

August 15, 2025
Project No. 34397-25

2684742 Ontario Inc.

**Re: Servicing and Stormwater Management Report
Proposed Semi Detached Dwellings
271 and 281 Doyle Street, Township of Southgate**

1.0 Introduction

Van Harten Surveying Inc. (Van Harten) was retained to prepare a Servicing and Stormwater Management Report in support of the severance application for proposed semi-detached dwellings at 271 and 281 Doyle Street, Dundalk.

The purpose of this Servicing and Stormwater Management Report is to outline proposed water servicing, sanitary servicing, and stormwater servicing for the proposed development.

2.0 Existing Site Conditions

The existing property consists of two residential lots each with a residence, driveway, and ancillary structures. The site is generally vegetated with maintained domestic grass and encompasses an area of approximately 0.144 ha. The property is bounded by existing residential properties to the east and west, Artemesia Street to the north and Doyle Street to the south. Existing driveway access is from Doyle Street.

3.0 Proposed Development Conditions

The proposed development will be comprised of six semi-detached units each with driveway access to Doyle Street.

4.0 Water Servicing

4.1 Existing Water Servicing

#271 Doyle Street is serviced by an existing drilled well near the front west corner of the building. No well was identified on the topographic survey for #281. Per record drawings, there are existing 150mm watermains on the south side of each Doyle Street and Artemesia Street. Record drawings illustrate water service connections for each #281 and #271 Doyle installed to the street line. The topographic survey located an existing curbstop for #281 and no curbstop was located for #271. It is unclear whether #271 was pre-serviced with a municipal water service connection.

There is an existing 150mm ϕ watermain along the north side of Eco Parkway. There are no water services to the site in the existing condition. There is an existing fire hydrant on the south side of Doyle opposite house #271.

4.2 Proposed Water Servicing

The water demand for the proposed development was completed with reference to the Township of Southgate Municipal Servicing Standards (June 2022) and the Ministry of Environment Design Guidelines for Drinking-Water Systems (2008). The water demand for the proposed development can be referenced in Table 1. Detailed water demand calculations have been provided in Attachment C. Referencing Table 1, the maximum daily water demand and the peak hour water demand for the proposed development are 0.89 L/s and 1.34 L/s, respectively.

Table 1: Water Demand Calculations - Proposed Development

Design Guidelines	Average Daily Flow (L/s)	Max. Daily Flow (L/s)	Peak Hour Design Flow (L/s)
Southgate/MOE	0.09	0.89	1.34

Each lot will be provided with a minimum 25mm water service connecting to the existing 150mm watermain on the south side of Doyle Street.

The existing fire hydrant will provide fire protection for the proposed development.

Details of the proposed water servicing can be referenced on the Site Servicing Plan (Drawing C02, as amended).

5.0 Sanitary Servicing

5.1 Existing Sanitary Servicing

With reference to the drawings for Project No. 14-262 (White Rose Park Subdivision, Township of Southgate), there is an existing 200mm diameter PVC sanitary on Artemesia Street and Doyle Street and each property (#271 and #281) have existing sanitary connections to the sewer on Doyle Street.

5.2 Proposed Sanitary Servicing

The sanitary demand for the proposed development was completed with reference to the Township of Southgate Municipal Servicing Standards (June 2022). The sanitary demand for the proposed development can be referenced in Table 2. Detailed sanitary demand calculations have

been provided in Attachment C. Referring to Table 2, the peak sanitary design flow for the development is 0.31 L/s.

Table 2: Sanitary Demand Calculations – Proposed Development

Design Guidelines	Peak Residential Flow (L/s)	Peak Infiltration Flow (L/s)	Peak Design Flow (L/s)
Southgate	0.29	0.02	0.31

Each lot will be provided with a 100mm PVC SDR 28 sanitary sewer connecting to the existing 200mm diameter PVC sanitary sewer on Doyle Street.

6.0 Stormwater Management

6.1 Stormwater Management Criteria

The Township of Southgate Municipal Servicing Standards (June 2022) and the Ministry of Environment Stormwater Management Planning and Design Manual (March 2003) were referenced to determine the stormwater management criteria for the proposed development. Based on the manuals the following stormwater criteria must be met:

Stormwater Quantity Control – Control of post-development runoff flows to pre-development levels for rainfall events with return periods between the 5 year and 100 year storm event.

Stormwater Quality Control – Provide enhanced protection - 80% total suspended solid (TSS) removal.

6.2 Existing Drainage Patterns

An Existing Drainage Plan has been prepared based on the topographic survey. The site generally slopes from the southwest to the northeast with a total topographic relief of approximately 1.2m. The majority of stormwater from the property drains overland to Artemesia Street and the existing 300mm storm sewer on Artemesia.

Two (2) catchments were identified in the pre-development condition:

- Catchment 101 – Represents the drainage area that drains via sheet flow to Artemesia Street.
- Catchment 102 – Represents the drainage area directed to adjacent private property to the east (House #261).

Table 2 summarizes the pre-development drainage areas and hydrologic design parameters. The Pre-Development Drainage Plan can be referenced in the Appendix.

Table 2: Pre-development Catchments and Hydrologic Design Parameters

Hydrologic Parameter	Catchment 101	Catchment 102
Hydrograph	NasHyd	NasHyd
Catchment Area (ha)	0.132	0.012
Curve Number	CN = 76.59	CN = 74.34
Initial Abstraction (mm)	4.68	4.96
Slope (%)	2.9	3.3
Time to Peak (hr)	0.12	0.05

6.3 Proposed Drainage Patterns

A proposed drainage plan has been prepared based on the Site Grading Plan prepared by Van Harten. Under post-development conditions, three catchments were identified:

- Catchment 201 – Consists of the landscape rear and side yards and the building roofs draining to Artemesia Street.
- Catchment 202 – Consists of the building roofs which drain to an infiltration gallery with overflow to Artemesia Street.
- Catchment 203 – Consists of the driveway areas and front yards draining uncontrolled to Doyle Street.

Table 3 summarizes the post-development drainage areas and hydrologic design parameters. The Post-Development Drainage Plan can be referenced in the Appendix.

Table 3: Post Development Catchments and Hydrologic Design Parameters

Hydrologic Parameter	Catchment 201	Catchment 202		Catchment 203	
Hydrograph	NasHyd	StanHyd		StanHyd	
Catchment Area (ha)	0.066	0.050		0.029	
Percent Imperv (%) / Curve Number	CN=74	100%		56.9%	
Initial Abstraction Depression Storage (mm)	5.0	5.0	2.0	5.0	2.0
Slope (%) (Perv Imperv)	2.9	2.0	8.0	2.0	2.0
Time to Peak (hr)	0.13	-		-	

6.4 Stormwater Quantity Controls

The stormwater management quantity control criteria for the site are subject to the Township of Southgate Municipal Servicing Standards. The quantity control criterion for the proposed development includes controlling the post-development peak flows to the pre-development peak flow rates for the 5-year through 100-year storm events.

Calculations were prepared using Visual Otthymo and IDF parameters obtained from the MTO Lookup Tool – Dundalk Specific IDF to calculate the return period peak flows under the pre-development and post-development conditions for the 5-year through 100-year return periods (Tables 4, 5 and 6). The Visual Otthymo output files are provided in Appendix B.

Table 4: Peak Flow and Storage Requirements Summary (Catchment 201 & 202) – Artemesia Street

Storm Event (yr)	Pre-Development Peak Flow (m ³ /s)	Post-Development Controlled Peak Flow (m ³ /s)	Required Storage (m ³)	Provided Storage (m ³)
5	0.005	0.003	19.2	19.2
10	0.007	0.004	19.2	
25	0.010	0.006	19.2	
50	0.013	0.011	19.2	
100	0.015	0.015	19.2	

¹ Pre-Development Peak Flows = Catchment 101

² Post-Development Controlled Peak Flow = Catchment 201 + Catchment 202

Table 5: Peak Flow Summary (Doyle Street)

Storm Event (yr)	Catchment 203 Peak Flow (m ³ /s)	Increase (L/s)
5	0.009	9
10	0.011	11
25	0.013	13
50	0.015	15
100	0.017	17

Table 6: Peak Flow Summary (Property)

Storm Event (yr)	Site (Pre-Dev)	Site (Post-Dev)	Increase (L/s)
5	0.006	0.011	5
10	0.008	0.014	6
25	0.011	0.017	6
50	0.014	0.020	6
100	0.016	0.023	7

¹ Pre-Development Peak Flows = Catchment 101 + 102

² Post-Development Controlled Peak Flow = Catchment 201 + 202 + 203

Quantity controls are required to attenuate the post-development peak flows to the pre-development levels. Quantity controls for the proposed development will be provided by routing the building roofs to sub-surface infiltration galleries (one per lot). Each gallery will provide a volume of 3.2 cu.m. with a combined volume across the property of 19.2 cu.m..

Building downspouts are to be routed to the subsurface gallery on each lot and be provided with overflow to grade and out to Artemesia Street.

Flows are projected to increase post-development from the property. This is as a result of the additional driveways to Doyle Street.

6.5 Stormwater Quality Controls

It is our understanding that the water quality related criterion for this property is Enhanced (80% longterm TSS removal).

The proposal is an infill development consisting of six semi-detached lots and no new roadways are proposed. Considering the nature of the proposed development, all runoff generated by these properties, with the exception of driveway areas, can be considered “clean” and not subject to requirements for additional polishing. Together, the driveways cover an approximate area of 163 sq.m.. This area represents 11% of the total property area and an increase in driveway area of 106 sq.m. The driveway area represents a small portion of the overall development and will not have a significant impact on the downstream stormwater system.

The following are proposed to support water quality objectives for the property:

- To the extent possible, impervious areas are to be directed to grassed areas to encourage filtration and infiltration of runoff;
- Building downspouts are to be diverted to infiltration galleries in the rear yard of each lot;
- Where possible, grass swales should have a trapezoidal rather than triangular cross-section to reduce flow depths and velocities;
- The rear yards will be graded to reduce flow concentrations and encourage sheet flow along the rear lot line.

6.6 Operation and Maintenance

The future property owners will be required to inspect the works on an annual basis to ensure their continued functioning.

- All downspouts, splash pads and roof leaders shall be kept in good working order at all times.
- For the roof leaders connected to the infiltration galleries, the debris screen should be periodically removed, cleaned of debris, inspected for integrity and reinstalled. We suggest that this should be undertaken at minimum in November and April of any given calendar year, or as needed to support their continued operation;
- Inspection ports are to be installed on the infiltration galleries for regular inspection and monitoring of rainwater drawdown times following major storm events;

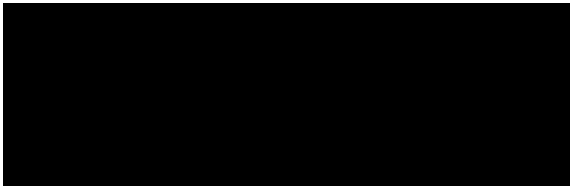
- All grass swales should be maintained free clear of obstructions so that they function as intended. The property owner should inspect on a routine basis for erosion, in particular at downspout locations, and repair any gullies, rills or bare spots;
- Should the drawdown of the soakaway exceed 72 hours following a major storm event, the clear stone reservoir should be replaced to restore function.

The maintenance of the stormwater management features on the site is the sole responsibility of each property owner and should be completed on an as needed basis.

7.0 Closure

The completed Servicing and Stormwater Management Report is specific to the site based on our knowledge of the proposed development. We trust that this report is suitable to support the severance application for the proposed development. Please contact our office if you have any questions or require further consultation.

VAN HARTEN SURVEYING INC.



Kristine Campell, P. Eng.



Encl. Attachment A – Figures

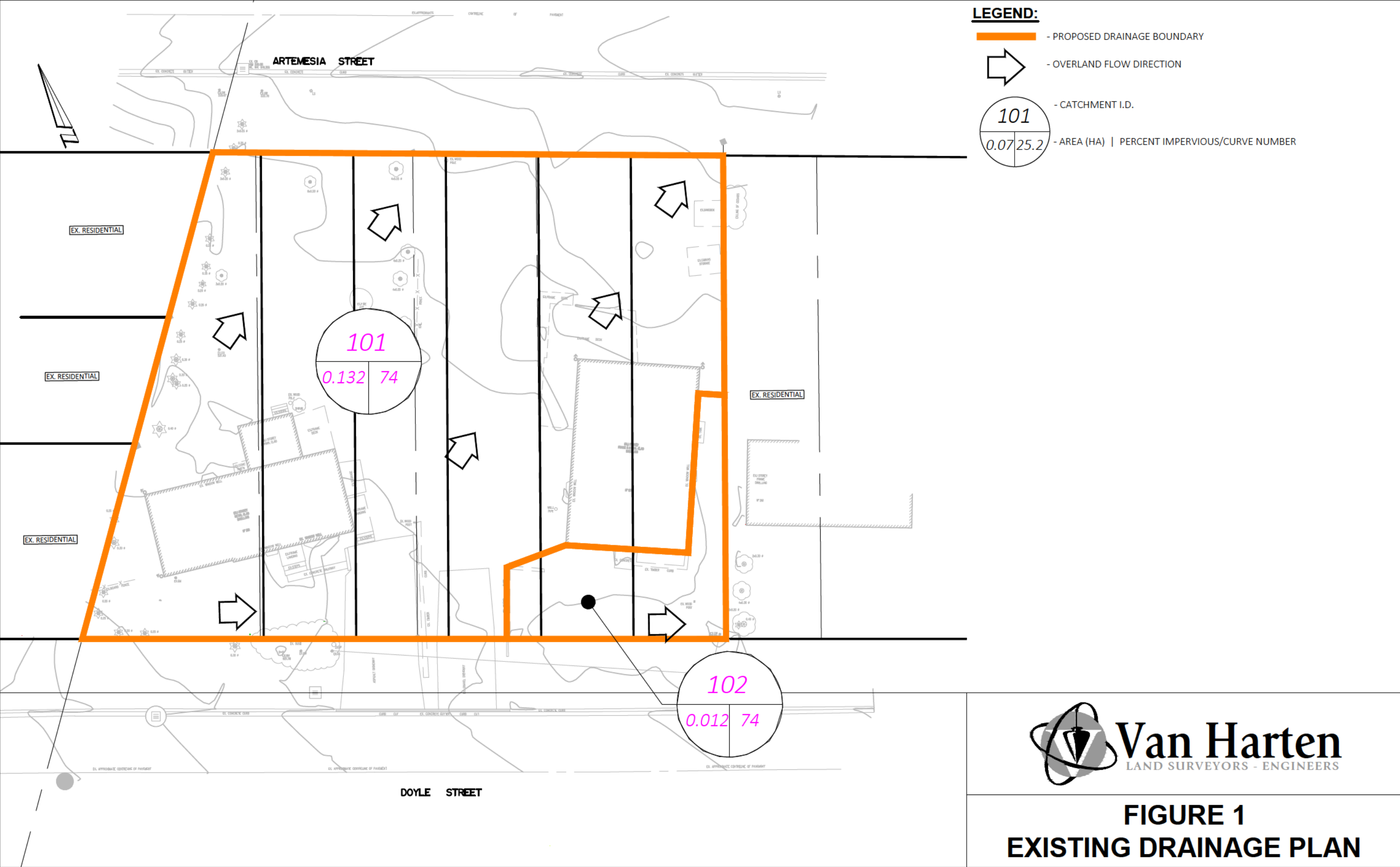
Encl. Attachment B - Stormwater Management Calculations

Enc. Attachment C – Sanitary and Water Demand Calculations

ATTACHMENT A

FIGURES

- Figure 1 – Existing Conditions Drainage Plan
- Figure 2 – Proposed Conditions Drainage Plan



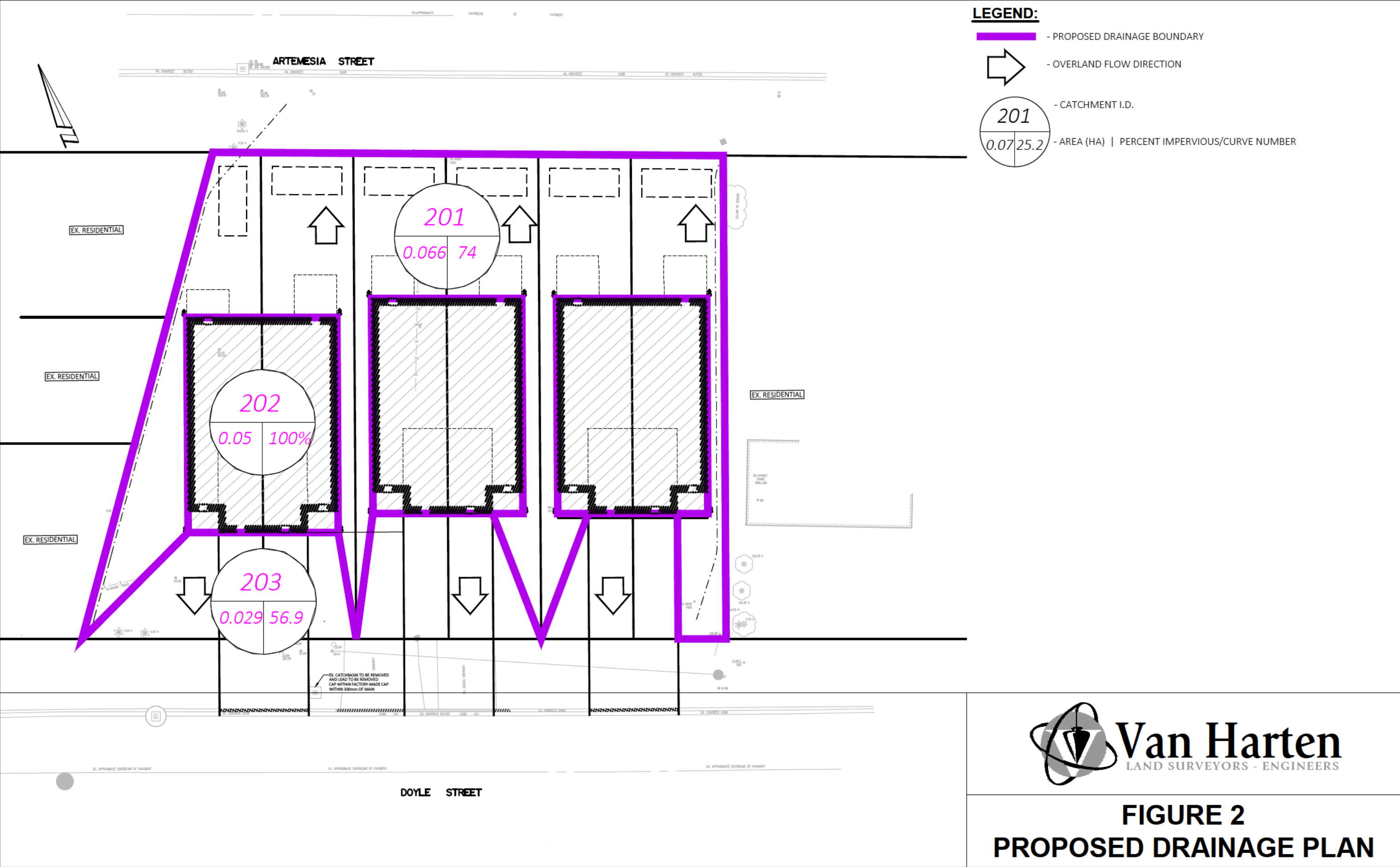


FIGURE 2
PROPOSED DRAINAGE PLAN

ATTACHMENT B

STORMWATER CALCULATIONS

- MTO Lookup Tool – IDF Parameters
- Table B.1a – Pre-Development Catchment 101 Parameters
- Table B.1b – Pre-Development Catchment 102 Parameters
- Table B.2a – Post-Development Catchment 201 Parameters
- Table B.2b – Post Development Catchment 202 Parameters
- Table B.2c – Post Development Catchment 203 Parameters
- VO Output

Active coordinate

44° 10' 15" N, 80° 23' 45" W (44.170833,-80.395833)

Retrieved: Thu, 14 Aug 2025 16:34:57 GMT



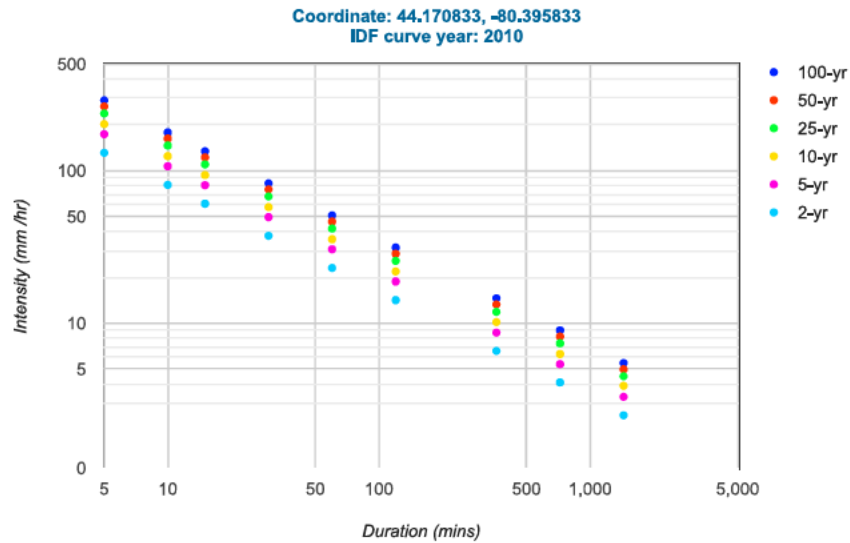
Location summary

These are the locations in the selection.

IDF Curve: 44° 10' 15" N, 80° 23' 45" W (44.170833,-80.395833)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 44° 10' 15" N, 80° 23' 45" W (44.170833,-80.395833)

Retrieved: Thu, 14 Aug 2025 16:34:57 GMT

Data year: 2010

IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	23.1	30.6	35.6	41.8	46.5	51.0
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

Rainfall intensity (mm hr⁻¹)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	131.2	80.8	60.9	37.5	23.1	14.2	6.6	4.1	2.5
5-yr	173.8	107.1	80.6	49.7	30.6	18.8	8.7	5.4	3.3
10-yr	202.2	124.6	93.8	57.8	35.6	21.9	10.2	6.3	3.9
25-yr	237.4	146.3	110.2	67.9	41.8	25.7	11.9	7.4	4.5
50-yr	264.1	162.7	122.5	75.5	46.5	28.6	13.3	8.2	5.0
100-yr	289.7	178.4	134.4	82.8	51.0	31.4	14.6	9.0	5.5

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	10.9	13.5	15.2	18.8	23.1	28.5	39.6	48.8	60.1
5-yr	14.5	17.8	20.2	24.8	30.6	37.7	52.5	64.6	79.6
10-yr	16.9	20.8	23.5	28.9	35.6	43.9	61.0	75.2	92.7
25-yr	19.8	24.4	27.5	33.9	41.8	51.5	71.7	88.3	108.8
50-yr	22.0	27.1	30.6	37.7	46.5	57.3	79.7	98.2	121.0
100-yr	24.1	29.7	33.6	41.4	51.0	62.8	87.5	107.7	132.7

Terms of Use

You agree to the [Terms of Use](#) of this site by reviewing, using, or interpreting these data.

Project No: 34397-25
 Project Name: Proposed Semi Detached Dwellings
 Project Location: 271 Doyle Street, Southgate
 Date: 8/15/2025
 Update: 8/15/2025



Table B.1a Pre-Development Catchment 101 NASHYD Hydraulic Parameter Sheet

Catchment Area: 0.132 ha

On-site Soils:

Type	Classification
Listowel silt loam	

Impervious Land Use:

Roadway/Driveway		Gravel		Building		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.004	98			0.011	98			0.014	98.00

*All areas are in Hectares.

Pervious Land Use:

Lawn		Woodland		Field		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.117	74							0.117	74.00

*All areas are in Hectares.

Composite Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.117
Woodland	10	0.000
Cultivated	7	0.000
Wetland	16	0.000
Impervious	2	0.014
Catchment Weighted	4.68	0.132

Composite Runoff Coefficient:

Landuse	RC	Area
Lawn	0.25	0.117
Woodland		0.000
Cultivated		0.000
Wetland		0.000
Impervious	0.9	0.014
Catchment Weighted	0.32	0.132

Composite Curve Number: 76.59
 Composite Initial Abstraction (mm): 4.68
 Composite Runoff Coefficient: 0.32
 Flow Length (m): 34
 Slope (%): 2.9
 Time to Concentration (hr) - Airport Method: 0.17
 Time to Peak (hr): 0.12

Project No: 34397-25
 Project Name: Proposed Semi Detached Dwellings
 Project Location: 271 Doyle Street, Southgate
 Date: 8/15/2025
 Update: 8/15/2025



Table B.1b Pre-Development Catchment 102 NASHYD Hydraulic Parameter Sheet

Catchment Area: 0.012 ha

On-site Soils:

Type	Classification
Listowel silt loam	

Impervious Land Use:

Roadway/Driveway		Gravel		Building		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.000	98							0.000	98.00

*All areas are in Hectares.

Pervious Land Use:

Lawn		Woodland		Field		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.012	74							0.012	74.00

*All areas are in Hectares.

Composite Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.012
Woodland	10	0.000
Cultivated	7	0.000
Wetland	16	0.000
Impervious	2	0.000
Catchment Weighted	4.96	0.012

Composite Runoff Coefficient:

Landuse	RC	Area
Lawn	0.25	0.012
Woodland		0.000
Cultivated		0.000
Wetland		0.000
Impervious	0.9	0.000
Catchment Weighted	0.26	0.012

Composite Curve Number: 74.34
 Composite Initial Abstraction (mm): 4.96
 Composite Runoff Coefficient: 0.26
 Flow Length (m): 6
 Slope (%): 3.3
 Time to Concentration (hr) - Airport Method: 0.08
 Time to Peak (hr): 0.05

Project No: 34397-25
 Project Name: Proposed Semi Detached Dwellings
 Project Location: 271 Doyle Street, Southgate
 Date: 8/15/2025
 Update: 8/15/2025



Table B.2a Post-Development Catchment 201 NASHYD Hydraulic Parameter Sheet

Catchment Area: 0.066 ha

On-site Soils:

Type	Classification
Listowel silt loam	

Impervious Land Use:

Roadway/Driveway		Gravel		Building		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN

*All areas are in Hectares.

Pervious Land Use:

Lawn		Woodland		Field		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.066	74							0.066	74.00

*All areas are in Hectares.

Composite Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.066
Woodland	10	0.000
Cultivated	7	0.000
Wetland	16	0.000
Impervious	2	0.000
Catchment Weighted	5.00	0.066

Composite Runoff Coefficient:

Landuse	RC	Area
Lawn	0.25	0.066
Woodland		0.000
Cultivated		0.000
Wetland		0.000
Impervious	0.9	0.000
Catchment Weighted	0.25	0.066

Composite Curve Number: 74.00
 Composite Initial Abstraction (mm): 5.00
 Composite Runoff Coefficient: 0.25
 Flow Length (m): 34
 Slope (%): 2.9
 Time to Concentration (hr) - Airport Method: 0.19
 Time to Peak (hr): 0.13

Project No: 34397-25
 Project Name: Proposed Semi Detached Dwellings
 Project Location: 271 Doyle Street, Southgate
 Date: 8/15/2025
 Update: 8/15/2025



Table B.2b Post-Development Catchment 202 STANHYD Hydraulic Parameter Sheet

Catchment Area: 0.050

On-site Soils:

Type	Classification
Listowel silt loam	

Impervious Land Use:

Roadway/Driveway		Gravel		Building		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
				0.050	98			0.050	98.00

*All areas are in Hectares.

Impervious Land Use VO Inputs:

Depression Storage (mm): 1
 Slope (%): 8
 Flow Length (m from model): 18.26
 Total Indirectly Connected Impervious Area (ha): 0.050
 Total Directly Connected Impervious Area (ha): 0.050
 T IMP: 0.999 <<< <1 for computation purposes
 X IMP: 0.999 <<< <1 for computation purposes

Pervious Land Use:

Lawn		Woodland		Cultivated		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN

*All areas are in Hectares.

Pervious Land Use VO Inputs:

Pervious Curve Number: 0.0
 Initial Abstraction (mm): 5.00
 Slope (%): 2
 Flow Length (m): 13
 RC 0.90

Pervious Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.000
Woodland	10	0
Cultivated	7	0
Wetland	16	0
Catchment Weighted	#DIV/0!	0

Project No: 34397-25
Project Name: Proposed Semi Detached Dwellings
Project Location: 271 Doyle Street, Southgate
Date: 8/15/2025
Update: 8/15/2025



Table B.2c Post-Development Catchment 203 STANHYD Hydraulic Parameter Sheet

Catchment Area: 0.029

On-site Soils:

Type	Classification
Listowel silt loam	

Impervious Land Use:

Roadway/Driveway		Gravel		Building		SWM Facility		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.016	98							0.016	98.00

*All areas are in Hectares.

Impervious Land Use VO Inputs:

Depression Storage (mm): 2
Slope (%): 2
Flow Length (m from model): 13.9
Total Indirectly Connected Impervious Area (ha): 0.016
Total Directly Connected Impervious Area (ha): 0.016
T IMP: 0.569
X IMP: 0.569

Pervious Land Use:

Lawn		Woodland		Cultivated		Wetland		Total	
Area	CN	Area	CN	Area	CN	Area	CN	Area	Weighted CN
0.012	74							0.0123714	74.00

*All areas are in Hectares.

Pervious Land Use VO Inputs:

Pervious Curve Number: 74.0
Initial Abstraction (mm): 5.00
Slope (%): 2
Flow Length (m): 9
RC 0.51

Pervious Initial Abstraction:

Landuse	IA (mm)	Area
Lawn	5	0.012
Woodland	10	0
Cultivated	7	0
Wetland	16	0
Catchment Weighted	5.00	0.0123714

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6.2.2017)
      V      V      I      SS      U      U      A A      L
      V      V      I      SS      U      U      AAAAA      L
      V      V      I      SS      U      U      A      A      L
      VV      I      SSSSS      UUUUU      A      A      LLLLL

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      O      O      T      T      H      H      Y      M      M      O      O
      OOO      T      T      H      H      Y      M      M      OOO

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***** D E T A I L E D O U T P U T *****

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DATE: 08/14/2025

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USER:

COMMENTS:

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*****
** SIMULATION : 100yr 3hr 5min Chicago **
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| CHICAGO STORM      |      IDF curve parameters: A= 892.273
| Ptotal= 70.98 mm  |      B=    0.000
-----
                                C=    0.699

```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs

Storm time step = 5.00 min

Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	7.65	0.75	26.87	1.50	16.60		
2.25	9.39	0.08	8.18	0.83	49.98	1.58	15.15
2.33	9.01	0.17	8.82	0.92	289.68	1.67	13.97
2.42	8.66	0.25	9.60	1.00	61.34	1.75	12.99
2.50	8.34	0.33	10.56	1.08	38.68	1.83	12.17
2.58	8.05	0.42	11.80	1.17	29.50	1.92	11.46
2.67	7.78	0.50	13.47	1.25	24.30	2.00	10.84
2.75	7.53	0.58	15.86	1.33	20.88	2.08	10.30
2.83	7.30	0.67	19.65	1.42	18.44	2.17	9.82
2.92	7.09						

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| CALIB |
| NASHYD ( 0102) | Area (ha)= 0.01 Curve Number
(CN)= 74.3
|ID= 1 DT=10.0 min | Ia (mm)= 4.96 # of Linear
Res. (N)= 3.00
----- U.H. Tp(hrs)= 0.17

```

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.167	7.92	1.000	169.83	1.833	13.48		
2.67	8.19	0.333	9.21	1.167	50.01	2.000	11.81
2.83	7.66						

3.00	7.20	0.500	11.18		1.333	26.90		2.167	10.57	
		0.667	14.66		1.500	19.66		2.333	9.61	
		0.833	23.26		1.667	15.87		2.500	8.83	

Unit Hyd Qpeak (cms)= 0.003

PEAK FLOW (cms)= 0.001 (i)
 TIME TO PEAK (hrs)= 1.167
 RUNOFF VOLUME (mm)= 26.987
 TOTAL RAINFALL (mm)= 70.976
 RUNOFF COEFFICIENT = 0.380

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
| CALIB |
| NASHYD ( 0101) | Area (ha)= 0.13 Curve Number
(CN)= 76.5
| ID= 1 DT=10.0 min | Ia (mm)= 4.68 # of Linear
Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.12

```

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

		---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN
hrs	mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr
2.67	8.19	0.167	7.92		1.000	169.83		1.833	13.48
2.83	7.66	0.333	9.21		1.167	50.01		2.000	11.81
3.00	7.20	0.500	11.18		1.333	26.90		2.167	10.57
		0.667	14.66		1.500	19.66		2.333	9.61
		0.833	23.26		1.667	15.87		2.500	8.83

Unit Hyd Qpeak (cms)= 0.042

PEAK FLOW (cms)= 0.015 (i)
 TIME TO PEAK (hrs)= 1.000
 RUNOFF VOLUME (mm)= 26.129
 TOTAL RAINFALL (mm)= 70.976
 RUNOFF COEFFICIENT = 0.368

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0101):    0.13    0.015    1.00    26.13
+ ID2= 2 ( 0102):    0.01    0.001    1.17    26.99
=====
ID = 3 ( 0007):    0.14    0.016    1.00    26.20

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
=====
=====
V      V      I      SSSSS  U      U      A      L      (v
6.2.2017)
V      V      I      SS      U      U      A A      L
V V      I      SS      U      U      AAAAA L
V V      I      SS      U      U      A      A L
VV      I      SSSSS  UUUUU  A      A  LLLLL
OOO      TTTTT  TTTTT  H      H      Y      Y  M      M  OOO      TM
O      O      T      T      H      H      Y Y      MM MM  O      O
O      O      T      T      H      H      Y      M      M  O      O
OOO      T      T      H      H      Y      M      M  OOO

```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2
 \voin.dat

Output filename: C:\Users\kristine.campbell\AppData\Local
 \Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\045c0475-
 deb1-421f-9f8e-d461d7d

Summary filename: C:\Users\kristine.campbell\AppData\Local
 \Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\045c0475-
 deb1-421f-9f8e-d461d7d

DATE: 08/14/2025

TIME: 02:48:40

USER:

COMMENTS:

```

-----
*****
** SIMULATION : 10yr 3hr 5min Chicago **
*****

```

```

-----
| CHICAGO STORM      | IDF curve parameters: A= 622.842
| Ptotal= 49.54 mm  | B= 0.000
----- C= 0.699
used in:  INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step   = 5.00 min
Time to peak ratio = 0.33

TIME      RAIN      TIME      RAIN | TIME      RAIN | TIME      RAIN |
hrs      mm/hr     hrs      mm/hr | hrs      mm/hr | hrs      mm/hr |
0.00      5.34     0.75      18.76 | 1.50      11.59 |
2.25      6.56     0.83      34.89 | 1.58      10.57 |
2.33      6.29     0.92     202.21 | 1.67       9.75 |
2.42      6.04     1.00      42.82 | 1.75       9.07 |
2.50      5.82     1.08      27.00 | 1.83       8.49 |
2.58      5.62     1.17      20.59 | 1.92       8.00 |
2.67      5.43     1.25      16.96 | 2.00       7.57 |
2.75      5.26     1.33      14.58 | 2.08       7.19 |
2.83      5.10     1.42      12.87 | 2.17       6.86 |
2.92      4.95

```

```

-----
-----
| CALIB              |
| NASHYD ( 0102) | Area      (ha)= 0.01 Curve Number
(CN)= 74.3
|ID= 1 DT=10.0 min | Ia        (mm)= 4.96 # of Linear

```

Res. (N)= 3.00

----- U.H. Tp(hrs)= 0.17

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

		----- TRANSFORMED HYETOGRAPH -----								
TIME	RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN	
hrs	mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr	
		0.167	5.53		1.000	118.55		1.833	9.41	
2.67	5.72	0.333	6.43		1.167	34.91		2.000	8.25	
2.83	5.34	0.500	7.81		1.333	18.77		2.167	7.38	
3.00	5.02	0.667	10.24		1.500	13.73		2.333	6.71	
		0.833	16.24		1.667	11.08		2.500	6.17	

Unit Hyd Qpeak (cms)= 0.003

PEAK FLOW (cms)= 0.001 (i)

TIME TO PEAK (hrs)= 1.167

RUNOFF VOLUME (mm)= 14.302

TOTAL RAINFALL (mm)= 49.544

RUNOFF COEFFICIENT = 0.289

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| NASHYD (0101) | Area (ha)= 0.13 Curve Number
(CN)= 76.5
| ID= 1 DT=10.0 min | Ia (mm)= 4.68 # of Linear
Res. (N)= 3.00
----- U.H. Tp(hrs)= 0.12

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

		----- TRANSFORMED HYETOGRAPH -----								
TIME	RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN	
hrs	mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr	
		0.167	5.53		1.000	118.55		1.833	9.41	
2.67	5.72	0.333	6.43		1.167	34.91		2.000	8.25	
2.83	5.34									

```

3.00      5.02      0.500      7.81 | 1.333      18.77 | 2.167      7.38 |
              0.667      10.24 | 1.500      13.73 | 2.333      6.71 |
              0.833      16.24 | 1.667      11.08 | 2.500      6.17 |

```

Unit Hyd Qpeak (cms)= 0.042

PEAK FLOW (cms)= 0.007 (i)
 TIME TO PEAK (hrs)= 1.000
 RUNOFF VOLUME (mm)= 14.053
 TOTAL RAINFALL (mm)= 49.544
 RUNOFF COEFFICIENT = 0.284

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----

```

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
              AREA      QPEAK      TPEAK      R.V.
              (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0101): 0.13    0.007      1.00      14.05
+ ID2= 2 ( 0102): 0.01    0.001      1.17      14.30
=====
ID = 3 ( 0007): 0.14    0.008      1.00      14.07

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
-----
=====
=====

```

```

V      V      I      SSSSS  U      U      A      L      (v
6.2.2017)
V      V      I      SS      U      U      A A      L
V      V      I      SS      U      U      AAAAA  L
V      V      I      SS      U      U      A      A  L
VV      I      SSSSS  UUUUU  A      A      LLLLL
OOO      TTTTT  TTTTT  H      H      Y      Y      M      M      OOO      TM
O      O      T      T      H      H      Y      Y      MM      MM      O      O
O      O      T      T      H      H      Y      M      M      O      O
OOO      T      T      H      H      Y      M      M      OOO

```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2
 \voin.dat
 Output filename: C:\Users\kristine.campbell\AppData\Local
 \Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\8d0ea48a-
 e90c-4bde-b58b-feb5ee2
 Summary filename: C:\Users\kristine.campbell\AppData\Local
 \Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\8d0ea48a-
 e90c-4bde-b58b-feb5ee2

DATE: 08/14/2025

TIME: 02:48:40

USER:

COMMENTS:

 ** SIMULATION : 25yr 3hr 5min Chicago **

 | CHICAGO STORM | IDF curve parameters: A= 731.314
 | Ptotal= 58.17 mm | B= 0.000
 ----- C= 0.699
 used in: INTENSITY = A / (t + B)^C
 Duration of storm = 3.00 hrs
 Storm time step = 5.00 min
 Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	6.27	0.75	22.03	1.50	13.60		
2.25	7.70	0.83	40.97	1.58	12.41		
2.33	7.38	0.92	237.42	1.67	11.45		
2.42	7.10	1.00	50.28	1.75	10.65		
2.50	6.83	1.08	31.70	1.83	9.97		
2.58	6.60	1.17	24.17	1.92	9.39		
2.67	6.38						

2.75	6.17	0.50	11.04		1.25	19.91		2.00	8.89	
2.83	5.99	0.58	13.00		1.33	17.12		2.08	8.44	
2.92	5.81	0.67	16.10		1.42	15.12		2.17	8.05	

```

-----
-----
-----
| CALIB |
| NASHYD ( 0102) | Area (ha)= 0.01 Curve Number
(CN)= 74.3
| ID= 1 DT=10.0 min | Ia (mm)= 4.96 # of Linear
Res. (N)= 3.00
----- U.H. Tp(hrs)= 0.17

```

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

```

----- TRANSFORMED HYETOGRAPH -----
TIME      RAIN      TIME      RAIN | TIME      RAIN | TIME      RAIN |
hrs      mm/hr     hrs      mm/hr | hrs      mm/hr | hrs      mm/hr |
2.67      6.72     0.167     6.49 | 1.000    139.20 | 1.833     11.05 |
2.83      6.27     0.333     7.55 | 1.167     40.99 | 2.000     9.68 |
3.00      5.90     0.500     9.16 | 1.333     22.04 | 2.167     8.67 |
           0.667    12.02 | 1.500     16.12 | 2.333     7.87 |
           0.833    19.06 | 1.667     13.01 | 2.500     7.24 |

```

```

Unit Hyd Qpeak (cms)= 0.003
PEAK FLOW (cms)= 0.001 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 19.126
TOTAL RAINFALL (mm)= 58.173
RUNOFF COEFFICIENT = 0.329

```

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
| CALIB |
| NASHYD ( 0101) | Area (ha)= 0.13 Curve Number
(CN)= 76.5
| ID= 1 DT=10.0 min | Ia (mm)= 4.68 # of Linear

```

Res. (N)= 3.00

----- U.H. Tp(hrs)= 0.12

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

```

                                ----- TRANSFORMED HYETOGRAPH -----
TIME      RAIN              TIME      RAIN | TIME      RAIN | TIME      RAIN |
hrs      mm/hr            hrs      mm/hr | hrs      mm/hr | hrs      mm/hr |
2.67      6.72            0.167      6.49 | 1.000    139.20 | 1.833     11.05 |
2.83      6.27            0.333      7.55 | 1.167     40.99 | 2.000      9.68 |
3.00      5.90            0.500      9.16 | 1.333     22.04 | 2.167      8.67 |
                                0.667     12.02 | 1.500     16.12 | 2.333      7.87 |
                                0.833     19.06 | 1.667     13.01 | 2.500      7.24 |

```

Unit Hyd Qpeak (cms)= 0.042

PEAK FLOW (cms)= 0.010 (i)

TIME TO PEAK (hrs)= 1.000

RUNOFF VOLUME (mm)= 18.667

TOTAL RAINFALL (mm)= 58.173

RUNOFF COEFFICIENT = 0.321

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.


```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
          ID1= 1 ( 0101):    0.13   0.010   1.00   18.67
+ ID2= 2 ( 0102):    0.01   0.001   1.17   19.13
=====
          ID = 3 ( 0007):    0.14   0.011   1.00   18.71

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

=====

```

        V    V    I    SSSSS  U    U    A    L              (v
6.2.2017)
        V    V    I    SS     U    U    A A    L
        V    V    I    SS     U    U    AAAAA  L

```

```

V  V      I      SS      U      U      A      A      L
VV      I      SSSSS  UUUUU  A      A      LLLLL

```

```

    OOO      TTTTT  TTTTT  H      H      Y      Y      M      M      OOO      TM
O      O      T      T      H      H      Y      Y      MM      MM      O      O
O      O      T      T      H      H      Y      M      M      O      O
    OOO      T      T      H      H      Y      M      M      OOO

```

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***** D E T A I L E D O U T P U T *****

```

Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2
\voindat
Output  filename: C:\Users\kristine.campbell\AppData\Local
\Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a
\2d41c165-0d29-4ac5-b0b3-78efcfd
Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a
\2d41c165-0d29-4ac5-b0b3-78efcfd

```

DATE: 08/14/2025

TIME: 02:48:40

USER:

COMMENTS:

```

*****
** SIMULATION : 50yr 3hr 5min Chicago **
*****

```

```

-----
| CHICAGO STORM |
| Ptotal= 64.71 mm |
-----

```

```

IDF curve parameters: A= 813.543
                      B= 0.000
                      C= 0.699

```

used in: INTENSITY = A / (t + B)^C

```

Duration of storm = 3.00 hrs
Storm time step   = 5.00 min
Time to peak ratio = 0.33

```

```

TIME      RAIN | TIME      RAIN | ' TIME      RAIN |

```

TIME	RAIN	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr	
hrs	mm/hr									
		0.00	6.97		0.75	24.50		1.50	15.13	
2.25	8.56	0.08	7.46		0.83	45.57		1.58	13.81	
2.33	8.21	0.17	8.04		0.92	264.12		1.67	12.74	
2.42	7.89	0.25	8.75		1.00	55.93		1.75	11.85	
2.50	7.60	0.33	9.63		1.08	35.26		1.83	11.09	
2.58	7.34	0.42	10.76		1.17	26.89		1.92	10.45	
2.67	7.09	0.50	12.28		1.25	22.15		2.00	9.89	
2.75	6.87	0.58	14.46		1.33	19.04		2.08	9.39	
2.83	6.66	0.67	17.91		1.42	16.82		2.17	8.96	
2.92	6.47									

```

-----
-----
-----
| CALIB |
| NASHYD ( 0102) | Area (ha)= 0.01 Curve Number
(CN)= 74.3
|ID= 1 DT=10.0 min | Ia (mm)= 4.96 # of Linear
Res. (N)= 3.00
----- U.H. Tp(hrs)= 0.17

```

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

		---- TRANSFORMED HYETOGRAPH ----								
TIME	RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN	
hrs	mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr	
		0.167	7.22		1.000	154.85		1.833	12.29	
2.67	7.47	0.333	8.40		1.167	45.60		2.000	10.77	
2.83	6.98	0.500	10.20		1.333	24.52		2.167	9.64	
3.00	6.56	0.667	13.37		1.500	17.93		2.333	8.76	
		0.833	21.21		1.667	14.47		2.500	8.05	

Unit Hyd Qpeak (cms)= 0.003

PEAK FLOW (cms)= 0.001 (i)
 TIME TO PEAK (hrs)= 1.167
 RUNOFF VOLUME (mm)= 23.048
 TOTAL RAINFALL (mm)= 64.714
 RUNOFF COEFFICIENT = 0.356

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| CALIB |
| NASHYD ( 0101) | Area (ha)= 0.13 Curve Number
(CN)= 76.5
| ID= 1 DT=10.0 min | Ia (mm)= 4.68 # of Linear
Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.12
  
```

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

```

----- TRANSFORMED HYETOGRAPH -----
TIME      RAIN      TIME      RAIN | TIME      RAIN | TIME      RAIN |
hrs      mm/hr      hrs      mm/hr | hrs      mm/hr | hrs      mm/hr |
2.67      7.47      0.167      7.22 | 1.000     154.85 | 1.833     12.29 |
2.83      6.98      0.333      8.40 | 1.167      45.60 | 2.000     10.77 |
3.00      6.56      0.500     10.20 | 1.333      24.52 | 2.167      9.64 |
              0.667     13.37 | 1.500      17.93 | 2.333      8.76 |
              0.833     21.21 | 1.667      14.47 | 2.500      8.05 |
  
```

Unit Hyd Qpeak (cms)= 0.042

PEAK FLOW (cms)= 0.013 (i)
 TIME TO PEAK (hrs)= 1.000
 RUNOFF VOLUME (mm)= 22.398
 TOTAL RAINFALL (mm)= 64.714
 RUNOFF COEFFICIENT = 0.346

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
  
```

ID1= 1 (0101):	0.13	0.013	1.00	22.40
+ ID2= 2 (0102):	0.01	0.001	1.17	23.05
=====				
ID = 3 (0007):	0.14	0.014	1.00	22.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

=====

=====

V	V	I	SSSSS	U	U	A	L	(v
6.2.2017)								
V	V	I	SS	U	U	A A	L	
V	V	I	SS	U	U	AAAAA	L	
V	V	I	SS	U	U	A A	L	
VV		I	SSSSS	UUUUU		A A	LLLLL	

OOO	TTTTT	TTTTT	H	H	Y	Y	M	M	OOO	TM
O O	T	T	H	H	Y Y		MM	MM	O O	
O O	T	T	H	H	Y		M	M	O O	
OOO	T	T	H	H	Y		M	M	OOO	

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2
\voin.dat

Output filename: C:\Users\kristine.campbell\AppData\Local
\Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\8ccd18a5-
f5dc-4e2b-8067-849f9fd

Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\8ccd18a5-
f5dc-4e2b-8067-849f9fd

DATE: 08/14/2025

TIME: 02:48:40

USER:

COMMENTS:

```

-----
*****
** SIMULATION : 5yr 3hr 5min Chicago **
*****

```

```

-----
| CHICAGO STORM      | IDF curve parameters: A= 535.364
| Ptotal= 42.59 mm   |                               B=  0.000
-----                               C=  0.699
                                used in:  INTENSITY =  A / (t + B)^C

                                Duration of storm =  3.00 hrs
                                Storm time step   =  5.00 min
                                Time to peak ratio =  0.33

```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	4.59	0.75	16.12	1.50	9.96		
2.25	5.64	0.83	29.99	1.58	9.09		
2.33	5.40	0.92	173.81	1.67	8.38		
2.42	5.19	1.00	36.80	1.75	7.80		
2.50	5.00	1.08	23.21	1.83	7.30		
2.58	4.83	1.17	17.70	1.92	6.88		
2.67	4.67	1.25	14.58	2.00	6.51		
2.75	4.52	1.33	12.53	2.08	6.18		
2.83	4.38	1.42	11.07	2.17	5.89		
2.92	4.25						

```

-----
-----
| CALIB              |
| NASHYD ( 0102) | Area      (ha)=  0.01  Curve Number
(CN)= 74.3
| ID= 1 DT=10.0 min | Ia        (mm)=  4.96  # of Linear
Res. (N)= 3.00
----- U.H. Tp(hrs)=  0.17

```

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN		TIME	RAIN	
hrs	mm/hr	hrs	mm/hr		hrs	mm/hr	
2.67	4.92	0.167	4.75		1.000	101.90	
2.83	4.59	0.333	5.53		1.167	30.01	
3.00	4.32	0.500	6.71		1.333	16.14	
		0.667	8.80		1.500	11.80	
		0.833	13.96		1.667	9.52	
					2.000	7.09	
					2.167	6.34	
					2.333	5.76	
					2.500	5.30	

Unit Hyd Qpeak (cms)= 0.003

PEAK FLOW (cms)= 0.000 (i)

TIME TO PEAK (hrs)= 1.167

RUNOFF VOLUME (mm)= 10.653

TOTAL RAINFALL (mm)= 42.586

RUNOFF COEFFICIENT = 0.250

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
| CALIB |
| NASHYD ( 0101) | Area (ha)= 0.13 Curve Number
(CN)= 76.5
| ID= 1 DT=10.0 min | Ia (mm)= 4.68 # of Linear
Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.12

```

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN		TIME	RAIN	
hrs	mm/hr	hrs	mm/hr		hrs	mm/hr	
2.67	4.92	0.167	4.75		1.000	101.90	
2.83	4.59	0.333	5.53		1.167	30.01	
3.00	4.32	0.500	6.71		1.333	16.14	
					2.167	6.34	

0.667	8.80		1.500	11.80		2.333	5.76	
0.833	13.96		1.667	9.52		2.500	5.30	

Unit Hyd Qpeak (cms)= 0.042

PEAK FLOW (cms)= 0.005 (i)
 TIME TO PEAK (hrs)= 1.000
 RUNOFF VOLUME (mm)= 10.634
 TOTAL RAINFALL (mm)= 42.586
 RUNOFF COEFFICIENT = 0.250

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	ADD HYD	(	0007)	
	1 + 2 =	3		

		AREA	QPEAK	TPEAK
		(ha)	(cms)	(hrs)
				R.V.
				(mm)
	ID1= 1 (	0.13	0.005	1.00
	0101):			10.63
	+ ID2= 2 (	0.01	0.000	1.17
	0102):			10.65
=====				
	ID = 3 (	0.14	0.006	1.00
	0007):			10.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```
=====
=====
```

```

      V      V      I      SSSSS  U      U      A      L      (v
6.2.2017)
      V      V      I      SS      U      U      A A      L
      V      V      I      SS      U      U      AAAAA L
      V      V      I      SS      U      U      A      A L
      VV      I      SSSSS  UUUUU  A      A      LLLLL

```

```

      OOO      TTTTT  TTTTT  H      H      Y      Y      M      M      OOO      TM
      O      O      T      T      H      H      Y Y      MM MM      O      O
      O      O      T      T      H      H      Y      M      M      O      O
      OOO      T      T      H      H      Y      M      M      OOO

```

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***** D E T A I L E D O U T P U T *****

```

Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2
\voindat
Output  filename: C:\Users\kristine.campbell\AppData\Local
\Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a
\5c913353-31b0-4e9a-ae8c-28eb8c2
Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a
\5c913353-31b0-4e9a-ae8c-28eb8c2

```

DATE: 08/14/2025

TIME: 02:55:23

USER:

COMMENTS:

```
-----
-----
```

```

*****
** SIMULATION : 100yr 3hr 5min Chicago **
*****

```

```

-----
| CHICAGO STORM      |      IDF curve parameters: A= 892.273
| Ptotal= 70.98 mm  |                      B=    0.000
-----                      C=    0.699

```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs

Storm time step = 5.00 min

Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	7.65	0.75	26.87	1.50	16.60		
2.25	9.39	0.83	49.98	1.58	15.15		
2.33	9.01	0.92	289.68	1.67	13.97		
2.42	8.66	1.00	61.34	1.75	12.99		
2.50	8.34	1.08	38.68	1.83	12.17		
2.58	8.05	1.17	29.50	1.92	11.46		
2.67	7.78	1.25	24.30	2.00	10.84		
2.75	7.53	1.33	20.88	2.08	10.30		
2.83	7.30	1.42	18.44	2.17	9.82		
2.92	7.09						

CALIB			
STANDHYD (0202)		Area (ha)=	0.05
ID= 1 DT= 5.0 min		Total Imp(%)=	99.90 Dir. Conn.(%)=
99.90			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.05	0.00
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	8.00	2.00
Length	(m)=	18.26	3.00
Mannings n	=	0.013	0.250
Max.Eff.Inten. (mm/hr)=		289.68	66.29
over (min)		5.00	5.00
Storage Coeff. (min)=		0.32 (ii)	0.38 (ii)
Unit Hyd. Tpeak (min)=		5.00	5.00
Unit Hyd. peak (cms)=		0.34	0.34

TOTALS

0.040	PEAK FLOW	(cms)=	0.04	0.00
1.00	TIME TO PEAK	(hrs)=	1.00	1.00
69.93	RUNOFF VOLUME	(mm)=	69.98	28.04
70.98	TOTAL RAINFALL	(mm)=	70.98	70.98
0.99	RUNOFF COEFFICIENT	=	0.99	0.40

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
|SOAKAWAY( 0012)| UNDERDRAIN: OFF
|IN= 2--> OUT= 3 |
|DT= 5.0 MIN    | STORAGE LAYER:
|-----| Length (m)= 30.00 Height
(m)= 0.80
Porosity = 0.40 Initial Water
Level (m)= 0.00
Width (m)= 2.00 Min. Drawdown
(hr)= 24.00
Max. Drawdown (hr)= 62.75 Available
Storage (cu.m.)= 19.20

NATIVE SOIL LAYER:
Infiltration (m/hr) = 0.0051

```

R.V.	AREA	QPEAK	TPEAK	
(mm)	(ha)	(cms)	(hrs)	
69.93	INFLOW:ID= 2	0.05	0.040	1.00
29.75	OVERFLOW:ID= 3	0.05	0.007	1.08

Volume Reduction Rate[(RVin-RVout)/RVin] (%):
If RVout= (Overflow) =

57.46

Time to reach Max storage (Hr)=

1.08

Volume of water for drawdown in LID (cu.m.)=

19.17
 Volume of maximum water storage (cu.m.)=
 19.20
 Calculated Drawdown Time (Hr)=
 62.58

Junction Command(0013)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 3(0012)	0.05	0.01	1.08	29.75
OUTFLOW: ID= 2(0013)	0.05	0.01	1.08	29.75

 | CALIB |
 | NASHYD (0201) | Area (ha)= 0.07 Curve Number
 (CN)= 74.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear
 Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.13

Unit Hyd Qpeak (cms)= 0.019

PEAK FLOW (cms)= 0.008 (i)
 TIME TO PEAK (hrs)= 1.083
 RUNOFF VOLUME (mm)= 27.759
 TOTAL RAINFALL (mm)= 70.976
 RUNOFF COEFFICIENT = 0.391

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 | ADD HYD (0016) |
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0013):	0.05	0.007	1.08	29.75
+ ID2= 2 (0201):	0.07	0.008	1.08	27.76
=====				
ID = 3 (0016):	0.12	0.015	1.08	28.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |

```
| STANDHYD ( 0203) | Area (ha)= 0.03
| ID= 1 DT= 5.0 min | Total Imp(%)= 56.90 Dir. Conn.(%)=
56.90
```

```
-----
                        IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)=      0.02          0.01
Dep. Storage (mm)=      2.00          5.00
Average Slope (%)=      2.00          2.00
Length (m)=      13.90          9.00
Mannings n =      0.013          0.250

Max.Eff.Inten.(mm/hr)= 289.68          66.29
over (min)          5.00          5.00
Storage Coeff. (min)= 0.42 (ii)      2.10 (ii)
Unit Hyd. Tpeak (min)= 5.00          5.00
Unit Hyd. peak (cms)= 0.34          0.31
```

```
*TOTALS*
PEAK FLOW (cms)=      0.01          0.00
0.017 (iii)
TIME TO PEAK (hrs)=      1.00          1.00
1.00
RUNOFF VOLUME (mm)=      68.98          28.04
51.32
TOTAL RAINFALL (mm)=      70.98          70.98
70.98
RUNOFF COEFFICIENT =      0.97          0.40
0.72
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
-----
```

```
-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
                        AREA      QPEAK      TPEAK      R.V.
                        (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0016):      0.12      0.015      1.08      28.62
+ ID2= 2 ( 0203):      0.03      0.017      1.00      51.32
=====
ID = 3 ( 0017):      0.14      0.023      1.00      33.16
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
-----
```

```
=====
=====
```

```

      V      V      I      SSSSS  U      U      A      L      (v
6.2.2017)
      V      V      I      SS      U      U      A A      L
      V      V      I      SS      U      U      AAAAA L
      V      V      I      SS      U      U      A      A L
      VV      I      SSSSS  UUUUU  A      A  LLLLL

```

```

      OOO      TTTTT  TTTTT  H      H      Y      Y  M      M      OOO      TM
      O      O      T      T      H      H      Y Y      MM MM  O      O
      O      O      T      T      H      H      Y      M      M  O      O
      OOO      T      T      H      H      Y      M      M      OOO

```

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***** D E T A I L E D O U T P U T *****

```

Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2
\voindat
Output  filename: C:\Users\kristine.campbell\AppData\Local
\Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\4f81034c-
d9a9-4bc2-ba24-eb656e
Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\4f81034c-
d9a9-4bc2-ba24-eb656e

```

DATE: 08/14/2025

TIME: 02:55:23

USER:

COMMENTS:

```
-----
-----
```

```

*****
** SIMULATION : 10yr 3hr 5min Chicago **
*****

```

```

-----
| CHICAGO STORM      |      IDF curve parameters: A= 622.842
| Ptotal= 49.54 mm  |                      B=   0.000
-----                      C=   0.699

```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs

Storm time step = 5.00 min

Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	5.34	0.75	18.76	1.50	11.59		
2.25	6.56	0.83	34.89	1.58	10.57		
2.33	6.29	0.92	202.21	1.67	9.75		
2.42	6.04	1.00	42.82	1.75	9.07		
2.50	5.82	1.08	27.00	1.83	8.49		
2.58	5.62	1.17	20.59	1.92	8.00		
2.67	5.43	1.25	16.96	2.00	7.57		
2.75	5.26	1.33	14.58	2.08	7.19		
2.83	5.10	1.42	12.87	2.17	6.86		
2.92	4.95						

CALIB			
STANDHYD (0202)		Area (ha)=	0.05
ID= 1 DT= 5.0 min		Total Imp(%)=	99.90 Dir. Conn.(%)=
99.90			

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.05	0.00
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	8.00	2.00
Length (m)=	18.26	3.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr)=	202.21	33.28
over (min)	5.00	5.00
Storage Coeff. (min)=	0.37 (ii)	0.44 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.34

TOTALS

```

    PEAK FLOW      (cms)=      0.03      0.00
0.028 (iii)
    TIME TO PEAK   (hrs)=      1.00      1.00
1.00
    RUNOFF VOLUME   (mm)=      48.54     14.83
48.51
    TOTAL RAINFALL  (mm)=      49.54     49.54
49.54
    RUNOFF COEFFICIENT =      0.98      0.30
0.98

```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
|SOAKAWAY( 0012)| UNDERDRAIN: OFF
|IN= 2--> OUT= 3 |
|DT= 5.0 MIN    | STORAGE LAYER:
-----
(m)= 0.80      Length      (m)= 30.00      Height
      Porosity      = 0.40      Initial Water
Level      (m)= 0.00
      Width      (m)= 2.00      Min. Drawdown
(hr)= 24.00
      Max. Drawdown (hr)= 62.75      Available
Storage (cu.m.)= 19.20

      NATIVE SOIL LAYER:
      Infiltration (m/hr) = 0.0051

```

```

      AREA      QPEAK      TPEAK
R.V.      (ha)      (cms)      (hrs)
(mm)
      INFLOW:ID= 2      0.05      0.028      1.00
48.51
      OVERFLOW:ID= 3      0.05      0.001      1.75
8.38

```

```

      Volume Reduction Rate[(RVin-RVout)/RVin] (%):
      If RVout= (Overflow) =
82.73
      Time to reach Max storage      (Hr)=
1.67
      Volume of water for drawdown in LID (cu.m.)=

```

19.17
 Volume of maximum water storage (cu.m.)=
 19.20
 Calculated Drawdown Time (Hr)=
 62.58

Junction Command(0013)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 3(0012)	0.05	0.00	1.75	8.38
OUTFLOW: ID= 2(0013)	0.05	0.00	1.75	8.38

 | CALIB |
 | NASHYD (0201) | Area (ha)= 0.07 Curve Number
 (CN)= 74.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear
 Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.13

Unit Hyd Qpeak (cms)= 0.019

PEAK FLOW (cms)= 0.004 (i)
 TIME TO PEAK (hrs)= 1.083
 RUNOFF VOLUME (mm)= 14.680
 TOTAL RAINFALL (mm)= 49.544
 RUNOFF COEFFICIENT = 0.296

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 | ADD HYD (0016) |
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0013):	0.05	0.001	1.75	8.38
+ ID2= 2 (0201):	0.07	0.004	1.08	14.68
=====				
ID = 3 (0016):	0.12	0.004	1.08	11.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |

```
| STANDHYD ( 0203) | Area (ha)= 0.03
| ID= 1 DT= 5.0 min | Total Imp(%)= 56.90 Dir. Conn.(%)=
56.90
```

```
-----
                        IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)=      0.02          0.01
Dep. Storage (mm)=      2.00          5.00
Average Slope (%)=      2.00          2.00
Length (m)=      13.90          9.00
Mannings n =      0.013          0.250

Max.Eff.Inten.(mm/hr)= 202.21          33.28
over (min)          5.00          5.00
Storage Coeff. (min)= 0.48 (ii)      2.43 (ii)
Unit Hyd. Tpeak (min)= 5.00          5.00
Unit Hyd. peak (cms)= 0.34          0.30
```

TOTALS

```
PEAK FLOW (cms)=      0.01          0.00
0.011 (iii)
TIME TO PEAK (hrs)=      1.00          1.00
1.00
RUNOFF VOLUME (mm)=      47.54          14.83
33.43
TOTAL RAINFALL (mm)=      49.54          49.54
49.54
RUNOFF COEFFICIENT =      0.96          0.30
0.67
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
-----
```

```
-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
                        AREA      QPEAK      TPEAK      R.V.
                        (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0016):      0.12      0.004      1.08      11.96
+ ID2= 2 ( 0203):      0.03      0.011      1.00      33.43
=====
ID = 3 ( 0017):      0.14      0.014      1.00      16.26
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
-----
```

```
=====
=====
```

```

      V      V      I      SSSSS  U      U      A      L      (v
6.2.2017)
      V      V      I      SS      U      U      A A      L
      V V      I      SS      U      U      AAAAA L
      V V      I      SS      U      U      A      A L
      VV      I      SSSSS  UUUUU  A      A  LLLLL

```

```

      OOO      TTTTT  TTTTT  H      H  Y      Y  M      M  OOO      TM
      O      O      T      T      H      H  Y Y      MM MM  O      O
      O      O      T      T      H      H  Y      M      M  O      O
      OOO      T      T      H      H  Y      M      M  OOO

```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2
 \voin.dat
 Output filename: C:\Users\kristine.campbell\AppData\Local
 \Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\aoce2446-
 bf52-4130-8210-f8248c3
 Summary filename: C:\Users\kristine.campbell\AppData\Local
 \Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\aoce2446-
 bf52-4130-8210-f8248c3

DATE: 08/14/2025

TIME: 02:55:23

USER:

COMMENTS:

```
-----
-----
```

```

*****
** SIMULATION : 25yr 3hr 5min Chicago **
*****

```

```

-----
| CHICAGO STORM      |      IDF curve parameters: A= 731.314
| Ptotal= 58.17 mm  |      B=      0.000
-----
|                     |      C=      0.699

```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs

Storm time step = 5.00 min

Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	6.27	0.75	22.03	1.50	13.60		
2.25	7.70	0.83	40.97	1.58	12.41		
2.33	7.38	0.92	237.42	1.67	11.45		
2.42	7.10	1.00	50.28	1.75	10.65		
2.50	6.83	1.08	31.70	1.83	9.97		
2.58	6.60	1.17	24.17	1.92	9.39		
2.67	6.38	1.25	19.91	2.00	8.89		
2.75	6.17	1.33	17.12	2.08	8.44		
2.83	5.99	1.42	15.12	2.17	8.05		
2.92	5.81						

CALIB			
STANDHYD (0202)		Area (ha)=	0.05
ID= 1 DT= 5.0 min		Total Imp(%)=	99.90
99.90		Dir. Conn.(%)=	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.05	0.00
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	8.00	2.00
Length (m)=	18.26	3.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr)=	237.42	45.68
over (min)	5.00	5.00
Storage Coeff. (min)=	0.35 (ii)	0.42 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.34

TOTALS

```

    PEAK FLOW      (cms)=      0.03      0.00
0.033 (iii)
    TIME TO PEAK   (hrs)=      1.00      1.00
1.00
    RUNOFF VOLUME  (mm)=      57.17      19.85
57.14
    TOTAL RAINFALL (mm)=      58.17      58.17
58.17
    RUNOFF COEFFICIENT =      0.98      0.34
0.98

```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
|SOAKAWAY( 0012)| UNDERDRAIN: OFF
|IN= 2--> OUT= 3 |
|DT= 5.0 MIN    | STORAGE LAYER:
-----
(m)= 0.80      Length      (m)= 30.00      Height
      Porosity      = 0.40      Initial Water
Level      (m)= 0.00
      Width      (m)= 2.00      Min. Drawdown
(hr)= 24.00
      Max. Drawdown (hr)= 62.75      Available
Storage (cu.m.)= 19.20

      NATIVE SOIL LAYER:
      Infiltration (m/hr) = 0.0051

```

R.V.	AREA	QPEAK	TPEAK
(mm)	(ha)	(cms)	(hrs)
INFLOW:ID= 2	0.05	0.033	1.00
OVERFLOW:ID= 3	0.05	0.003	1.33

```

      Volume Reduction Rate[(RVin-RVout)/RVin] (%):
      If RVout= (Overflow) =
70.33
      Time to reach Max storage      (Hr)=
1.25
      Volume of water for drawdown in LID (cu.m.)=

```

19.17
 Volume of maximum water storage (cu.m.)=
 19.20
 Calculated Drawdown Time (Hr)=
 62.58

Junction Command(0013)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 3(0012)	0.05	0.00	1.33	16.95
OUTFLOW: ID= 2(0013)	0.05	0.00	1.33	16.95

 | CALIB |
 | NASHYD (0201) | Area (ha)= 0.07 Curve Number
 (CN)= 74.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear
 Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.13

Unit Hyd Qpeak (cms)= 0.019

PEAK FLOW (cms)= 0.006 (i)
 TIME TO PEAK (hrs)= 1.083
 RUNOFF VOLUME (mm)= 19.651
 TOTAL RAINFALL (mm)= 58.173
 RUNOFF COEFFICIENT = 0.338

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 | ADD HYD (0016) |
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0013):	0.05	0.003	1.33	16.95
+ ID2= 2 (0201):	0.07	0.006	1.08	19.65
=====				
ID = 3 (0016):	0.12	0.006	1.08	18.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | CALIB |

```
| STANDHYD ( 0203) | Area (ha)= 0.03
| ID= 1 DT= 5.0 min | Total Imp(%)= 56.90 Dir. Conn.(%)=
56.90
```

```
-----
                        IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)=      0.02          0.01
Dep. Storage (mm)=      2.00          5.00
Average Slope (%)=      2.00          2.00
Length (m)=      13.90          9.00
Mannings n =      0.013          0.250

Max.Eff.Inten.(mm/hr)= 237.42          45.68
over (min)          5.00          5.00
Storage Coeff. (min)= 0.45 (ii)      2.28 (ii)
Unit Hyd. Tpeak (min)= 5.00          5.00
Unit Hyd. peak (cms)= 0.34          0.30
```

```
*TOTALS*
PEAK FLOW (cms)=      0.01          0.00
0.013 (iii)
TIME TO PEAK (hrs)=      1.00          1.00
1.00
RUNOFF VOLUME (mm)=      56.17          19.85
40.50
TOTAL RAINFALL (mm)=      58.17          58.17
58.17
RUNOFF COEFFICIENT =      0.97          0.34
0.70
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
-----
```

```
-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
                        AREA      QPEAK      TPEAK      R.V.
                        (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0016):      0.12      0.006      1.08      18.49
+ ID2= 2 ( 0203):      0.03      0.013      1.00      40.50
=====
ID = 3 ( 0017):      0.14      0.017      1.00      22.89
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
-----
```

```
=====
=====
```

```

      V      V      I      SSSSS  U      U      A      L      (v
6.2.2017)
      V      V      I      SS      U      U      A A      L
      V V      I      SS      U      U      AAAAA L
      V V      I      SS      U      U      A      A L
      VV      I      SSSSS  UUUUU  A      A  LLLLL

```

```

      OOO      TTTTT  TTTTT  H      H  Y      Y  M      M  OOO      TM
      O      O      T      T      H      H  Y Y      MM MM  O      O
      O      O      T      T      H      H  Y      M      M  O      O
      OOO      T      T      H      H  Y      M      M  OOO

```

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***** D E T A I L E D O U T P U T *****

```

Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2
\voindat
Output  filename: C:\Users\kristine.campbell\AppData\Local
\Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a
\09105d79-2797-4e99-92ce-8e83521
Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a
\09105d79-2797-4e99-92ce-8e83521

```

DATE: 08/14/2025

TIME: 02:55:23

USER:

COMMENTS:

```
-----
-----
```

```

*****
** SIMULATION : 50yr 3hr 5min Chicago **
*****

```

```

-----
| CHICAGO STORM      |      IDF curve parameters: A= 813.543
| Ptotal= 64.71 mm  |                      B=    0.000
-----                      C=    0.699

```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs

Storm time step = 5.00 min

Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	6.97	0.75	24.50	1.50	15.13		
2.25	8.56	0.83	45.57	1.58	13.81		
2.33	8.21	0.92	264.12	1.67	12.74		
2.42	7.89	1.00	55.93	1.75	11.85		
2.50	7.60	1.08	35.26	1.83	11.09		
2.58	7.34	1.17	26.89	1.92	10.45		
2.67	7.09	1.25	22.15	2.00	9.89		
2.75	6.87	1.33	19.04	2.08	9.39		
2.83	6.66	1.42	16.82	2.17	8.96		
2.92	6.47						

CALIB			
STANDHYD (0202)		Area (ha)=	0.05
ID= 1 DT= 5.0 min		Total Imp(%)=	99.90
99.90		Dir. Conn.(%)=	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.05	0.00
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	8.00	2.00
Length	(m)=	18.26	3.00
Mannings n	=	0.013	0.250
Max.Eff.Inten. (mm/hr)=		264.12	55.91
over (min)		5.00	5.00
Storage Coeff. (min)=		0.33 (ii)	0.40 (ii)
Unit Hyd. Tpeak (min)=		5.00	5.00
Unit Hyd. peak (cms)=		0.34	0.34

TOTALS

```

        PEAK FLOW      (cms)=      0.04      0.00
0.037 (iii)
        TIME TO PEAK   (hrs)=      1.00      1.00
1.00
        RUNOFF VOLUME   (mm)=      63.71      23.94
63.67
        TOTAL RAINFALL   (mm)=      64.71      64.71
64.71
        RUNOFF COEFFICIENT  =      0.98      0.37
0.98

```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
|SOAKAWAY( 0012)| UNDERDRAIN: OFF
|IN= 2--> OUT= 3 |
|DT= 5.0 MIN    | STORAGE LAYER:
-----
(m)= 0.80          Length      (m)= 30.00   Height
                    Porosity    = 0.40     Initial Water
Level      (m)= 0.00          Width      (m)= 2.00   Min. Drawdown
(hr)= 24.00          Max. Drawdown (hr)= 62.75   Available
Storage      (cu.m.)= 19.20
                    NATIVE SOIL LAYER:
                    Infiltration (m/hr) = 0.0051

```

R.V.	AREA	QPEAK	TPEAK
(mm)	(ha)	(cms)	(hrs)
INFLOW:ID= 2	0.05	0.037	1.00
OVERFLOW:ID= 3	0.05	0.005	1.17

```

        Volume Reduction Rate[(RVin-RVout)/RVin] (%):
        If RVout= (Overflow) =
63.11
        Time to reach Max storage (Hr)=
1.08
        Volume of water for drawdown in LID (cu.m.)=

```

19.17
 Volume of maximum water storage (cu.m.)=
 19.20
 Calculated Drawdown Time (Hr)=
 62.58

Junction Command(0013)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 3(0012)	0.05	0.00	1.17	23.49
OUTFLOW: ID= 2(0013)	0.05	0.00	1.17	23.49

 | CALIB |
 | NASHYD (0201) | Area (ha)= 0.07 Curve Number
 (CN)= 74.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear
 Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.13

Unit Hyd Qpeak (cms)= 0.019

PEAK FLOW (cms)= 0.007 (i)
 TIME TO PEAK (hrs)= 1.083
 RUNOFF VOLUME (mm)= 23.694
 TOTAL RAINFALL (mm)= 64.714
 RUNOFF COEFFICIENT = 0.366

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 | ADD HYD (0016) |
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0013):	0.05	0.005	1.17	23.49
+ ID2= 2 (0201):	0.07	0.007	1.08	23.69
=====				
ID = 3 (0016):	0.12	0.011	1.17	23.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | CALIB |

```
| STANDHYD ( 0203) | Area (ha)= 0.03
| ID= 1 DT= 5.0 min | Total Imp(%)= 56.90 Dir. Conn.(%)=
56.90
```

```
-----
                        IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)=      0.02          0.01
Dep. Storage (mm)=      2.00          5.00
Average Slope (%)=      2.00          2.00
Length (m)=      13.90          9.00
Mannings n    =      0.013          0.250

Max.Eff.Inten.(mm/hr)= 264.12          55.91
                        over (min)      5.00          5.00
Storage Coeff. (min)= 0.43 (ii)      2.18 (ii)
Unit Hyd. Tpeak (min)= 5.00          5.00
Unit Hyd. peak (cms)= 0.34          0.31
```

```
*TOTALS*
PEAK FLOW (cms)=      0.01          0.00
0.015 (iii)
TIME TO PEAK (hrs)=      1.00          1.00
1.00
RUNOFF VOLUME (mm)=      62.71          23.94
45.98
TOTAL RAINFALL (mm)=      64.71          64.71
64.71
RUNOFF COEFFICIENT =      0.97          0.37
0.71
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
-----
```

```
-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
                        AREA      QPEAK      TPEAK      R.V.
                        (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0016):      0.12      0.011      1.17      23.61
+ ID2= 2 ( 0203):      0.03      0.015      1.00      45.98
=====
ID = 3 ( 0017):      0.14      0.020      1.00      28.08
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
-----
```

```
=====
=====
```

```

      V      V      I      SSSSS  U      U      A      L      (v
6.2.2017)
      V      V      I      SS      U      U      A A      L
      V      V      I      SS      U      U      AAAAA L
      V      V      I      SS      U      U      A      A L
      VV      I      SSSSS  UUUUU  A      A      LLLLL

```

```

      OOO      TTTTT  TTTTT  H      H      Y      Y      M      M      OOO      TM
      O      O      T      T      H      H      Y Y      MM MM      O      O
      O      O      T      T      H      H      Y      M      M      O      O
      OOO      T      T      H      H      Y      M      M      OOO

```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2
 \voin.dat
 Output filename: C:\Users\kristine.campbell\AppData\Local
 \Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\3f62f09e-
 db1d-4903-88ab-69047c5
 Summary filename: C:\Users\kristine.campbell\AppData\Local
 \Civica\XH5\6ec45647-ad21-4b76-932e-273312f20f6a\3f62f09e-
 db1d-4903-88ab-69047c5

DATE: 08/14/2025

TIME: 02:55:23

USER:

COMMENTS:

```
-----
```

```

*****
** SIMULATION : 5yr 3hr 5min Chicago **
*****

```

```

-----
| CHICAGO STORM      |      IDF curve parameters: A= 535.364
| Ptotal= 42.59 mm  |      B=    0.000
-----              C=    0.699

```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs

Storm time step = 5.00 min

Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	4.59	0.75	16.12	1.50	9.96		
2.25	5.64	0.83	29.99	1.58	9.09		
2.33	5.40	0.92	173.81	1.67	8.38		
2.42	5.19	1.00	36.80	1.75	7.80		
2.50	5.00	1.08	23.21	1.83	7.30		
2.58	4.83	1.17	17.70	1.92	6.88		
2.67	4.67	1.25	14.58	2.00	6.51		
2.75	4.52	1.33	12.53	2.08	6.18		
2.83	4.38	1.42	11.07	2.17	5.89		
2.92	4.25						

CALIB			
STANDHYD (0202)		Area (ha)=	0.05
ID= 1 DT= 5.0 min		Total Imp(%)=	99.90 Dir. Conn.(%)=
99.90			

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.05	0.00
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	8.00	2.00
Length (m)=	18.26	3.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr)=	173.81	24.32
over (min)	5.00	5.00
Storage Coeff. (min)=	0.40 (ii)	0.47 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.34

TOTALS

0.024	PEAK FLOW	(cms)=	0.02	0.00
1.00	TIME TO PEAK	(hrs)=	1.00	1.00
41.56	RUNOFF VOLUME	(mm)=	41.59	11.14
42.59	TOTAL RAINFALL	(mm)=	42.59	42.59
0.98	RUNOFF COEFFICIENT	=	0.98	0.26

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
|SOAKAWAY( 0012)| UNDERDRAIN: OFF
|IN= 2--> OUT= 3 |
|DT= 5.0 MIN    | STORAGE LAYER:
-----
(m)= 0.80          Length          (m)= 30.00   Height
                    Porosity       = 0.40     Initial Water
Level              (m)= 0.00
                    Width           (m)= 2.00   Min. Drawdown
(hr)= 24.00
                    Max. Drawdown (hr)= 62.75   Available
Storage (cu.m.)= 19.20
                    NATIVE SOIL LAYER:
                    Infiltration (m/hr) = 0.0051

```

R.V.	AREA	QPEAK	TPEAK	
(mm)	(ha)	(cms)	(hrs)	
41.56	INFLOW:ID= 2	0.05	0.024	1.00
1.42	OVERFLOW:ID= 3	0.05	0.001	2.75

Volume Reduction Rate[(RVin-RVout)/RVin] (%):
If RVout= (Overflow) =

96.58

Time to reach Max storage (Hr)=

2.67

Volume of water for drawdown in LID (cu.m.)=

19.17
 Volume of maximum water storage (cu.m.)=
 19.20
 Calculated Drawdown Time (Hr)=
 62.58

Junction Command(0013)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 3(0012)	0.05	0.00	2.75	1.42
OUTFLOW: ID= 2(0013)	0.05	0.00	2.75	1.42

 | CALIB |
 | NASHYD (0201) | Area (ha)= 0.07 Curve Number
 (CN)= 74.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear
 Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.13

Unit Hyd Qpeak (cms)= 0.019

PEAK FLOW (cms)= 0.003 (i)
 TIME TO PEAK (hrs)= 1.083
 RUNOFF VOLUME (mm)= 11.025
 TOTAL RAINFALL (mm)= 42.586
 RUNOFF COEFFICIENT = 0.259

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 | ADD HYD (0016) |
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0013):	0.05	0.001	2.75	1.42
+ ID2= 2 (0201):	0.07	0.003	1.08	11.02
=====				
ID = 3 (0016):	0.12	0.003	1.08	6.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | CALIB |

```
| STANDHYD ( 0203) | Area (ha)= 0.03
| ID= 1 DT= 5.0 min | Total Imp(%)= 56.90 Dir. Conn.(%)=
56.90
```

```
-----
                        IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)=      0.02      0.01
Dep. Storage (mm)=      2.00      5.00
Average Slope (%)=      2.00      2.00
Length (m)=      13.90      9.00
Mannings n =      0.013      0.250

Max.Eff.Inten.(mm/hr)= 173.81      24.32
over (min)      5.00      5.00
Storage Coeff. (min)= 0.51 (ii)      2.58 (ii)
Unit Hyd. Tpeak (min)= 5.00      5.00
Unit Hyd. peak (cms)= 0.34      0.29
```

```
*TOTALS*
PEAK FLOW (cms)=      0.01      0.00
0.009 (iii)
TIME TO PEAK (hrs)=      1.00      1.00
1.00
RUNOFF VOLUME (mm)=      40.59      11.14
27.88
TOTAL RAINFALL (mm)=      42.59      42.59
42.59
RUNOFF COEFFICIENT =      0.95      0.26
0.65
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
-----
```

```
-----
| ADD HYD ( 0017) |
| 1 + 2 = 3 |
-----
                        AREA      QPEAK      TPEAK      R.V.
                        (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0016):      0.12      0.003      1.08      6.89
+ ID2= 2 ( 0203):      0.03      0.009      1.00      27.88
=====
ID = 3 ( 0017):      0.14      0.011      1.00      11.08
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
-----
```

FINISH

=====

=====

ATTACHMENT C

SANITARY AND WATER DEMAND CALCULATIONS

- Table C.1 – Sanitary Design Flow Calculations
- Table C.2 – Water Design Flow Calculations

Project No: 34397-25
 Project Name: Proposed Semi Detached Dwellings
 Project Location: 271 Doyle Street, Southgate
 Date: 8/15/2025
 Update: 8/15/2025



Table C.1: Sanitary Design Flow Calculation

Site Characteristics

Site Area =	0.144	ha	*Per Site Plan
Number of Units =	6	units	*Per Site Plan
Population per Unit =	2.938	ppu	*Per 2022 Development Charges Background Study
Site Population =	18	people	

Residential Design Flow

Average Daily Sanitary Flow =	350	L/cap/day	*Per Southgate Municipal Servicing Standards Section C.1
Site Population =	18	people	
Site Average Daily Flow =	0.07	L/s	
Harmon Peaking Factor =	4.00		*Min PF = 2 , Max PF = 4
Peak Residential Design Flow =	0.29	L/s	=Average Daily Flow * Peaking Factor

Inflow and Infiltration

Average Inflow per Hectare =	0.15	L/s/ha	*Per Southgate Municipal Servicing Standards Section C.1
Site Area =	0.144	ha	
Total Infiltration Flow =	0.02	L/s	

Design Guideline	Peak Residential Flow (L/s)	Extraneous Flow (L/s)	Peak Design Flow (L/s)	
Southgate	0.29	0.02	0.31	

*Sanitary design flow calculations completed with reference to the Township of Southgate Municipal Servicing Standards (June 2022)

Project No: 34397-25
Project Name: Proposed Semi Detached Dwellings
Project Location: 271 Doyle Street, Southgate
Date: 8/15/2025
Update: 8/15/2025



Table C.2: Water Design Flow Calculation

Site Characteristics

Site Area = 0.144 ha
Number of Units = 6 units
Population per Unit = 2.938 ppu
Site Population = 18 people

Notes:

*Per Site Plan
*Per Site Plan
*Per 2022 Development Charges Background Study

Residential Design Flow

Average Daily Water Flow = 450 L/cap/day *Per Southgate Municipal Servicing Standards Section E.2
Site Population = 18 people
Site Average Daily Flow = 0.09 L/s
MOE Max. Day Peak Factor = 9.50 *MOE Design Guidelines, Table 3-3
MOE Peak Hour Factor = 14.30 *MOE Design Guidelines, Table 3-3
Peak Max. Day Design Flow = 0.89 L/s =Average Daily Flow * Max Day PF
Peak Hour Design Flow = 1.34 L/s =Average Daily Flow * Max Hour PF

Design Guideline	Average Daily Flow (L/s)	Max. Day Flow (L/s)	Peak Hour Design Flow (L/s)
Southgate/MOE	0.09	0.89	1.34

*Water design flow calculations completed with reference to the Township of Southgate Municipal Servicing Standards (June 2022) and the Ministry of Environment Design Guidelines for Drinking-Water Systems (2008)