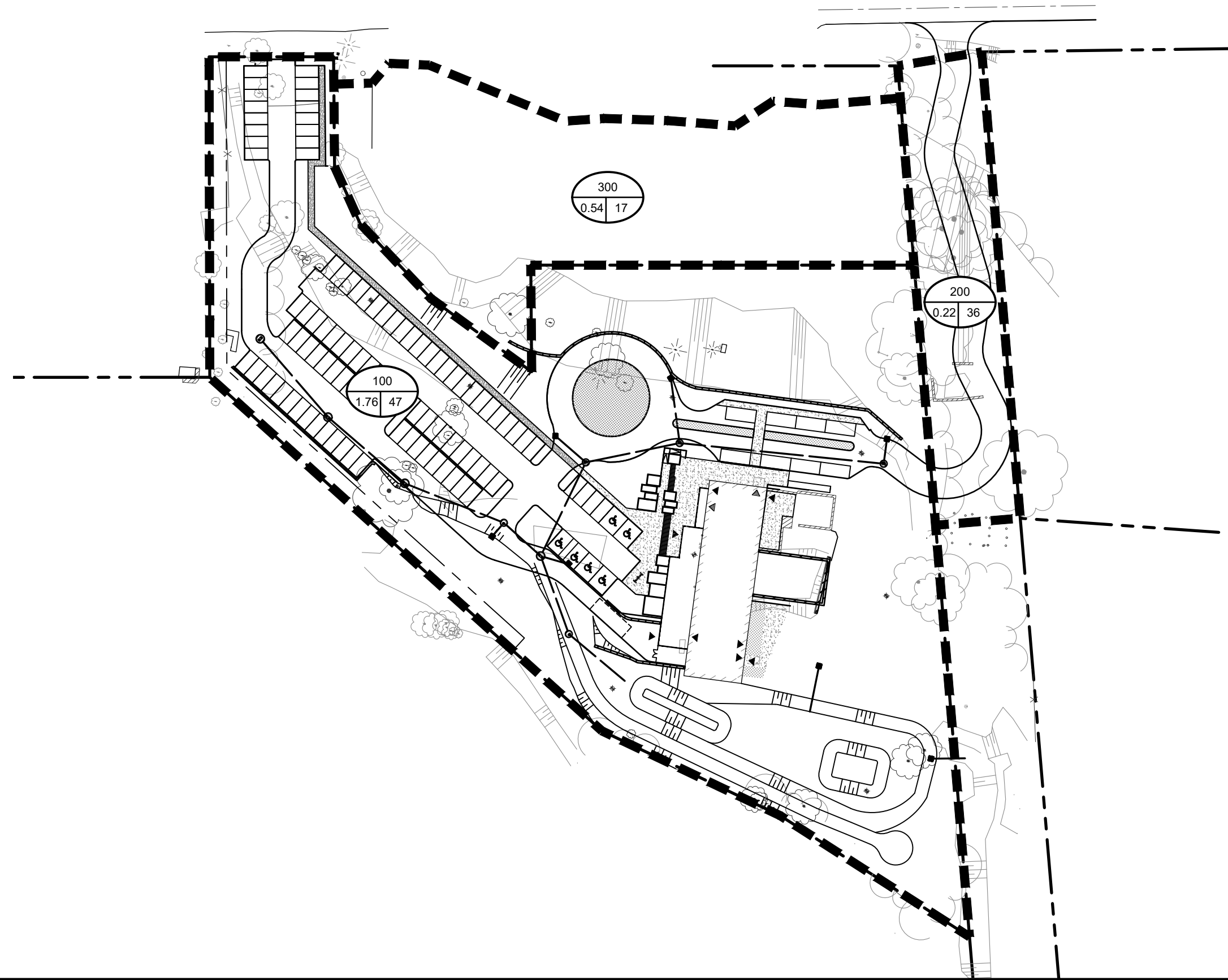
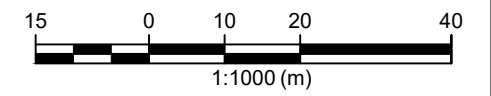
FILE:Working\1000\152197 ONTARIO INCI2406548 3089 Greenfield Rd Ayr\Design Phase\Drawings\2406548 SWM FIG.dwg LAYOUT:PRE DEVELOPMENT
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3089 GREENFIELD ROAD
TOWNSHIP OF NORTH DUMFRIES
(AYR)



LEGEND

-  DRAINAGE AREA BOUNDARY
-  CATCHMENT NUMBER
PERCENT IMPERVIOUS
CATCHMENT AREA IN HECTARES



POST DEVELOPMENT
DRAINAGE AREA
FIGURE

Figure No. 2



2406548
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Appendix A Fire Flow Demand Calculations

A.1. FUS Fire Flow Demand Calculation

FIRE UNDERWRITERS SURVEY CALCULATIONS															Project No:	2406548	Date:	6/4/2026	
Designed By:		SJ		Greenfield Road, Ayr										Checked By:		SP			
Township of Wellesley																			
Parameters from Water Supply for Public Fire Protection, Fire Underwriters Survey (1999)																	Proximity to closest structure (m)		
Type of Construction				Fire Hazard				Sprinklers				0 to 3		25%					
Wood	1.5	Non-Combustible		-0.25		No		0		3 to 10		20%							
Ordinary	1.0	Limited Combustibility		-0.15		System		-30%		10 to 20		15%							
Non-Combustible	0.8	Combustible		0		Standard Water Supply		-40%		20 to 30		10%							
Fire-Resistive	0.6	Free Burning		0.15		Fully Supervised		-50%		30 to 40		5%							
		Rapid Burning		0.25						None		0%							
										Fire Wall		10%							
Block	Floor Area (m2)	# Floors	Total Effective Area (m2)	Construction Coefficient	NFF 220°C*(A)**0.5	Rounded NFF (to nearest 1000L/min)	Occupancy Factor	NFF adjusted for occupancy	Sprinkler Adjustment	Sprinkler Credit	Exposure Coefficient				Total (max 0.75)	Exposure Flow Debit	RFF	Rounded RFF (to nearest 1000L/min)	Required Fire Flow (L/s)
BLOCK A	805	5	2506	0.8	8811	9000	-0.15	7650	-40%	-3060	0	0	0	0	0	0	4590	5000	83

Appendix B Region of Waterloo Water Modelling Letter (April 9, 2026)



Region of Waterloo

ENGINEERING AND ENVIRONMENTAL SERVICES

Water and Wastewater Services

150 Frederick Street 7th Floor
Kitchener Ontario N2G 4J3 Canada
Telephone: 519-575-4400; TTY: 519-575-4608
Email: waterservices@regionofwaterloo.ca
www.regionofwaterloo.ca/water

Robert MacDonald
GEI Consultants
300 Trillium Dr, Unit D,
Kitchener, ON
N2E 3J2
519.748.1440 x 4203
rmacdonald@geiconsultants.com

Date: April 9, 2026

Dear: Robert

Re: 3089 Greenfield Rd, Ayr

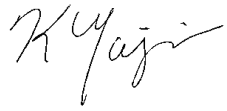
Please find the results of the modeling simulations for boundary conditions requested on February 3, 2026. As there is no existing watermain within the vicinity, the watermain on Northumberland was extended within the model based on the Servicing Concept provided by GEI. The results include a figure showing the location of the node and the existing infrastructure in the Region's model. Please note the watermain was extended hypothetically for modeling purposes only, previous comments regarding servicing still apply. This modelled watermain extension does not provide approval or acceptance of the conceptual watermain alignment. Attached are a series of spreadsheets containing results for Average Day, Maximum Day demands and available fire flows for node JCT_10552 located at Greenfield Road. The diurnal 24-hour demand distribution accounts for the minimum hour and peak hour peaking factors. The maximum pressure on the average day represents the minimum hour, and the minimum pressure on the maximum day represents the peak hour.

Table 1 – Modeling Results

Node	Elevation (mASL)	Demand		Fire Flow Results	
		Ave Day (L/s)	Max Day (L/s)	Design Flow (L/s)	Design Pressure (m)
JCT_10552	295.00	0.05	0.08	85.3	14.1

A fire flow analysis shows the maximum flow available at a node with an associated design pressure during the maximum day scenario while maintaining the minimum design pressure of 14 m (140 kPa) at all nodes within the pressure zone.

If you have any questions, please contact me.

A handwritten signature in black ink, appearing to read 'KYajima', written in a cursive style.

Kaoru Yajima, P.Eng.

Manager, Engineering & Planning Group | Engineering and Environmental Services

Cell: 226-753-0065 | KYajima@regionofwaterloo.ca

Ayr

Greenfield Rd

JCT_10552 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.02	345.02	50.32
01:00 hrs	0.02	342.93	48.23
02:00 hrs	0.03	342.33	47.63
03:00 hrs	0.04	341.58	46.88
04:00 hrs	0.05	340.66	45.96
05:00 hrs	0.08	340.77	46.07
06:00 hrs	0.08	341.92	47.22
07:00 hrs	0.08	342.91	48.21
08:00 hrs	0.07	341.96	47.26
09:00 hrs	0.07	340.51	45.81
10:00 hrs	0.06	342.83	48.13
11:00 hrs	0.05	342.57	47.87
12:00 hrs	0.06	341.34	46.64
13:00 hrs	0.06	342.56	47.86
14:00 hrs	0.06	343.77	49.07
15:00 hrs	0.05	341.63	46.93
16:00 hrs	0.06	342.27	47.57
17:00 hrs	0.06	343.40	48.70
18:00 hrs	0.06	341.71	47.01
19:00 hrs	0.05	340.74	46.04
20:00 hrs	0.04	339.74	45.04
21:00 hrs	0.03	340.79	46.09
22:00 hrs	0.02	342.88	48.18
23:00 hrs	0.02	344.81	50.11

Average Day HGL: 342.15
Minimum Hour: 345.02

JCT_10552 Maximum Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.02	344.76	50.06
01:00 hrs	0.03	344.23	49.53
02:00 hrs	0.04	343.57	48.87
03:00 hrs	0.06	342.73	48.03
04:00 hrs	0.08	341.69	46.99
05:00 hrs	0.11	341.90	47.20
06:00 hrs	0.12	342.88	48.18
07:00 hrs	0.12	343.73	49.03
08:00 hrs	0.11	344.62	49.92
09:00 hrs	0.11	343.60	48.90
10:00 hrs	0.09	342.37	47.67
11:00 hrs	0.08	341.23	46.53
12:00 hrs	0.08	342.32	47.62
13:00 hrs	0.08	343.47	48.77
14:00 hrs	0.08	344.54	49.84
15:00 hrs	0.08	345.72	51.02
16:00 hrs	0.08	343.15	48.45
17:00 hrs	0.09	341.71	47.01
18:00 hrs	0.09	340.26	45.56
19:00 hrs	0.08	342.86	48.16
20:00 hrs	0.06	344.26	49.56
21:00 hrs	0.05	345.75	51.05
22:00 hrs	0.03	344.60	49.90
23:00 hrs	0.03	344.06	49.36

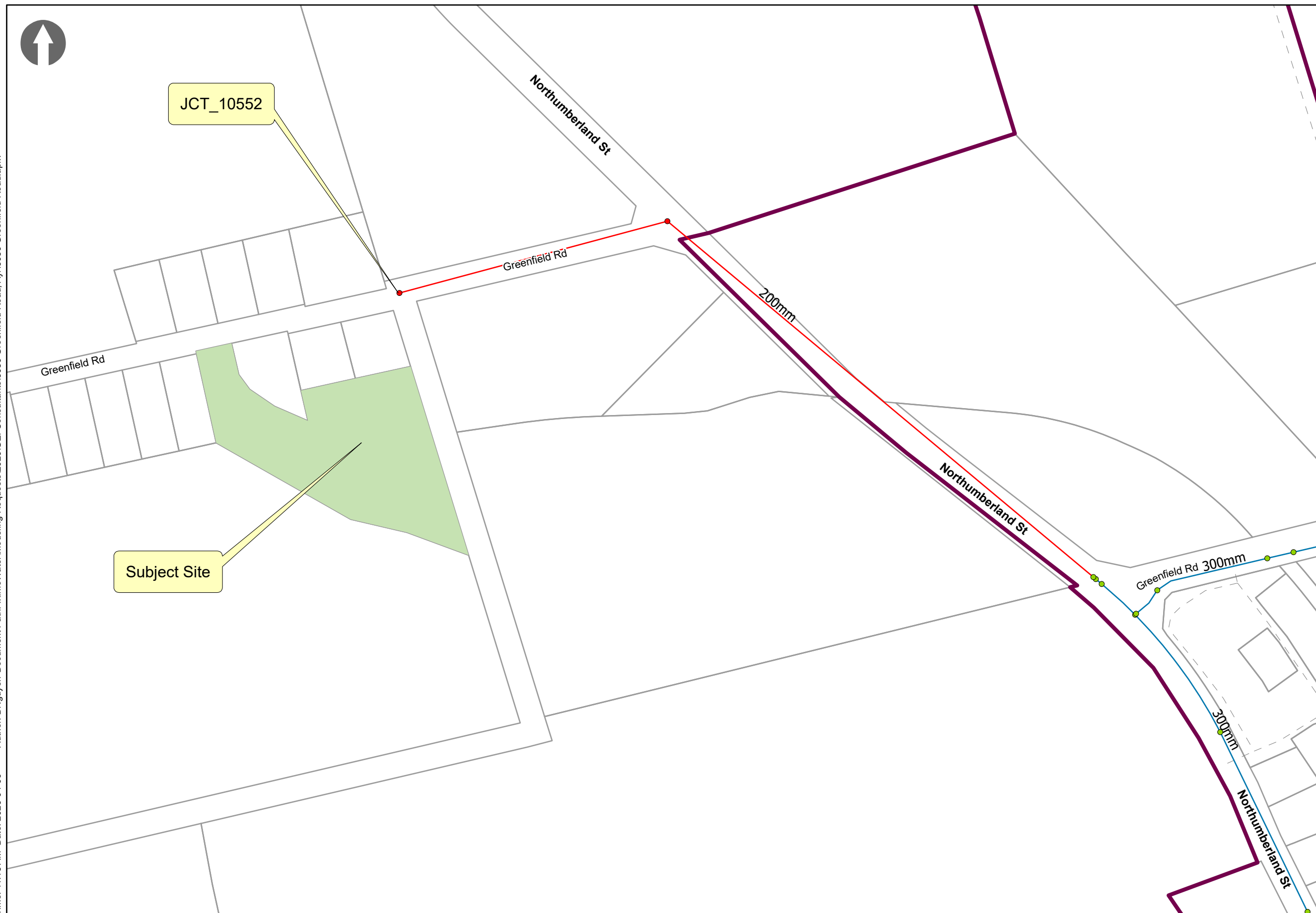
Maximum Day HGL: 343.33
Peak Hour: 340.26



Region of Waterloo

ENGINEERING AND ENVIRONMENTAL SERVICES
Water and Wastewater Services
150 Frederick Street
Kitchener ON Canada N2G 4J3
Telephone: (519) 575-4426
Fax: (519) 575-4452
www.regionofwaterloo.ca

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Junction

- Active
- Hypothetical Extension

Pipe

- Active
- Hypothetical Extension

Non-Modelling Data

- Subject Site
- Pressure Zone
- Assessment Parcels (MPAC)

3089 Greenfield Road
Ayr

Appendix C Servicing Strategy Memo (GEI Consultants Canada Ltd., Sept 6, 2024)

Technical Memorandum

330 Trillium Drive Unit D • Kitchener, ON N2E 3J2 • 519.748.1440

Via Email: kfried@musselmanexcavating.com

To: Kurt Fried

From: Angela Kroetsch

Date: September 5, 2024

Re: Servicing Strategy
3089 Greenfield Road West
Township of North Dumfries (Ayr)

Project No.: 2406548

This technical memorandum has been prepared by GEI Consultants Canada Ltd. to document the servicing strategy required to support the development of 3089 Greenfield Road West in the Township of North Dumfries (Ayr), including the extension of sanitary sewers, watermain, storm sewers/outlets, and stormwater management controls.

The 1.763-hectare site fronts onto Greenfield Road West and is bound by Greenfield Road West and existing residential development to the north, unopened right-of-way/hydro corridor to the east, and the Nith River to the south and west.

Site Topography

Using the available topography data from the Grand River Conservation Authority (Map Your Property, dated September 2024), the existing ground elevations across the site range from ± 300.50 at the northeast boundary of the site to ± 284.50 at the southeast boundary of the site. The site generally slopes in a northeast to southwest direction towards the Nith River. There is a section of steep slope identified along the northeast boundary of the site.

Sanitary Servicing

There are currently no sanitary sewers along Greenfield Road West. As part of the commercial development at 1011 Northumberland Street, a 200mm diameter sanitary sewer was extended and terminated on Northumberland Street (approximately 440m south of the intersection of Northumberland Street and Greenfield Road West).

The following is a summary of the anticipated sanitary sewer design flows for the proposed development at 3089 Greenfield Road West:

Table 1. Anticipated Sanitary Design Flow

	Anticipated Sanitary Design Flow
Site Area = 1.763 ha (4.36 acre) Peak Factor = 2.5 Infiltration Rate= 0.25 L/s/ha General Flow = Commercial (0.5 L/s/ha)	0.00265 m ³ /sec

Notes:

- 1) General Commercial Flow (0.5 L/s/ha) and infiltration rate (0.25 l/s/ha) are based on Region of Waterloo and Area Municipalities Design Guidelines and Supplemental Specifications for Municipal Services (February 2024)

To provide a sanitary service to 3089 Greenfield Road West the following options were investigated.

Option 1: Extension of a Gravity Sanitary Sewer along Northumberland Street and Greenfield Road West.

This option requires the extension of a 200mm diameter sanitary sewer approximately 450m along Northumberland Street and approximately 388m along Greenfield Road West to the property boundary of 3089 Greenfield Road West.

Based on the invert elevation of the existing sanitary sewer on Northumberland Street of 294.70, the invert elevation at the property boundary would be approximately 299.33.

Therefore, based on the existing ground elevations across the property and the centerline road elevation along Greenfield Road West, the extension of gravity sanitary sewer along the existing municipal rights-of-way is not feasible.

Option 2: Extension of a gravity sanitary sewer along Northumberland Street and on easement across 170 Greenfield Road West and the unopened right-of-way/hydro corridor.

This option requires the extension of a 200mm diameter sanitary sewer approximately 360m along Northumberland Street and approximately 300m on easement across 170 Greenfield Road West and the unopened right-of-way/hydro corridor to the easterly boundary of 3089 Greenfield Road West.

Based on the invert elevation of the existing sanitary sewer on Northumberland Street of 294.70, the invert elevation at the easterly property boundary would be approximately 298.27.

Based on Region of Waterloo Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS), a minimum 10m wide easement is anticipated to be required.

Therefore, based on the existing ground elevations across the property and the elevation at the east property boundary of 298.27, the extension of gravity sanitary sewer outlet is not feasible.

Option 3: Extension of a gravity sanitary sewer along Northumberland Street and on easement across 170 Greenfield Road West and the unopened right-of-way/hydro corridor complete with a private sewage pumping station at 3089 Greenfield Road West.

This option requires the extension of a 200mm diameter sanitary sewer approximately 360m along Northumberland Street and approximately 300m on easement across 170 Greenfield Road West and the unopened right-of-way/hydro corridor to the easterly boundary of 3089 Greenfield Road West.

Based on the invert elevation of the existing sanitary sewer on Northumberland Street of 294.70, the invert elevation at the easterly property boundary would be approximately 298.27.

Based on Region of Waterloo Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS), a minimum 10m wide easement is anticipated to be required.

Therefore, based on the existing ground elevations across the property and the elevation at the east property boundary of 298.27, a private sewage pumping station and forcemain on 3089 Greenfield Road West is required to provide a sanitary outlet to the gravity sanitary sewer located on easement across 170 Greenfield Road West and the unopened right-of-way/hydro corridor.

Watermain Servicing

There are currently no watermains along Greenfield Road West. As part of the commercial development at 1011 Northumberland Street, a 200mm diameter watermain was extended and terminated on Northumberland Street (approximately 440m south of the intersection of Northumberland Street and Greenfield Road West).

To provide a domestic watermain service to 3089 Greenfield Road West a 200mm diameter watermain is proposed to be extended along Northumberland Street and on easement across 170 Greenfield Road West and the unopened right-of-way/hydro corridor to the easterly boundary of 3089 Greenfield Road West.

Subject to the building footprint and construction, fire protection for 3089 Greenfield Road West will be provided by either the 200mm diameter watermain or an on-site fire reservoir/on-site firefighting pond.

Storm Servicing

Storm servicing for the development at 3089 Greenfield Road West will be provided via on-site storm sewer sized to convey the 5-year design storm event to the on-site stormwater management system, prior to discharging to the Nith River.

Stormwater Management

Under existing conditions, runoff generated from 3089 Greenfield Road West sheetflows overland, ultimately discharging to the Nith River.

As part of the development of 3089 Greenfield Road West, an on-site stormwater management facility will be required to attenuate the post-development flows to the existing condition and to provide the

required enhanced quality control treatment (80% total suspended solids removal) prior to discharge to the Nith river.

To provide the required on-site stormwater management storage volume of approximately 3,500 m³ is anticipated. To accommodate this volume, a footprint of approximately 6,000 m² is anticipated.

Summary

In summary, the servicing strategy for 3089 Greenfield Road West is as follows:

- Extension of a 200mm diameter gravity sanitary sewer approximately 360m along Northumberland Street and 300m on easement across 170 Greenfield Road West and the unopened right-of-way/hydro corridor, to the existing sewer and 298.27 at the easterly property boundary, including a private sewage pumping station at 3089 Greenfield Road West
- Extension of a 200mm diameter watermain along Northumberland Street and on an easement across 170 Greenfield Road West and the unopened right-of-way/hydro corridor to the easterly boundary of 3089 Greenfield Road West.
- Subject to the building footprint and construction, fire protection for 3089 Greenfield Road West will be provided by either the 200mm diameter watermain or an on-site fire reservoir/on-site fire fighting pond.
- Based on Region of Waterloo Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS), a minimum 10m wide easement is anticipated to be required.
- Storm servicing for the development at 3089 Greenfield Road West will be provided via an on-site storm sewers sized to convey the 5-year design storm event to the on-site stormwater management system, prior to discharge to the Nith River.
- On-site stormwater management will be required to attenuate the post-development flows to the existing condition and to provide the required enhanced quality control treatment (80% total suspended solids removal) prior to discharging to the Nith River.
- To accommodate the required storage volume, a stormwater management facility with an estimated footprint of approximately 6,000 m² is anticipated.

If you have any questions or require additional information, please do not hesitate to call.

Sincerely,

GEI Consultants Canada Ltd.



Angela Kroetsch, P.Eng.
Senior Project Manager

AK

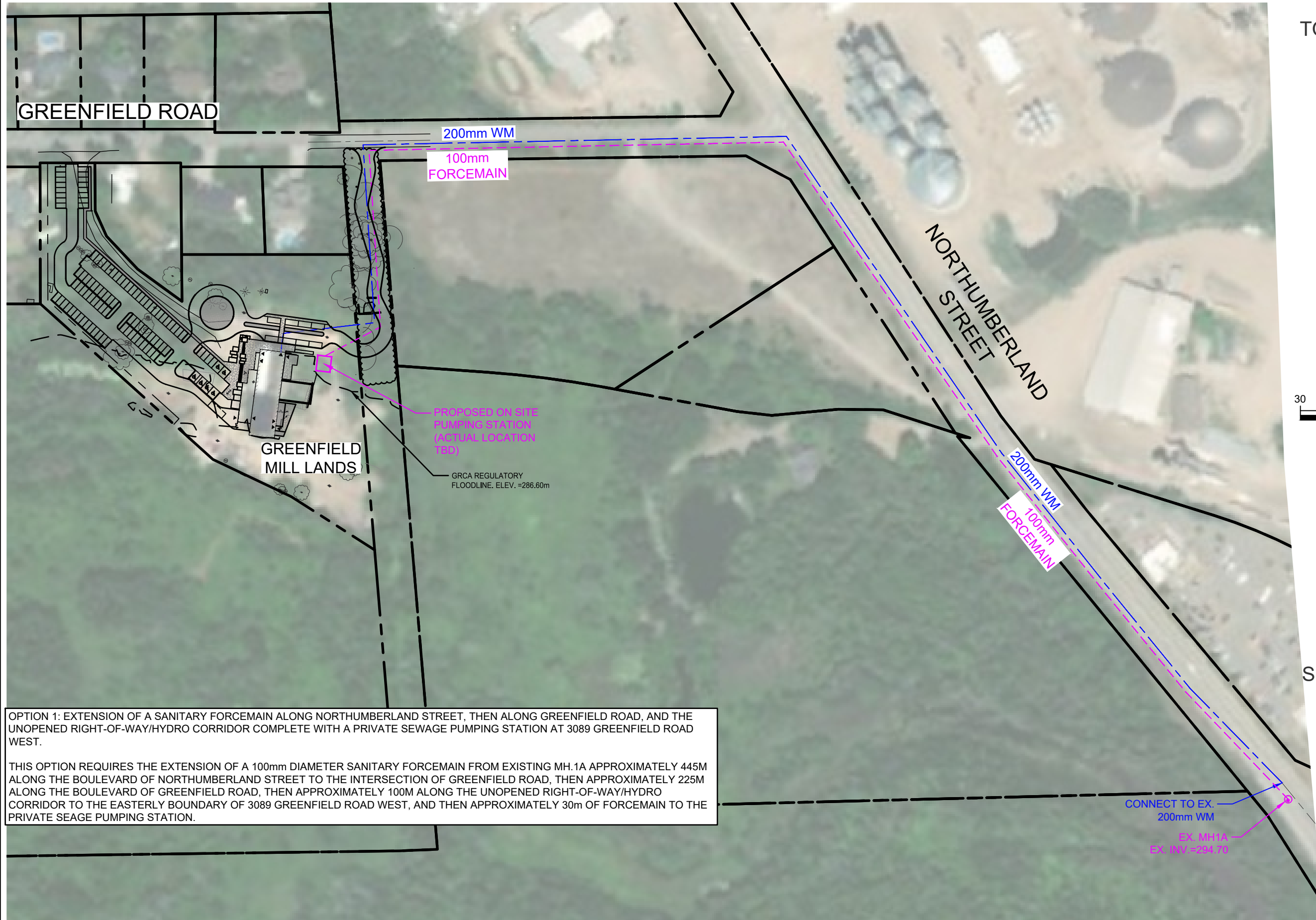
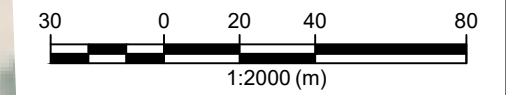
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Appendix D Sanitary Servicing Concept

3089 GREENFIELD
TOWNSHIP OF NORTH
DUMFRIES (AYR)



LEGEND



OPTION 1: EXTENSION OF A SANITARY FORCEMAIN ALONG NORTHUMBERLAND STREET, THEN ALONG GREENFIELD ROAD, AND THE UNOPENED RIGHT-OF-WAY/HYDRO CORRIDOR COMPLETE WITH A PRIVATE SEWAGE PUMPING STATION AT 3089 GREENFIELD ROAD WEST.

THIS OPTION REQUIRES THE EXTENSION OF A 100mm DIAMETER SANITARY FORCEMAIN FROM EXISTING MH.1A APPROXIMATELY 445M ALONG THE BOULEVARD OF NORTHUMBERLAND STREET TO THE INTERSECTION OF GREENFIELD ROAD, THEN APPROXIMATELY 225M ALONG THE BOULEVARD OF GREENFIELD ROAD, THEN APPROXIMATELY 100M ALONG THE UNOPENED RIGHT-OF-WAY/HYDRO CORRIDOR TO THE EASTERLY BOUNDARY OF 3089 GREENFIELD ROAD WEST, AND THEN APPROXIMATELY 30m OF FORCEMAIN TO THE PRIVATE SEAGE PUMPING STATION.

SERVICING CONCEPT
OPTION 1
FIGURE A



2406548
JULY 2025
Scale: 1:2000 | NAD 1983 UTM Zone 17N

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Appendix E SWM Facility Calculations and MIDUSS Modeling Files

A.1. Stage-Storage-Discharge Table and Forebay Sizing

A.2. Pre-Development Modeling Files

A.3. Post-Development Modeling Files

SWM Facility - Stage/Storage Volume Calculations

Forebay/Permanent Pool Storage Volume Calculations

Elevation (m)	Depth (m)	Forebay Surface Area (m ²)	Forebay Incremental Storage Volume (m ³)	Perm. Pool Surface Area (m ²)	Perm. Pool Incremental Storage Volume (m ³)	Accumulative Volume (m ³)	
283.97	0.00	37.6	0.0	0.00	0.00	0.00	Bottom of Forebay
284.97	1.00	187.9	112.78	967.40	483.70	596.48	Bottom of Permanent Pool
285.07	1.10			1073.60	102.05	102.05	
285.17	1.20			1183.30	112.85	112.85	
285.27	1.30			1296.00	123.97	123.97	Top of Permanent Pool

Active Storage Volume Calculations

Elevation (m)	Depth (m)	Active Surface Area (m ²)	Active Incremental Volume (m ³)	Accumulative Active Volume (m ³)	
285.27	0.00	1,296.0	0.00	0.00	Bottom of Active Storage
285.37	0.10	1,408.4	135.22	135.22	
285.45	0.18	1,498.3	116.27	251.49	Weir
285.47	0.20	1,520.8	30.19	281.68	
285.50	0.23	1,558.6	46.19	327.87	Top of Pond

Orifice Outlet (Extended Detention)

INV 284.55 m
Q = 0.093 m³/s
Cd = 0.600
H = 0.840 m
2g = 19.620

A = 0.038 m²
D = 0.220 m

Flow Over Grate

modelled with 50% blockage
d1 = 0.23 m
h = 0.00
H = 0.23 m
2g = 19.62
L = 2.46 m
Q = 0.521 m³/s

Length of Weir

Head over Grate (m) Length (m)
0 1.200
0.1 1.832
0.2 2.464
0.3 3.66

Overflow Weir

d1 = 0.230 m
h = 0.180
H = 0.050 m
2g = 19.620
L = 10.0 m
Q = 0.161 m³/s

$$\text{Orifice Flow} = Cd A \sqrt{2gH}$$

Cd = Discharge Coefficient
A = Area of Orifice
2g = 19.62
H = Depth of Water above orifice - half of orifice diameter

$$\text{Weir Flow} = 0.433 \sqrt{2g \left(\frac{d}{d+h}\right)} LH^{3/2}$$

L = Length of Weir
2g = 19.62
d = total depth of water
h = depth of water below weir
H = depth of water above weir

Pipe Outflow

Diameter = 450 mm
Gradient = 0.63%
Pipe Capacity = 0.235 m³/s
Length = 8.00 m

Stage-Storage-Discharge Table

Elevation (m)	Stage (m)	Storage (m ³)	CB Control Gate (m ³ /s)	210mm Orifice At Outlet (m ³ /s)	450mm Outlet Pipe (m ³ /s)	Weir Overflow (m ³ /s)	Actual Discharge (m ³ /s)	
285.27	0.00	0.0	0.000	0.079	0.235	0.000	0.000	Bottom of Active Storage/T/G CB
285.37	0.10	135.2	0.111	0.085	0.235	0.000	0.085	
285.45	0.18	251.5	0.128	0.090	0.235	0.000	0.090	Weir
285.47	0.20	281.7	0.423	0.091	0.235	0.039	0.130	
285.50	0.23	327.9	0.521	0.093	0.235	0.161	0.253	Overflow

Notes:

Major Controls - the minimum of flow over grate and pipe discharge flow rate is used in the actual discharge calculation
Knockout Controls - the knockout is assumed to contribute to discharge flow rates until the pipe discharge rate is the controlling release rate.
Major Control Pipe Flow - based on Pipe Capacity

3089 Greenfield Road
Township of North Dumfries (Ayr)
Our File: 2406548
June 5, 2026

Catchment 100: Proposed Forebay

Forebay Length =	25.0	m	(Dist)
Forebay Top Width =	8.0	m	
Active Forebay Depth =	1.0	m	(d)
Active Forebay Bottom Width =	2.0	m	

Approximate Permanent Forebay Pool Volume = 113 m³

Length Width Ratio =	3.1	:1	(r)
25 mm Storm Pond Outlet Flowrate =	0.056	m ³ /s	(Q25mm)
5 Year Storm Inflow Rate =	0.249	m ³ /s	(Q5)

Desired Forebay Velocity =	0.500	m/s	(Vf)
Desired Settling Velocity (recommended)	0.0003	m/s	(Vs)

Settling Length

$$\text{Dist} = ((r \times Q_{25\text{mm}})/V_s)^{0.5} = 24.2 \text{ m} \quad 25\text{mm}$$

Forebay length (25 m) exceeds the settling length (24.2 m).

Dispersion Length

$$\text{Dist} = (8 \times Q_5)/(d \times V_f) = 4.0 \text{ m} \quad 5 \text{ Year}$$

Forebay length (25 m) exceeds the dispersion length (4 m).

Flow Velocity in Forebay

Cross-sectional Area (Forebay Only) =	5	m ²	
Cross-sectional Area (With Permanent Pool)	9.65	m ²	(A)
Q5 =	0.249	m ³ /s	

$$\text{Velocity} = Q_5/A = 0.03 \text{ m/s} \quad 5 \text{ Year}$$

The average flow velocity through the forebay is less than the allowable velocity of 0.15 m/s.

Pre-Dev Modeling Files

```
"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
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"          Working\1000152197 ONTARIO INC\2406548 3089 Greenfield Rd
Ayr\Design Phase\Design Data\Modelling Files\Pre-Development Modelling Files"
"          Output filename:                    2406548 -Pre-2yr.out"
"          Licensee name:                      "
"          Company                            "
"          Date & Time last used:              2/10/2026 at 8:05:32 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          829.746  Coefficient A"
"          11.312  Constant B"
"          0.820  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    80.163  mm/hr"
"          Total depth                          33.499  mm"
"          6  002hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          10  Catchment 10"
"          20.000  % Impervious"
"          1.760  Total Area"
"          60.000  Flow length"
"          10.000  Overland Slope"
"          1.408  Pervious Area"
"          60.000  Pervious length"
"          10.000  Pervious slope"
"          0.352  Impervious Area"
"          60.000  Impervious length"
"          10.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"
```

"	1.500	Impervious Depression storage"				
"		0.062	0.000	0.000	0.000	c.m/sec"
"		Catchment 10	Pervious	Impervious	Total Area	"
"		Surface Area	1.408	0.352	1.760	hectare"
"		Time of concentration	---	2.267	2.267	minutes"
"		Time to Centroid	0.000	84.034	84.034	minutes"
"		Rainfall depth	33.499	33.499	33.499	mm"
"		Rainfall volume	471.67	117.92	589.59	c.m"
"		Rainfall losses	33.499	2.005	27.201	mm"
"		Runoff depth	0.000	31.494	6.299	mm"
"		Runoff volume	0.00	110.86	110.86	c.m"
"		Runoff coefficient	0.000	0.940	0.188	"
"		Maximum flow	0.000	0.062	0.062	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.062	0.062	0.000	0.000"	
" 33		CATCHMENT 20"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	20	Catchment 20"				
"	0.000	% Impervious"				
"	0.220	Total Area"				
"	25.000	Flow length"				
"	15.000	Overland Slope"				
"	0.220	Pervious Area"				
"	25.000	Pervious length"				
"	15.000	Pervious slope"				
"	0.000	Impervious Area"				
"	25.000	Impervious length"				
"	15.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.000	0.062	0.000	0.000	c.m/sec"
"		Catchment 20	Pervious	Impervious	Total Area	"
"		Surface Area	0.220	0.000	0.220	hectare"
"		Time of concentration	---	1.187	2.267	minutes"
"		Time to Centroid	0.000	0.000	0.000	minutes"
"		Rainfall depth	33.499	33.499	33.499	mm"
"		Rainfall volume	73.70	0.00	73.70	c.m"
"		Rainfall losses	33.499	33.499	33.499	mm"
"		Runoff depth	0.000	0.000	0.000	mm"

"	Runoff volume	0.00	0.00	0.00	c.m"
"	Runoff coefficient	0.000	0.000	0.000	"
"	Maximum flow	0.000	0.000	0.000	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.000	0.062	0.000	0.000"
" 33	CATCHMENT 30"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	30 Catchment 30"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"		0.016	0.062	0.000	0.000 c.m/sec"
"	Catchment 30	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	---	2.019	2.019	minutes"
"	Time to Centroid	0.000	83.605	83.605	minutes"
"	Rainfall depth	33.499	33.499	33.499	mm"
"	Rainfall volume	150.14	30.75	180.90	c.m"
"	Rainfall losses	33.499	1.962	28.138	mm"
"	Runoff depth	0.000	31.538	5.361	mm"
"	Runoff volume	0.00	28.95	28.95	c.m"
"	Runoff coefficient	0.000	0.941	0.160	"
"	Maximum flow	0.000	0.016	0.016	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.016	0.078	0.000	0.000"
" 38	START/RE-START TOTALS 30"				
"	3 Runoff Totals on EXIT"				
"	Total Catchment area			2.520	hectare"
"	Total Impervious area			0.444	hectare"

"	Total % impervious	17.611"
" 19	EXIT"	

```

"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                        \\geiconsultants.com\data\Data_Storage\
"          Working\1000152197 ONTARIO INC\2406548 3089 Greenfield Rd
Ayr\Design Phase\Design Data\Modelling Files\Pre-Development Modelling Files"
"          Output filename:                    2406548 -Pre-5yr.out"
"          Licensee name:                      "
"          Company                             "
"          Date & Time last used:              2/10/2026 at 8:19:13 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          1066.198  Coefficient A"
"          11.193  Constant B"
"          0.818  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    104.195  mm/hr"
"          Total depth                          43.523  mm"
"          6  005hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          10  Catchment 10"
"          20.000  % Impervious"
"          1.760  Total Area"
"          60.000  Flow length"
"          10.000  Overland Slope"
"          1.408  Pervious Area"
"          60.000  Pervious length"
"          10.000  Pervious slope"
"          0.352  Impervious Area"
"          60.000  Impervious length"
"          10.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"

```

"	1.500	Impervious Depression storage"				
"		0.081	0.000	0.000	0.000	c.m/sec"
"		Catchment 10	Pervious	Impervious	Total Area	"
"		Surface Area	1.408	0.352	1.760	hectare"
"		Time of concentration	---	2.041	2.041	minutes"
"		Time to Centroid	0.000	83.128	83.128	minutes"
"		Rainfall depth	43.523	43.523	43.523	mm"
"		Rainfall volume	612.80	153.20	766.00	c.m"
"		Rainfall losses	43.523	2.111	35.240	mm"
"		Runoff depth	0.000	41.411	8.282	mm"
"		Runoff volume	0.00	145.77	145.77	c.m"
"		Runoff coefficient	0.000	0.951	0.190	"
"		Maximum flow	0.000	0.081	0.081	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.081	0.081	0.000	0.000"	
" 33		CATCHMENT 20"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	20	Catchment 20"				
"	0.000	% Impervious"				
"	0.220	Total Area"				
"	25.000	Flow length"				
"	15.000	Overland Slope"				
"	0.220	Pervious Area"				
"	25.000	Pervious length"				
"	15.000	Pervious slope"				
"	0.000	Impervious Area"				
"	25.000	Impervious length"				
"	15.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.000	0.081	0.000	0.000	c.m/sec"
"		Catchment 20	Pervious	Impervious	Total Area	"
"		Surface Area	0.220	0.000	0.220	hectare"
"		Time of concentration	---	1.069	1.069	minutes"
"		Time to Centroid	0.000	81.684	81.684	minutes"
"		Rainfall depth	43.523	43.523	43.523	mm"
"		Rainfall volume	95.75	0.00	95.75	c.m"
"		Rainfall losses	43.523	2.705	43.523	mm"
"		Runoff depth	0.000	40.817	0.000	mm"

"	Runoff volume	0.00	0.00	0.00	c.m"
"	Runoff coefficient	0.000	0.000	0.000	"
"	Maximum flow	0.000	0.000	0.000	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.000	0.081	0.000	0.000"
" 33	CATCHMENT 30"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	30 Catchment 30"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"		0.022	0.081	0.000	0.000 c.m/sec"
"	Catchment 30	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	---	1.818	1.818	minutes"
"	Time to Centroid	0.000	82.755	82.755	minutes"
"	Rainfall depth	43.523	43.523	43.523	mm"
"	Rainfall volume	195.07	39.95	235.02	c.m"
"	Rainfall losses	43.523	2.099	36.481	mm"
"	Runoff depth	0.000	41.424	7.042	mm"
"	Runoff volume	0.00	38.03	38.03	c.m"
"	Runoff coefficient	0.000	0.952	0.162	"
"	Maximum flow	0.000	0.022	0.022	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.022	0.103	0.000	0.000"
" 38	START/RE-START TOTALS 30"				
"	3 Runoff Totals on EXIT"				
"	Total Catchment area			2.520	hectare"
"	Total Impervious area			0.444	hectare"

"	Total % impervious	17.611"
" 19	EXIT"	

```

"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                        \\geiconsultants.com\data\Data_Storage\
"          Working\1000152197 ONTARIO INC\2406548 3089 Greenfield Rd
Ayr\Design Phase\Design Data\Modelling Files\Pre-Development Modelling Files"
"          Output filename:                    2406548 -Pre-10yr.out"
"          Licensee name:                      "
"          Company                             "
"          Date & Time last used:              2/10/2026 at 8:19:44 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          1233.774  Coefficient A"
"          11.230  Constant B"
"          0.818  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    120.354  mm/hr"
"          Total depth                          50.355  mm"
"          6  005hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          10  Catchment 10"
"          20.000  % Impervious"
"          1.760  Total Area"
"          60.000  Flow length"
"          10.000  Overland Slope"
"          1.408  Pervious Area"
"          60.000  Pervious length"
"          10.000  Pervious slope"
"          0.352  Impervious Area"
"          60.000  Impervious length"
"          10.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"

```

"	1.500	Impervious Depression storage"				
"		0.094	0.000	0.000	0.000	c.m/sec"
"		Catchment 10	Pervious	Impervious	Total Area	"
"		Surface Area	1.408	0.352	1.760	hectare"
"		Time of concentration	---	1.927	1.927	minutes"
"		Time to Centroid	0.000	82.685	82.685	minutes"
"		Rainfall depth	50.355	50.355	50.355	mm"
"		Rainfall volume	709.00	177.25	886.25	c.m"
"		Rainfall losses	50.355	2.236	40.731	mm"
"		Runoff depth	0.000	48.119	9.624	mm"
"		Runoff volume	0.00	169.38	169.38	c.m"
"		Runoff coefficient	0.000	0.956	0.191	"
"		Maximum flow	0.000	0.094	0.094	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.094	0.094	0.000	0.000"	
" 33		CATCHMENT 20"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	20	Catchment 20"				
"	0.000	% Impervious"				
"	0.220	Total Area"				
"	25.000	Flow length"				
"	15.000	Overland Slope"				
"	0.220	Pervious Area"				
"	25.000	Pervious length"				
"	15.000	Pervious slope"				
"	0.000	Impervious Area"				
"	25.000	Impervious length"				
"	15.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.000	0.094	0.000	0.000	c.m/sec"
"		Catchment 20	Pervious	Impervious	Total Area	"
"		Surface Area	0.220	0.000	0.220	hectare"
"		Time of concentration	---	1.009	1.009	minutes"
"		Time to Centroid	0.000	81.368	81.368	minutes"
"		Rainfall depth	50.355	50.355	50.355	mm"
"		Rainfall volume	110.78	0.00	110.78	c.m"
"		Rainfall losses	50.355	3.052	50.355	mm"
"		Runoff depth	0.000	47.303	0.000	mm"

"	Runoff volume	0.00	0.00	0.00	c.m"
"	Runoff coefficient	0.000	0.000	0.000	"
"	Maximum flow	0.000	0.000	0.000	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.000	0.094	0.000	0.000"
" 33	CATCHMENT 30"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	30 Catchment 30"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"		0.025	0.094	0.000	0.000 c.m/sec"
"	Catchment 30	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	---	1.716	1.716	minutes"
"	Time to Centroid	0.000	82.378	82.378	minutes"
"	Rainfall depth	50.355	50.355	50.355	mm"
"	Rainfall volume	225.69	46.23	271.92	c.m"
"	Rainfall losses	50.355	2.189	42.167	mm"
"	Runoff depth	0.000	48.166	8.188	mm"
"	Runoff volume	0.00	44.22	44.22	c.m"
"	Runoff coefficient	0.000	0.957	0.163	"
"	Maximum flow	0.000	0.025	0.025	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.025	0.119	0.000	0.000"
" 38	START/RE-START TOTALS 30"				
"	3 Runoff Totals on EXIT"				
"	Total Catchment area			2.520	hectare"
"	Total Impervious area			0.444	hectare"

"	Total % impervious	17.611"
" 19	EXIT"	

```

"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                        \\geiconsultants.com\data\Data_Storage\
"          Working\1000152197 ONTARIO INC\2406548 3089 Greenfield Rd
Ayr\Design Phase\Design Data\Modelling Files\Pre-Development Modelling Files"
"          Output filename:                    2406548 -Pre-25yr.out"
"          Licensee name:                      "
"          Company                             "
"          Date & Time last used:              2/10/2026 at 8:20:14 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          1421.027  Coefficient A"
"          11.468  Constant B"
"          0.822  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    135.482  mm/hr"
"          Total depth                          56.734  mm"
"          6  025hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          10  Catchment 10"
"          20.000  % Impervious"
"          1.760  Total Area"
"          60.000  Flow length"
"          10.000  Overland Slope"
"          1.408  Pervious Area"
"          60.000  Pervious length"
"          10.000  Pervious slope"
"          0.352  Impervious Area"
"          60.000  Impervious length"
"          10.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"

```

"	1.500	Impervious Depression storage"				
"		0.107	0.000	0.000	0.000	c.m/sec"
"		Catchment 10	Pervious	Impervious	Total Area	"
"		Surface Area	1.408	0.352	1.760	hectare"
"		Time of concentration	---	1.837	1.837	minutes"
"		Time to Centroid	0.000	82.275	82.275	minutes"
"		Rainfall depth	56.734	56.734	56.734	mm"
"		Rainfall volume	798.81	199.70	998.51	c.m"
"		Rainfall losses	56.734	2.287	45.844	mm"
"		Runoff depth	0.000	54.447	10.889	mm"
"		Runoff volume	0.00	191.65	191.65	c.m"
"		Runoff coefficient	0.000	0.960	0.192	"
"		Maximum flow	0.000	0.107	0.107	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.107	0.107	0.000	0.000"	
" 33		CATCHMENT 20"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	20	Catchment 20"				
"	0.000	% Impervious"				
"	0.220	Total Area"				
"	25.000	Flow length"				
"	15.000	Overland Slope"				
"	0.220	Pervious Area"				
"	25.000	Pervious length"				
"	15.000	Pervious slope"				
"	0.000	Impervious Area"				
"	25.000	Impervious length"				
"	15.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.000	0.107	0.000	0.000	c.m/sec"
"		Catchment 20	Pervious	Impervious	Total Area	"
"		Surface Area	0.220	0.000	0.220	hectare"
"		Time of concentration	---	0.962	0.962	minutes"
"		Time to Centroid	0.000	81.083	81.083	minutes"
"		Rainfall depth	56.734	56.734	56.734	mm"
"		Rainfall volume	124.81	0.00	124.81	c.m"
"		Rainfall losses	56.734	3.388	56.734	mm"
"		Runoff depth	0.000	53.345	0.000	mm"

"	Runoff volume	0.00	0.00	0.00	c.m"
"	Runoff coefficient	0.000	0.000	0.000	"
"	Maximum flow	0.000	0.000	0.000	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.000	0.107	0.000	0.000"
" 33	CATCHMENT 30"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	30 Catchment 30"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"		0.029	0.107	0.000	0.000 c.m/sec"
"	Catchment 30	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	---	1.637	1.637	minutes"
"	Time to Centroid	0.000	82.048	82.048	minutes"
"	Rainfall depth	56.734	56.734	56.734	mm"
"	Rainfall volume	254.28	52.08	306.36	c.m"
"	Rainfall losses	56.734	2.295	47.479	mm"
"	Runoff depth	0.000	54.439	9.255	mm"
"	Runoff volume	0.00	49.98	49.98	c.m"
"	Runoff coefficient	0.000	0.960	0.163	"
"	Maximum flow	0.000	0.029	0.029	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.029	0.136	0.000	0.000"
" 38	START/RE-START TOTALS 30"				
"	3 Runoff Totals on EXIT"				
"	Total Catchment area			2.520	hectare"
"	Total Impervious area			0.444	hectare"

"	Total % impervious	17.611"
" 19	EXIT"	

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"          MIDUSS Output ----->"
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"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                        \\geiconsultants.com\data\Data_Storage\
"          Working\1000152197 ONTARIO INC\2406548 3089 Greenfield Rd
Ayr\Design Phase\Design Data\Modelling Files\Pre-Development Modelling Files"
"          Output filename:                    2406548 -Pre-50yr.out"
"          Licensee name:                      "
"          Company                            "
"          Date & Time last used:              2/10/2026 at 8:20:47 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          1578.288  Coefficient A"
"          11.111  Constant B"
"          0.817  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    155.298  mm/hr"
"          Total depth                          64.788  mm"
"          6  050hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          10  Catchment 10"
"          20.000  % Impervious"
"          1.760  Total Area"
"          60.000  Flow length"
"          10.000  Overland Slope"
"          1.408  Pervious Area"
"          60.000  Pervious length"
"          10.000  Pervious slope"
"          0.352  Impervious Area"
"          60.000  Impervious length"
"          10.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"

```

"	1.500	Impervious Depression storage"				
"		0.124	0.000	0.000	0.000	c.m/sec"
"		Catchment 10	Pervious	Impervious	Total Area	"
"		Surface Area	1.408	0.352	1.760	hectare"
"		Time of concentration	---	1.740	1.740	minutes"
"		Time to Centroid	0.000	82.011	82.011	minutes"
"		Rainfall depth	64.788	64.788	64.788	mm"
"		Rainfall volume	912.22	228.06	1140.28	c.m"
"		Rainfall losses	64.788	2.405	52.312	mm"
"		Runoff depth	0.000	62.383	12.477	mm"
"		Runoff volume	0.00	219.59	219.59	c.m"
"		Runoff coefficient	0.000	0.963	0.193	"
"		Maximum flow	0.000	0.124	0.124	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.124	0.124	0.000	0.000"	
" 33		CATCHMENT 20"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	20	Catchment 20"				
"	0.000	% Impervious"				
"	0.220	Total Area"				
"	25.000	Flow length"				
"	15.000	Overland Slope"				
"	0.220	Pervious Area"				
"	25.000	Pervious length"				
"	15.000	Pervious slope"				
"	0.000	Impervious Area"				
"	25.000	Impervious length"				
"	15.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.000	0.124	0.000	0.000	c.m/sec"
"		Catchment 20	Pervious	Impervious	Total Area	"
"		Surface Area	0.220	0.000	0.220	hectare"
"		Time of concentration	---	0.911	0.911	minutes"
"		Time to Centroid	0.000	80.981	80.981	minutes"
"		Rainfall depth	64.788	64.788	64.788	mm"
"		Rainfall volume	142.53	0.00	142.53	c.m"
"		Rainfall losses	64.788	3.851	64.788	mm"
"		Runoff depth	0.000	60.938	0.000	mm"

"	Runoff volume	0.00	0.00	0.00	c.m"
"	Runoff coefficient	0.000	0.000	0.000	"
"	Maximum flow	0.000	0.000	0.000	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.000	0.124	0.000	0.000"
" 33	CATCHMENT 30"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	30 Catchment 30"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"		0.033	0.124	0.000	0.000 c.m/sec"
"	Catchment 30	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	---	1.550	1.550	minutes"
"	Time to Centroid	0.000	81.814	81.814	minutes"
"	Rainfall depth	64.788	64.788	64.788	mm"
"	Rainfall volume	290.38	59.48	349.86	c.m"
"	Rainfall losses	64.788	2.435	54.188	mm"
"	Runoff depth	0.000	62.353	10.600	mm"
"	Runoff volume	0.00	57.24	57.24	c.m"
"	Runoff coefficient	0.000	0.962	0.164	"
"	Maximum flow	0.000	0.033	0.033	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.033	0.157	0.000	0.000"
" 38	START/RE-START TOTALS 30"				
"	3 Runoff Totals on EXIT"				
"	Total Catchment area			2.520	hectare"
"	Total Impervious area			0.444	hectare"

"	Total % impervious	17.611"
" 19	EXIT"	

```

"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                        \\geiconsultants.com\data\Data_Storage\
"          Working\1000152197 ONTARIO INC\2406548 3089 Greenfield Rd
Ayr\Design Phase\Design Data\Modelling Files\Pre-Development Modelling Files"
"          Output filename:                    2406548 -Pre-100yr.out"
"          Licensee name:                      "
"          Company                             "
"          Date & Time last used:              2/10/2026 at 8:21:35 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          1732.249  Coefficient A"
"          11.119  Constant B"
"          0.817  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    170.380  mm/hr"
"          Total depth                          71.106  mm"
"          6  100hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          10  Catchment 10"
"          20.000  % Impervious"
"          1.760  Total Area"
"          60.000  Flow length"
"          10.000  Overland Slope"
"          1.408  Pervious Area"
"          60.000  Pervious length"
"          10.000  Pervious slope"
"          0.352  Impervious Area"
"          60.000  Impervious length"
"          10.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"

```

"	1.500	Impervious Depression storage"				
"		0.137	0.000	0.000	0.000	c.m/sec"
"		Catchment 10	Pervious	Impervious	Total Area	"
"		Surface Area	1.408	0.352	1.760	hectare"
"		Time of concentration	21.333	1.676	3.421	minutes"
"		Time to Centroid	86.187	81.831	82.218	minutes"
"		Rainfall depth	71.106	71.106	71.106	mm"
"		Rainfall volume	1001.17	250.29	1251.47	c.m"
"		Rainfall losses	69.435	2.478	56.043	mm"
"		Runoff depth	1.671	68.628	15.063	mm"
"		Runoff volume	23.53	241.57	265.11	c.m"
"		Runoff coefficient	0.024	0.965	0.212	"
"		Maximum flow	0.018	0.137	0.137	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.137	0.137	0.000	0.000"	
" 33		CATCHMENT 20"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	20	Catchment 20"				
"	0.000	% Impervious"				
"	0.220	Total Area"				
"	25.000	Flow length"				
"	15.000	Overland Slope"				
"	0.220	Pervious Area"				
"	25.000	Pervious length"				
"	15.000	Pervious slope"				
"	0.000	Impervious Area"				
"	25.000	Impervious length"				
"	15.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.004	0.137	0.000	0.000	c.m/sec"
"		Catchment 20	Pervious	Impervious	Total Area	"
"		Surface Area	0.220	0.000	0.220	hectare"
"		Time of concentration	11.171	0.878	11.171	minutes"
"		Time to Centroid	78.732	80.880	78.732	minutes"
"		Rainfall depth	71.106	71.106	71.106	mm"
"		Rainfall volume	156.43	0.00	156.43	c.m"
"		Rainfall losses	69.434	4.223	69.434	mm"
"		Runoff depth	1.672	66.883	1.672	mm"

"	Runoff volume	3.68	0.00	3.68	c.m"
"	Runoff coefficient	0.024	0.000	0.024	"
"	Maximum flow	0.004	0.000	0.004	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"	0.004 0.137 0.000 0.000"				
" 33	CATCHMENT 30"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	30 Catchment 30"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"	0.036 0.137 0.000 0.000 c.m/sec"				
"	Catchment 30 Pervious Impervious Total Area "				
"	Surface Area 0.448 0.092 0.540 hectare"				
"	Time of concentration 19.007 1.494 3.350 minutes"				
"	Time to Centroid 84.383 81.619 81.912 minutes"				
"	Rainfall depth 71.106 71.106 71.106 mm"				
"	Rainfall volume 318.70 65.28 383.97 c.m"				
"	Rainfall losses 69.442 2.580 58.075 mm"				
"	Runoff depth 1.664 68.526 13.031 mm"				
"	Runoff volume 7.46 62.91 70.37 c.m"				
"	Runoff coefficient 0.023 0.964 0.183 "				
"	Maximum flow 0.006 0.036 0.036 c.m/sec"				
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"	0.036 0.173 0.000 0.000"				
" 38	START/RE-START TOTALS 30"				
"	3 Runoff Totals on EXIT"				
"	Total Catchment area 2.520 hectare"				
"	Total Impervious area 0.444 hectare"				

"	Total % impervious	17.611"
" 19	EXIT"	

```

"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                        B:\Working\1000152197 ONTARIO INC\
"          2406548 3089 Greenfield Rd Ayr\Design Phase\Design Data\Modelling
Files\Pre-Development Modelling Files"
"          Output filename:                    2406548 -Pre-Regional.out"
"          Licensee name:                     "
"          Company                            "
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" 31          TIME PARAMETERS"
"          60.000  Time Step"
"          2880.000  Max. Storm length"
"          30000.000  Max. Hydrograph"
" 32          STORM Historic"
"          5  Historic"
"          2880.000  Duration"
"          48.000  Rainfall intensity values"
"                  2.028    2.028    2.028    2.028    2.028"
"                  2.028    2.028    2.028    2.028    2.028"
"                  2.028    2.028    2.028    2.028    2.028"
"                  2.028    2.028    2.028    2.028    2.028"
"                  2.028    2.028    2.028    2.028    2.028"
"                  2.028    2.026    2.026    2.026    2.028"
"                  2.026    6.000    4.000    6.000    13.000"
"                  17.000    13.000    23.000    13.000    13.000"
"                  53.000    38.000    13.000"
"          Maximum intensity                    53.000  mm/hr"
"          Total depth                          285.000  mm"
"          6  555hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 10"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          10  Catchment 10"
"          20.000  % Impervious"
"          1.760  Total Area"
"          60.000  Flow length"
"          10.000  Overland Slope"
"          1.408  Pervious Area"
"          60.000  Pervious length"
"          10.000  Pervious slope"
"          0.352  Impervious Area"
"          60.000  Impervious length"
"          10.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"

```

```

"      0.250 Pervious Lag constant (hours)"
"      5.000 Pervious Depression storage"
"      0.015 Impervious Manning 'n'"
"      0.000 Impervious Max.infiltration"
"      0.000 Impervious Min.infiltration"
"      0.050 Impervious Lag constant (hours)"
"      1.500 Impervious Depression storage"
"              0.154      0.000      0.000      0.000 c.m/sec"
"      Catchment 10      Pervious      Impervious      Total Area  "
"      Surface Area      1.408      0.352      1.760      hectare"
"      Time of concentration 16.190      2.675      10.003      minutes"
"      Time to Centroid      2777.350      2255.695      2538.562      minutes"
"      Rainfall depth      285.000      285.000      285.000      mm"
"      Rainfall volume      4012.80      1003.20      5016.00      c.m"
"      Rainfall losses      212.425      39.936      177.927      mm"
"      Runoff depth      72.575      245.064      107.073      mm"
"      Runoff volume      1021.86      862.63      1884.49      c.m"
"      Runoff coefficient      0.255      0.860      0.376      "
"      Maximum flow      0.109      0.045      0.154      c.m/sec"
" 40      HYDROGRAPH Add Runoff "
"      4      Add Runoff "
"              0.154      0.154      0.000      0.000"
" 33      CATCHMENT 20"
"      1      Triangular SCS"
"      1      Equal length"
"      2      Horton equation"
"      20      Catchment 20"
"      0.000      % Impervious"
"      0.220      Total Area"
"      25.000      Flow length"
"      15.000      Overland Slope"
"      0.220      Pervious Area"
"      25.000      Pervious length"
"      15.000      Pervious slope"
"      0.000      Impervious Area"
"      25.000      Impervious length"
"      15.000      Impervious slope"
"      0.250      Pervious Manning 'n'"
"      200.000      Pervious Max.infiltration"
"      13.000      Pervious Min.infiltration"
"      0.250      Pervious Lag constant (hours)"
"      5.000      Pervious Depression storage"
"      0.015      Impervious Manning 'n'"
"      0.000      Impervious Max.infiltration"
"      0.000      Impervious Min.infiltration"
"      0.050      Impervious Lag constant (hours)"
"      1.500      Impervious Depression storage"
"              0.019      0.154      0.000      0.000 c.m/sec"
"      Catchment 20      Pervious      Impervious      Total Area  "
"      Surface Area      0.220      0.000      0.220      hectare"

```

"	Time of concentration	8.478	1.401	8.478	minutes"
"	Time to Centroid	2764.766	2281.059	2764.764	minutes"
"	Rainfall depth	285.000	285.000	285.000	mm"
"	Rainfall volume	627.00	0.00	627.00	c.m"
"	Rainfall losses	218.824	39.702	218.824	mm"
"	Runoff depth	66.176	245.298	66.176	mm"
"	Runoff volume	145.59	0.00	145.59	c.m"
"	Runoff coefficient	0.232	0.000	0.232	"
"	Maximum flow	0.019	0.000	0.019	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4	Add Runoff "			
"		0.019	0.174	0.000	0.000"
" 33	CATCHMENT 30"				
"	1	Triangular SCS"			
"	1	Equal length"			
"	2	Horton equation"			
"	30	Catchment 30"			
"	17.000	% Impervious"			
"	0.540	Total Area"			
"	35.000	Flow length"			
"	5.000	Overland Slope"			
"	0.448	Pervious Area"			
"	35.000	Pervious length"			
"	5.000	Pervious slope"			
"	0.092	Impervious Area"			
"	35.000	Impervious length"			
"	5.000	Impervious slope"			
"	0.250	Pervious Manning 'n'"			
"	200.000	Pervious Max.infiltration"			
"	13.000	Pervious Min.infiltration"			
"	0.250	Pervious Lag constant (hours)"			
"	5.000	Pervious Depression storage"			
"	0.015	Impervious Manning 'n'"			
"	0.000	Impervious Max.infiltration"			
"	0.000	Impervious Min.infiltration"			
"	0.050	Impervious Lag constant (hours)"			
"	1.500	Impervious Depression storage"			
"		0.048	0.174	0.000	0.000 c.m/sec"
"	Catchment 30	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	14.425	2.383	9.474	minutes"
"	Time to Centroid	2775.078	2263.048	2564.563	minutes"
"	Rainfall depth	285.000	285.000	285.000	mm"
"	Rainfall volume	1277.37	261.63	1539.00	c.m"
"	Rainfall losses	213.235	40.368	183.848	mm"
"	Runoff depth	71.765	244.632	101.152	mm"
"	Runoff volume	321.65	224.57	546.22	c.m"
"	Runoff coefficient	0.252	0.858	0.355	"
"	Maximum flow	0.036	0.012	0.048	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				

"	4	Add Runoff "				
"			0.048	0.221	0.000	0.000"
" 38		START/RE-START TOTALS 30"				
"	3	Runoff Totals on EXIT"				
"		Total Catchment area			2.520	hectare"
"		Total Impervious area			0.444	hectare"
"		Total % impervious			17.611"	
" 19		EXIT"				

Post-Dev Modeling Files

```
"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                          B:\Working\1000152197 ONTARIO INC\
"          2406548 3089 Greenfield Rd Ayr\Design Phase\Design Data\Modelling
Files\Post-Development Modelling Files\Controlled"
"          Output filename:                    2406548 -Post-2yr.out"
"          Licensee name:                      "
"          Company                             "
"          Date & Time last used:              5/20/2026 at 8:30:42 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          829.746  Coefficient A"
"          11.312  Constant B"
"          0.820  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    80.163  mm/hr"
"          Total depth                          33.499  mm"
"          6  002hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 100"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          100  Catchment 100"
"          50.000  % Impervious"
"          1.760  Total Area"
"          25.000  Flow length"
"          5.000  Overland Slope"
"          0.880  Pervious Area"
"          25.000  Pervious length"
"          5.000  Pervious slope"
"          0.880  Impervious Area"
"          25.000  Impervious length"
"          5.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"
```

"	1.500	Impervious Depression storage"				
"		0.161	0.000	0.000	0.000	c.m/sec"
"		Catchment 100	Pervious	Impervious	Total Area	"
"		Surface Area	0.880	0.880	1.760	hectare"
"		Time of concentration	---	1.650	1.650	minutes"
"		Time to Centroid	0.000	83.106	83.106	minutes"
"		Rainfall depth	33.499	33.499	33.499	mm"
"		Rainfall volume	294.80	294.80	589.59	c.m"
"		Rainfall losses	33.499	1.968	17.734	mm"
"		Runoff depth	0.000	31.531	15.766	mm"
"		Runoff volume	0.00	277.48	277.48	c.m"
"		Runoff coefficient	0.000	0.941	0.471	"
"		Maximum flow	0.000	0.161	0.161	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.161	0.161	0.000	0.000"	
" 33		CATCHMENT 200"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	200	Catchment 200"				
"	26.000	% Impervious"				
"	0.220	Total Area"				
"	10.000	Flow length"				
"	5.000	Overland Slope"				
"	0.163	Pervious Area"				
"	10.000	Pervious length"				
"	5.000	Pervious slope"				
"	0.057	Impervious Area"				
"	10.000	Impervious length"				
"	5.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.011	0.161	0.000	0.000	c.m/sec"
"		Catchment 200	Pervious	Impervious	Total Area	"
"		Surface Area	0.163	0.057	0.220	hectare"
"		Time of concentration	---	0.952	0.952	minutes"
"		Time to Centroid	0.000	82.146	82.146	minutes"
"		Rainfall depth	33.499	33.499	33.499	mm"
"		Rainfall volume	54.54	19.16	73.70	c.m"
"		Rainfall losses	33.499	2.623	25.471	mm"
"		Runoff depth	0.000	30.877	8.028	mm"

"	Runoff volume	0.00	17.66	17.66	c.m"
"	Runoff coefficient	0.000	0.922	0.240	"
"	Maximum flow	0.000	0.011	0.011	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"	0.011	0.173	0.000	0.000"	
" 33	CATCHMENT 300"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	300 Catchment 300"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"	0.016	0.173	0.000	0.000 c.m/sec"	
"	Catchment 300	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	---	2.019	2.019	minutes"
"	Time to Centroid	0.000	83.605	83.605	minutes"
"	Rainfall depth	33.499	33.499	33.499	mm"
"	Rainfall volume	150.14	30.75	180.90	c.m"
"	Rainfall losses	33.499	1.962	28.138	mm"
"	Runoff depth	0.000	31.538	5.361	mm"
"	Runoff volume	0.00	28.95	28.95	c.m"
"	Runoff coefficient	0.000	0.941	0.160	"
"	Maximum flow	0.000	0.016	0.016	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"	0.016	0.189	0.000	0.000"	
" 54	POND DESIGN"				
"	0.189 Current peak flow	c.m/sec"			
"	0.189 Target outflow	c.m/sec"			
"	324.1 Hydrograph volume	c.m"			

```

"      5.  Number of stages"
"      285.270  Minimum water level  metre"
"      2855.000  Maximum water level  metre"
"      285.270  Starting water level  metre"
"      0  Keep Design Data: 1 = True; 0 = False"
"          Level Discharge  Volume"
"          285.270  0.000  0.000"
"          285.370  0.08500  135.200"
"          285.450  0.09000  251.500"
"          285.470  0.1300  281.700"
"          285.500  0.2530  327.900"
"          Peak outflow  0.078  c.m/sec"
"          Maximum level  285.363  metre"
"          Maximum storage  125.582  c.m"
"          Centroidal lag  1.827  hours"
"          0.016  0.189  0.078  0.000 c.m/sec"
" 38  START/RE-START TOTALS 300"
"      3  Runoff Totals on EXIT"
"          Total Catchment area  2.520  hectare"
"          Total Impervious area  1.029  hectare"
"          Total % impervious  40.833"
" 19  EXIT"

```

```

"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                          B:\Working\1000152197 ONTARIO INC\
"          2406548 3089 Greenfield Rd Ayr\Design Phase\Design Data\Modelling
Files\Post-Development Modelling Files\Controlled"
"          Output filename:                     2406548 -Post-5yr.out"
"          Licensee name:                      "
"          Company                             "
"          Date & Time last used:              5/20/2026 at 8:31:25 AM"
" 31      TIME PARAMETERS"
"          5.000  Time Step"
"          180.000 Max. Storm length"
"          1500.000 Max. Hydrograph"
" 32      STORM Chicago storm"
"          1  Chicago storm"
"          1066.200 Coefficient A"
"          11.193  Constant B"
"          0.818  Exponent C"
"          0.350  Fraction R"
"          180.000 Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    104.195  mm/hr"
"          Total depth                          43.523  mm"
"          6 005hyd Hydrograph extension used in this file"
" 33      CATCHMENT 100"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          100  Catchment 100"
"          50.000 % Impervious"
"          1.760  Total Area"
"          25.000 Flow length"
"          5.000  Overland Slope"
"          0.880  Pervious Area"
"          25.000 Pervious length"
"          5.000  Pervious slope"
"          0.880  Impervious Area"
"          25.000 Impervious length"
"          5.000  Impervious slope"
"          0.250 Pervious Manning 'n'"
"          200.000 Pervious Max.infiltration"
"          13.000 Pervious Min.infiltration"
"          0.250 Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015 Impervious Manning 'n'"
"          0.000 Impervious Max.infiltration"
"          0.000 Impervious Min.infiltration"
"          0.050 Impervious Lag constant (hours)"

```

"	1.500	Impervious Depression storage"				
"		0.213	0.000	0.000	0.000	c.m/sec"
"		Catchment 100	Pervious	Impervious	Total Area	"
"		Surface Area	0.880	0.880	1.760	hectare"
"		Time of concentration	---	1.486	1.486	minutes"
"		Time to Centroid	0.000	82.389	82.389	minutes"
"		Rainfall depth	43.523	43.523	43.523	mm"
"		Rainfall volume	383.00	383.00	766.00	c.m"
"		Rainfall losses	43.523	2.168	22.845	mm"
"		Runoff depth	0.000	41.355	20.677	mm"
"		Runoff volume	0.00	363.92	363.92	c.m"
"		Runoff coefficient	0.000	0.950	0.475	"
"		Maximum flow	0.000	0.213	0.213	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.213	0.213	0.000	0.000"	
" 33		CATCHMENT 200"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	200	Catchment 200"				
"	26.000	% Impervious"				
"	0.220	Total Area"				
"	10.000	Flow length"				
"	5.000	Overland Slope"				
"	0.163	Pervious Area"				
"	10.000	Pervious length"				
"	5.000	Pervious slope"				
"	0.057	Impervious Area"				
"	10.000	Impervious length"				
"	5.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.014	0.213	0.000	0.000	c.m/sec"
"		Catchment 200	Pervious	Impervious	Total Area	"
"		Surface Area	0.163	0.057	0.220	hectare"
"		Time of concentration	---	0.858	0.858	minutes"
"		Time to Centroid	0.000	81.703	81.703	minutes"
"		Rainfall depth	43.523	43.523	43.523	mm"
"		Rainfall volume	70.85	24.89	95.75	c.m"
"		Rainfall losses	43.523	3.228	33.046	mm"
"		Runoff depth	0.000	40.295	10.477	mm"

"	Runoff volume	0.00	23.05	23.05	c.m"
"	Runoff coefficient	0.000	0.926	0.241	"
"	Maximum flow	0.000	0.014	0.014	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.014	0.227	0.000	0.000"
" 33	CATCHMENT 300"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	300 Catchment 300"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"		0.022	0.227	0.000	0.000 c.m/sec"
"	Catchment 300	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	---	1.818	1.818	minutes"
"	Time to Centroid	0.000	82.755	82.755	minutes"
"	Rainfall depth	43.523	43.523	43.523	mm"
"	Rainfall volume	195.07	39.95	235.02	c.m"
"	Rainfall losses	43.523	2.099	36.481	mm"
"	Runoff depth	0.000	41.424	7.042	mm"
"	Runoff volume	0.00	38.03	38.03	c.m"
"	Runoff coefficient	0.000	0.952	0.162	"
"	Maximum flow	0.000	0.022	0.022	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.022	0.249	0.000	0.000"
" 54	POND DESIGN"				
"	0.249 Current peak flow	c.m/sec"			
"	0.189 Target outflow	c.m/sec"			
"	425.0 Hydrograph volume	c.m"			

```

"      5.  Number of stages"
"      285.270  Minimum water level  metre"
"      2855.000  Maximum water level  metre"
"      285.270  Starting water level  metre"
"      0  Keep Design Data: 1 = True; 0 = False"
"      Level Discharge  Volume"
"      285.270  0.000  0.000"
"      285.370  0.08500  135.200"
"      285.450  0.09000  251.500"
"      285.470  0.1300  281.700"
"      285.500  0.2530  327.900"
"      Peak outflow  0.087  c.m/sec"
"      Maximum level  285.394  metre"
"      Maximum storage  170.152  c.m"
"      Centroidal lag  1.838  hours"
"      0.022  0.249  0.087  0.000 c.m/sec"
" 38  START/RE-START TOTALS 300"
"      3  Runoff Totals on EXIT"
"      Total Catchment area  2.520  hectare"
"      Total Impervious area  1.029  hectare"
"      Total % impervious  40.833"
" 19  EXIT"

```

```

"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                         B:\Working\1000152197 ONTARIO INC\
"          2406548 3089 Greenfield Rd Ayr\Design Phase\Design Data\Modelling
Files\Post-Development Modelling Files\Controlled"
"          Output filename:                    2406548 -Post-10yr.out"
"          Licensee name:                      "
"          Company                            "
"          Date & Time last used:             5/20/2026 at 8:32:19 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          1233.774  Coefficient A"
"          11.230  Constant B"
"          0.818  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    120.354  mm/hr"
"          Total depth                          50.355  mm"
"          6  010hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 100"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          100  Catchment 100"
"          50.000  % Impervious"
"          1.760  Total Area"
"          25.000  Flow length"
"          5.000  Overland Slope"
"          0.880  Pervious Area"
"          25.000  Pervious length"
"          5.000  Pervious slope"
"          0.880  Impervious Area"
"          25.000  Impervious length"
"          5.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"

```

"	1.500	Impervious Depression storage"				
"		0.248	0.000	0.000	0.000	c.m/sec"
"		Catchment 100	Pervious	Impervious	Total Area	"
"		Surface Area	0.880	0.880	1.760	hectare"
"		Time of concentration	---	1.403	1.403	minutes"
"		Time to Centroid	0.000	82.013	82.013	minutes"
"		Rainfall depth	50.355	50.355	50.355	mm"
"		Rainfall volume	443.13	443.13	886.25	c.m"
"		Rainfall losses	50.355	2.349	26.352	mm"
"		Runoff depth	0.000	48.006	24.003	mm"
"		Runoff volume	0.00	422.45	422.45	c.m"
"		Runoff coefficient	0.000	0.953	0.477	"
"		Maximum flow	0.000	0.248	0.248	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.248	0.248	0.000	0.000"	
" 33		CATCHMENT 200"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	200	Catchment 200"				
"	26.000	% Impervious"				
"	0.220	Total Area"				
"	10.000	Flow length"				
"	5.000	Overland Slope"				
"	0.163	Pervious Area"				
"	10.000	Pervious length"				
"	5.000	Pervious slope"				
"	0.057	Impervious Area"				
"	10.000	Impervious length"				
"	5.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.017	0.248	0.000	0.000	c.m/sec"
"		Catchment 200	Pervious	Impervious	Total Area	"
"		Surface Area	0.163	0.057	0.220	hectare"
"		Time of concentration	---	0.809	0.809	minutes"
"		Time to Centroid	0.000	81.473	81.473	minutes"
"		Rainfall depth	50.355	50.355	50.355	mm"
"		Rainfall volume	81.98	28.80	110.78	c.m"
"		Rainfall losses	50.355	3.703	38.225	mm"
"		Runoff depth	0.000	46.653	12.130	mm"

"	Runoff volume	0.00	26.69	26.69	c.m"
"	Runoff coefficient	0.000	0.926	0.241	"
"	Maximum flow	0.000	0.017	0.017	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"	0.017	0.265	0.000	0.000"	
" 33	CATCHMENT 300"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	300 Catchment 300"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"	0.025	0.265	0.000	0.000 c.m/sec"	
"	Catchment 300	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	---	1.716	1.716	minutes"
"	Time to Centroid	0.000	82.378	82.378	minutes"
"	Rainfall depth	50.355	50.355	50.355	mm"
"	Rainfall volume	225.69	46.23	271.92	c.m"
"	Rainfall losses	50.355	2.189	42.167	mm"
"	Runoff depth	0.000	48.166	8.188	mm"
"	Runoff volume	0.00	44.22	44.22	c.m"
"	Runoff coefficient	0.000	0.957	0.163	"
"	Maximum flow	0.000	0.025	0.025	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"	0.025	0.290	0.000	0.000"	
" 54	POND DESIGN"				
"	0.290 Current peak flow	c.m/sec"			
"	0.189 Target outflow	c.m/sec"			
"	493.4 Hydrograph volume	c.m"			

```

"      5.  Number of stages"
"      285.270  Minimum water level    metre"
"      2855.000  Maximum water level    metre"
"      285.270  Starting water level    metre"
"      0      Keep Design Data: 1 = True; 0 = False"
"              Level Discharge    Volume"
"              285.270    0.000    0.000"
"              285.370    0.08500    135.200"
"              285.450    0.09000    251.500"
"              285.470    0.1300    281.700"
"              285.500    0.2530    327.900"
"      Peak outflow                0.088    c.m/sec"
"      Maximum level                285.419    metre"
"      Maximum storage              206.024    c.m"
"      Centroidal lag               1.873    hours"
"              0.025    0.290    0.088    0.000 c.m/sec"
" 38      START/RE-START TOTALS 300"
"      3      Runoff Totals on EXIT"
"      Total Catchment area                2.520    hectare"
"      Total Impervious area              1.029    hectare"
"      Total % impervious                40.833"
" 19      EXIT"

```

```

"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                         B:\Working\1000152197 ONTARIO INC\
"          2406548 3089 Greenfield Rd Ayr\Design Phase\Design Data\Modelling
Files\Post-Development Modelling Files\Controlled"
"          Output filename:                    2406548 -Post-25yr.out"
"          Licensee name:                      "
"          Company                             "
"          Date & Time last used:              5/20/2026 at 8:34:36 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          1421.027  Coefficient A"
"          11.468  Constant B"
"          0.822  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    135.482  mm/hr"
"          Total depth                          56.734  mm"
"          6  025hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 100"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          100  Catchment 100"
"          50.000  % Impervious"
"          1.760  Total Area"
"          25.000  Flow length"
"          5.000  Overland Slope"
"          0.880  Pervious Area"
"          25.000  Pervious length"
"          5.000  Pervious slope"
"          0.880  Impervious Area"
"          25.000  Impervious length"
"          5.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"

```

"	1.500	Impervious Depression storage"				
"		0.281	0.000	0.000	0.000	c.m/sec"
"		Catchment 100	Pervious	Impervious	Total Area	"
"		Surface Area	0.880	0.880	1.760	hectare"
"		Time of concentration	---	1.338	1.338	minutes"
"		Time to Centroid	0.000	81.658	81.658	minutes"
"		Rainfall depth	56.734	56.734	56.734	mm"
"		Rainfall volume	499.26	499.26	998.51	c.m"
"		Rainfall losses	56.734	2.551	29.642	mm"
"		Runoff depth	0.000	54.182	27.091	mm"
"		Runoff volume	0.00	476.81	476.81	c.m"
"		Runoff coefficient	0.000	0.955	0.478	"
"		Maximum flow	0.000	0.281	0.281	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.281	0.281	0.000	0.000"	
" 33		CATCHMENT 200"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	200	Catchment 200"				
"	26.000	% Impervious"				
"	0.220	Total Area"				
"	10.000	Flow length"				
"	5.000	Overland Slope"				
"	0.163	Pervious Area"				
"	10.000	Pervious length"				
"	5.000	Pervious slope"				
"	0.057	Impervious Area"				
"	10.000	Impervious length"				
"	5.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.019	0.281	0.000	0.000	c.m/sec"
"		Catchment 200	Pervious	Impervious	Total Area	"
"		Surface Area	0.163	0.057	0.220	hectare"
"		Time of concentration	---	0.772	0.772	minutes"
"		Time to Centroid	0.000	81.239	81.239	minutes"
"		Rainfall depth	56.734	56.734	56.734	mm"
"		Rainfall volume	92.36	32.45	124.81	c.m"
"		Rainfall losses	56.734	4.227	43.082	mm"
"		Runoff depth	0.000	52.506	13.652	mm"

"	Runoff volume	0.00	30.03	30.03	c.m"
"	Runoff coefficient	0.000	0.925	0.241	"
"	Maximum flow	0.000	0.019	0.019	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.019	0.299	0.000	0.000"
" 33	CATCHMENT 300"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	300 Catchment 300"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"		0.029	0.299	0.000	0.000 c.m/sec"
"	Catchment 300	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	---	1.637	1.637	minutes"
"	Time to Centroid	0.000	82.048	82.048	minutes"
"	Rainfall depth	56.734	56.734	56.734	mm"
"	Rainfall volume	254.28	52.08	306.36	c.m"
"	Rainfall losses	56.734	2.295	47.479	mm"
"	Runoff depth	0.000	54.439	9.255	mm"
"	Runoff volume	0.00	49.98	49.98	c.m"
"	Runoff coefficient	0.000	0.960	0.163	"
"	Maximum flow	0.000	0.029	0.029	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.029	0.328	0.000	0.000"
" 54	POND DESIGN"				
"	0.328 Current peak flow	c.m/sec"			
"	0.189 Target outflow	c.m/sec"			
"	556.8 Hydrograph volume	c.m"			

```

"      5.  Number of stages"
"      285.270  Minimum water level    metre"
"      2855.000  Maximum water level    metre"
"      285.270  Starting water level    metre"
"      0      Keep Design Data: 1 = True; 0 = False"
"              Level Discharge    Volume"
"              285.270    0.000    0.000"
"              285.370    0.08500    135.200"
"              285.450    0.09000    251.500"
"              285.470    0.1300    281.700"
"              285.500    0.2530    327.900"
"      Peak outflow                0.090    c.m/sec"
"      Maximum level                285.443    metre"
"      Maximum storage              241.932    c.m"
"      Centroidal lag               1.913    hours"
"              0.029    0.328    0.090    0.000 c.m/sec"
" 38      START/RE-START TOTALS 300"
"      3      Runoff Totals on EXIT"
"      Total Catchment area                2.520    hectare"
"      Total Impervious area              1.029    hectare"
"      Total % impervious                40.833"
" 19      EXIT"

```

```

"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                          B:\Working\1000152197 ONTARIO INC\
"          2406548 3089 Greenfield Rd Ayr\Design Phase\Design Data\Modelling
Files\Post-Development Modelling Files\Controlled"
"          Output filename:                     2406548 -Post-50yr.out"
"          Licensee name:                      "
"          Company                             "
"          Date & Time last used:              5/20/2026 at 8:35:04 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          1578.288  Coefficient A"
"          11.111  Constant B"
"          0.817  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    155.298  mm/hr"
"          Total depth                          64.788  mm"
"          6  050hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 100"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          100  Catchment 100"
"          50.000  % Impervious"
"          1.760  Total Area"
"          25.000  Flow length"
"          5.000  Overland Slope"
"          0.880  Pervious Area"
"          25.000  Pervious length"
"          5.000  Pervious slope"
"          0.880  Impervious Area"
"          25.000  Impervious length"
"          5.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"

```

"	1.500	Impervious Depression storage"				
"		0.323	0.000	0.000	0.000	c.m/sec"
"		Catchment 100	Pervious	Impervious	Total Area	"
"		Surface Area	0.880	0.880	1.760	hectare"
"		Time of concentration	---	1.267	1.267	minutes"
"		Time to Centroid	0.000	81.392	81.392	minutes"
"		Rainfall depth	64.788	64.788	64.788	mm"
"		Rainfall volume	570.14	570.14	1140.28	c.m"
"		Rainfall losses	64.788	2.839	33.814	mm"
"		Runoff depth	0.000	61.950	30.975	mm"
"		Runoff volume	0.00	545.16	545.16	c.m"
"		Runoff coefficient	0.000	0.956	0.478	"
"		Maximum flow	0.000	0.323	0.323	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.323	0.323	0.000	0.000"	
" 33		CATCHMENT 200"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	200	Catchment 200"				
"	26.000	% Impervious"				
"	0.220	Total Area"				
"	10.000	Flow length"				
"	5.000	Overland Slope"				
"	0.163	Pervious Area"				
"	10.000	Pervious length"				
"	5.000	Pervious slope"				
"	0.057	Impervious Area"				
"	10.000	Impervious length"				
"	5.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.021	0.323	0.000	0.000	c.m/sec"
"		Catchment 200	Pervious	Impervious	Total Area	"
"		Surface Area	0.163	0.057	0.220	hectare"
"		Time of concentration	---	0.731	0.731	minutes"
"		Time to Centroid	0.000	81.108	81.108	minutes"
"		Rainfall depth	64.788	64.788	64.788	mm"
"		Rainfall volume	105.48	37.06	142.53	c.m"
"		Rainfall losses	64.788	4.914	49.221	mm"
"		Runoff depth	0.000	59.875	15.567	mm"

"	Runoff volume	0.00	34.25	34.25	c.m"
"	Runoff coefficient	0.000	0.924	0.240	"
"	Maximum flow	0.000	0.021	0.021	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.021	0.344	0.000	0.000"
" 33	CATCHMENT 300"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	300 Catchment 300"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"		0.033	0.344	0.000	0.000 c.m/sec"
"	Catchment 300	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	---	1.550	1.550	minutes"
"	Time to Centroid	0.000	81.814	81.814	minutes"
"	Rainfall depth	64.788	64.788	64.788	mm"
"	Rainfall volume	290.38	59.48	349.86	c.m"
"	Rainfall losses	64.788	2.435	54.188	mm"
"	Runoff depth	0.000	62.353	10.600	mm"
"	Runoff volume	0.00	57.24	57.24	c.m"
"	Runoff coefficient	0.000	0.962	0.164	"
"	Maximum flow	0.000	0.033	0.033	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.033	0.377	0.000	0.000"
" 54	POND DESIGN"				
"	0.377 Current peak flow	c.m/sec"			
"	0.189 Target outflow	c.m/sec"			
"	636.6 Hydrograph volume	c.m"			

```

"          5.  Number of stages"
"      285.270  Minimum water level    metre"
"  2855.000  Maximum water level    metre"
"      285.270  Starting water level  metre"
"          0   Keep Design Data: 1 = True; 0 = False"
"              Level Discharge    Volume"
"      285.270    0.000    0.000"
"      285.370    0.08500    135.200"
"      285.450    0.09000    251.500"
"      285.470    0.1300    281.700"
"      285.500    0.2530    327.900"
"      Peak outflow                0.119    c.m/sec"
"      Maximum level                285.465    metre"
"      Maximum storage              274.239    c.m"
"      Centroidal lag                1.923    hours"
"          0.033    0.377    0.119    0.000 c.m/sec"
" 38      START/RE-START TOTALS 300"
"          3   Runoff Totals on EXIT"
"      Total Catchment area                2.520    hectare"
"      Total Impervious area              1.029    hectare"
"      Total % impervious                40.833"
" 19      EXIT"

```

```

"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                         B:\Working\1000152197 ONTARIO INC\
"          2406548 3089 Greenfield Rd Ayr\Design Phase\Design Data\Modelling
Files\Post-Development Modelling Files\Controlled"
"          Output filename:                    2406548 -Post-100yr.out"
"          Licensee name:                      "
"          Company                             "
"          Date & Time last used:              5/20/2026 at 8:35:32 AM"
" 31          TIME PARAMETERS"
"          5.000  Time Step"
"          180.000  Max. Storm length"
"          1500.000  Max. Hydrograph"
" 32          STORM Chicago storm"
"          1  Chicago storm"
"          1732.249  Coefficient A"
"          11.119  Constant B"
"          0.817  Exponent C"
"          0.350  Fraction R"
"          180.000  Duration"
"          1.000  Time step multiplier"
"          Maximum intensity                    170.380  mm/hr"
"          Total depth                          71.106  mm"
"          6  100hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 100"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          100  Catchment 100"
"          50.000  % Impervious"
"          1.760  Total Area"
"          25.000  Flow length"
"          5.000  Overland Slope"
"          0.880  Pervious Area"
"          25.000  Pervious length"
"          5.000  Pervious slope"
"          0.880  Impervious Area"
"          25.000  Impervious length"
"          5.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"
"          0.250  Pervious Lag constant (hours)"
"          5.000  Pervious Depression storage"
"          0.015  Impervious Manning 'n'"
"          0.000  Impervious Max.infiltration"
"          0.000  Impervious Min.infiltration"
"          0.050  Impervious Lag constant (hours)"

```

"	1.500	Impervious Depression storage"				
"		0.356	0.000	0.000	0.000	c.m/sec"
"		Catchment 100	Pervious	Impervious	Total Area	"
"		Surface Area	0.880	0.880	1.760	hectare"
"		Time of concentration	15.532	1.221	1.563	minutes"
"		Time to Centroid	81.953	81.195	81.213	minutes"
"		Rainfall depth	71.106	71.106	71.106	mm"
"		Rainfall volume	625.73	625.73	1251.47	c.m"
"		Rainfall losses	69.440	3.094	36.267	mm"
"		Runoff depth	1.666	68.012	34.839	mm"
"		Runoff volume	14.66	598.50	613.17	c.m"
"		Runoff coefficient	0.023	0.956	0.490	"
"		Maximum flow	0.015	0.356	0.356	c.m/sec"
" 40		HYDROGRAPH Add Runoff "				
"	4	Add Runoff "				
"		0.356	0.356	0.000	0.000"	
" 33		CATCHMENT 200"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	2	Horton equation"				
"	200	Catchment 200"				
"	26.000	% Impervious"				
"	0.220	Total Area"				
"	10.000	Flow length"				
"	5.000	Overland Slope"				
"	0.163	Pervious Area"				
"	10.000	Pervious length"				
"	5.000	Pervious slope"				
"	0.057	Impervious Area"				
"	10.000	Impervious length"				
"	5.000	Impervious slope"				
"	0.250	Pervious Manning 'n'"				
"	200.000	Pervious Max.infiltration"				
"	13.000	Pervious Min.infiltration"				
"	0.250	Pervious Lag constant (hours)"				
"	5.000	Pervious Depression storage"				
"	0.015	Impervious Manning 'n'"				
"	0.000	Impervious Max.infiltration"				
"	0.000	Impervious Min.infiltration"				
"	0.050	Impervious Lag constant (hours)"				
"	1.500	Impervious Depression storage"				
"		0.023	0.356	0.000	0.000	c.m/sec"
"		Catchment 200	Pervious	Impervious	Total Area	"
"		Surface Area	0.163	0.057	0.220	hectare"
"		Time of concentration	8.963	0.704	1.261	minutes"
"		Time to Centroid	77.066	80.987	80.723	minutes"
"		Rainfall depth	71.106	71.106	71.106	mm"
"		Rainfall volume	115.76	40.67	156.43	c.m"
"		Rainfall losses	69.440	5.505	52.817	mm"
"		Runoff depth	1.666	65.602	18.289	mm"

"	Runoff volume	2.71	37.52	40.24	c.m"
"	Runoff coefficient	0.023	0.923	0.257	"
"	Maximum flow	0.004	0.023	0.023	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"	0.023	0.379	0.000	0.000"	
" 33	CATCHMENT 300"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	300 Catchment 300"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"	0.036	0.379	0.000	0.000 c.m/sec"	
"	Catchment 300	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	19.007	1.494	3.350	minutes"
"	Time to Centroid	84.383	81.619	81.912	minutes"
"	Rainfall depth	71.106	71.106	71.106	mm"
"	Rainfall volume	318.70	65.28	383.97	c.m"
"	Rainfall losses	69.442	2.580	58.075	mm"
"	Runoff depth	1.664	68.526	13.031	mm"
"	Runoff volume	7.46	62.91	70.37	c.m"
"	Runoff coefficient	0.023	0.964	0.183	"
"	Maximum flow	0.006	0.036	0.036	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"	0.036	0.415	0.000	0.000"	
" 54	POND DESIGN"				
"	0.415 Current peak flow	c.m/sec"			
"	0.189 Target outflow	c.m/sec"			
"	723.8 Hydrograph volume	c.m"			

```

"      5.  Number of stages"
"      285.270  Minimum water level    metre"
"      2855.000  Maximum water level    metre"
"      285.270  Starting water level    metre"
"      0      Keep Design Data: 1 = True; 0 = False"
"              Level Discharge    Volume"
"              285.270    0.000    0.000"
"              285.370    0.08500    135.200"
"              285.450    0.09000    251.500"
"              285.470    0.1300    281.700"
"              285.500    0.2530    327.900"
"      Peak outflow                0.172    c.m/sec"
"      Maximum level                285.480    metre"
"      Maximum storage              297.324    c.m"
"      Centroidal lag              1.901    hours"
"              0.036    0.415    0.172    0.000 c.m/sec"
" 38      START/RE-START TOTALS 300"
"      3      Runoff Totals on EXIT"
"      Total Catchment area                2.520    hectare"
"      Total Impervious area              1.029    hectare"
"      Total % impervious                40.833"
" 19      EXIT"

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"          MIDUSS Output ----->"
"          MIDUSS version                      Version 2.25  rev. 473"
"          MIDUSS created                      Sunday, February 7, 2010"
"          10  Units used:                      ie METRIC"
"          Job folder:                        B:\Working\1000152197 ONTARIO INC\
"          2406548 3089 Greenfield Rd Ayr\Design Phase\Design Data\Modelling
Files\Post-Development Modelling Files\Controlled"
"          Output filename:                   2406548 -Post-Regional.out"
"          Licensee name:                     "
"          Company                            "
"          Date & Time last used:            5/20/2026 at 8:36:02 AM"
" 31          TIME PARAMETERS"
"          60.000  Time Step"
"          2880.000  Max. Storm length"
"          30000.000  Max. Hydrograph"
" 32          STORM Historic"
"          5  Historic"
"          2880.000  Duration"
"          48.000  Rainfall intensity values"
"                  2.028    2.028    2.028    2.028    2.028"
"                  2.028    2.028    2.028    2.028    2.028"
"                  2.028    2.028    2.028    2.028    2.028"
"                  2.028    2.028    2.028    2.028    2.028"
"                  2.028    2.028    2.028    2.028    2.028"
"                  2.028    2.026    2.026    2.026    2.028"
"                  2.026    6.000    4.000    6.000    13.000"
"                  17.000    13.000    23.000    13.000    13.000"
"                  53.000    38.000    13.000"
"          Maximum intensity                   53.000  mm/hr"
"          Total depth                         285.000  mm"
"          6  555hyd  Hydrograph extension used in this file"
" 33          CATCHMENT 100"
"          1  Triangular SCS"
"          1  Equal length"
"          2  Horton equation"
"          100  Catchment 100"
"          50.000  % Impervious"
"          1.760  Total Area"
"          25.000  Flow length"
"          5.000  Overland Slope"
"          0.880  Pervious Area"
"          25.000  Pervious length"
"          5.000  Pervious slope"
"          0.880  Impervious Area"
"          25.000  Impervious length"
"          5.000  Impervious slope"
"          0.250  Pervious Manning 'n'"
"          200.000  Pervious Max.infiltration"
"          13.000  Pervious Min.infiltration"

```

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"      0.250 Pervious Lag constant (hours)"
"      5.000 Pervious Depression storage"
"      0.015 Impervious Manning 'n'"
"      0.000 Impervious Max.infiltration"
"      0.000 Impervious Min.infiltration"
"      0.050 Impervious Lag constant (hours)"
"      1.500 Impervious Depression storage"
"          0.187      0.000      0.000      0.000 c.m/sec"
"      Catchment 100      Pervious      Impervious Total Area "
"      Surface Area      0.880      0.880      1.760      hectare"
"      Time of concentration 11.788      1.947      4.140      minutes"
"      Time to Centroid 2771.120      2275.642      2386.045      minutes"
"      Rainfall depth      285.000      285.000      285.000      mm"
"      Rainfall volume      2508.00      2508.00      5016.00      c.m"
"      Rainfall losses      215.089      41.156      128.122      mm"
"      Runoff depth      69.911      243.844      156.878      mm"
"      Runoff volume      615.22      2145.83      2761.05      c.m"
"      Runoff coefficient      0.245      0.856      0.550      "
"      Maximum flow      0.074      0.114      0.187      c.m/sec"
" 40 HYDROGRAPH Add Runoff "
"      4 Add Runoff "
"          0.187      0.187      0.000      0.000"
" 33 CATCHMENT 200"
"      1 Triangular SCS"
"      1 Equal length"
"      2 Horton equation"
"      200 Catchment 200"
"      26.000 % Impervious"
"      0.220 Total Area"
"      10.000 Flow length"
"      5.000 Overland Slope"
"      0.163 Pervious Area"
"      10.000 Pervious length"
"      5.000 Pervious slope"
"      0.057 Impervious Area"
"      10.000 Impervious length"
"      5.000 Impervious slope"
"      0.250 Pervious Manning 'n'"
"      200.000 Pervious Max.infiltration"
"      13.000 Pervious Min.infiltration"
"      0.250 Pervious Lag constant (hours)"
"      5.000 Pervious Depression storage"
"      0.015 Impervious Manning 'n'"
"      0.000 Impervious Max.infiltration"
"      0.000 Impervious Min.infiltration"
"      0.050 Impervious Lag constant (hours)"
"      1.500 Impervious Depression storage"
"          0.022      0.187      0.000      0.000 c.m/sec"
"      Catchment 200      Pervious      Impervious Total Area "
"      Surface Area      0.163      0.057      0.220      hectare"

```

"	Time of concentration	6.802	1.124	3.522	minutes"
"	Time to Centroid	2760.662	2278.426	2482.088	minutes"
"	Rainfall depth	285.000	285.000	285.000	mm"
"	Rainfall volume	463.98	163.02	627.00	c.m"
"	Rainfall losses	221.489	37.749	173.717	mm"
"	Runoff depth	63.511	247.251	111.283	mm"
"	Runoff volume	103.40	141.43	244.82	c.m"
"	Runoff coefficient	0.223	0.868	0.390	"
"	Maximum flow	0.015	0.007	0.022	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				
"	4 Add Runoff "				
"		0.022	0.209	0.000	0.000"
" 33	CATCHMENT 300"				
"	1 Triangular SCS"				
"	1 Equal length"				
"	2 Horton equation"				
"	300 Catchment 300"				
"	17.000 % Impervious"				
"	0.540 Total Area"				
"	35.000 Flow length"				
"	5.000 Overland Slope"				
"	0.448 Pervious Area"				
"	35.000 Pervious length"				
"	5.000 Pervious slope"				
"	0.092 Impervious Area"				
"	35.000 Impervious length"				
"	5.000 Impervious slope"				
"	0.250 Pervious Manning 'n'"				
"	200.000 Pervious Max.infiltration"				
"	13.000 Pervious Min.infiltration"				
"	0.250 Pervious Lag constant (hours)"				
"	5.000 Pervious Depression storage"				
"	0.015 Impervious Manning 'n'"				
"	0.000 Impervious Max.infiltration"				
"	0.000 Impervious Min.infiltration"				
"	0.050 Impervious Lag constant (hours)"				
"	1.500 Impervious Depression storage"				
"		0.048	0.209	0.000	0.000 c.m/sec"
"	Catchment 300	Pervious	Impervious	Total Area	"
"	Surface Area	0.448	0.092	0.540	hectare"
"	Time of concentration	14.425	2.383	9.474	minutes"
"	Time to Centroid	2775.078	2263.048	2564.563	minutes"
"	Rainfall depth	285.000	285.000	285.000	mm"
"	Rainfall volume	1277.37	261.63	1539.00	c.m"
"	Rainfall losses	213.235	40.368	183.848	mm"
"	Runoff depth	71.765	244.632	101.152	mm"
"	Runoff volume	321.65	224.57	546.22	c.m"
"	Runoff coefficient	0.252	0.858	0.355	"
"	Maximum flow	0.036	0.012	0.048	c.m/sec"
" 40	HYDROGRAPH Add Runoff "				

```

"          4  Add Runoff "
"              0.048      0.257      0.000      0.000"
" 54      POND DESIGN"
"          0.257  Current peak flow    c.m/sec"
"          0.189  Target outflow    c.m/sec"
"          3552.1  Hydrograph volume    c.m"
"          5.      Number of stages"
"          285.270  Minimum water level    metre"
"          2855.000  Maximum water level    metre"
"          285.270  Starting water level    metre"
"          0      Keep Design Data: 1 = True; 0 = False"
"              Level Discharge    Volume"
"              285.270      0.000      0.000"
"              285.370      0.08500      135.200"
"              285.450      0.09000      251.500"
"              285.470      0.1300      281.700"
"              285.500      0.2530      327.900"
"              Peak outflow                0.205    c.m/sec"
"              Maximum level                285.499    metre"
"              Maximum storage              326.610    c.m"
"              Centroidal lag              40.718    hours"
"              0.048      0.257      0.205      0.000 c.m/sec"
" 38      START/RE-START TOTALS 300"
"          3  Runoff Totals on EXIT"
"              Total Catchment area                2.520    hectare"
"              Total Impervious area              1.029    hectare"
"              Total % impervious                40.833"
" 19      EXIT"

```

Appendix F Water Budget Calculations

Table 13: Monthly Water Balance (Pre-Development Conditions)

PRE-DEVELOPMENT CONDITIONS

Contributing Catchments:

Catchments 10,20, and 30

Contributing Area = 2.52 ha

Percent Impervious = 17.6%

Soil Type: Sandy silt till (silt loam)

Vegetation: Shallow rooted

Root Zone Depth = 0.62m

Soil Moisture Retention Capacity (mm) = 125

Runoff Factor = 0.75

Evapotranspiration
Factor for Impervious
Surfaces = 0.33

Month	Daily Average Temperature	Monthly Heat Index (I)	Unadjusted Daily Potential Evapotranspiration	Correction Factors	Adjusted Potential Evapotranspiration (PE)	Average Precipitation (P)	P-PE	Accum. Pot. Water Loss	Storage (ST)	ΔS	Pervious ET	Actual Evapotranspiration (AE)	Pervious ET - Actual ET	Moisture Deficit (D)	Moisture Surplus (S)	Water Runoff (RO)	Snow Melt Runoff	Total Recharge and Runoff	Actual Runoff	Runoff Volume	Recharge Volume
	(°C)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(m ³)	(m ³)
Jan	-6.3	0.0	0.0	24.3	0.0	66.3	66.3		246.2	0.0		0.0	0.0	0.0	0.0	3.5	0.0	3.5	2.7	67	22
Feb	-5.9	0.0	0.0	24.6	0.0	46.1	46.1		292.3	0.0		0.0	0.0	0.0	0.0	1.8	0.0	1.8	1.3	33	11
Mar	-0.8	0.0	0.0	30.6	0.0	57.0	57.0		349.3	0.0		0.0	0.0	0.0	0.0	0.9	0.0	0.9	0.7	17	5
Apr	5.9	1.3	0.9	33.6	30.2	81.2	51.0		125.0	0.0	30.2	26.7	3.6	3.6	54.5	28.3	22.4	50.7	38.2	962	316
May	12.6	4.1	2.0	37.8	75.6	80.2	4.6		125.0	0.0	75.6	66.7	8.9	8.9	13.5	20.9	100.9	121.8	91.7	2,311	759
Jun	17.8	6.8	2.9	38.4	111.4	80.5	-30.9	-30.9	98.0	-27.0	107.5	94.9	12.6	16.5	12.6	16.8	50.5	67.2	50.6	1,275	419
Jul	20.2	8.3	3.4	38.7	131.6	96.2	-35.4	-66.2	73.0	-25.0	121.2	106.9	14.3	24.6	14.3	15.5	25.2	40.7	30.7	773	254
Aug	19.1	7.6	3.3	36.0	118.8	67.2	-51.6	-117.8	48.0	-25.0	92.2	81.4	10.8	37.4	10.8	13.2	12.6	25.8	19.4	489	161
Sep	15.2	5.4	2.5	31.2	78.0	75.2	-2.8		45.2	-2.8	78.0	68.8	9.2	9.2	9.2	11.2	7.0	18.2	13.7	345	113
Oct	8.8	2.4	1.3	28.5	37.1	71.0	34.0		79.2	34.0	37.1	32.7	4.4	4.4	4.4	7.8	3.1	10.9	8.2	206	68
Nov	2.6	1.4	0.4	24.3	9.7	74.9	65.2		125.0	45.9	9.7	8.6	1.1	1.1	20.5	14.1	2.5	16.6	12.5	315	104
Dec	-2.8	0.0	0.0	23.1	0.0	54.9	54.9		179.9	0.0		0.0	0.0	0.0	0.0	7.1	0.0	7.1	5.3	134	44
Total	7.2	37.2				850.7	258.4				551.5	486.7	64.9	105.7	139.7	140.9	224.3	365.1	274.9	6,927	2,275

Notes: Precipitation and Temperature data from Environment Canada Climate Normals 1990-2020 for Kitchener/Waterloo Stations

Monthly water balance strategy as outlined in the document *Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance (Thornthwaite and Mather, 1957)*

Monthly Heat Index (I) from Table 2 of *Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance*

Correction Factors from Table 6 of *Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance*

Evaporation Factor for Impervious Surfaces = Average Annual Evapotranspiration for Impervious Surfaces (150mm/year) / Average Annual Evapotranspiration for Pervious Surfaces (562.3mm/year) = 0.27

Runoff Factor = [(Impervious Percentage of Site x Average Annual Runoff for Impervious Surfaces) + (Pervious Silt Till Percentage of Site x Average Annual Runoff for Pervious Silt Till Surfaces)] / Total Annual Recharge & Runoff

POST-DEVELOPMENT CONDITIONS

Contributing Catchments:

Catchments 10,20, and 30

Contributing Area = 2.52 ha

Percent Impervious = 39.6%

Soil Type: Sandy silt till (silt loam)

Vegetation: Shallow rooted

Root Zone Depth = 0.62m

Soil Moisture Retention Capacity (mm) = 125

Runoff Factor = 0.82

Evapotranspiration
Factor for Impervious
Surfaces = 0.33

Month	Daily Average Temperature	Monthly Heat Index (I)	Unadjusted Daily Potential Evapotranspiration	Correction Factors	Adjusted Potential Evapotranspiration (PE)	Average Precipitation (P)	P-PE	Accum. Pot. Water Loss	Storage (ST)	ΔS	Pervious ET	Actual Evapotranspiration (AE)	Pervious ET - Actual ET	Moisture Deficit (D)	Moisture Surplus (S)	Water Runoff (RO)	Snow Melt Runoff	Total Recharge and Runoff	Actual Runoff	Runoff Volume	Recharge Volume
	(°C)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(m ³)	(m ³)
Jan	-6.3	0.0	0.0	24.3	0.0	66.3	66.3		246.2	0.0		0.0	0.0	0.0	0.0	4.8	0.0	4.8	4.0	100	22
Feb	-5.9	0.0	0.0	24.6	0.0	46.1	46.1		292.3	0.0		0.0	0.0	0.0	0.0	2.4	0.0	2.4	2.0	50	11
Mar	-0.8	0.0	0.0	30.6	0.0	57.0	57.0		349.3	0.0		0.0	0.0	0.0	0.0	1.2	0.0	1.2	1.0	25	6
Apr	5.9	1.3	0.9	33.6	30.2	81.2	51.0		125.0	0.0	30.2	22.2	8.0	8.0	59.0	30.5	22.4	52.9	43.3	1,092	242
May	12.6	4.1	2.0	37.8	75.6	80.2	4.6		125.0	0.0	75.6	55.6	20.0	20.0	24.6	27.5	100.9	128.5	105.2	2,651	587
Jun	17.8	6.8	2.9	38.4	111.4	80.5	-30.9	-30.9	98.0	-27.0	107.5	79.1	28.4	32.3	28.4	28.0	50.5	78.5	64.2	1,619	358
Jul	20.2	8.3	3.4	38.7	131.6	96.2	-35.4	-66.2	73.0	-25.0	121.2	89.1	32.1	42.4	32.1	30.0	25.2	55.3	45.3	1,140	252
Aug	19.1	7.6	3.3	36.0	118.8	67.2	-51.6	-117.8	48.0	-25.0	92.2	67.8	24.4	51.0	24.4	27.2	12.6	39.8	32.6	822	182
Sep	15.2	5.4	2.5	31.2	78.0	75.2	-2.8		45.2	-2.8	78.0	57.4	20.6	20.6	20.6	23.9	7.0	30.9	25.3	638	141
Oct	8.8	2.4	1.3	28.5	37.1	71.0	34.0		79.2	34.0	37.1	27.2	9.8	9.8	9.8	16.9	3.1	20.0	16.3	412	91
Nov	2.6	1.4	0.4	24.3	9.7	74.9	65.2		125.0	45.9	9.7	7.1	2.6	2.6	21.9	19.4	2.5	21.9	17.9	452	100
Dec	-2.8	0.0	0.0	23.1	0.0	54.9	54.9		179.9	0.0		0.0	0.0	0.0	0.0	9.7	0.0	9.7	7.9	200	44
Total	7.2	37.2				850.7	258.4				551.5	405.6	145.9	186.8	220.8	221.6	224.3	445.9	365.1	9,200	2,036

Notes: Precipitation and Temperature data from Environment Canada Climate Normals 1990-2020 for Kitchener/Waterloo Stations

Monthly water balance strategy as outlined in the document *Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance (Thornthwaite and Mather, 1957)*

Monthly Heat Index (I) from Table 2 of *Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance*

Correction Factors from Table 6 of *Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance*

Evaporation Factor for Impervious Surfaces = Average Annual Evapotranspiration for Impervious Surfaces (150mm/year) / Average Annual Evapotranspiration for Pervious Surfaces (562.3mm/year) = 0.27

Runoff Factor = [(Impervious Percentage of Site x Average Annual Runoff for Impervious Surfaces) + (Pervious Silt Till Percentage of Site x Average Annual Runoff for Pervious Silt Till Surfaces)] / Total Annual Recharge & Runoff

3089 Greenfield Road
Township of North Dumfries (Ayr)
6/4/2026

	Pre-Development Conditions	Post-Development Conditions	Difference (Post - Pre)
Recharge			
On Site	2,275	2,036	-10.49%
Runoff			
To tributary (Nith River)	6,927	9,200	32.82%

Appendix G LID TTT Analysis Results- Annual TP Exports

Summary

Site	Project Name	Project Title	Storm Type	Runoff Continuity Error (%)	Flow Routing Continuity Error (%)
pre-development	3089 Greenfield Road, AYR	Pre-Dev	avg-annual	-0.001	-0.061

These continuity errors represent the percent difference between initial storage+ total inflow for the entire drainage system versus final storage + total outflow for the entire drainage system. If the continuity error exceed some reasonable level, such as 10 percent, then the validity of the analysis results must be questioned. The most common reasons for an excessive continuity error are conduits that are too short, abrupt changes in storage (very small or very large storage areas), or flooding losses in the model (insufficient node depth).

Water Balance | Pre-Dev

Catchment	Site Area	Site Rainfall	Site Infiltration	Site Evapotranspiration	External Outflow	Rainfall Reduction
		(mm) (m ³)	(mm) (m ³)	(mm) (m ³)	(mm) (m ³)	(mm) (%)
1	2.52 ha	944.70 mm 23,806.44 m ³	578.32 mm 14,573.66 m ³	113.45 mm 2,858.94 m ³	252.14 mm 6,354 m ³	692.56 mm 73.31 %
TOTAL	2.52 ha	944.7 mm 23,806.44 m³	578.32 mm 14,573.66 m³	113.45 mm 2,858.94 m³	252.14 mm 6,354 m³	692.56 mm 73.31 %

Loading Summary TP | Pre-Dev

Catchment	Total Catchment TP Removal	Peak Outflow	Incoming	Outgoing
			Total Flow (m ³)	Total Flow (m ³)
			Average Concentration (mg/l)	Average Concentration (mg/l)
			Total Load (kg)	Total Load (kg)
Catchment 1	73.309 %	0.182 m ³ /s	23,806.44 m ³	6,354 m ³
			0.23 mg/l	0.23 mg/l
			5.523 kg	1.474 kg
Total	73.309 %	0.182 m³/s	23,806.44 m³	6,354 m³
			0.23 mg/l	0.23 mg/l
			5.523 kg	1.474 kg

Existing Conditions

Field	Value
Subcatchment name	Existing Conditions
Catchment	1
Soil type	Silt Loam
Weighted EMC TSS (mg/L)	58.45
Weighted EMC TP (mg/L)	0.23
Total AREA (HA)	2.52
Impervious area (HA)	0.378
Roof area (HA)	0.126
Landscaped area (HA)	0.504
Row Crop area (HA)	0
Open Space / Parkland area (HA)	0.756
Forest area (HA)	0.756
Wetland area (HA)	0
Other area (HA)	0

% Impervious (%)	20
Subcatchment Width (m)	220
Subcatchment Slope (%)	10
Manning's n for impervious areas	0.015
Manning's n for pervious areas	0.25
Depression storage for impervious areas (mm)	1.5
Depression storage for pervious areas (mm)	5
Weighted Curve Number	75.6

Outlet

Field	Value
Name	Outlet
Catchment	1
Outfall Elevation (m)	0

Summary

Site	Project Name	Project Title	Storm Type	Runoff Continuity Error (%)	Flow Routing Continuity Error (%)
post-development	3089 Greenfield Road, AYR	post-development	avg-annual	-0.001	-0.043

These continuity errors represent the percent difference between initial storage+ total inflow for the entire drainage system versus final storage + total outflow for the entire drainage system. If the continuity error exceed some reasonable level, such as 10 percent, then the validity of the analysis results must be questioned. The most common reasons for an excessive continuity error are conduits that are too short, abrupt changes in storage (very small or very large storage areas), or flooding losses in the model (insufficient node depth).

Water Balance | post-development

Catchment	Site Area	Site Rainfall	Site Infiltration	Site Evapotranspiration	External Outflow	Rainfall Reduction
		(mm) (m ³)	(mm) (m ³)	(mm) (m ³)	(mm) (m ³)	(mm) (%)
1	2.52 ha	944.70 mm 23,806.44 m ³	406.72 mm 10,249.34 m ³	148.32 mm 3,737.78 m ³	390.04 mm 9,829 m ³	554.66 mm 58.71 %
TOTAL	2.52 ha	944.7 mm 23,806.44 m³	406.72 mm 10,249.34 m³	148.32 mm 3,737.78 m³	390.04 mm 9,829 m³	554.66 mm 58.71 %

LID Summary | post-development

Element	Type	LID Area	Drawdown Time	Effective Impervious to Pervious Ratio	FLOW		TSS	TP
					Flow In (m ³)	Load In (kg)	Load In (kg)	
					Flow Out (m ³)	Load Out (kg)	Load Out (kg)	
					Actual Reduction (%)	Actual Reduction (%)	Actual Reduction (%)	
SWM Facility	Wetland	-	-	-	9,890 m ³	820.219 kg	2.597 kg	
					9,791.1 m ³	162.403 kg	1.028 kg	
					1 %	80.2 %	60.4 %	

Loading Summary TP | post-development

Catchment	Total Catchment TP Removal	Peak Outflow	Incoming	Outgoing
			Total Flow (m ³)	Total Flow (m ³)
			Average Concentration (mg/l)	Average Concentration (mg/l)
			Total Load (kg)	Total Load (kg)
Catchment 1	83.548 %	0.105 m ³ /s	23,806.44 m ³	9,829 m ³
			0.26 mg/l	0.1 mg/l
			6.251 kg	1.028 kg
Total	83.548 %	0.105 m³/s	23,806.44 m³	9,829 m³
			0.26 mg/l	0.1 mg/l
			6.251 kg	1.028 kg

Peak Flow | post-development

Catchment	Element	Description	Peak outflow
1	Post-Dev	PEAK RUNOFF FLOW from	0.19 m ³ /s
	SWM Facility	MAXIMUM OUTFLOW from	0.105 m ³ /s
	Outfall	MAXIMUM FLOW at	0.105 m ³ /s

Detailed Loading TP | post-development

TP - Catchment 1

Name	LID Type	Peak Outflow	Incoming	Outgoing
			Total Flow (m ³)	Total Flow (m ³)
			Concentration (mg/l)	Concentration (mg/l)
			Total Load (kg)	Total Load (kg)
Post-Dev	0 %	0.19 m ³ /s	23,806.44 m ³	9,890.496 m ³
			0.263 mg/l	0.263 mg/l
			6.251 kg	2.597 kg
SWM Facility	60 %	0.105 m ³ /s	9,890 m ³	9,791.1 m ³
			0.263 mg/l	0.105 mg/l
			2.597 kg	1.028 kg
Outlet	0 %	0.105 m ³ /s	9,791.1 m ³	9,791.1 m ³
			0.105 mg/l	0.105 mg/l
			1.028 kg	1.028 kg
Outfall	0 %	0.105 m ³ /s	9,829 m ³	9,829 m ³
			0.105 mg/l	0.105 mg/l

1.028 kg

1.028 kg

Detailed Report Parameters | post-development

Post-Dev

Field	Value
Subcatchment name	Post-Dev
Catchment	1
Soil type	Silt Loam
Weighted EMC TSS (mg/L)	82.93
Weighted EMC TP (mg/L)	0.26
Total AREA (HA)	2.52
Impervious area (HA)	0.82152
Roof area (HA)	0.1764
Landscaped area (HA)	1.27008
Row Crop area (HA)	0
Open Space / Parkland area (HA)	0.252
Forest area (HA)	0
Wetland area (HA)	0
Other area (HA)	0

% Impervious (%)	39.6
Subcatchment Width (m)	100
Subcatchment Slope (%)	1
Manning's n for impervious areas	0.01
Manning's n for pervious areas	0.2
Depression storage for impervious areas (mm)	2
Depression storage for pervious areas (mm)	5
Weighted Curve Number	81

SWM Facility

Field	Value
Name	SWM Facility
Storage Type	Constructed Wetland
Catchment	1
User defined TP Removal Efficiency (fraction)	0.6
Bottom Elevation (m)	285.27
Maximum Depth (m)	0.23
Initial Water Depth (m)	0
Lined/Unlined	lined

Evaporation Factor	1
Suction Head (mm)	100
Saturated Conductivity (mm/hr)	2.5
Initial Soil Moisture Deficit (Fraction)	0

Outfall

Field	Value
Name	Outfall
Catchment	1
Outfall Elevation (m)	284.5

Outlet

Field	Value
Name	Outlet
Catchment	1
Upstream Node	SWM-Facility
Downstream Node	Outfall
Length (m)	28
Upstream offset (m)	285.27