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 150mmØ 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 Townshp 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;

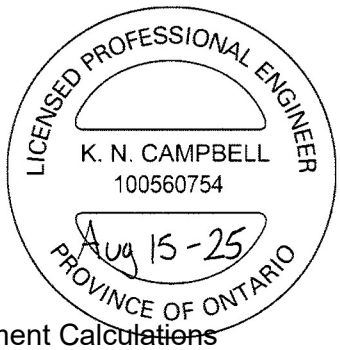
- All grass swales should be maintained free clear of obstructions so that they function as intended. The property owner should inspect on a routine basis for erosion, in particular at downspout locations, and repair any gullies, rills or bare spots;
- Should the drawdown of the soakaway exceed 72 hours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

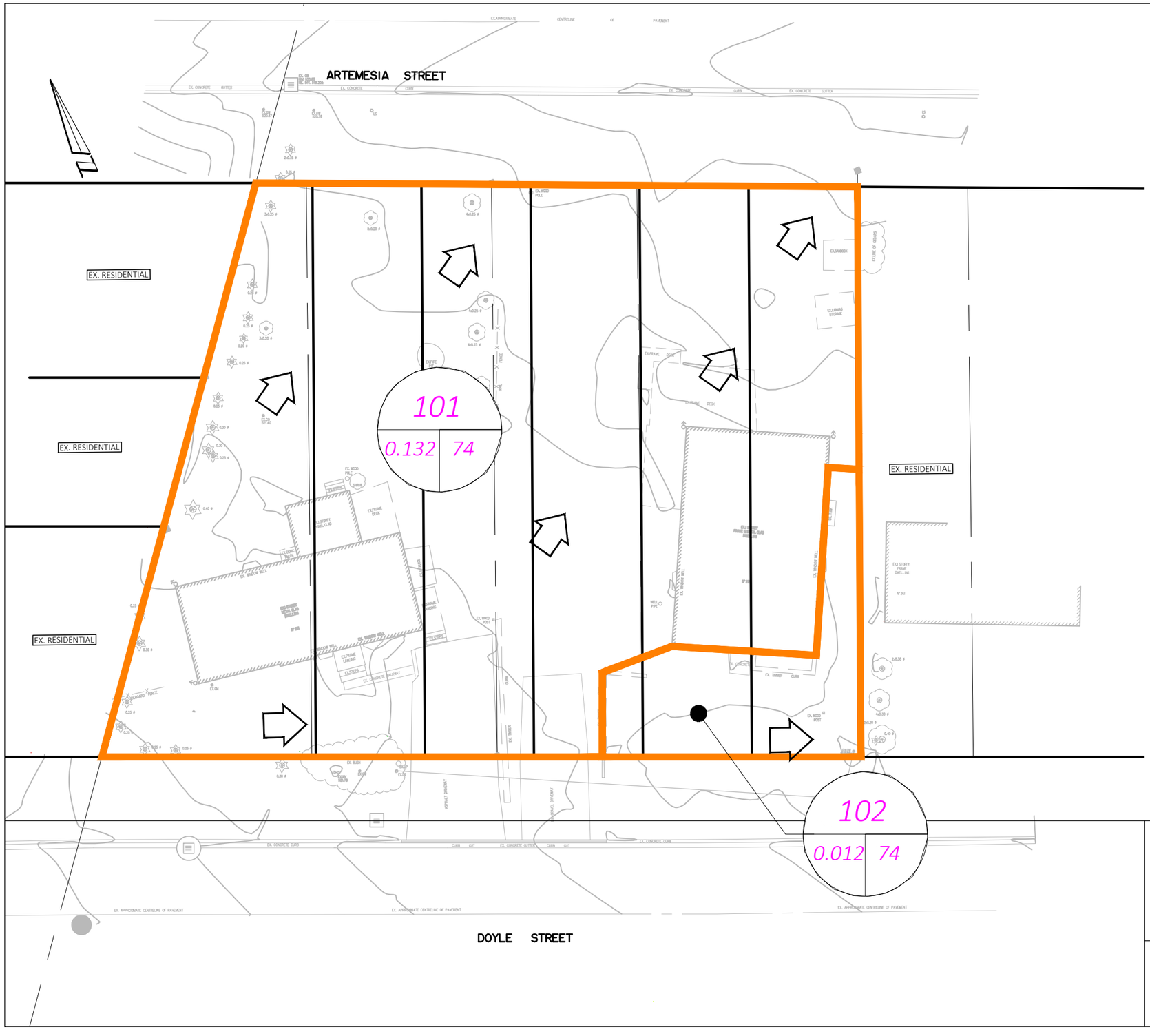


Kristine Campell, P. Eng.

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



LEGEND:

- PROPOSED DRAINAGE BOUNDARY
- OVERLAND FLOW DIRECTION
- CATCHMENT I.D.
- AREA (HA) | PERCENT IMPERVIOUS/CURVE NUMBER

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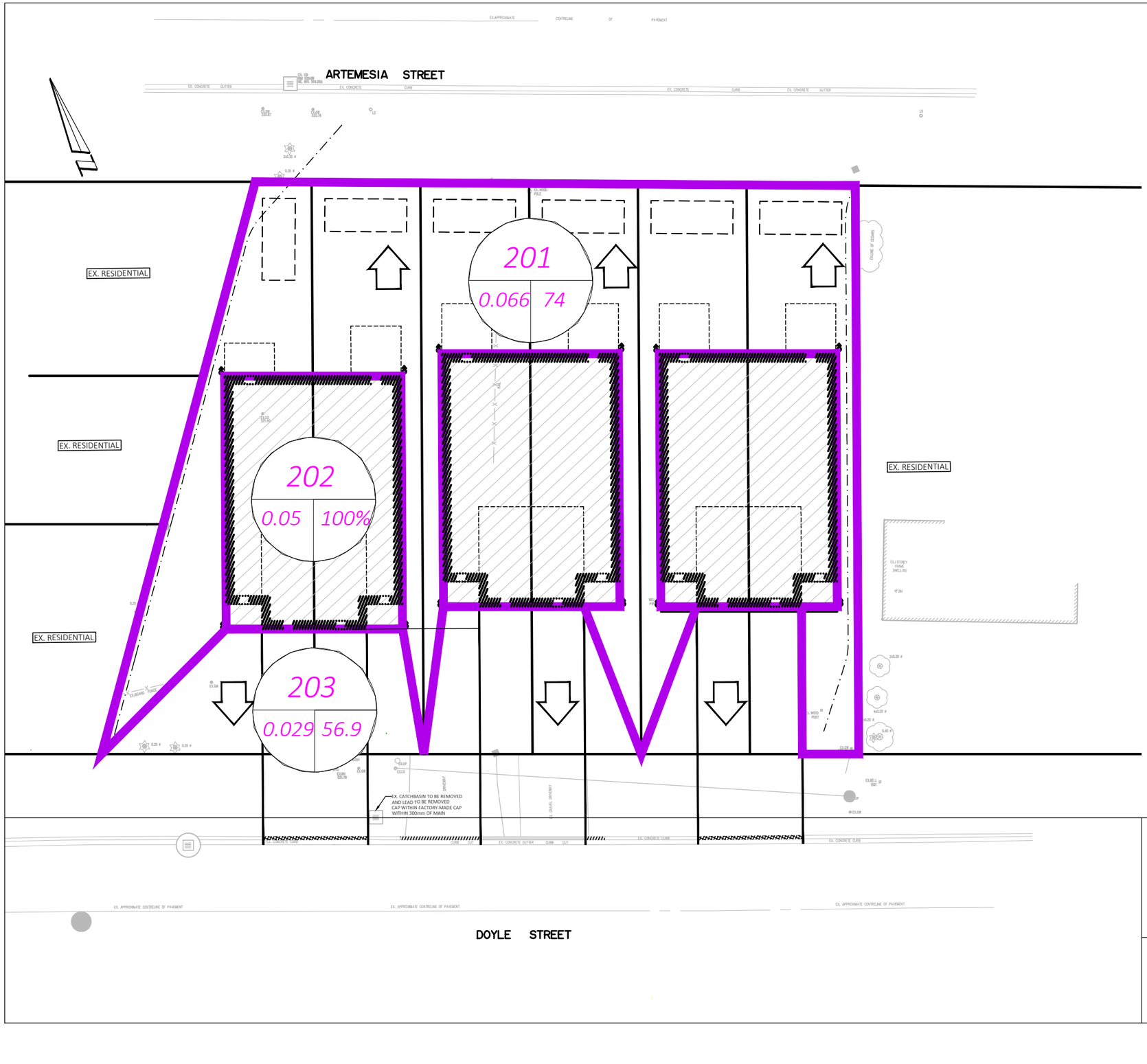
FIGURE 1
EXISTING DRAINAGE PLAN



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- CATCHMENT I.D.
- AREA (HA) | PERCENT IMPERVIOUS/CURVE NUMBER

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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

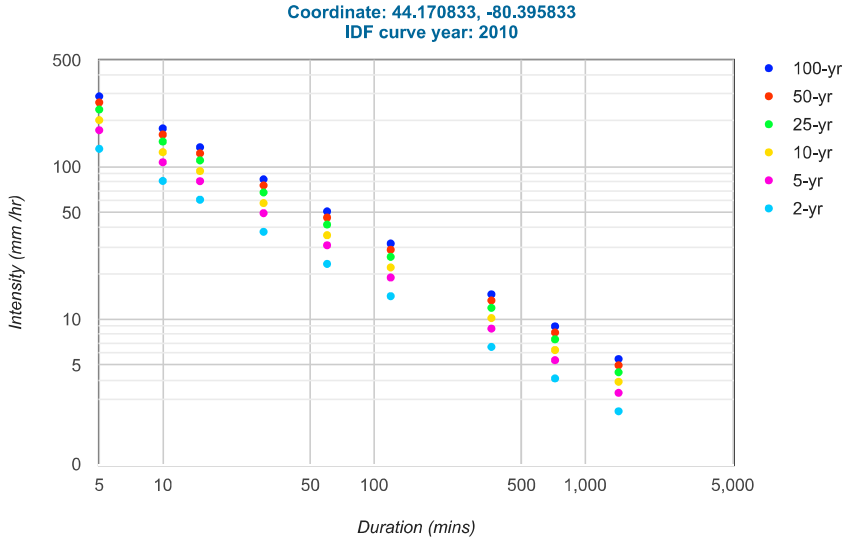
Location summary

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

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

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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

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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

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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
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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

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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)
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DATE: 08/14/2025                          TIME: 02:48:40

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

CALIB NASHYD (0102) ID= 1 DT=10.0 min	Area (ha)= 0.01	Curve Number (CN)= 74.3
	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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	7.92	1.000	169.83	1.833	13.48
0.333	9.21	1.167	50.01	2.000	11.81
2.67	8.19				
2.83	7.66				

```
                0.500   11.18 | 1.333   26.90 | 2.167   10.57 |
3.00    7.20
                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.

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--------------
--------------------
| 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    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
                0.500   11.18 | 1.333   26.90 | 2.167   10.57 |
3.00    7.20
                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.
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--------------------
| 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.
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       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\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\045c0475-
deb1-421f-9f8e-d461d7d
  Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\045c0475-
deb1-421f-9f8e-d461d7d


DATE: 08/14/2025                          TIME: 02:48:40

USER:
```

COMMENTS:
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  ********************************************
  ** 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
                 0.08    5.71 |  0.83   34.89 |  1.58   10.57 |
2.33    6.29
                 0.17    6.16 |  0.92  202.21 |  1.67    9.75 |
2.42    6.04
                 0.25    6.70 |  1.00   42.82 |  1.75    9.07 |
2.50    5.82
                 0.33    7.37 |  1.08   27.00 |  1.83    8.49 |
2.58    5.62
                 0.42    8.24 |  1.17   20.59 |  1.92    8.00 |
2.67    5.43
                 0.50    9.40 |  1.25   16.96 |  2.00    7.57 |
2.75    5.26
                 0.58   11.07 |  1.33   14.58 |  2.08    7.19 |
2.83    5.10
                 0.67   13.71 |  1.42   12.87 |  2.17    6.86 |
2.92    4.95

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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    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.

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--------------
--------------------
| 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
```

```
                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)=   0.042

     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.

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--------------------
| 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.
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       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\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\8d0ea48a-
e90c-4bde-b58b-feb5ee2
  Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\8d0ea48a-
e90c-4bde-b58b-feb5ee2


DATE: 08/14/2025                              TIME: 02:48:40

USER:



COMMENTS:
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  ************************************************
  ** 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
                  0.08    6.71 |  0.83   40.97 |  1.58   12.41 |
2.33    7.38
                  0.17    7.23 |  0.92  237.42 |  1.67   11.45 |
2.42    7.10
                  0.25    7.87 |  1.00   50.28 |  1.75   10.65 |
2.50    6.83
                  0.33    8.66 |  1.08   31.70 |  1.83    9.97 |
2.58    6.60
                  0.42    9.67 |  1.17   24.17 |  1.92    9.39 |
2.67    6.38
```

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

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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    6.49 | 1.000  139.20 | 1.833   11.05 |
2.67    6.72
                  0.333    7.55 | 1.167   40.99 | 2.000    9.68 |
2.83    6.27
                  0.500    9.16 | 1.333   22.04 | 2.167    8.67 |
3.00    5.90
                  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.

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--------------
--------------------
| 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    6.49 | 1.000  139.20 | 1.833   11.05 |
2.67    6.72
                 0.333    7.55 | 1.167   40.99 | 2.000    9.68 |
2.83    6.27
                 0.500    9.16 | 1.333   22.04 | 2.167    8.67 |
3.00    5.90
                 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.

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


***** 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\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\2d41c165-0d29-4ac5-b0b3-78efcfd
Summary filename: C:\Users\kristine.campbell\AppData\Local\Civica\VH5\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
                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)=   0.042

     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.

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--------------------
| 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.
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 FINISH
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       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\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\8ccd18a5-
f5dc-4e2b-8067-849f9fd
  Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\8ccd18a5-
f5dc-4e2b-8067-849f9fd


DATE: 08/14/2025                              TIME: 02:48:40

USER:



COMMENTS:
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  ***********************************************
  ** 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
                 0.08    4.91 |  0.83   29.99 |  1.58    9.09 |
2.33    5.40
                 0.17    5.29 |  0.92  173.81 |  1.67    8.38 |
2.42    5.19
                 0.25    5.76 |  1.00   36.80 |  1.75    7.80 |
2.50    5.00
                 0.33    6.34 |  1.08   23.21 |  1.83    7.30 |
2.58    4.83
                 0.42    7.08 |  1.17   17.70 |  1.92    6.88 |
2.67    4.67
                 0.50    8.08 |  1.25   14.58 |  2.00    6.51 |
2.75    4.52
                 0.58    9.51 |  1.33   12.53 |  2.08    6.18 |
2.83    4.38
                 0.67   11.79 |  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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	4.75	1.000	101.90	1.833	8.09
0.333	5.53	1.167	30.01	2.000	7.09
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
2.67	4.92				
2.83	4.59				
3.00	4.32				

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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.167	4.75	1.000	101.90	1.833	8.09
0.333	5.53	1.167	30.01	2.000	7.09
0.500	6.71	1.333	16.14	2.167	6.34
2.67	4.92				
2.83	4.59				
3.00	4.32				

```
                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.

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

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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       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\VH5\6ec45647-ad21-4b76-932e-273312f20f6a
\5c913353-31b0-4e9a-ae8c-28eb8c2
  Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a
\5c913353-31b0-4e9a-ae8c-28eb8c2


DATE: 08/14/2025                          TIME: 02:55:23

USER:



COMMENTS:
_____________________________________________________________


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

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

***** 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

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

               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     QPEAK   TPEAK     R.V.
                            (ha)     (cms)    (hrs)    (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.

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--------------------
| ADD HYD  (  0016)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (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.
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--------------------
| 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.

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--------------------
| 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.
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       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\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\4f81034c-
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  Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\4f81034c-
d9a9-4bc2-ba24-ebe656e


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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	5.34	0.75	18.76	1.50	11.59
0.08	5.71	0.83	34.89	1.58	10.57
0.17	6.16	0.92	202.21	1.67	9.75
0.25	6.70	1.00	42.82	1.75	9.07
0.33	7.37	1.08	27.00	1.83	8.49
0.42	8.24	1.17	20.59	1.92	8.00
0.50	9.40	1.25	16.96	2.00	7.57
0.58	11.07	1.33	14.58	2.08	7.19
0.67	13.71	1.42	12.87	2.17	6.86
2.25	6.56				
2.33	6.29				
2.42	6.04				
2.50	5.82				
2.58	5.62				
2.67	5.43				
2.75	5.26				
2.83	5.10				
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:
------------------  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

                       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     QPEAK   TPEAK     R.V.
                            (ha)     (cms)    (hrs)    (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.

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--------------------
| ADD HYD  (  0016)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (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.
--------------------------------------------------------------------
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```

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================================================================
========================================

       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\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\a0ce2446-
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  Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\a0ce2446-
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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.27	0.75	22.03	1.50	13.60
0.08	6.71	0.83	40.97	1.58	12.41
0.17	7.23	0.92	237.42	1.67	11.45
0.25	7.87	1.00	50.28	1.75	10.65
0.33	8.66	1.08	31.70	1.83	9.97
0.42	9.67	1.17	24.17	1.92	9.39
0.50	11.04	1.25	19.91	2.00	8.89
0.58	13.00	1.33	17.12	2.08	8.44
0.67	16.10	1.42	15.12	2.17	8.05
2.25	7.70				
2.33	7.38				
2.42	7.10				
2.50	6.83				
2.58	6.60				
2.67	6.38				
2.75	6.17				
2.83	5.99				
2.92	5.81				

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)=	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:
------------------  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

                       AREA         QPEAK            TPEAK
R.V.
                       (ha)         (cms)            (hrs)
(mm)
      INFLOW:ID= 2     0.05         0.033             1.00
57.14
    OVERFLOW:ID= 3     0.05         0.003             1.33
16.95

               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     QPEAK   TPEAK     R.V.
                            (ha)     (cms)    (hrs)    (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.

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--------------------
| ADD HYD  (  0016)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (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.
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================================================================================
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       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\VH5\6ec45647-ad21-4b76-932e-273312f20f6a
\09105d79-2797-4e99-92ce-8e83521
  Summary filename: C:\Users\kristine.campbell\AppData\Local
\Civica\VH5\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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.97	0.75	24.50	1.50	15.13
0.08	7.46	0.83	45.57	1.58	13.81
0.17	8.04	0.92	264.12	1.67	12.74
0.25	8.75	1.00	55.93	1.75	11.85
0.33	9.63	1.08	35.26	1.83	11.09
0.42	10.76	1.17	26.89	1.92	10.45
0.50	12.28	1.25	22.15	2.00	9.89
0.58	14.46	1.33	19.04	2.08	9.39
0.67	17.91	1.42	16.82	2.17	8.96
2.25	8.56				
2.33	8.21				
2.42	7.89				
2.50	7.60				
2.58	7.34				
2.67	7.09				
2.75	6.87				
2.83	6.66				
2.92	6.47				

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)=	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:
------------------  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

                       AREA         QPEAK            TPEAK
R.V.
                       (ha)         (cms)            (hrs)
(mm)
      INFLOW:ID= 2     0.05         0.037             1.00
63.67
    OVERFLOW:ID= 3     0.05         0.005             1.17
23.49

               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     QPEAK   TPEAK     R.V.
                            (ha)     (cms)    (hrs)    (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.

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--------------------
| ADD HYD  (  0016)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (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.
--------------------------------------------------------------------
--------------
```

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================================================================
========================================

       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\VH5\6ec45647-ad21-4b76-932e-273312f20f6a\3f62f09e-
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\Civica\VH5\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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	4.59	0.75	16.12	1.50	9.96
0.08	4.91	0.83	29.99	1.58	9.09
0.17	5.29	0.92	173.81	1.67	8.38
0.25	5.76	1.00	36.80	1.75	7.80
0.33	6.34	1.08	23.21	1.83	7.30
0.42	7.08	1.17	17.70	1.92	6.88
0.50	8.08	1.25	14.58	2.00	6.51
0.58	9.51	1.33	12.53	2.08	6.18
0.67	11.79	1.42	11.07	2.17	5.89
2.25	5.64				
2.33	5.40				
2.42	5.19				
2.50	5.00				
2.58	4.83				
2.67	4.67				
2.75	4.52				
2.83	4.38				
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

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

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

               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     QPEAK   TPEAK     R.V.
                            (ha)     (cms)    (hrs)    (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.

------------------------------------------------------------------
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--------------------
| ADD HYD  (  0016)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (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.
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| 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.

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--------------------
| 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.
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```

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 FINISH
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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

Van Harten
LAND SURVEYORS — ENGINEERS

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 Muncipal 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 Muncipal 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 theTownship 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

			Notes:
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 Water Flow =	450	L/cap/day	*Per Southgate Muncipal 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 theTownship of Southgate Municipal Servicing Standards (June 2022) and the Ministry of Environment Design Guidelines for Drinking-Water Systems (2008)