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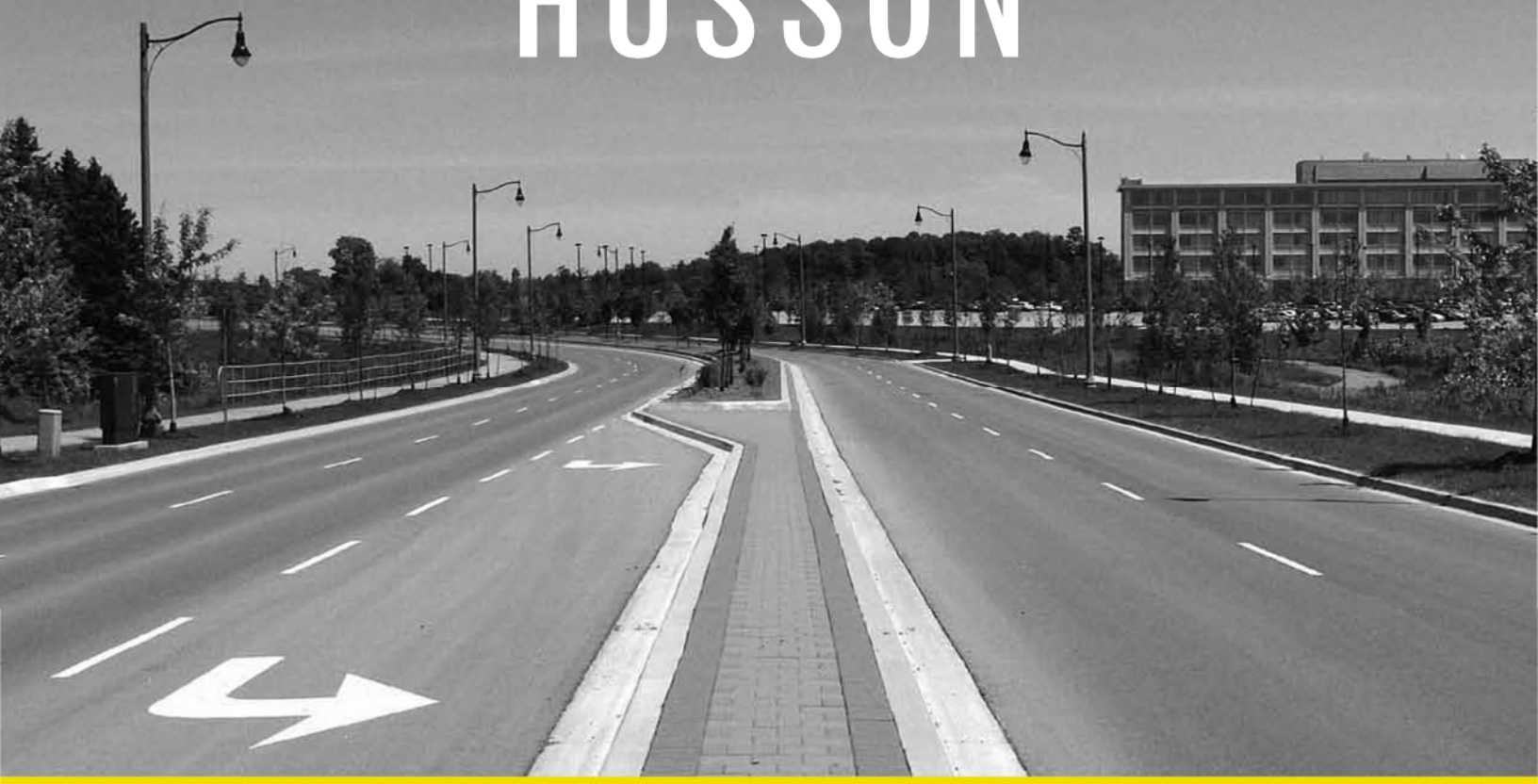

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

2809 TOWNLINE ROAD
TOWNSHIP OF PUSLINCH

PREPARED FOR:
FIELDGATE PROPERTIES
5400 YONGE STREET, SUITE 300
TORONTO, ON M2N 5R5

DATE: NOVEMBER 2025

PROJECT: 251619

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PREPARED BY HUSSON
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1.0 INTRODUCTION

The purpose of this report is to provide design information related to the storm drainage and stormwater management (SWM) plan, sanitary and water servicing for the proposed commercial and industrial development. This report will outline the stormwater management measures to be implemented in order to meet the water quantity and quality requirements established by the Township of Puslinch.

At present, two concept plans exist for the proposed development. Both plans contain six industrial buildings in the north portion of the site, with associated parking. Schematic Site Plan (Scheme 6) (Plan A) includes one commercial/retail building with parking and a proposed gas station within the southern area, whereas Schematic Site Plan (Scheme 7) (Plan B) contains two industrial buildings with parking in this area. Both site plans will be accessed from Townline Road via three driveways that will provide access to various locations of the site.

The plans used for this report are based on the layout of Plan A; however, based on the similarity of the layout of Plan B, the concepts laid out herein will be generally consistent for both plans. The site plan that is ultimately preferred for the development will be used for the Site Plan stage of the project; this functional review serves to confirm that both development options can be designed to meet the required development standards.

1.1 Site Description

The site is located on the east side of Townline Road, north of Highway 401 and south of Ellis Road. The 34.03ha site is currently undeveloped, consisting of row crops. The site location can be referenced on **Figure 1**.

1.2 Background

The SWM design for the site has been prepared to meet the requirements of the Township of Puslinch, Grand River Conservation Authority (GRCA) and the Ministry of Transportation (MTO).

The following materials were referenced in the preparation of this report:

- The Stormwater Management Planning and Design Manual (MECP Guidelines), prepared by the Ministry of the Environment, March 2003.
- The Township of Puslinch Municipal Development Standards, September 2019.
- The Development Engineering Manual, prepared by the City of Guelph, October 2023.
- As-constructed plan and profile drawings for Townline Road and Jamieson Parkway, provided by the City of Cambridge (included in **Appendix A**).
- The Preliminary Geotechnical Investigation for Proposed Commercial/Industrial Development – 2809 Townline Road, prepared by Soil Engineers Ltd, dated September 2025.

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FIGURE 1
2809 TOWNLINE ROAD
SITE LOCATION

DATE: NOVEMBER 2025 SCALE: N.T.S. PROJECT: 251619

2.0 DESIGN CRITERIA

The following design criteria have been followed in the preparation of the grading, servicing and Stormwater management on the site.

- Water quality controls for the site are to provide Level 1 (enhanced) treatment levels to meet the requirements of the Township.
- Water quantity controls are required for the site to control the post development peak flows to the existing peak flow rates for the 2-100 year design storms, using City of Guelph IDF curves.
- Water balance to be maintained in the proposed development compared to the existing condition, based on the hydro-geological work for the site.

The proposed design will generally maintain the existing drainage patterns and outlet at the northeast corner of the property, while providing the required quality and quantity controls. Hydrogeological work is currently being completed and will be incorporated to meet the water balance requirements as part of the upcoming SPA work.

3.0 STORM DRAINAGE

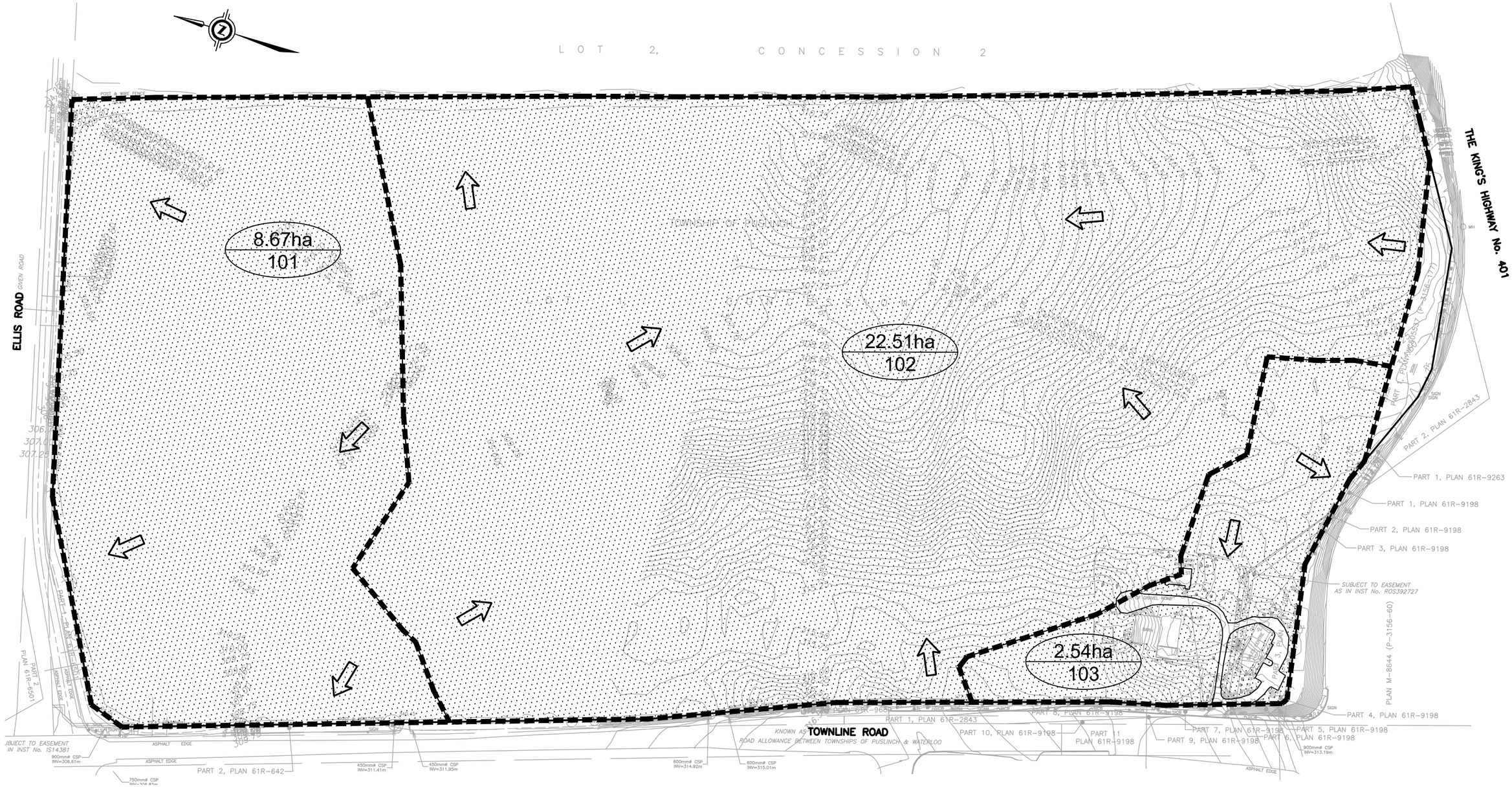
3.1 Existing Drainage

The existing site consists of farmland with three residential/commercial buildings in the southwest portion of the site. Based on the topography of the site, the majority of runoff generated on the site flows overland to the east toward Puslinch Golf Club before flowing north toward Ellis Road. A smaller catchment to the north also drains toward Ellis Road, and an area in the southeast corner of the site flows overland toward the Townline Road / Highway 401 intersection. The existing drainage plan can be referenced on **Figure 2**.

The target flows for the proposed development were determined by a Visual Otthymo (VO6) model, using the 4-hour Chicago storm. The predevelopment peak flows are based on the existing undeveloped condition of the site. The catchment parameters and target flows are outlined in **Tables 1** and **2**, respectively.

Table 1. Catchment Parameters – Existing Site

Area (Catchment ID)	Catchment Area (ha)	Percent Imperviousness
To North (101/102)	31.17	0%
To South (103)	2.54	14%



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LEGEND

- DRAINAGE BOUNDARY
- PERVIOUS AREA
- 8.67ha / 101 — CATCHMENT AREA (ha) / CATCHMENT ID
- OVERLAND FLOW DIRECTION

FIGURE 2

2809 TOWNLINE ROAD
EXISTING DRAINAGE PLAN

DATE: NOVEMBER 2025 SCALE: 1:2500 PROJECT: 251619

Table 2. Target Flows

Return Period	Target Flow Rate* (m^3/s)	
	Catchment 101 & 102	Catchment 103
2-Year	0.392	0.059
5-Year	0.797	0.118
10-Year	1.141	0.169
25-Year	1.621	0.236
50-Year	2.042	0.296
100-Year	2.491	0.359

* Target Flows are based on the VO6 modelling output for the existing condition.

Stormwater management calculations are included in **Appendix B** and the modelling results can be referenced in **Appendix C**. Modelling details are further outlined in **Section 4.5**.

3.2 Site Grading

All grading will be completed in a manner to satisfy the following goals:

- Achieve proper road gradients to maintain sufficient site lines.
- Minimize cut to fill earth operations.
- Enable gravity servicing outlets.
- Reduce or eliminate the need for retaining walls, where feasible.
- Provide minimal impact to abutting properties.
- Achieve stormwater management and environmental objectives required for the proposed development.

The site will be graded to suit the Township's design criteria and accommodate constraints imposed by the stormwater management and servicing objectives. An overall functional grading scheme has been included in this report (refer to **Drawing SW1**). As noted, the grading concepts laid out herein will be generally consistent for both plans.

3.3 Minor System Drainage

All on-site storm sewers are to be designed for the 5-year design storm using the City of Guelph's Intensity-Duration Frequency (IDF) curves as outlined in the Township's Development Standards. In order to maintain the existing drainage patterns, all controlled flows generated by the proposed development will be discharged to the north, toward Ellis Road.

Details of the stormwater management plan are outlined in **Section 4** below. The proposed storm sewer network can be referenced in **Drawing SW2**.

3.4 Major System Drainage

The proposed grading design for the site will consist of sawtoothed grading through the parking lot; therefore, with this type of design, the majority of runoff will be collected in the storm sewers. For storm events larger than the minor system event, storm runoff will fill the storm network until the spill elevation is reached. An emergency overland flow route has been incorporated to direct runoff from the proposed development to the northeast corner of the site, toward Ellis Road, in the case of pipe blockage or other extreme storm events.

The overland flow route is shown on **Drawing SW1**.

4.0 STORMWATER MANAGEMENT PLAN

A stormwater management plan has been prepared to meet the stormwater management criteria for the site. Low-Impact Development (LID) techniques were investigated, including the use of infiltration measures; however, this will be further examined as part of the next submission. As noted, the functional design at this stage is based on Plan A; however, the layout and design would also be suitable for Plan B.

4.1 Water Balance

A water balance assessment will be completed by others and included with the SPA work. Based on the Preliminary Geotechnical Assessment by Soil Engineers, the groundwater levels appear to be low on the site, which would be conducive to providing infiltration from the rooftops to meet water balance requirements.

Details will be provided with the SPA work.

4.2 Quality Control

Based on the Township's requirements, the water quality criteria for this site is 80 percent average TSS removal from runoff originating onsite.

An Up-Flo Filter unit (or approved equivalent) will be used to achieve the water quality targets on-site. Surface runoff will be captured by the storm sewer system on site and drained by gravity to the proposed Up-Flo unit. The unit will provide at least 80 percent TSS removal. The functional sizing and details for the filter units will be included as part of the SPA process.

4.3 Quantity Control

Quantity control for the site will be provided to meet the design criteria provided by the Township, as well as the GRCA and MTO. In order to meet the allowable release rates for the site, the following options are proposed for quantity control on site:

- **Rooftop Storage** – Controlled flow roof drains could be installed on the rooftop and water could be stored on the rooftops to attenuate peak flows. With typical flat rooftop design, flows can generally be limited to approximately 42L/s/ha.
- **Underground Storage** – A restrictor pipe could be provided at the site outlets, with surplus storage provided in the pipes and in a storage chamber.

In order to meet the target release rates, a combination of underground, storm sewer and surface storage is proposed to provide quantity control for the proposed development.

Controlled Site Drainage

Flow from the site's surface will be directed to the internal storm sewer system, towards the site outlet at the northeast corner. Storage of the stormwater will be provided on the rooftop, in the underground chamber and storm system.

Two pervious catchments along the perimeter of the site will flow uncontrolled toward the north and south, respectively. The SWM controls have been designed to overcontrol the post development flow to account for the uncontrolled flow to the north. The uncontrolled area draining south is less than in the existing condition; therefore, controls are not required. The post development drainage plan can be referenced on **Figure 3**.

Tables 3 and **4** provide a summary of the storage volumes available in the underground chamber and storm network until the spill point at an elevation of 310.29m, with and without roof controls. Stage-storage-discharge information and generic underground storage chamber details can be referenced in **Appendix B**, respectively.

Table 3. Available Storage – Catchment 201 – With Roof Controls

	Elevation (m)	Storage Volume (m^3)
Underground Storage System	305.64-309.09	16,000
Pipe and Structure Storage	309.09-310.29	504
Total	305.64-310.29	16,504

Although the site is adjacent to Highway 401, the drainage is directed away from the MTO roadway and the post-development flows will not impact the highway. However, to be conservative, the storage requirements without using rooftop controls were also reviewed to determine the impact.

Table 4. Available Storage – Catchment 201 – Without Roof Controls

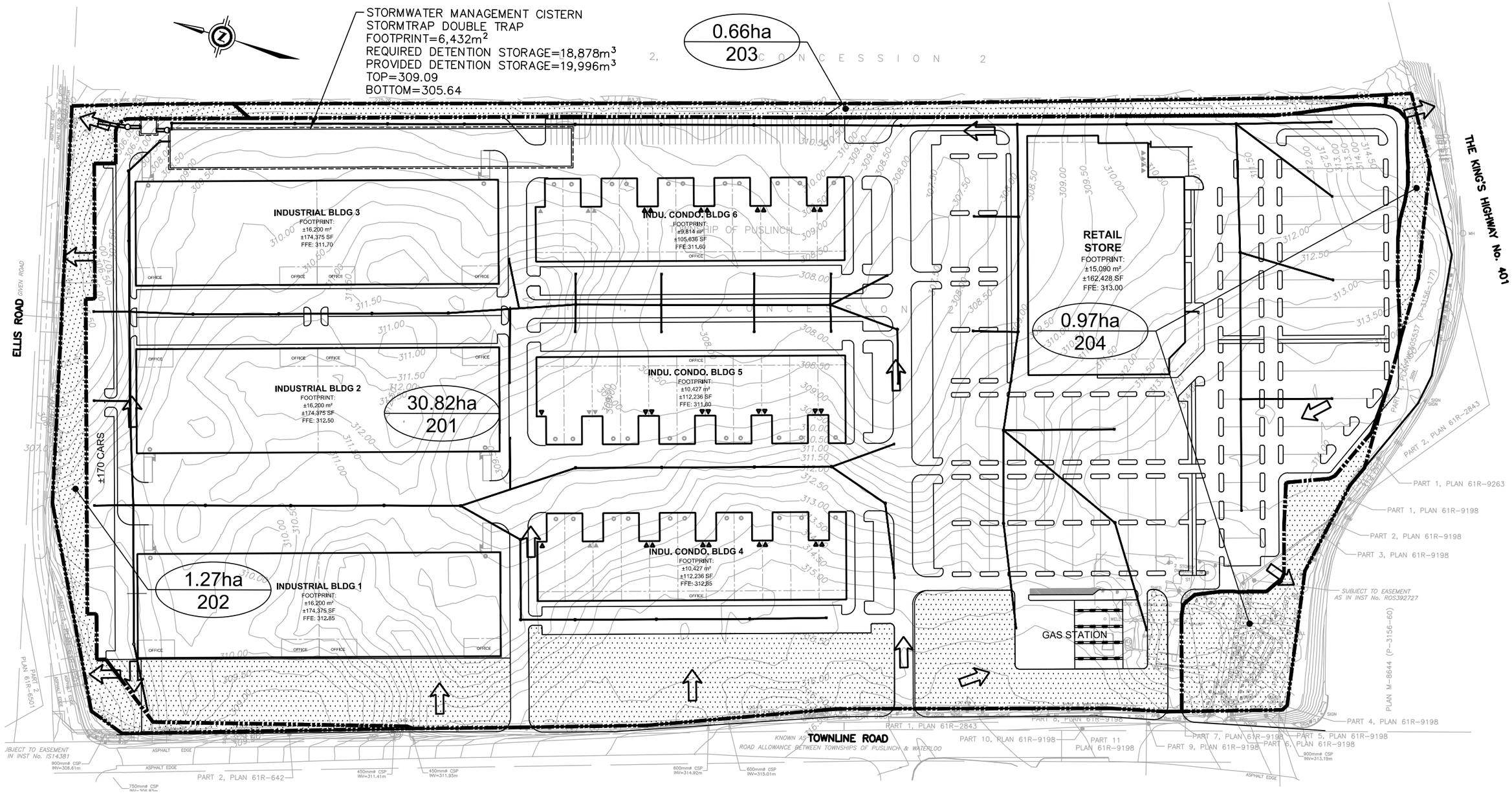
	Elevation (m)	Storage Volume (m^3)
Underground Storage System	305.64-309.09	18,200
Pipe and Structure Storage	309.09-310.29	504
Total	305.64-310.29	18,704

As shown, the rooftop controls would reduce the storage requirements by approximately 3,000m^3, or 13%. The design will be confirmed as part of the detailed design as part of the Site Plan stage of the project.

4.3.1 Rooftop Storage

Rooftop storage could be used to reduce the size of the sewers on the private development as well as the storage required in the stormwater underground storage system. Stormwater runoff from the roof would be controlled by Accutrol Adjustable Roof Drains with a maximum of 4" head and a maximum discharge of 42L/s/ha.

The estimated control flow and storage volume for each industrial building are summarized in **Table 5**.



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LEGEND

DRAINAGE BOUNDARY

30.82ha / 201 — CATCHMENT AREA (ha) / CATCHMENT ID

PERVIOUS AREA

OVERLAND FLOW DIRECTION

FIGURE 3

2809 TOWNLINE ROAD
PROPOSED DRAINAGE PLAN

DATE: NOVEMBER 2025 SCALE: 1:2500 PROJECT: 251619

Table 5. Estimated Rooftop Flow Summary

Building	Roof Area (ha)	Controlled Flow (m^3/s)	Max. Ponding Depth (mm)
Industrial Buildings 1-3	4.740	0.197	102
Industrial Condo Buildings 4-6	3.067	0.127	102

Overflow scuppers would be installed to ensure that maximum ponding does not exceed 102mm. The final details will be confirmed by the mechanical engineer.

4.5 Hydrology Modelling

The Visual OTTHYMO (VO6) model was used to assess the proposed control measures for the site. VO6 is a single event hydrologic model that is based on unit hydrograph theory. The simulation for this site uses the StandHyd method for the primarily impervious catchments and NASHYD for the landscaped areas around the perimeter of the site.

Rainfall data was based on the 4-hour Chicago storm and the City of Guelph IDF Curves, as per the Town's Development Standards.

Stormwater generated in the developed portion of the site is captured by the internal storm network, conveyed to the underground chamber and released through a dual orifice to the northeast outlet. Storage for the proposed development is provided in the underground chamber, pipes, and structures. Orifice information is provided in **Table 6**, with and without roof controls.

Table 6. Orifice Controls

	With Roof Controls		Without Roof Controls	
Orifice	Diameter (mm)	Invert (m)	Diameter (mm)	Invert (m)
Orifice 1	300	305.64	300	305.64
Orifice 2	600	307.14	600	307.04

With the proposed design, the post development flows for the site from the 2 to 100-year events is less than the target flows. **Table 7** and **8** provide the summary of the proposed flows and storage to attenuate flows from to the northern outlet for the 2–100-year design storms with and without roof controls. **Table 9** compares existing and proposed peak flows discharged to the south outlet.

Table 7. 2-100 Year Flow Summary – Northern Outlet (Ellis Road) – With Roof Controls

Storm Event	Proposed Flow (m^3/s)	Target Flow (m^3/s)	Required Storage (m^3)	Provided Storage (m^3)
2 Year	0.274	0.392	6,922	16,504
5 Year	0.541	0.797	9,245	
10 Year	0.822	1.141	10,792	
25 Year	1.200	1.621	12,857	
50 Year	1.515	2.042	14,568	
100 Year	2.032	2.491	16,270	

* Uncontrolled Flows has been included based on the VO6 modelling output for the proposed condition.

Table 8. 2-100 Year Flow Comparison – Northern Outlet (Ellis Road) – Without Roof Controls

Storm Event	Proposed Flow (m^3/s)	Target Flow (m^3/s)	Required Storage (m^3)	Provided Storage (m^3)
2 Year	0.388	0.392	7,469	18,704
5 Year	0.671	0.797	10,452	
10 Year	0.953	1.141	12,374	
25 Year	1.312	1.621	14,820	
50 Year	1.602	2.042	16,775	
100 Year	2.178	2.491	18,618	

* Uncontrolled Flows has been included based on the VO6 modelling output for the proposed condition.

Table 9. 2-100 Year Flow Comparison – Southern Outlet (Highway 401)

Storm Event	Proposed Flow (m^3/s)	Target Flow (m^3/s)
2 Year	0.007	0.059
5 Year	0.014	0.118
10 Year	0.022	0.169
25 Year	0.032	0.236
50 Year	0.041	0.296
100 Year	0.052	0.359

* Uncontrolled Flows has been included based on the VO6 modelling output for the proposed condition.

Therefore, with the proposed SWM design, the site will meet the quantity control requirements as the post development flows will be less than in the existing condition. Refer to **Appendix B** for detailed calculations. Modelling output can be referenced in **Appendix C.** Refer to **Drawing SW2** for details of the proposed servicing for the site.

5.0 WASTEWATER

The roads adjacent to the site do not have sanitary services; however, there is an existing sanitary sewer on Jamieson Parkway, approximately 150m downstream of the intersection with Townline Road. It is our understanding that a prospective tenant for the southern portion of the proposed development would require municipal servicing. As such, a preliminary functional review has been completed to determine the feasibility of connecting to the downstream sanitary sewer.

As noted, the functional design at this stage is based on Plan A; however, the layout and design would also be suitable for Plan B. If the municipal servicing option is not found to be acceptable, it is feasible to provide private servicing for the entire site. The details will be provided as part of the Site Plan work for the site.

5.1 Functional Design for External Sanitary

As shown on the Plan and Profile drawing for Jamieson Parkway, there is a 300mm sanitary sewer located on the northern portion of the road that drains to an easement and subsequently to Lardner Street.

A preliminary review has been completed to outline the functional design for the connection to this sewer from the proposed development.

As outlined on **Figure 4**, it is feasible to provide a gravity connection to the existing 300mm sanitary sewer on Jamieson Parkway.

It is noted that the sewer is located within the City of Cambridge, and not within the Township of Puslinch. This can be further discussed and coordinated as part of the detailed design in the Site Plan stage.

5.2 Sanitary Design for Proposed Site

Although the southern portion of the site can outlet to the downstream municipal sanitary system, the grading on the site is such that the northern portion cannot drain by gravity to Jamieson Parkway. Therefore, a private sanitary treatment system has been functionally designed to provide service for the northern portion.

As outlined in the report prepared by Crozier, there is a septic system proposed that can service the northern portion of the site. The site will connect to the septic system as shown on **Drawing SW2**. Refer to the servicing memo by Crozier, included in **Appendix D**, for details of the proposed sanitary treatment system for the site.

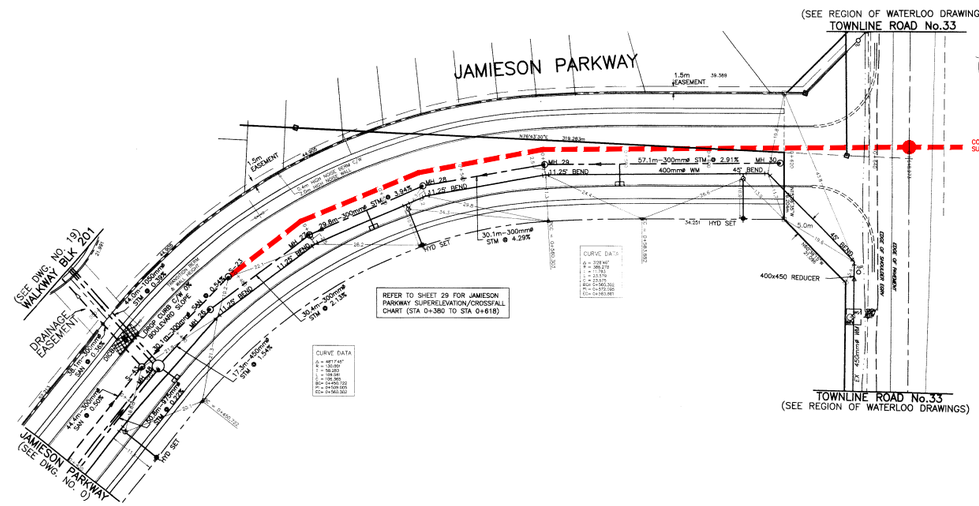
It is also noted that an ECA will be required for the septic system, to be completed by others.

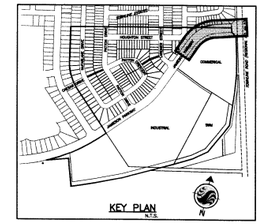
6.0 WATER DISTRIBUTION

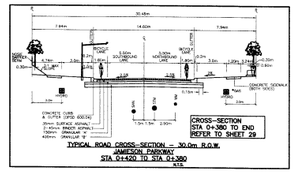
According to the As Constructed drawings for Townline Road provided by the City, a 450mm diameter watermain has been installed within the western boulevard, south of Jamieson Parkway. There is a 400mm watermain on Jamieson Parkway. As noted, it is our understanding that the prospective tenant for the southern portion of the proposed development requires municipal servicing.

It is noted that the watermain is located within the City of Cambridge, and not within the Township of Puslinch. This can be further discussed and coordinated as part of the detailed design in the Site Plan stage. A hydrant flow test will be completed to confirm the pressures as part of the future work.

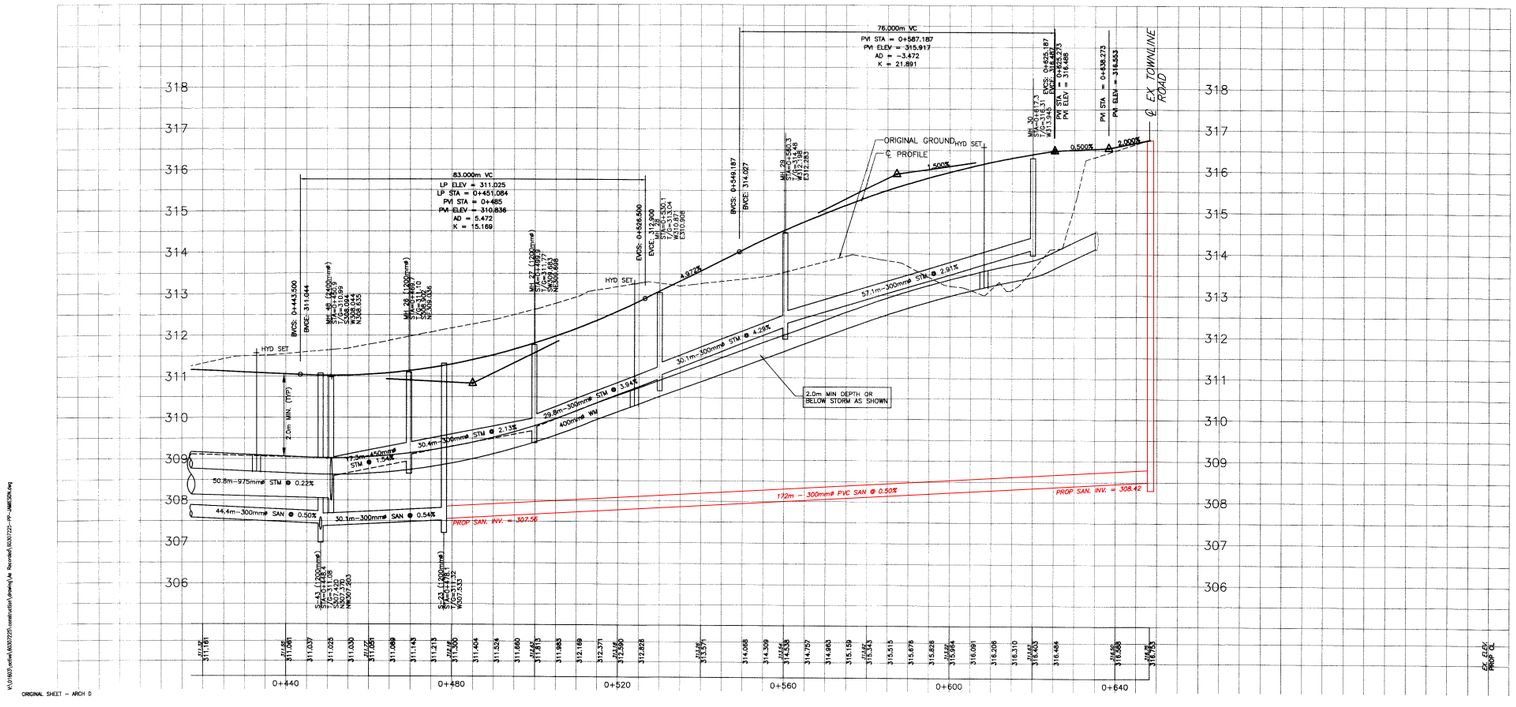
The anticipated flows from the proposed development have been estimated in order to determine the feasibility of connecting to the watermain on Townline Road. **Table 10** provide a summary of the proposed water demands for the site, with additional details provided in **Appendix E**.







TYPICAL ROAD CROSS-SECTION – 30.0m R.O.W.
JAMIESON PARKWAY
STA 0+420 TO STA 0+380
N.T.S.



ORIGINAL SHEET – ARCH D

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Fax. 519.579.6733
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Stantec

Notes

1. BENCHMARK:
   CITY OF CAMBRIDGE BENCHMARK #240 ON OVERFLOW STRUCTURE ON EAST SIDE OF TOWNLINE ROAD & 200.0m NORTH OF INTERSECTION OF RIVER ROAD/ TOWNLINE INTERSECTION
   ELEVATION 296.572m
2. SANITARY SEWERS ARE PVC DR 35 INSTALLED AS PER OPSD 802.010
3. SANITARY SERVICES ARE 100mmø PVC DR 28 INSTALLED AS PER OPSD 1006.02 WITH A MINIMUM COVER OF 2.5m.
4. BEDDING AND COVER MATERIAL FOR SANITARY SEWERS AND SERVICE CONNECTIONS IS GRANULAR 'A' COMPACTED TO 98% STANDARD PROCTOR DENSITY.
5. STORM SEWERS ARE AS FOLLOWS (UNLESS OTHERWISE NOTED):
   –300mmø – PVC ULTRA RIBBED PIPE
   –375mmø TO 600mmø – PVC ULTRA RIBBED PIPE
   –GREATER THAN 600mmø – 65–D CONCRETE PIPE
6. CATCHBASIN LEADS ARE AS FOLLOWS:
   –SINGLE – 250mmø PVC DR35
   –DOUBLE – 300mmø PVC DR35
   CATCHBASIN LEADS ARE INSTALLED IN ACCORDANCE WITH OPSD 708.01 AND OPSD 708.03 WITH A MINIMUM SLOPE OF 1.00% AND MINIMUM COVER OF 1.20m
7. STORM SERVICES ARE 150mmø PVC SDR 28 WITH A MINIMUM COVER OF 1.2m.
8. CONCRETE STORM SEWERS ARE INSTALLED AS PER OPSD 802.013. BEDDING AND COVER MATERIAL IS GRANULAR 'A' COMPACTED TO 98% STD. PROCTOR DENSITY.
9. PVC AND PE STORM SEWERS ARE INSTALLED AS PER OPSD 802.010. BEDDING AND COVER MATERIAL IS GRANULAR 'A' COMPACTED TO 98% STD. PROCTOR DENSITY, 98% STD. PROCTOR DENSITY.
10. WATERMAINS ARE AWWA C–900 PVC CLASS 150 INSTALLED AS PER OPSD 802.010 WITH A MINIMUM COVER OF 2.0m
11. WATER SERVICES ARE 19mmø KITEC PIPE INSTALLED AS PER OPSD 1104.01 WITH A MINIMUM COVER OF 2.0m. WATER BOX'S HAVE APPROPRIATE FITTINGS TO ALLOW FOR 19mmø TYPE 'K' SOFT COPPER FOR HOUSE CONNECTIONS
12. INTERFERENCE WHERE WATERMAINS CROSS SEWERS HAVE BEEN OVERCOME BY LOWERING OF THE WATERMAIN TO PROVIDE A MINIMUM SEPARATION OF 0.50m. AS PER CITY OF CAMBRIDGE 3–C–6
13. BEDDING AND COVER MATERIAL FOR WATERMAINS AND SERVICE CONNECTIONS IS GRANULAR 'A' COMPACTED TO 98% STANDARD PROCTOR DENSITY.
14. SIDEWALK RAMPS ARE AS PER CITY OF CAMBRIDGE 5–C–5
15. CURB RADII IS 9.2m (UNLESS OTHERWISE NOTED)

The Corporation of the City of Cambridge

	Revision	By	Appd.	YY.MM.DD
3	AS RECORDED	V.B.M.	K.M.F.	02.(
2	AS PER DRAFT PLAN CONDITIONS/ 1st SUBMISSION COMMENTS	D.F.H.	S.G.P.	01.(
1	REVISED JAMESON PARKWAY VERTICALLY ALIGNMENT	K.M.F.	S.G.P.	01.(

Seal

Client/Project
JAMIESON ESTATES (CAMBRIDGE) LTD.
JAMIESON ESTATES
City of Cambridge, ON Canada

Title
PLAN & PROFILE
JAMIESON PARKWAY
STA 0+420 TO END

Project No. 60307225
Scale H1:500 V1:50
Drawing No. 17 A709-15
Revision 3

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200 CACHET WOODS COURT, SUITE 204
MARKHAM, ON L6C 0Z8
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FIGURE 4
2809 TOWNLINE ROAD
JAMIESON PKWY SANITARY SEWER

DATE: NOVEMBER 2025 SCALE: NTS PROJECT: 251619

Table 10. Water Demand

Land Use	Building Area (m^2)	Average Day Demand[1] (L/s)	Peak Hour Demand[2] (L/s)	Maximum Day Demand[2] (L/s)
Industrial Buildings:				
Building 1	16,200	0.21	0.79	0.53
Building 2	16,200	0.21	0.79	0.53
Building 3	16,200	0.21	0.79	0.53
Building 4	10,427	0.14	0.51	0.34
Building 5	10,427	0.14	0.51	0.34
Building 6	9,814	0.13	0.48	0.32
Commercial Building	15,090	0.20	0.74	0.49
Total	**94,358**	**1.23**	**4.61**	**3.07**

[1]Average Per Capita Demand are based on 225L/c/day, as outlined in section B.2.2.2 of the Region of Waterloo and Area Municipalities Design Guidelines and Supplemental Specifications for Municipal Services (February 2022).

[2]Peaking Factors taken from "Design Guidelines for Drinking Water Systems" (MOE, 2008), Average Day = 1, Maximum Day = 2.5, Peak Hour = 3.75, Minimum Hour = 0.45.

Hydrants will be included in the detailed design of the site. The design will be completed according to the required fire flow. Additional details will be included during the detailed design stage.

Fire Flow

The detailed fire formula on page 17 of the FUS was used to calculate the minimum fire flow for the proposed development. The following assumptions have been made in preparing the calculations:

- Building GFA: Building 1 = 16,200m^2
  Building 2 = 16,200m^2
  Building 3 = 16,200m^2
  Building 4 = 10,427m^2
  Building 5 = 10,427m^2
  Building 6 = 9,814m^2
  Commercial Building = 15,090m^2
- Non-combustible construction.
- The building will be designed with fully supervised systems with complete automatic sprinkler protection conforming to NFPA 13 and other NFPA sprinkler standards.

Table 17 provides the building characteristics and minimum fire flow requirements for the building.

Table 17. Fire Flow Estimates

Building	Area (m^2)	Required Fire Flow (L/min)
Building 1	16,200	14,000
Building 2	16,200	14,000
Building 3	16,200	14,000
Building 4	10,427	11,000
Building 5	10,427	11,000
Building 6	9,814	11,000
Commercial Building	15,090	13,000

When using this information, the minimum required fire flow for the development is 14,000L/min (3,700gal/min) for the proposed development. Detailed calculations have been included in **Appendix E**.

The proposed hydrants will be sufficiently sized to accommodate the proposed development, ensuring there is adequate fire protection. Additional details will be provided during the detailed design stage.

6.1 Private Servicing Option

If it is concluded that municipal servicing is not feasible, a private water supply system will be proposed that can service the site. The site plan would be revised as needed, as part of the Site Plan stage of the project.

In the private servicing option, it is noted that a Permit To Take Water will be required for the on-site well due to the anticipated demands, to be completed by others.

7.0 SUMMARY

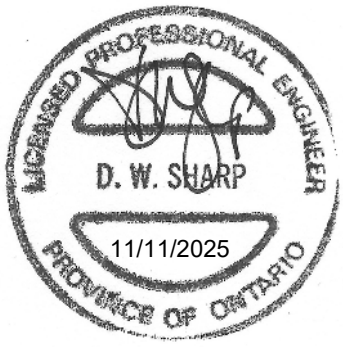
The proposed development meets the Township of Puslinch and the Grand River Conservation Authority's requirements as follows:

- Peak flows for storms up to and including the 100-year event will be controlled on site to meet the required targets.
- Water quality controls will be designed to provide 80 percent overall TSS removal, as required.
- Sanitary drainage for the northern portion of the site will be conveyed to the proposed treatment system, as per Township requirements, as outlined in the Crozier servicing memo.
- The existing watermain on Townline Road can be used to service the proposed development. A hydrant flow test will be completed to confirm the available pressures with the SPA work.

Summary continues on next page...

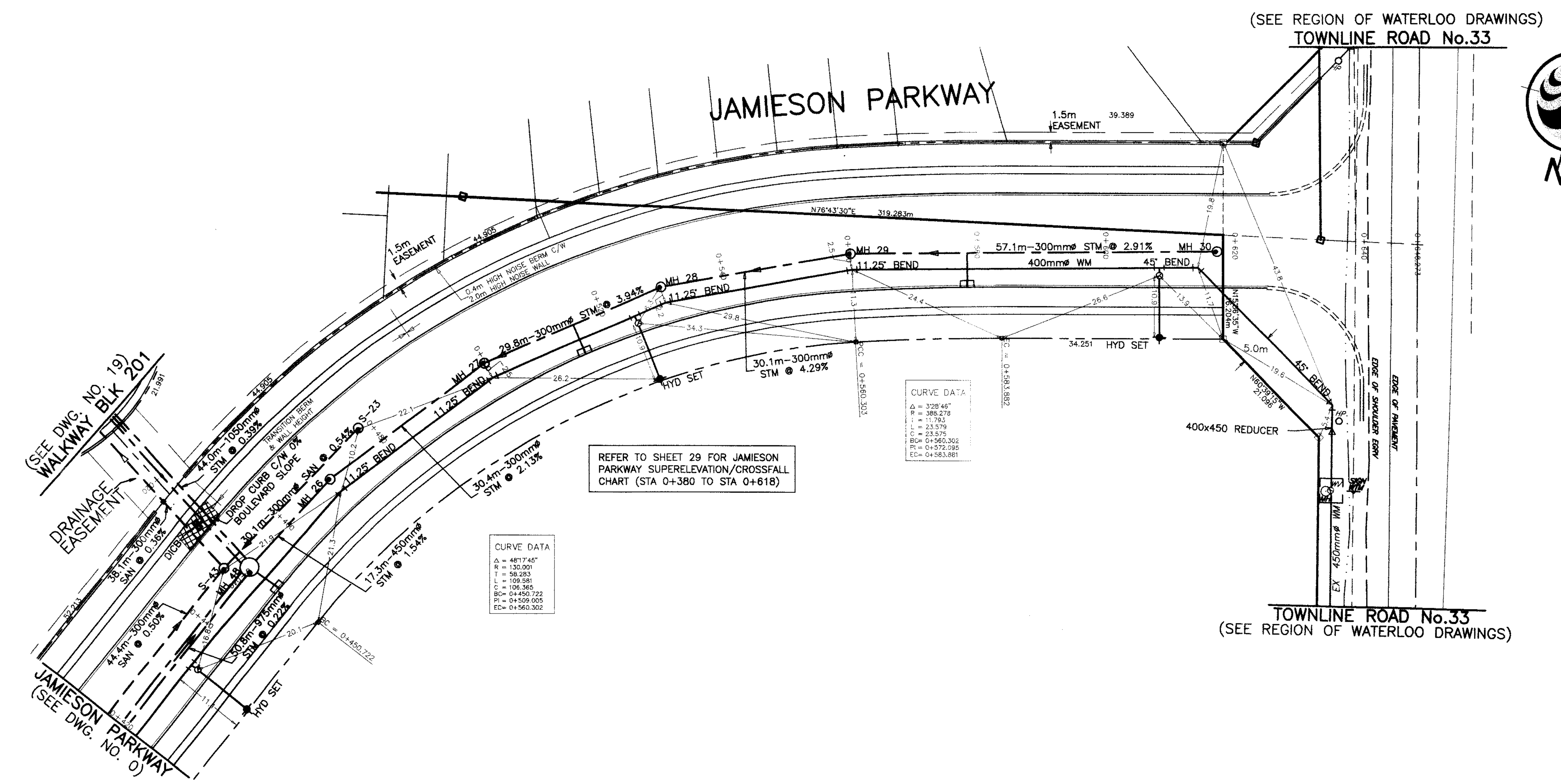
- The existing sanitary sewer on Jamieson Parkway can be used to provide service for the southern portion of the site. External works will be required to extend the service to Townline, adjacent to the site. The detailed design will be completed as part of the Site Plan application stage of the project. In the case where municipal services are not provided for the site, private sewage and water supply can be provided on the site as outlined in the Crozier servicing memo. This will be further detailed as part of the Site Plan work for the proposed development.
- Water balance will be investigated by the hydrogeologic engineer and included with the SPA work. The water balance target for the site will be met through underground infiltration chambers, based on the soils and the recommendations provided in the Investigation.

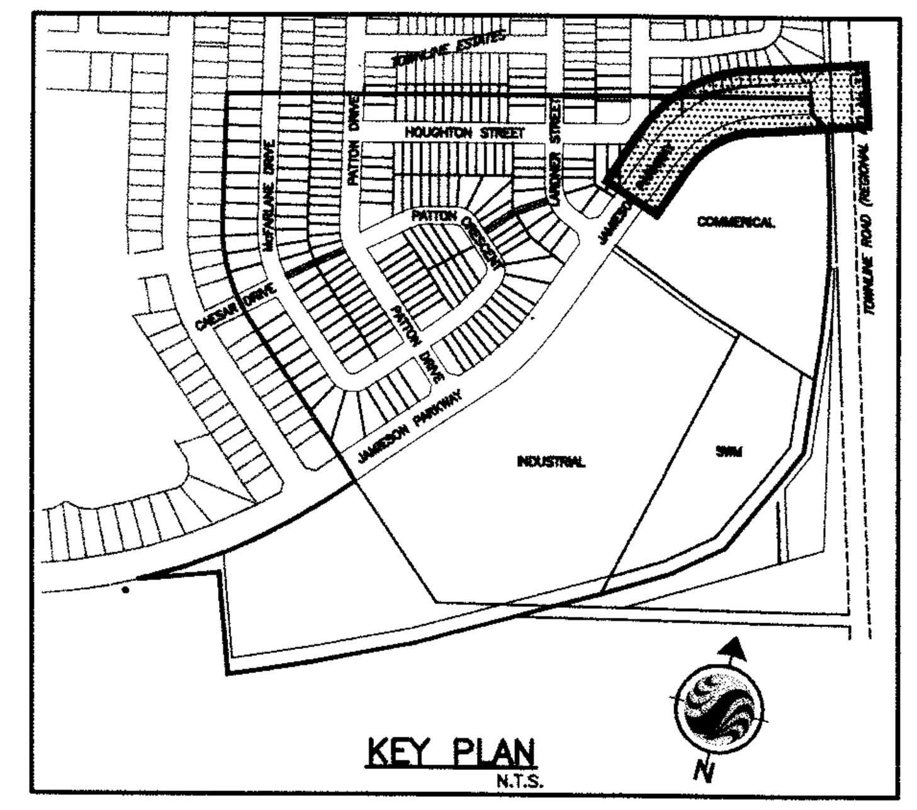
Therefore, based on the information provided herein, the stormwater management and site servicing requirements for the Rezoning application have been met.

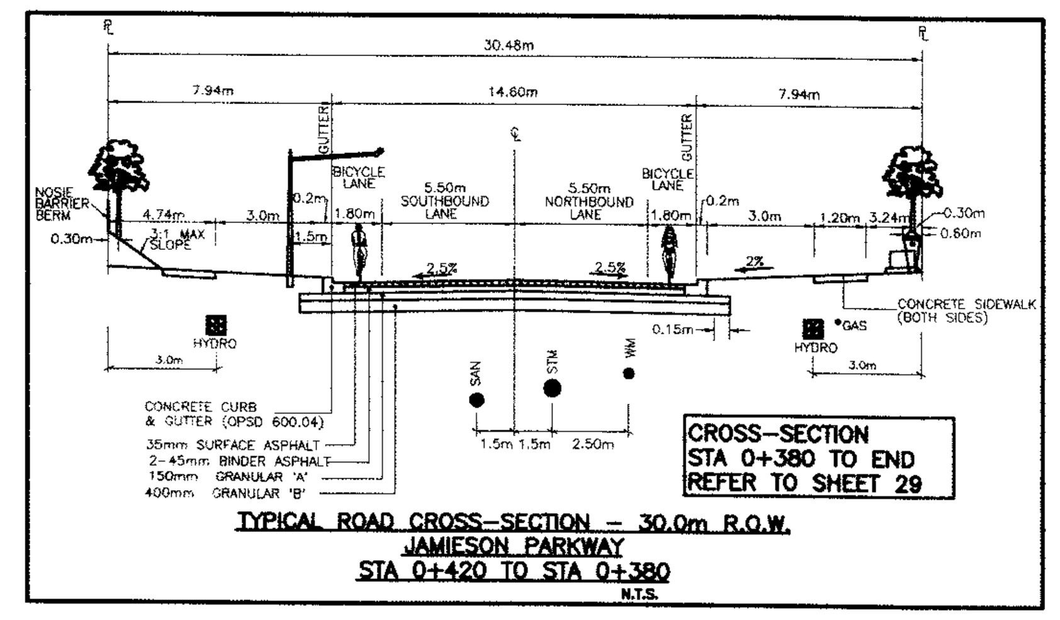


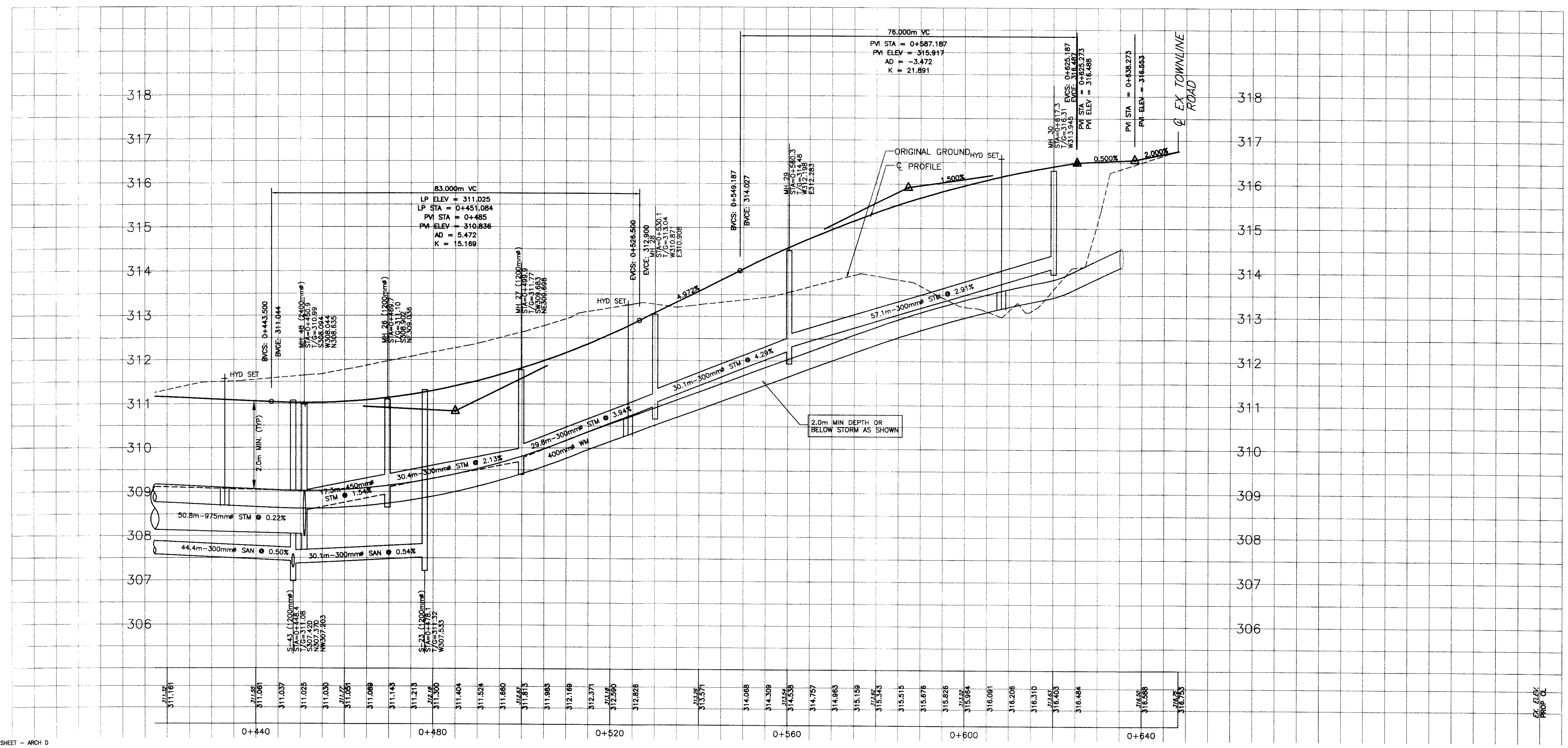
APPENDIX A

BACKGROUND INFORMATION









ORIGINAL SHEET – ARCH D

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Fax. 519.579.6733
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Notes

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The Corporation of the City of Cambridge

Revision		By	Appd.	YY.M…
3	AS RECORDED	V.B.M.	K.M.F.	02.0…
2.	AS PER DRAFT PLAN CONDITIONS/ 1st SUBMISSION COMMENTS	D.F.H.	S.G.P.	01.0…
1.	REVISED JAMIESON PARKWAY VERTICALLY ALIGNMENT	K.M.F.	S.G.P.	01.0…

Seal

LICENSED PROFESSIONAL ENGINEER
K.M. FERGIN
FEB 1/02
PROVINCE OF ONTARIO

Client/Project

JAMIESON ESTATES (CAMBRIDGE) LTD.

JAMIESON ESTATES

City of Cambridge, ON Canada

Title

PLAN & PROFILE JAMIESON PARKWAY STA 0+420 TO END

Project No.	Scale
60307225	H1:500 V1:50

Drawing No.		Revision
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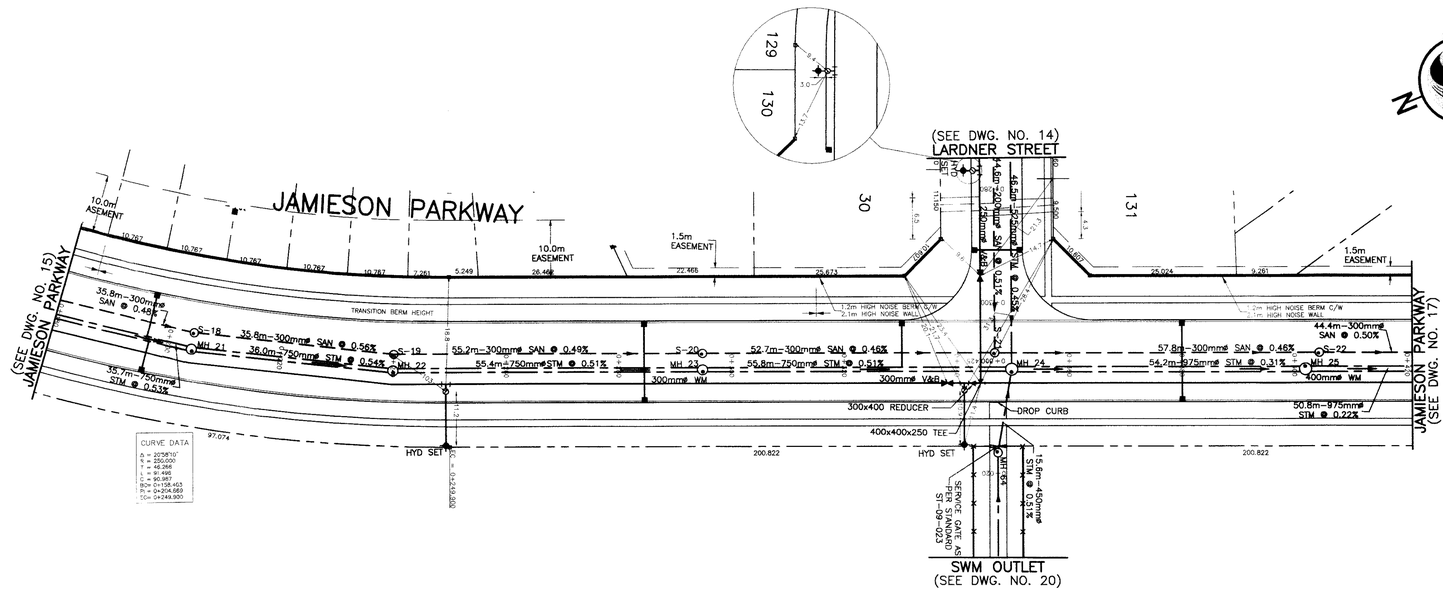

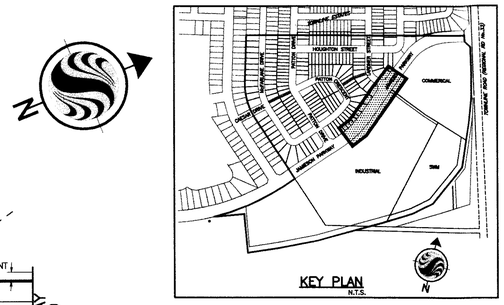

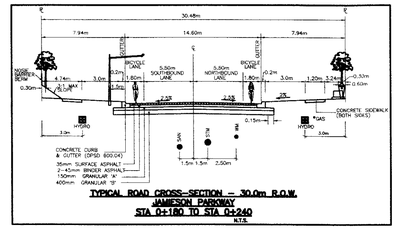

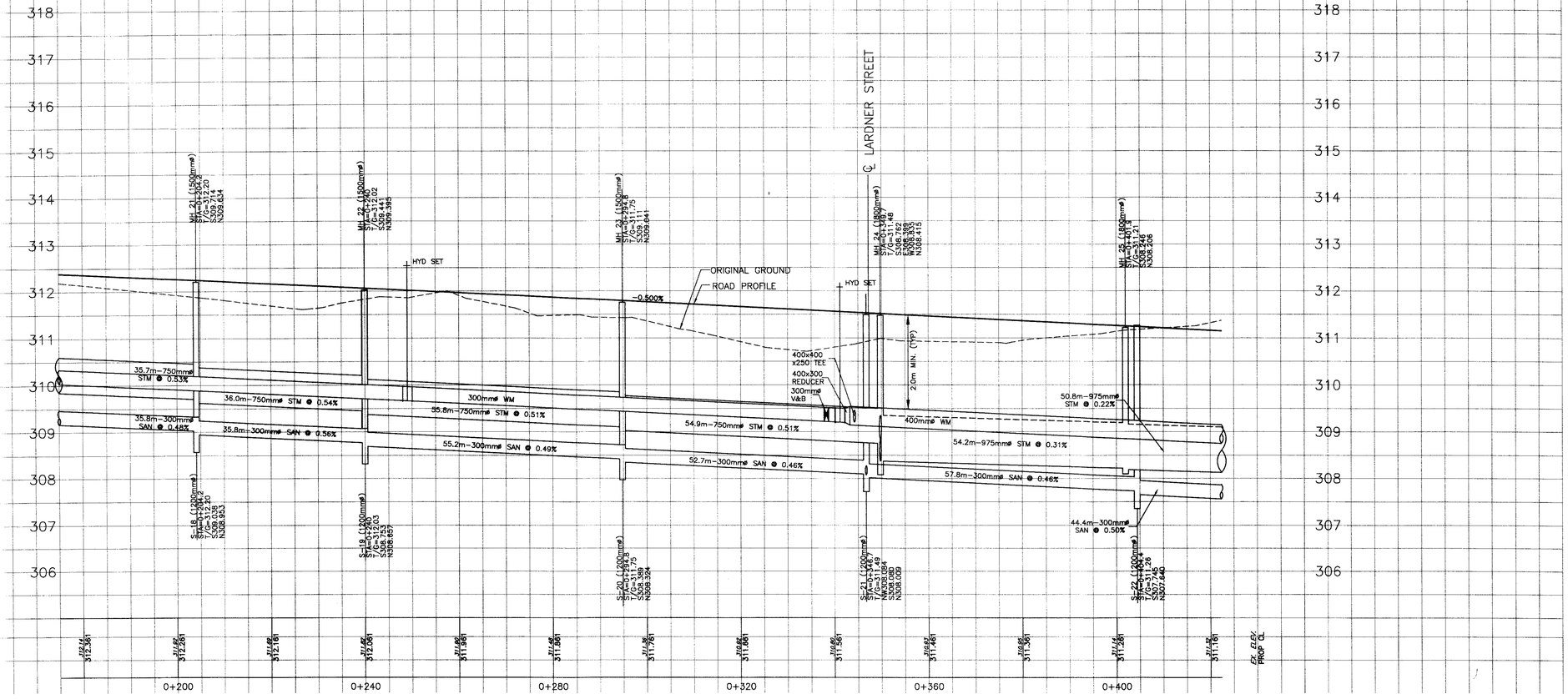

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The Corporation of the City of Cambridge

Revision	By	Appd.	YY.MM.DD
2 AS RECORDED	V.B.M.	K.M.F.	02.12.20
1 AS PER DRAFT PLAN CONDITIONS/ 1st SUBMISSION COMMENTS	D.F.H.	S.G.P.	01.12.20

Seal

LICENSED PROFESSIONAL ENGINEER
K.M. FERGIN
PROVINCE OF ONTARIO

Client/Project
JAMIESON ESTATES (CAMBRIDGE) LTD.
JAMIESON ESTATES
City of Cambridge, ON Canada

Title
PLAN & PROFILE
JAMIESON PARKWAY
STA 0+180 TO 0+420

Project No. 60307225
Scale H1:500 V1:50
Drawing No. 16 A709-14
Revision 2

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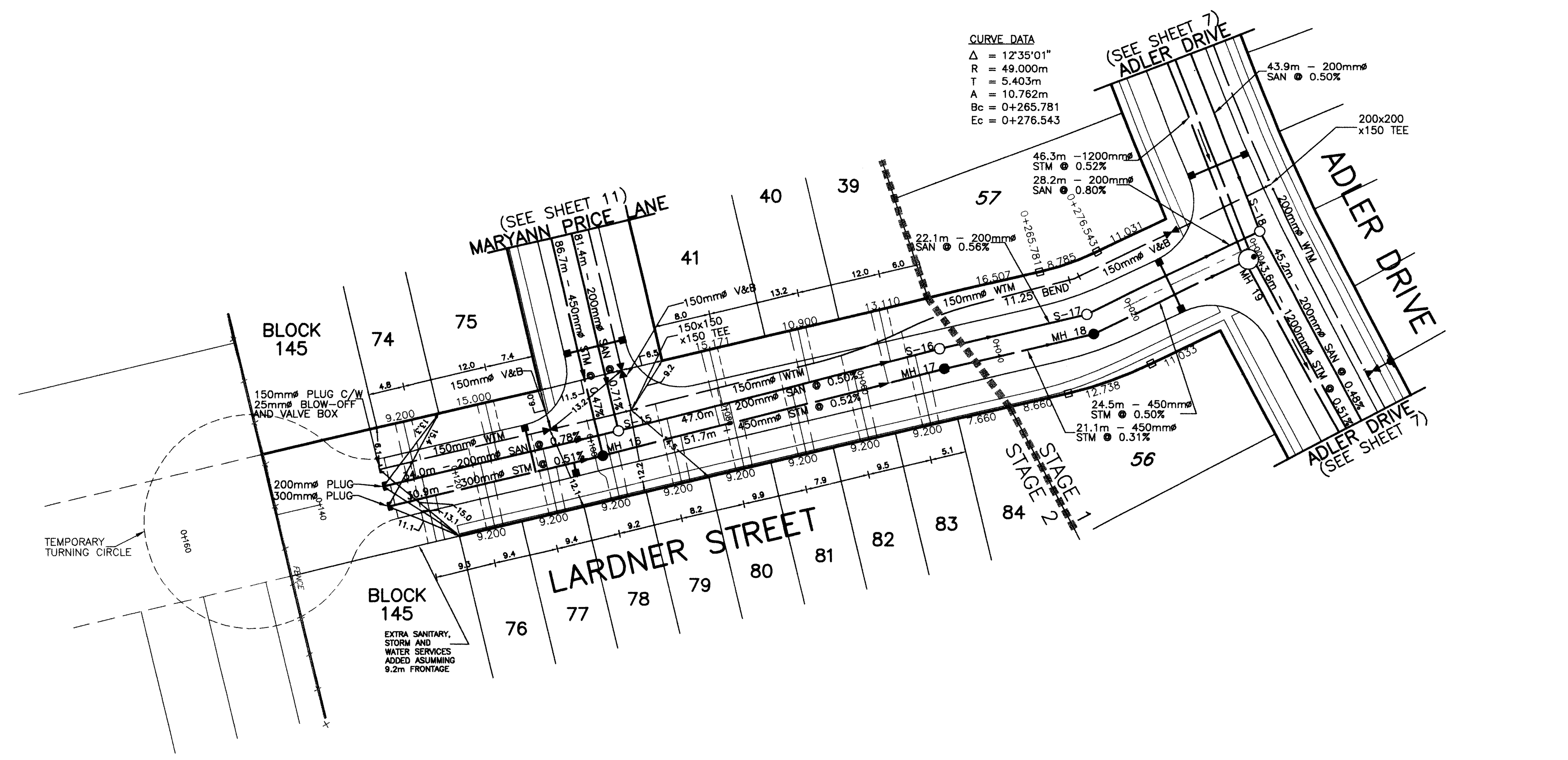

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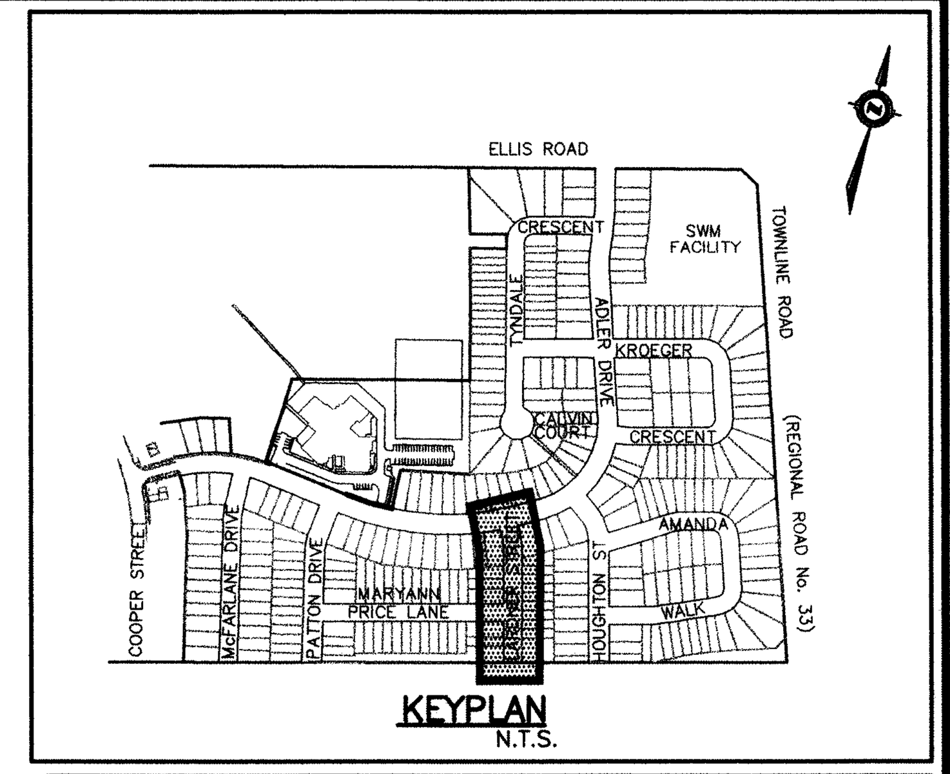

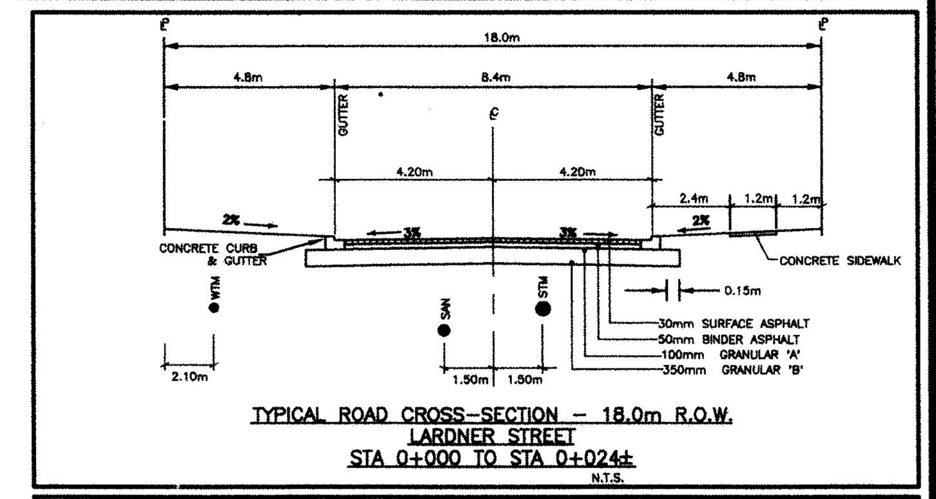

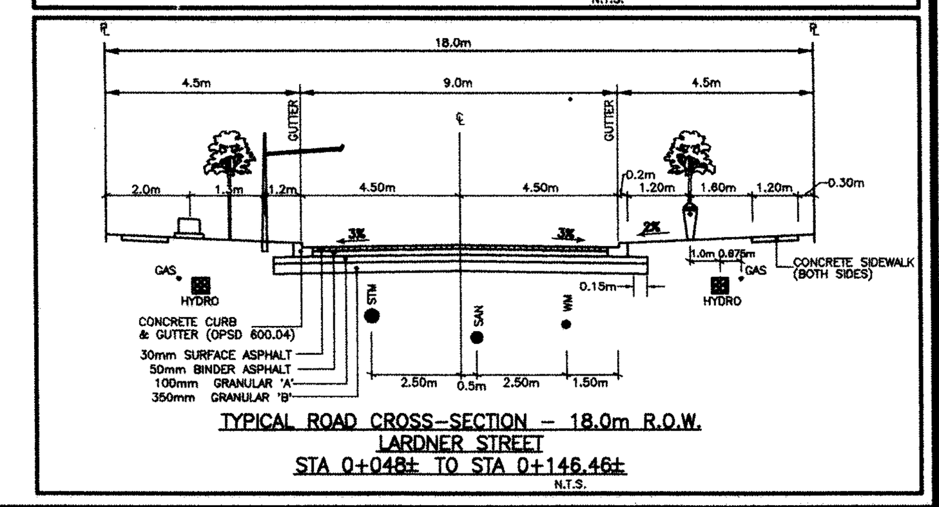

NORTH

The position of existing above ground and underground utilities and facilities are not necessarily shown on the drawings, and where shown, the accuracy of the position of such utilities and facilities is not guaranteed. Before starting work, the contractor shall confirm the exact location of all existing utilities and facilities, and shall assume all liability for damage to them.

Drawings shall not be used for construction unless sealed. All work to be performed in accordance with the Occupational Health & Safety Act 1990.

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The Corporation of the City of Cambridge

NO.	YY.MM.DD	REVISION	BY
6	02.02.08	AS RECORDED – STAGE 2	D.T.M.
5	01.04.26	REVISED STREET NAMES	KMF
4	01.02.19	AS RECORDED – STAGE 1	D.T.M.
3	01.02.16	REVISED DRAFT PLAN	K.M.F.
2	00.09.19	REVISIONS FOR STAGE 2 SUBMISSION	K.M.F.
1	00.02.24	AS RECORDED STAGE 1	J.R.

LICENSED PROFESSIONAL ENGINEER S.G. Perschbacher Aug.31/1 PROVINCE OF ONTARIO

Stantec

DESIGN BY:	V.E.R./K.M.F.
DRAWN BY:	D.F.H.
CHECKED	V.E.R./S.G.P.
DATE:	98.12.02
SCALE:	1:500 1:50

TOWNLINE ESTATES (CAMBRIDGE) LTD.

PROJECT
TOWNLINE ESTATES SUBDIVISION STAGE 2

DRAWING NAME
PLAN & PROFILE LARDNER STREET STA 0+000 TO STA 0+146

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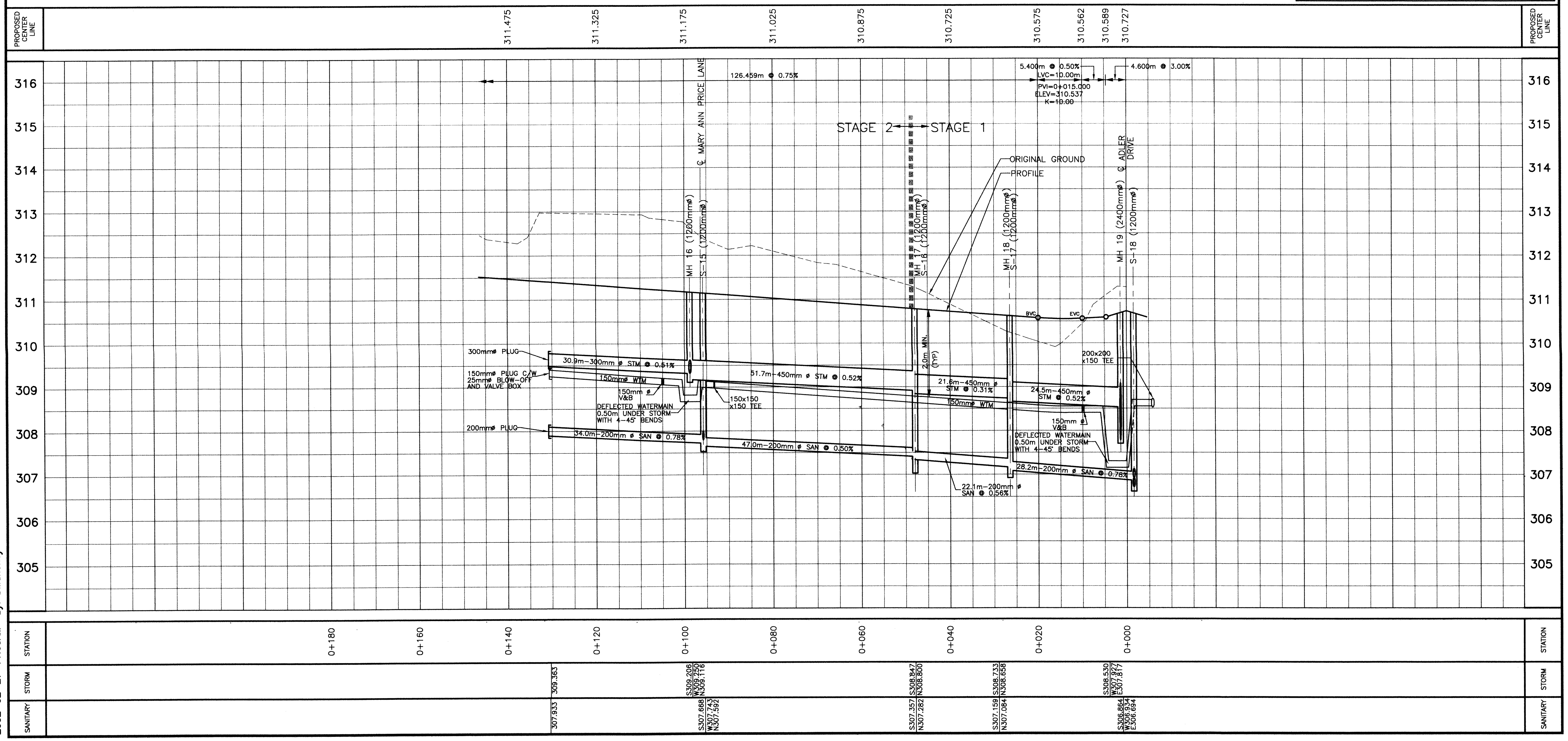

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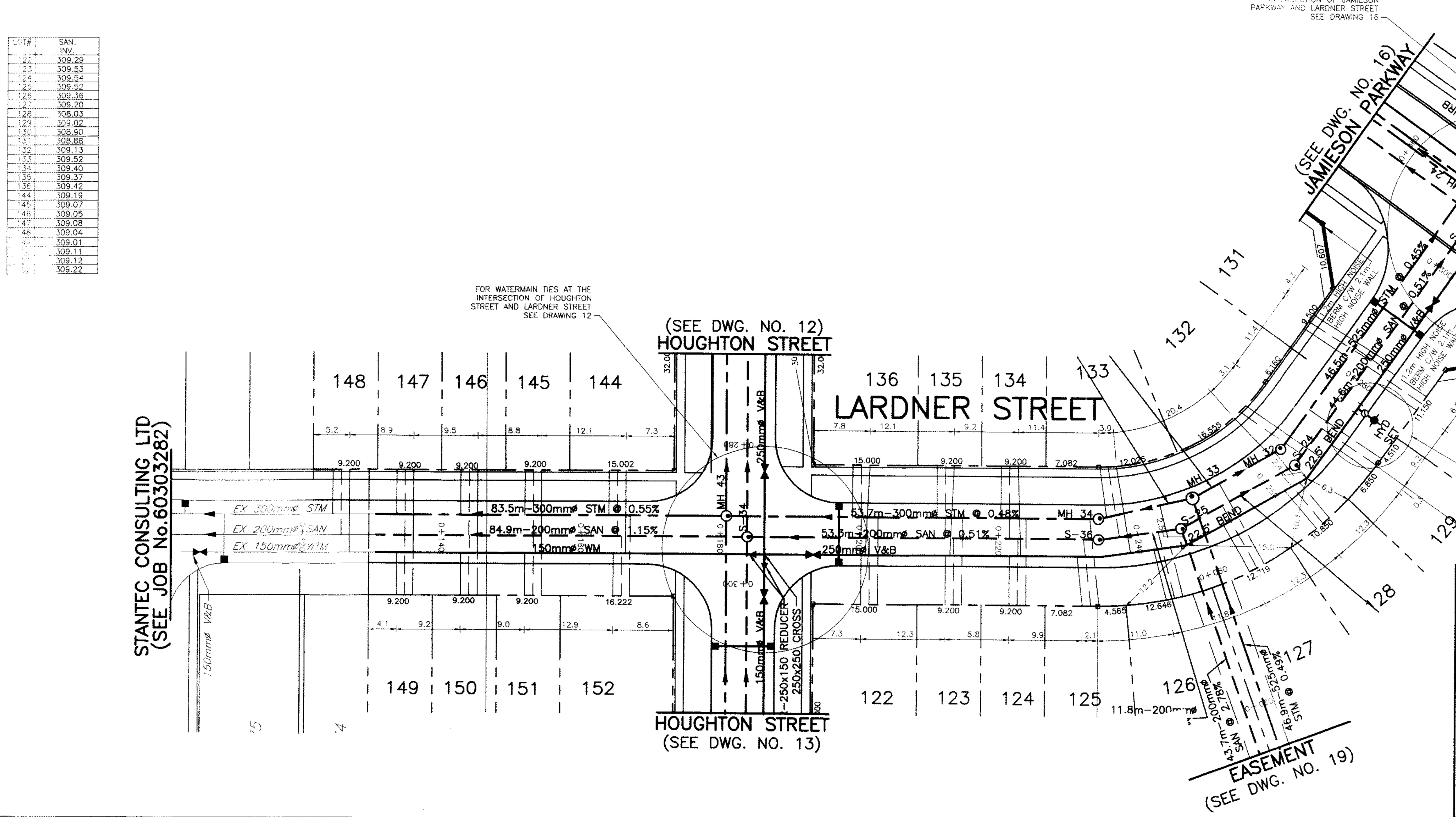

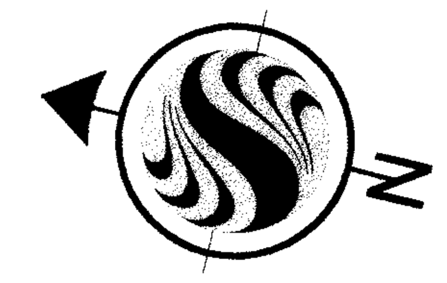

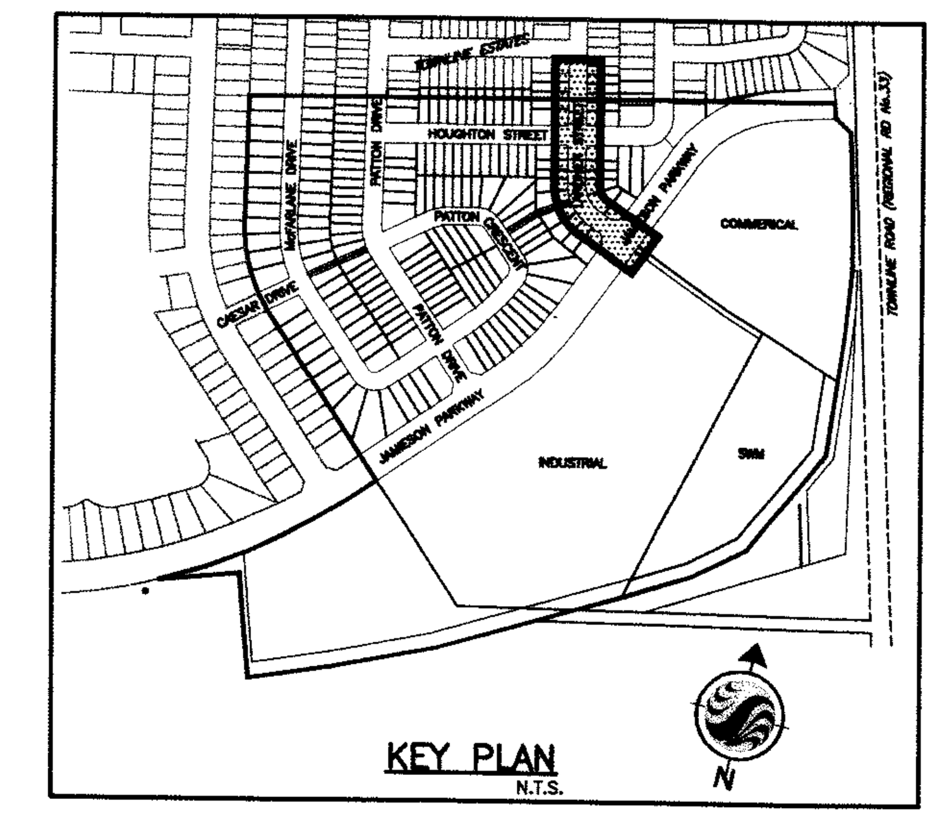

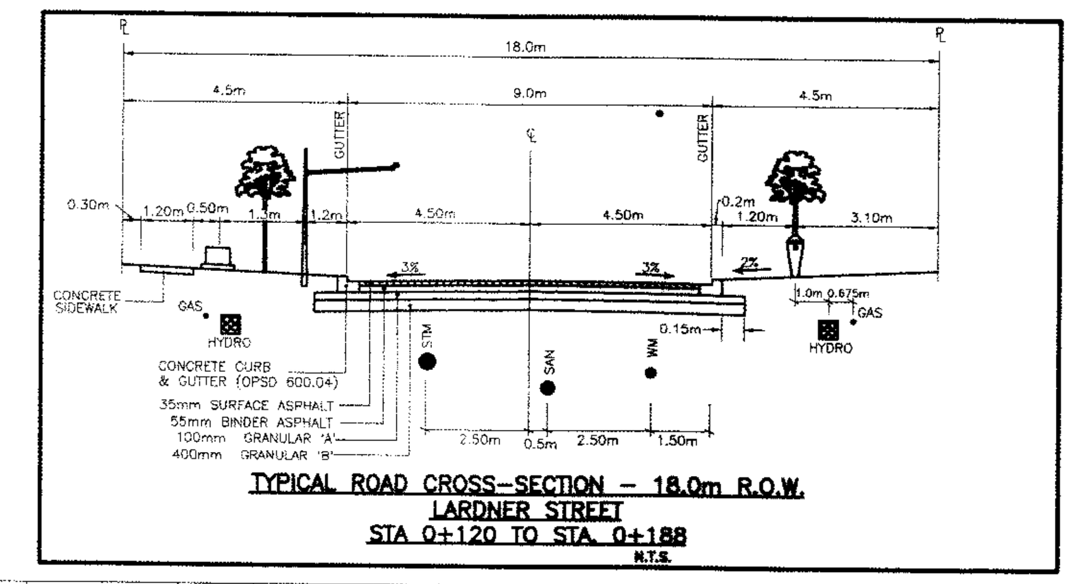

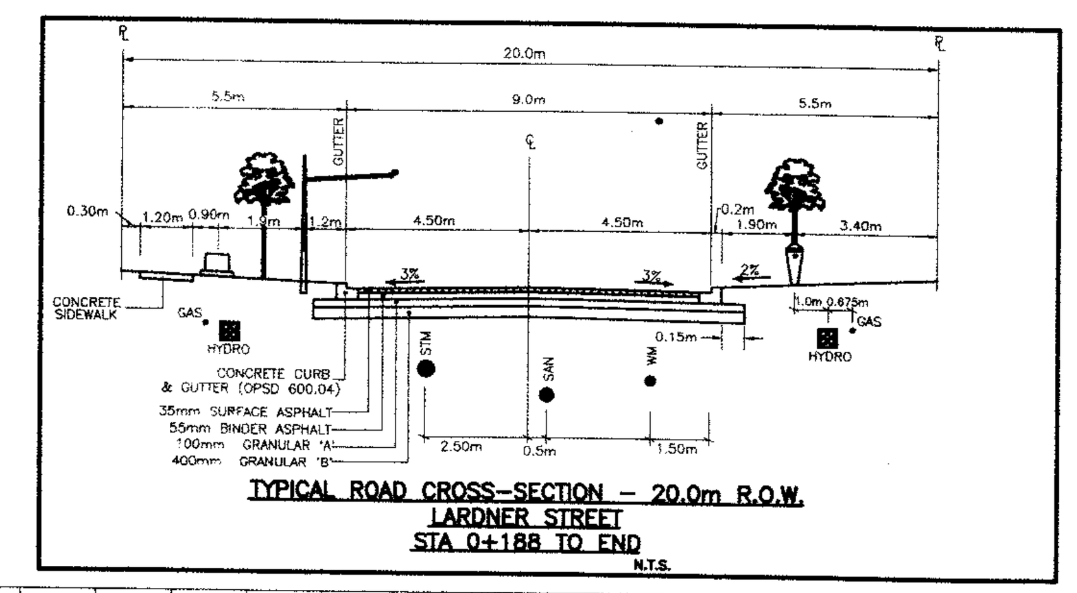

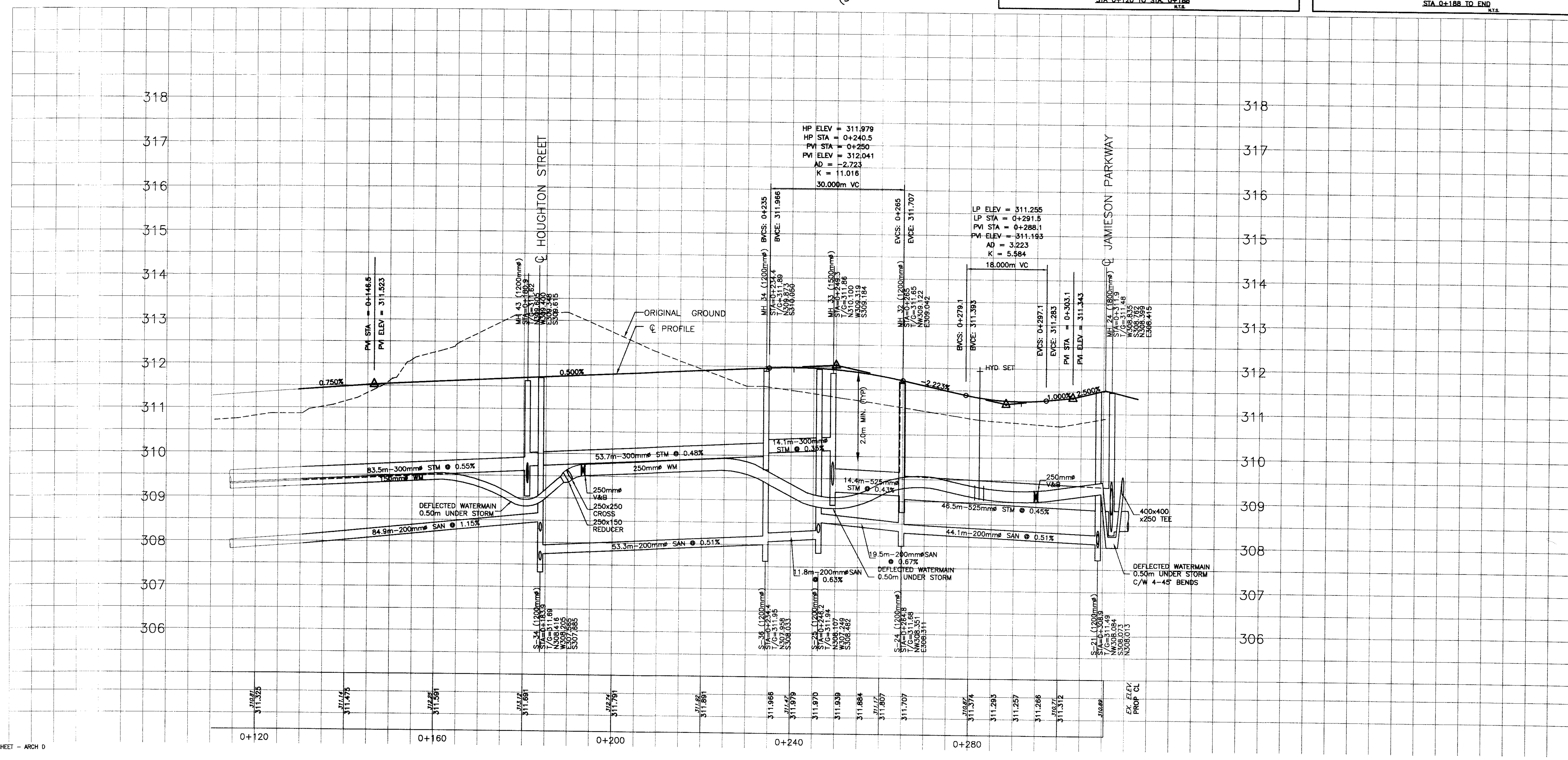

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1	AS PER DRAFT PLAN CONDITIONS/ 1st SUBMISSION COMMENTS	D.F.H.	S.G.P.	01.06
Revision		By	Appd.	YY.MM

Seal

K.M. FERGIN
FEB 14/02
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

Client/Project

JAMIESON ESTATES (CAMBRIDGE) LTD.

JAMIESON ESTATES

City of Cambridge, ON Canada

Title

PLAN & PROFILE LARDNER STREET STA 0+120 TO END

Project No.	Scale
60307225	H1:500 V1:50

Drawing No.	Revision
14	2

A912-2

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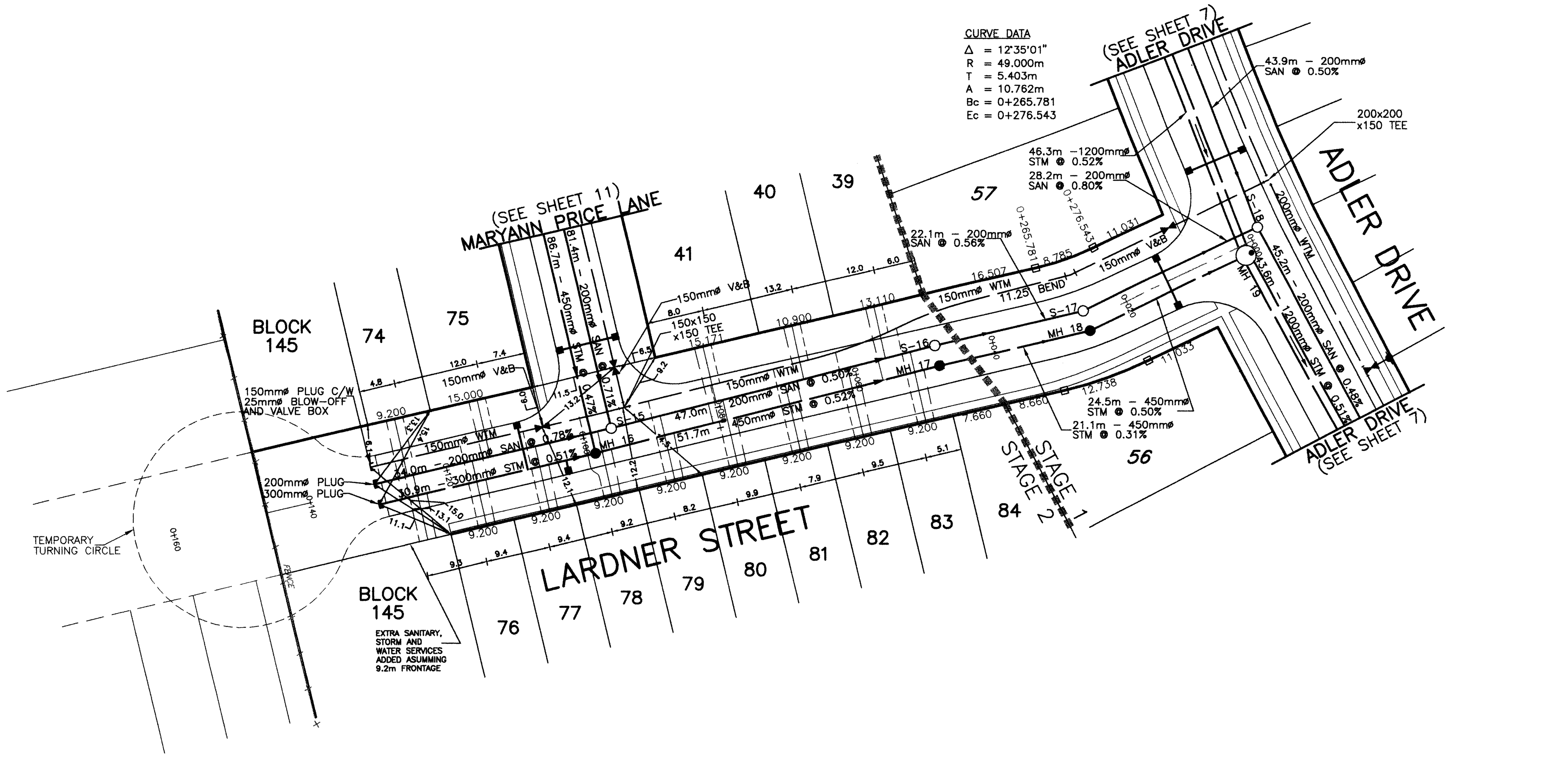

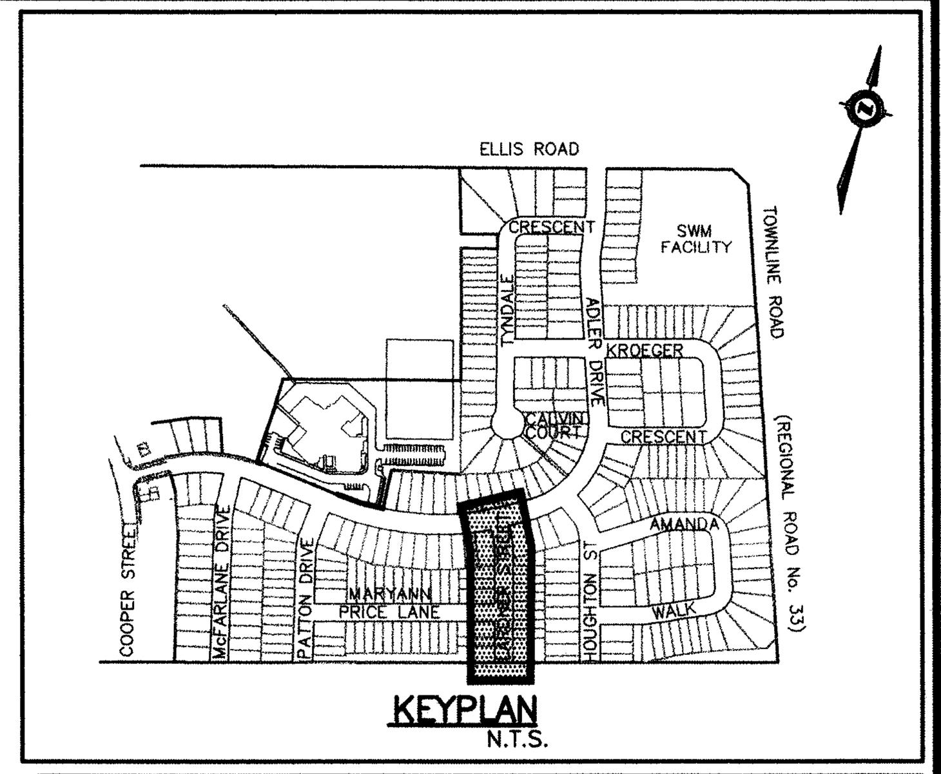

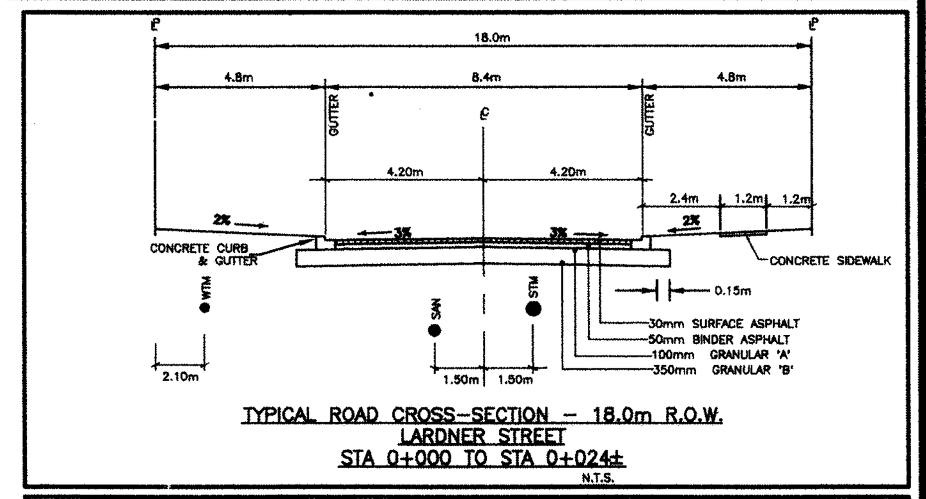

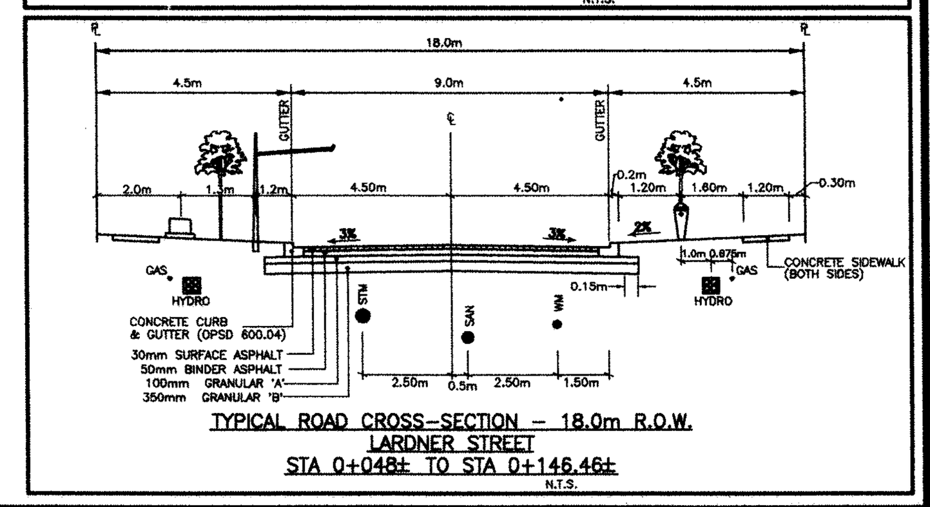

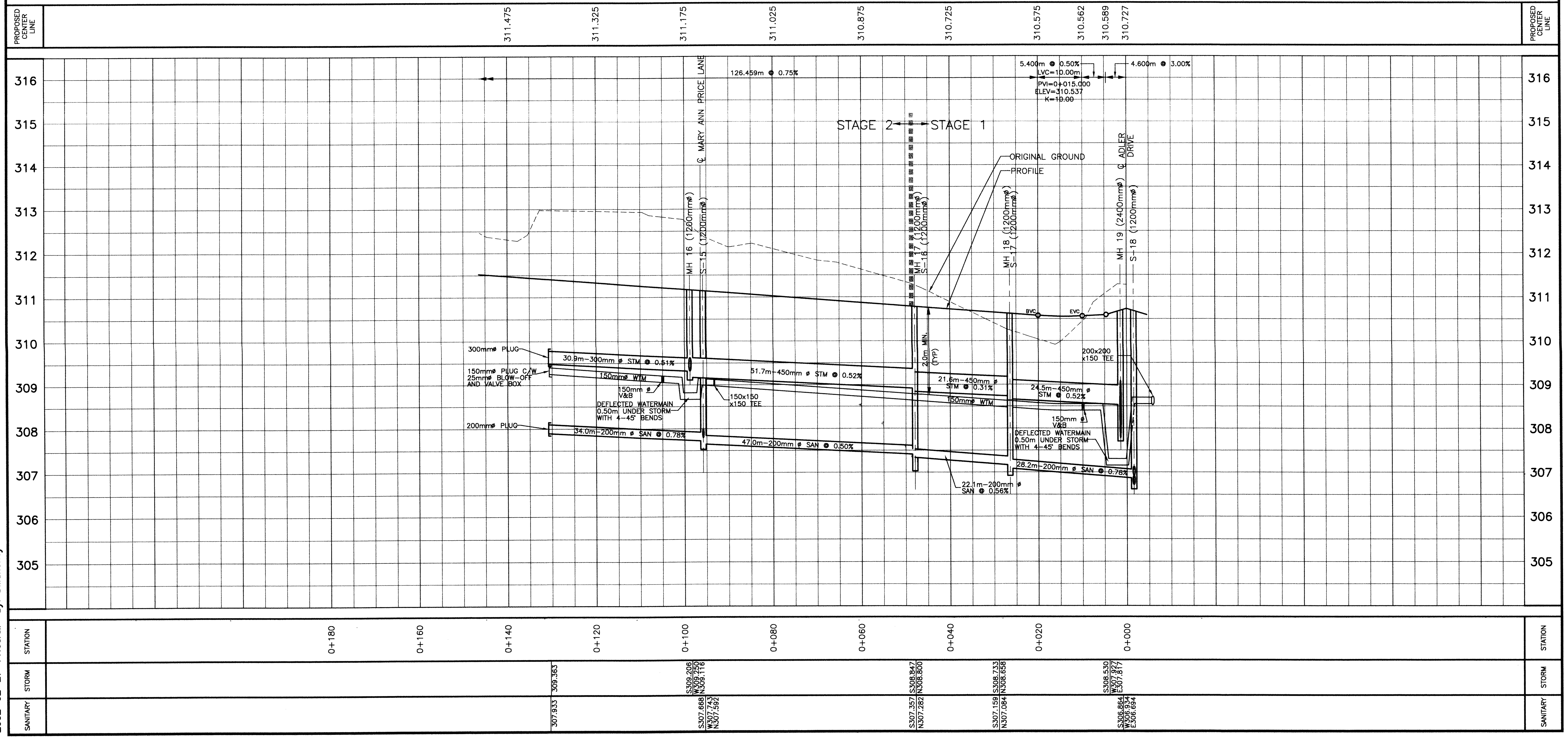

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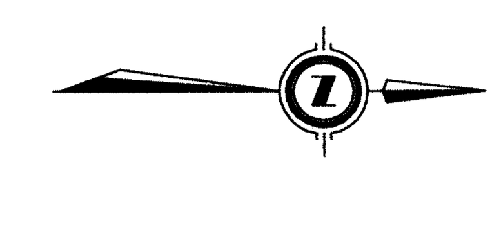


The position of existing above ground and underground utilities and facilities are not necessarily shown on the drawings, and where shown, the accuracy of the position of such utilities and facilities is not guaranteed. Before starting work, the contractor shall confirm the exact location of all existing utilities and facilities, and shall assume all liability for damage to them.

Drawings shall not be used for construction unless sealed. All work to be performed in accordance with the Occupational Health & Safety Act 1990.

NOTES

1. BENCHMARK:
   CITY OF CAMBRIDGE BENCHMARK #240 ON OVERFLOW STRUCTURE ON EAST SIDE OF TOWNLINE ROAD & 200.0m NORTH OF INTERSECTION OF RIVER ROAD/ TOWNLINE INTERSECTION
   ELEVATION 296.572m
2. SANITARY SEWERS ARE PVC DR 35 INSTALLED AS PER OPSD 802.010.
3. SANITARY SERVICES ARE 100mmø PVC DR 28 INSTALLED AS PER OPSD 1006.02 WITH A MINIMUM COVER OF 2.5m.
4. BEDDING AND COVER MATERIAL FOR SANITARY SEWERS AND SERVICE CONNECTIONS IS GRANULAR 'A' COMPACTED TO 98% STANDARD PROCTOR DENSITY.
5. STORM SEWERS ARE AS FOLLOWS (UNLESS OTHERWISE NOTED):
   –300mmø CL-3 CONC
   –375mmø TO 600mmø – 65-D CONC
   –GREATER THAN 600mmø – 65-D
6. CATCHBASIN LEADS ARE AS FOLLOWS:
   –SINGLE – 250mmø PVC DR35
   CATCHBASIN LEADS ARE INSTALLED IN ACCORDANCE WITH OPSD 708.01 AND OPSD 708.03 WITH A MINIMUM SLOPE OF 1.00% AND MINIMUM COVER OF 1.20m
7. STORM SERVICES ARE 150mmø PVC SDR 28 WITH A MINIMUM COVER OF 1.2m.
8. CONCRETE STORM SEWERS ARE INSTALLED AS PER OPSD 802.030 CLASS 'B. BEDDING AND COVER MATERIAL IS GRANULAR 'A'. COMPACTED TO 98% STD. PROCTOR DENSITY.
9. PVC AND PE STORM SEWERS ARE INSTALLED AS PER OPSD 802.010. BEDDING AND COVER MATERIAL IS GRANULAR 'A', COMPACTED TO 98% STD. PROCTOR DENSITY.
10. WATERMAINS ARE AWWA C-900 PVC CLASS 150 INSTALLED AS PER OPSD 802.010 WITH A MINIMUM COVER OF 2.0m
11. WATER SERVICES ARE 19mmø KITEC PIPE INSTALLED AS PER OPSD 1104.01 WITH A MINIMUM COVER OF 2.0m. WATER BOX HAVE APPROPRIATE FITTINGS TO ALLOW FOR 19mmø TYPE 'K' SOFT COPPER FOR HOUSE CONNECTIONS
12. INTERFERENCE WHERE WATERMAINS CROSS SEWERS WERE OVERCOME BY LOWERING OF THE WATERMAIN TO PROVIDE A MINIMUM SEPARATION OF 0.50m. MINIMUM ALL AS PER CITY OF CAMBRIDGE 3-C-6
13. BEDDING AND COVER MATERIAL FOR WATERMAINS AND SERVICE CONNECTIONS IS GRANULAR 'A' COMPACTED TO 98% STANDARD PROCTOR DENSITY.
14. INSTALL SIDEWALK RAMPS AS PER CITY OF CAMBRIDGE 5-C-3
15. CURB RADII ARE 9.2m (UNLESS OTHERWISE NOTED)

The Corporation of the City of Cambridge

NO.	YY.MM.DD	REVISION	BY
6	02.02.08	AS RECORDED – STAGE 2	D.T.M.
5	01.04.26	REVISED STREET NAMES	KMF
4	01.02.19	AS RECORDED – STAGE 1	D.T.M.
3	01.02.16	REVISED DRAFT PLAN	K.M.F.
2	00.09.19	REVISIONS FOR STAGE 2 SUBMISSION	K.M.F.
1	00.02.24	AS RECORDED STAGE 1	J.R.

LICENSED PROFESSIONAL ENGINEER
S.G. Perschbacher
Aug.31/11
PROVINCE OF ONTARIO

Stantec

DESIGN BY:	V.E.R./K.M.F.
DRAWN BY:	D.F.H.
CHECKED	V.E.R./S.G.P.
DATE:	98.12.02
SCALE:	1:500 1:50

TOWNLINE ESTATES (CAMBRIDGE) LTD.

PROJECT
TOWNLINE ESTATES SUBDIVISION STAGE 2

DRAWING NAME
PLAN & PROFILE LARDNER STREET STA 0+000 TO STA 0+146

PROJECT NO.	DRAWING NO.	REVISION
3-3282	11B	6

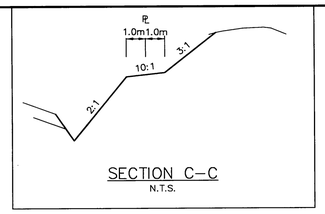
A912-1

DFH–01.02.21–3282lard.DWG

A912-1

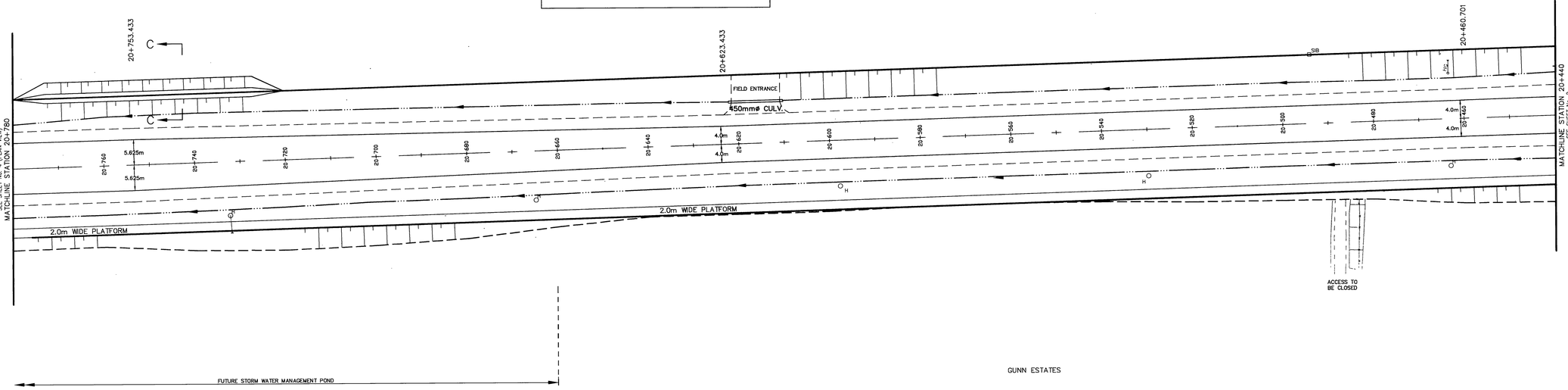
W:\active\60303282\construction\drawing\3282LARD.DWG
2002-02-27 11:03AM By: DMahoney

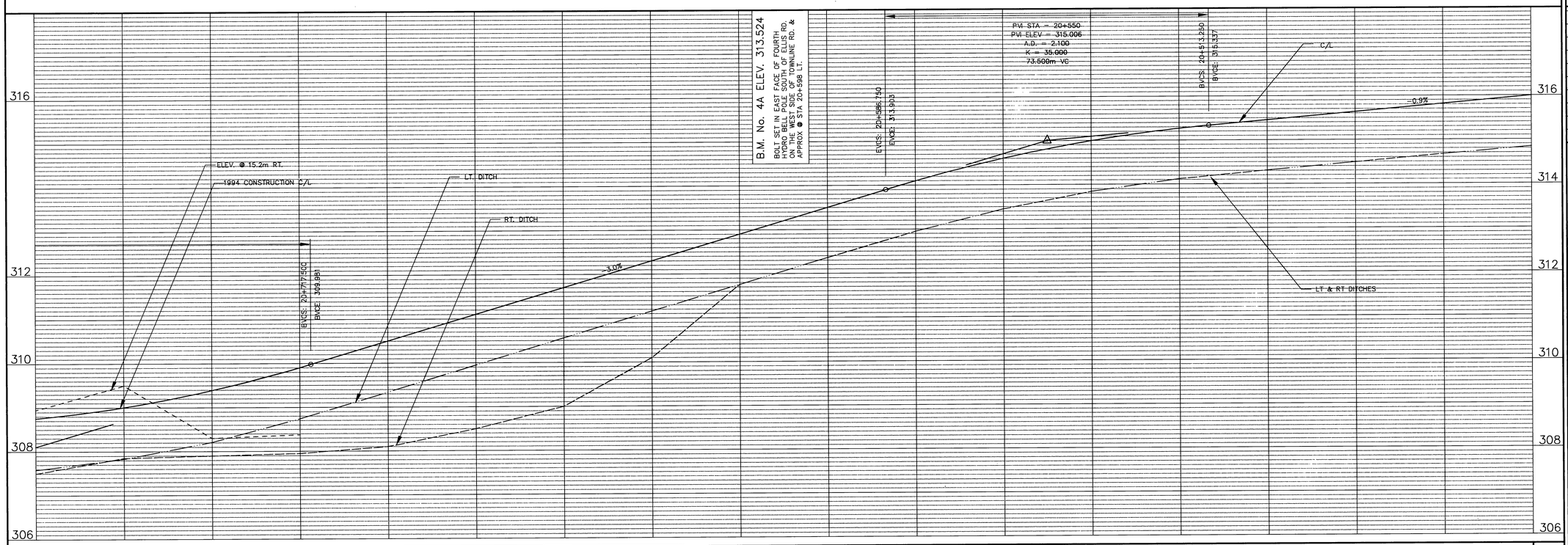
REGIONAL ROAD No. 33/
GUELPH SUBURBAN ROAD No. 33
TOWNLINE ROAD



SECTION C–C
N.T.S.

EDWARD & JOYCE WITMER





STATION	20+780	20+760	20+740	20+720	20+700	20+680	20+660	20+640	20+620	20+600	20+580	20+560	20+540	20+520	20+500	20+480	20+460	20+440	STATION
EXISTING																			EXISTING
DESIGN	308.757	309.007	309.390	309.907	310.506	311.106	311.706	312.306	312.906	313.506	314.099	314.604	314.994	315.269	315.456	315.636	315.816	315.996	DESIGN

NORTH ARROW

NOTES:

1. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISIONS	BY	DATE
3	RECORD DRAWING	DGJ	95 02 13
2	ISSUED FOR CONSTRUCTION	RTF	94 05 26
1	ISSUED FOR TENDER	RTF	94 04 26

The Regional
Municipality of Waterloo

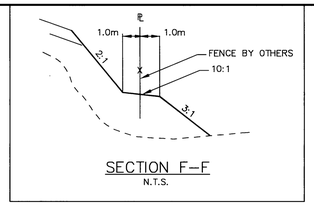
REGIONAL ROAD No. 33/
GUELPH SUBURBAN ROAD NO. 33
TOWNLINE ROAD

STA. 20+440 to 20+780

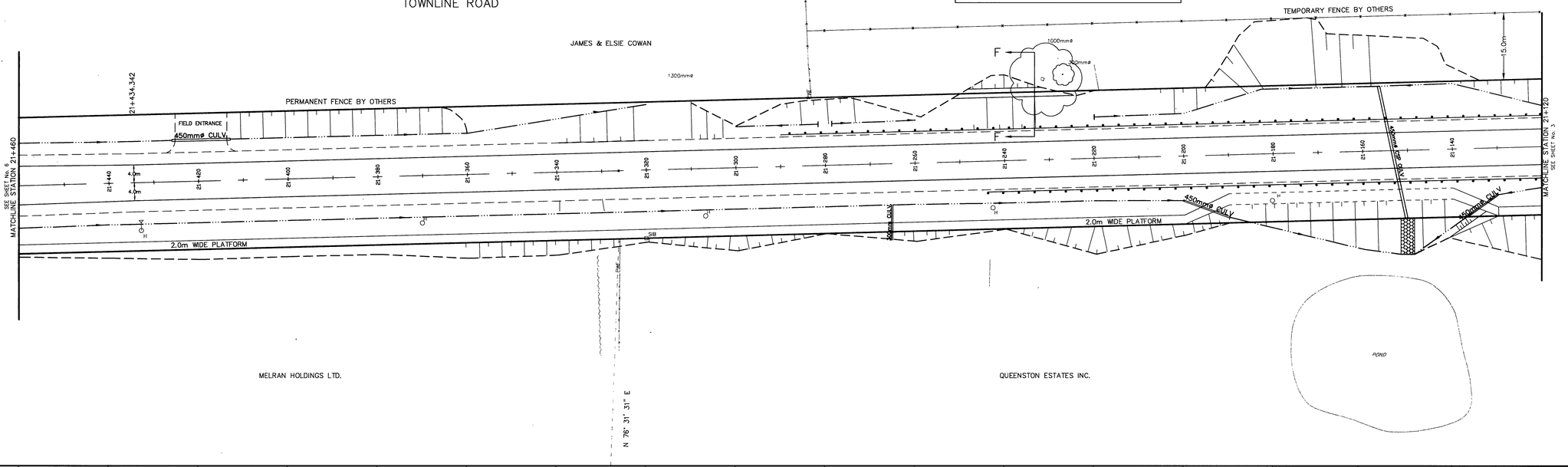
DRAWN BY:	CONTRACT No. 94011
CHECKED BY: G. MacDONALD	FILE No. 6419
DATE: APRIL 1994	DRAWING No. 489
SCALE HOR. 1:500 VERT. 1:50	SHEET 2 OF 14
H:\DCCADD\EO06419\6419-2AR.DWG	A703-8

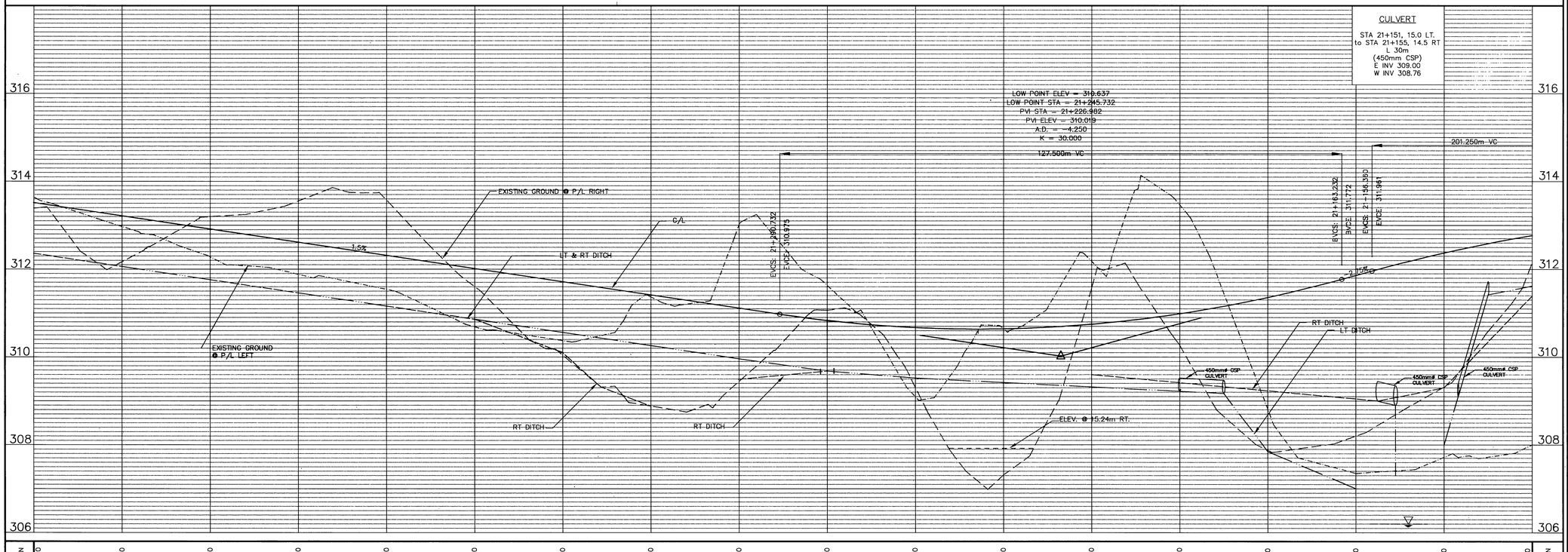
A703-8

REGIONAL ROAD No. 33/
GUELPH SUBURBAN ROAD No. 33
TOWNLINE ROAD



SECTION F-F
N.T.S.





STATION	21+460	21+440	21+420	21+400	21+380	21+360	21+340	21+320	21+300	21+280	21+260	21+240	21+220	21+200	21+180	21+160	21+140	21+120	STATION
EXISTING																			EXISTING
DESIGN	313.514	313.214	312.914	312.614	312.314	312.014	311.714	311.414	311.114	310.833	310.671	310.643	310.748	310.986	311.358	311.861	312.373	312.772	DESIGN

NORTH ARROW

NOTES:

1. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISIONS	BY	DATE
3	RECORD DRAWING	DGJ	95 02 17
2	ISSUED FOR CONSTRUCTION	RTF	94 05 26
1	ISSUED FOR TENDER	RTF	94 04 26

The Regional Municipality of Waterloo

REGIONAL ROAD No. 33/
GUELPH SUBURBAN ROAD No. 33
TOWNLINE ROAD

STA. 21+120 to 21+460

DRAWN BY:
CONTRACT No. 94011
CHECKED BY: G. MacDONALD
FILE No. 6419
DATE: APRIL 1994
DRAWING No. 489
SCALE HOR. 1:500 VERT. 1:50
SHEET 5 OF 14
H:\DCCADD\E006419\6419-5AR.DWG **A703-10**

A703-10

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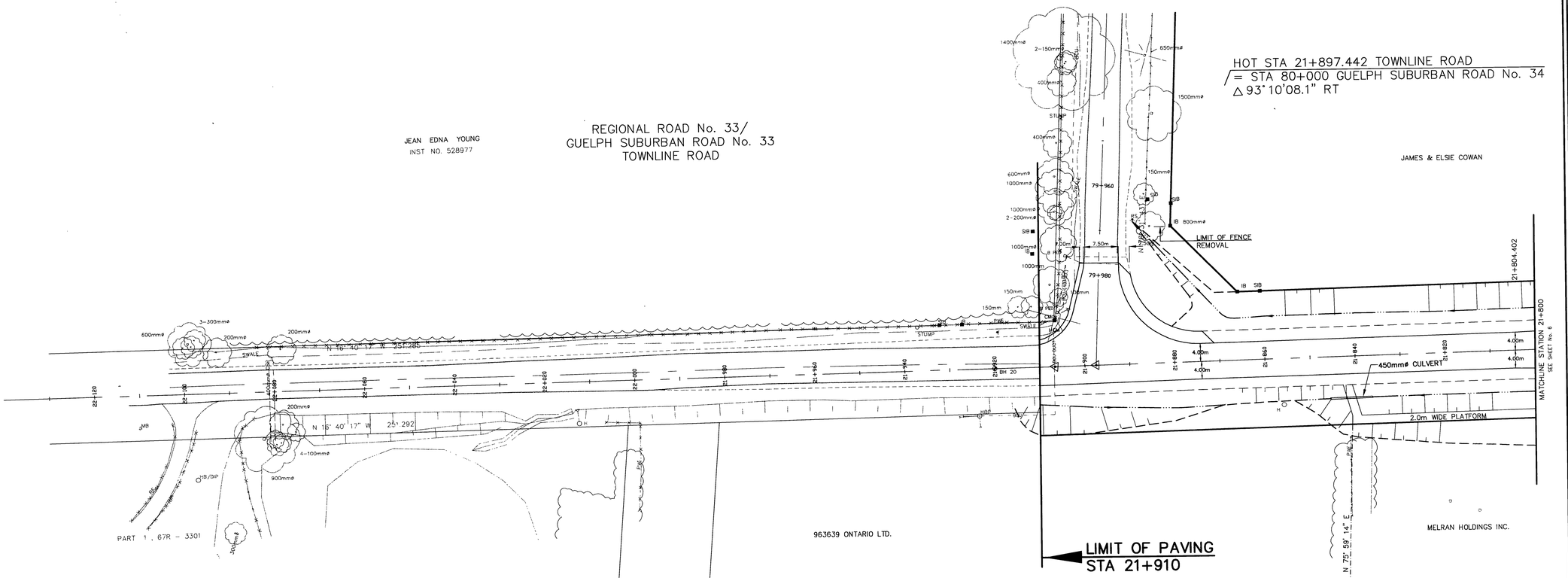

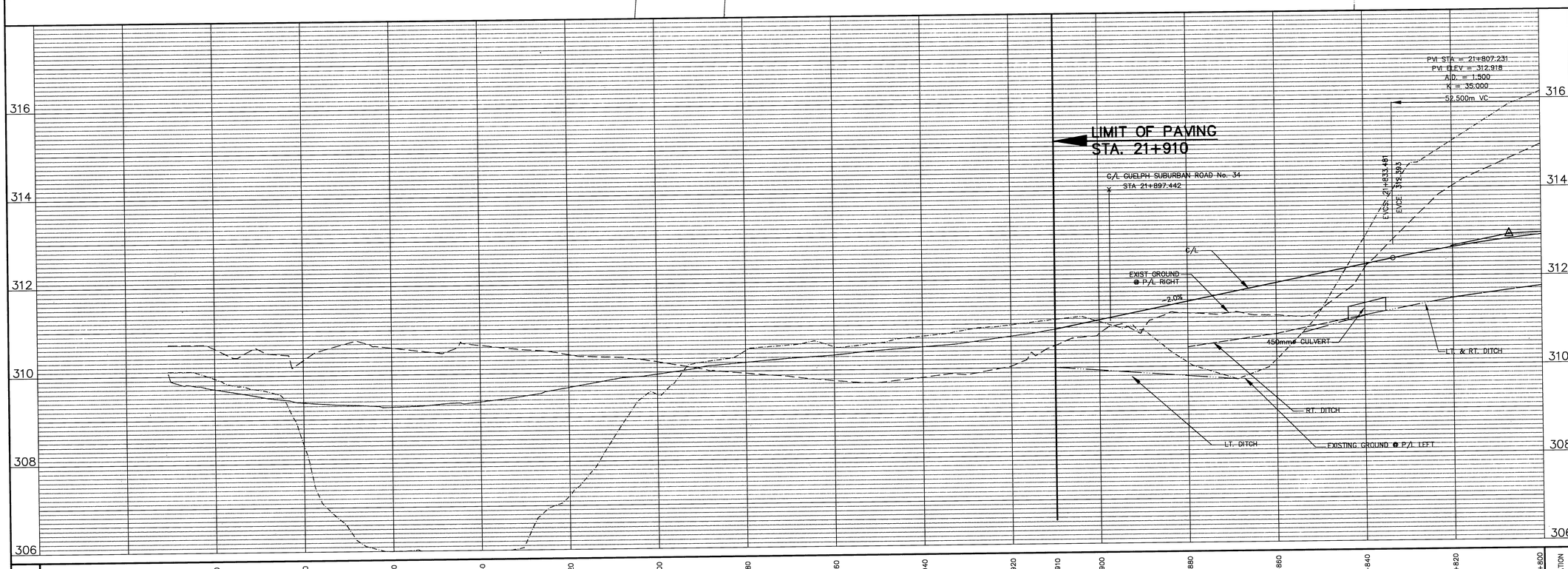

STATION	22+100	22+080	22+060	22+040	22+020	22+000	21+980	21+960	21+940	21+920	21+910	21+900	21+880	21+860	21+840	21+820	21+800	STATION
EXISTING	309.70	309.38	309.26	309.37	309.67	309.95	310.19	310.33	310.50	310.72	310.86							EXISTING
DESIGN											310.862	311.062	311.462	311.862	312.262	312.637	312.902	DESIGN

NORTH ARROW

NOTES:

1. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

CONTROLLING BM.: CA-176 RMW 239 ELEV. 310.859
TABLET SET IN SOUTH FACE 0.30m X 0.30m SQUARE STONE MONUMENT SET IN NORTHEAST INTERSECTION OF REGIONAL ROAD No. 33 AND GUELPH SUBURBAN ROAD No. 34 AT 1.0m ø PINE TREE ON GROUND LEVEL. TABLET IS SET IN SOUTH FACE OF STONE MONUMENT.

No.	REVISIONS	BY	DATE
3	RECORD DRAWING	DGJ	95 02 20
2	ISSUED FOR CONSTRUCTION	RTF	94 05 26
1	ISSUED FOR TENDER	RTF	94 04 26

The Regional Municipality of Waterloo

REGIONAL ROAD No. 33/
GUELPH SUBURBAN ROAD No. 33
TOWNLINE ROAD

STA. 21+800 to 22+100

DRAWN BY:	CONTRACT No. 94011
CHECKED BY: G. MacDONALD	DRAWING No. 6419
DATE: APRIL 1994	DRAWING No. 489
SCALE HOR. 1:500 VERT. 1:50	SHEET 7 OF 14
H:\DCCADD\EO06419\6419-7AR.DWG	A703-12

A703-12

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APPENDIX B

STORMWATER MANAGEMENT CALCULATIONS

Rational Method Calc.

Project:	2509 Townline Road
Project No.:	251619
Municipality:	Puslinch
Catchment:	Existing Site

Drainage Area to the North (Ellis Road)

Catchment 101

	Area (m2)	C	C x A
Landscape	86683	0.25	21670.8
Pavement	0	0.90	0.0
	86683	0.25	21670.8
Percent Impervious =	0%		

Drainage Area to the East (Puslinch Golf Club)

Catchment 102

	Area (m2)	C	C x A
Landscape	225040	0.25	56259.9
Pavement	0	0.90	0.0
	225040	0.25	56259.9
Percent Impervious =	0%		

Drainage Area to the Southwest (Townline Road / HWY 401)

Catchment 103

	Area (m2)	C	C x A
Landscape	21901	0.25	5475.3
Pavement	3470	0.90	3123.4
	25372	0.34	8598.7
Percent Impervious =	14%		

Time of Concentration Estimates

Airport Formula

Project:	2509 Townline Road
Project No.:	251619
Catchment ID:	101

Airport Equation

recommended for watersheds where C<0.4

$$t_c = \frac{3.26(1.1 - C)L^{0.5}}{S_w^{0.33}}$$

Input Data:

watershed length (L)	360.57	m		
Watershed Slope (S_w):	1.89	%	u/s elev	313
Runoff Coefficient (C):	0.25		d/s elev	306.2

Time of Concentration (t_c): 42.7 min

Time to Peak (t_p):

for NASHYD use:

$$t_p = t_c\left(\frac{N-1}{N}\right)$$

Number of linear reservoirs (N)	3	
Time to Peak (t_p):	0.47	hours

Soil Texture	Hillsburgh Fine Sandy Loam & Fox Sandy Loam
Soil Group	A

Initial Abstraction / Runoff Coefficient

	Area	Percentage	CN	Weighted CN	RC	Weighted RC	IA Depth (mm)	Weighted IA
Pervious	8.67	100%	72	72.0	0.25	0.250	8.0	8.00
Impervious	0.00	0%	98	0.0	0.90	0.000	1.0	0.00
	8.67			72.0		0.250		8.00

Time of Concentration Estimates

Airport Formula

Project:	2509 Townline Road
Project No.:	251619
Catchment ID:	102

Airport Equation

recommended for watersheds where C<0.4

$$t_c = \frac{3.26(1.1 - C)L^{0.5}}{S_w^{0.33}}$$

Input Data:

watershed length (L)	359.18	m		
Watershed Slope (S_w):	1.56	%	u/s elev	313
Runoff Coefficient (C):	0.25		d/s elev	307.38

Time of Concentration (t_c): 45.3 min

Time to Peak (t_p):

for NASHYD use:

$$t_p = t_c\left(\frac{N-1}{N}\right)$$

Number of linear reservoirs (N) 3

Time to Peak (t_p): 0.50 hours

Soil Texture Hillsburgh Fine Sandy Loam & Fox Sandy Loam

Soil Group A

Initial Abstraction / Runoff Coefficient

	Area	Percentage	CN	Weighted CN	RC	Weighted RC	IA Depth (mm)	Weighted IA
Pervious	22.50	100%	72	72.0	0.25	0.250	8.0	8.00
Impervious	0.00	0%	98	0.0	0.90	0.000	1.0	0.00
	22.50			72.0		0.250		8.00

Time of Concentration Estimates

Airport Formula

Project:	2509 Townline Road
Project No.:	251619
Catchment ID:	103

Airport Equation

recommended for watersheds where C<0.4

$$t_c = \frac{3.26(1.1 - C)L^{0.5}}{S_w^{0.33}}$$

Input Data:

watershed length (L)	67.26	m		
Watershed Slope (S_w):	1.40	%	u/s elev	314.51
Runoff Coefficient (C):	0.25		d/s elev	313.57

Time of Concentration (t_c): 20.3 min

Time to Peak (t_p):

for NASHYD use:

$$t_p = t_c\left(\frac{N-1}{N}\right)$$

Number of linear reservoirs (N) 3

Time to Peak (t_p): 0.23 hours

Soil Texture Hillsburgh Fine Sandy Loam & Fox Sandy Loam

Soil Group A

Initial Abstraction / Runoff Coefficient

	Area	Percentage	CN	Weighted CN	RC	Weighted RC	IA Depth (mm)	Weighted IA
Pervious	2.19	86%	72	62.1	0.25	0.216	8.0	6.90
Impervious	0.35	14%	98	13.5	0.90	0.124	1.0	0.14
	2.54			75.6		0.340		7.04

Time of Concentration Estimates

Airport Formula

Project:	2509 Townline Road
Project No.:	251619
Catchment ID:	202

Airport Equation

recommended for watersheds where C<0.4

$$t_c = \frac{3.26(1.1 - C)L^{0.5}}{S_w^{0.33}}$$

Input Data:

watershed length (L)	70.69	m		
Watershed Slope (S_w):	9.92	%	u/s elev	311.3
Runoff Coefficient (C):	0.25		d/s elev	304.29

Time of Concentration (t_c): 10.9 min

Time to Peak (t_p):

for NASHYD use:

$$t_p = t_c\left(\frac{N-1}{N}\right)$$

Number of linear reservoirs (N) 3

Time to Peak (t_p): 0.12 hours

Soil Texture	Hillsburgh Fine Sandy Loam & Fox Sandy Loam
Soil Group	A

Initial Abstraction / Runoff Coefficient

	Area	Percentage	CN	Weighted CN	RC	Weighted RC	IA Depth (mm)	Weighted IA
Pervious	1.16	92%	39	35.8	0.25	0.230	8.0	7.35
Impervious	0.10	8%	98	8.0	0.90	0.073	1.0	0.08
	1.27			43.8		0.303		7.43

Time of Concentration Estimates

Airport Formula

Project:	2509 Townline Road
Project No.:	251619
Catchment ID:	203

Airport Equation

recommended for watersheds where C<0.4

$$t_c = \frac{3.26(1.1 - C)L^{0.5}}{S_w^{0.33}}$$

Input Data:

watershed length (L)	8.8	m		
Watershed Slope (S_w):	17.95	%	u/s elev	310.28
Runoff Coefficient (C):	0.25		d/s elev	308.7

Time of Concentration (t_c): 3.2 min

Time to Peak (t_p):

for NASHYD use:

$$t_p = t_c\left(\frac{N-1}{N}\right)$$

Number of linear reservoirs (N)	3	
Time to Peak (t_p):	0.04	hours

Soil Texture	Hillsburgh Fine Sandy Loam & Fox Sandy Loam
Soil Group	A

Initial Abstraction / Runoff Coefficient

	Area	Percentage	CN	Weighted CN	RC	Weighted RC	IA Depth (mm)	Weighted IA
Pervious	0.66	100%	39	39.0	0.25	0.250	8.0	8.00
Impervious	0.00	0%	98	0.0	0.90	0.000	1.0	0.00
	0.66			39.0		0.250		8.00

Time of Concentration Estimates

Airport Formula

Project:	2509 Townline Road
Project No.:	251619
Catchment ID:	204

Airport Equation

recommended for watersheds where C<0.4

$$t_c = \frac{3.26(1.1-C)L^{0.5}}{S_w^{0.33}}$$

Input Data:

watershed length (L)	39.25	m		
Watershed Slope (S_w):	1.71	%	u/s elev	314.2
Runoff Coefficient (C):	0.25		d/s elev	313.53

Time of Concentration (t_c): 14.6 min

Time to Peak (t_p):

for NASHYD use:

$$t_p = t_c\left(\frac{N-1}{N}\right)$$

Number of linear reservoirs (N)	3	
Time to Peak (t_p):	0.16	hours

Soil Texture	Hillsburgh Fine Sandy Loam & Fox Sandy Loam
Soil Group	A

Initial Abstraction / Runoff Coefficient

	Area	Percentage	CN	Weighted CN	RC	Weighted RC	IA Depth (mm)	Weighted IA
Pervious	0.97	100%	39	39.0	0.25	0.250	8.0	8.00
Impervious	0.00	0%	98	0.0	0.90	0.000	1.0	0.00
	0.97			39.0		0.250		8.00

Rational Method Calc.

Project:	2509 Townline Road
Project No.:	251619
Municipality:	Puslinch
Catchment:	Proposed Development - Site Plan Plan A

Controlled Drainage Area to Chamber / North (Ellis Road)

Catchment 201

	Area (m2)	C	C x A
Building	93274	0.90	83946.6
Pervious	27508	0.25	6876.9
Impervious	187375	0.90	168637.5
	308157	0.84	259461.0
Percent Impervious =	91%		

Uncontrolled Drainage Area to Norrth (Ellis Road)

Catchment 202

	Area (m2)	C	C x A
Building	0	0.90	0.0
Pervious	11629	0.25	2907.1
Impervious	1032	0.90	928.7
	12660	0.30	3835.9
Percent Impervious =	8%		

Uncontrolled Drainage Area to the East (Puslinch Golf Club)

Catchment 203

	Area (m2)	C	C x A
Building	0	0.90	0.0
Pervious	6624	0.25	1655.9
Impervious	0	0.90	0.0
	6624	0.25	1655.9
Percent Impervious =	0%		

Drainage Area to the Southwest (Townline Road / HWY 401)

Catchment 204

	Area (m2)	C	C x A
Building	0	0.90	0.0
Pervious	9653	0.25	2413.4
Impervious	0	0.90	0.0
	9653	0.25	2413.4
Percent Impervious =	0%		

Rational Method Calc.

Project:	2509 Townline Road
Project No.:	251619
Municipality:	Puslinch
Catchment:	Proposed Development - Site Plan B

Controlled Drainage Area to Chamber / North (Ellis Road)

Catchment 201

	Area (m2)	C	C x A
Building	116520	0.90	104868.3
Pervious	20605	0.25	5151.1
Impervious	170142	0.90	153127.9
	307267	0.86	263147.4
Percent Impervious =	93%		

Uncontrolled Drainage Area to Norrth (Ellis Road)

Catchment 202

	Area (m2)	C	C x A
Building	0	0.90	0.0
Pervious	14102	0.25	3525.5
Impervious	0	0.90	0.0
	14102	0.25	3525.5
Percent Impervious =	0%		

Uncontrolled Drainage Area to the East (Puslinch Golf Club)

Catchment 203

	Area (m2)	C	C x A
Building	0	0.90	0.0
Pervious	6848	0.25	1712.0
Impervious	0	0.90	0.0
	6848	0.25	1712.0
Percent Impervious =	0%		

Drainage Area to the Southwest (Townline Road / HWY 401)

Catchment 204

	Area (m2)	C	C x A
Building	0	0.90	0.0
Pervious	8877	0.25	2219.3
Impervious	0	0.90	0.0
	8877	0.25	2219.3
Percent Impervious =	0%		

OSD Storage-Discharge

Project: 2509 Townline Road
Project No.: 251619
Catchment: 201 - With Roof Controls

Orifice Tube	1	
Co-efficient	0.80	
Orifice1 Invert	305.64	m
Orifice1 Size	300	mm
Area	0.0707	m^2

Orifice Tube	2	
Co-efficient	0.80	
Orifice2 Invert	307.14	m
Orifice2 Size	600	mm
Area	0.2827	m^2

STAGE-STORAGE	Elevation	Area (m^2)	Incremental Storage (m^3)	Total Storage (ha-m)	Head on Orifice 1 (m)	Head on Orifice 2 (m)	Orifice 1 Flow (m^3/s)	Orifice 2 Flow (m^3/s)	Actual Flow (m^3/s)
Bottom of Detention System	305.64	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000
	307.36	0.00	8000.00	0.8000	1.57	0.00	0.3142	0.0000	0.3142
Top of Detention System	309.09	0.00	8000.00	1.6000	3.30	1.65	0.4553	1.2885	1.7438
Pipe and Structure Storage Before Spill	310.29	0.00	504.46	1.6504	4.50	2.85	0.5316	1.6926	2.2242

OSD Storage-Discharge

Project: 2509 Townline Road
Project No.: 251619
Catchment: 201 - Without Roof Controls

Orifice Tube	1	
Co-efficient	0.80	
Orifice1 Invert	305.64	m
Orifice1 Size	300	mm
Area	0.0707	m^2

Orifice Tube	2	
Co-efficient	0.80	
Orifice2 Invert	307.04	m
Orifice2 Size	600	mm
Area	0.2827	m^2

STAGE-STORAGE	Elevation	Area (m^2)	Incremental Storage (m^3)	Total Storage (ha-m)	Head on Orifice 1 (m)	Head on Orifice 2 (m)	Orifice 1 Flow (m^3/s)	Orifice 2 Flow (m^3/s)	Actual Flow (m^3/s)
Bottom of Detention System	305.64	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000
	307.36	0.00	9100.00	0.9100	1.57	0.02	0.3142	0.1552	0.4695
Top of Detention System	309.09	0.00	9100.00	1.8200	3.30	1.75	0.4553	1.3269	1.7822
Pipe and Structure Storage Before Spill	310.29	0.00	504.46	1.8704	4.50	2.95	0.5316	1.7220	2.2536

Pipe/Structure Storage Volumes

Project: 2509 Townline Road
Project No.: 251619
Catchment: 201

Pipe Storage

Diameter	Length	Storage Volume
100	57.78	0.45
200	0	0.00
250	0	0.00
300	3937.1	278.30
375	0	0.00
450	0	0.00
525	0	0.00
600	0	0.00
675	0	0.00
750	0	0.00
825	0	0.00
900	0	0.00
975	0	0.00
1050	0	0.00
1200	0	0.00
1350	0	0.00
1500	19.25	34.02
1800	0	0.00
Total		312.77 m^3

Manhole Storage

Diameter	Quantity	Avg. Depth (inv. to top)	Storage Volume
1200	54.00	2.19	133.95
3000	1.00	6.25	44.21
1800	0.00	0.00	0.00
Total			178.16 m^3

CB Storage

Quantity	Avg. Depth	Vol
23.00	1.63	13.5324
Total		13.5324 m^3

Total Storage	504	m^3

STORMWATER MANAGEMENT CISTERN
STORMTRAP DOUBLE TRAP
FOOTPRINT=6,432.4m²
REQUIRED DETENTION STORAGE=17,662m³
PROVIDED DETENTION STORAGE=19,996m³
TOP=309.09
BOTTOM=305.64

0.68ha
203

2, CONCESSION 2

THE KING'S HIGHWAY No. 401

ELLIS ROAD

FFE=311.70
INDUSTRIAL BLDG 3
FOOTPRINT:
±16,200 m²
±174,375 SF

INDU. CONDO. BLDG 6
FOOTPRINT:
±9,674 m²
±105,636 SF
FFE=311.60

INDUSTRIAL BLDG 8
FOOTPRINT:
±19,510 m²
±210,000 SF

TOWNSHIP OF PUSLINCH

PLOT 1, CONCESSION

INDUSTRIAL BLDG 2
FOOTPRINT:
±16,200 m²
±174,375 SF
FFE=312.50

30.73ha
201

INDU. CONDO. BLDG 5
FOOTPRINT:
±10,427 m²
±112,236 SF
FFE=311.80

0.89ha
204

1.41ha
202

INDUSTRIAL BLDG 7
FOOTPRINT:
±19,510 m²
±210,000 SF

FFE=312.85
INDUSTRIAL BLDG 1
FOOTPRINT:
±16,200 m²
±174,375 SF

INDU. CONDO. BLDG 4
FOOTPRINT:
±10,427 m²
±112,236 SF
FFE=312.85

PART 1, PLAN 61R-9263
PART 1, PLAN 61R-9198
PART 2, PLAN 61R-9198
PART 3, PLAN 61R-9198
SUBJECT TO EASEMENT AS IN INST No. ROS392727
PART 4, PLAN 61R-9198
PART 5, PLAN 61R-9198
PART 6, PLAN 61R-9198
PART 7, PLAN 61R-9198
PART 9, PLAN 61R-9198
PART 10, PLAN 61R-9198
PART 11 PLAN 61R-9198
PART 8, PLAN 61R-9198
PART 1, PLAN 61R-2843
PART 2, PLAN 61R-2843
PART 2, PLAN 61R-642
PART 2 PLAN 61R-6501
PLAN M-8644 (P-3156-60)
PLAN 61R-9198 (P-3156-177)

KNOWN AS TOWNLINE ROAD
ROAD ALLOWANCE BETWEEN TOWNSHIPS OF PUSLINCH & WATERLOO

SUBJECT TO EASEMENT IN INST No. IS14381

HUSSON
ENGINEERING + MANAGEMENT
P 905.709.5825
200 CACHET WOODS COURT, SUITE 204
MARKHAM, ON L6C 0Z8
HUSSON.CA

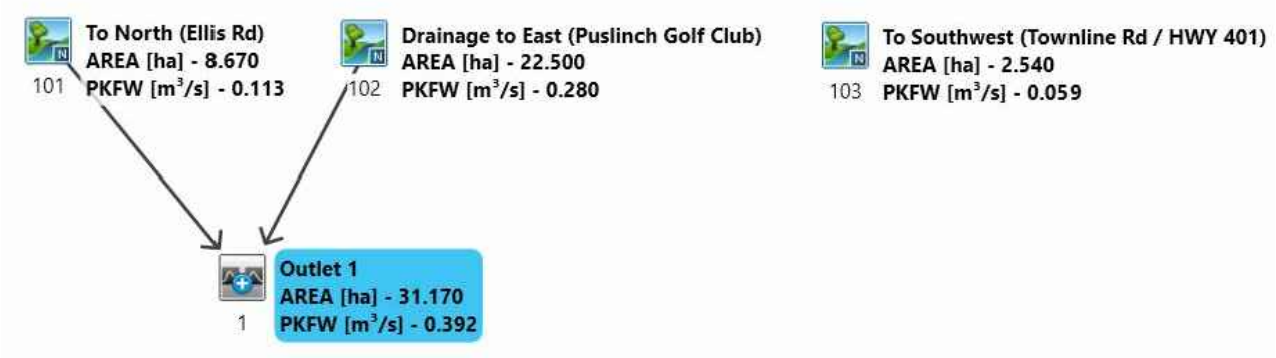
LEGEND
- DRAINAGE BOUNDARY
- 30.73ha / 201 — CATCHMENT AREA (ha) / CATCHMENT ID
- PERVIOUS AREA
- OVERLAND FLOW DIRECTION

FIGURE B1
2809 TOWNLINE ROAD
PROPOSED DRAINAGE PLAN - SITE PLAN B

DATE: OCTOBER 2025 SCALE: 1:2500 PROJECT: 251619

APPENDIX C

HYDROLOGIC MODELLING



HUSSON
ENGINEERING + MANAGEMENT
P 905.709.5825
200 CACHET WOODS COURT, SUITE 204
MARKHAM, ON L6C 0Z8
HUSSON.CA

FIGURE C1

2509 TOWNLINE ROAD
EXISTING CONDITION VO6 SCHEMATIC

DATE: OCTOBER 2025 SCALE: NTS PROJECT: 251619

Existing VO Modelling Output

```
       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       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 *****

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DATE: 10-01-2025 TIME: 11:55:27

USER:

COMMENTS: _____

** SIMULATION : 00_25MM4HR.STM **

READ STORM	Filename: C:\Users\workstation\AppData\Local\Temp\dd95caaf-843e-4750-a898-133500217177\2c18ad34
Ptotal= 25.00 mm	Comments: Twenty five mm Four Hour Chicago Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.07	1.00	5.70	2.00	5.19	3.00	2.80
0.17	2.27	1.17	10.78	2.17	4.47	3.17	2.62
0.33	2.52	1.33	50.21	2.33	3.95	3.33	2.48
0.50	2.88	1.50	13.37	2.50	3.56	3.50	2.35
0.67	3.38	1.67	8.29	2.67	3.25	3.67	2.23
0.83	4.18	1.83	6.30	2.83	3.01	3.83	2.14

CALIB			
NASHYD (0103)	Area (ha)=	2.54	Curve Number (CN)= 75.6
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.23	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35

0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.18	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.30	3.000	3.01	4.00	2.14

Unit Hyd Qpeak (cms)= 0.422

PEAK FLOW (cms)= 0.020 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 3.917
TOTAL RAINFALL (mm)= 24.997
RUNOFF COEFFICIENT = 0.157

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

CALIB							
NASHYD (0102)	Area (ha)= 22.50	Curve Number (CN)= 72.0					
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00					
	U.H. Tp(hrs)= 0.50						

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.18	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.30	3.000	3.01	4.00	2.14

Unit Hyd Qpeak (cms)= 1.719

PEAK FLOW (cms)= 0.101 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 3.366
TOTAL RAINFALL (mm)= 24.997
RUNOFF COEFFICIENT = 0.135

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

CALIB							
NASHYD (0101)	Area (ha)= 8.67	Curve Number (CN)= 72.0					
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00					
	U.H. Tp(hrs)= 0.47						

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.18	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.30	3.000	3.01	4.00	2.14

Unit Hyd Qpeak (cms)= 0.705

```
     PEAK FLOW       (cms)=   0.040 (i)
     TIME TO PEAK    (hrs)=   2.167
     RUNOFF VOLUME    (mm)=   3.366
     TOTAL RAINFALL   (mm)=  24.997
     RUNOFF COEFFICIENT   =   0.135

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

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):     8.67   0.040     2.17     3.37
      + ID2= 2 (  0102):    22.50   0.101     2.25     3.37
        ================================================
        ID = 3 (  0001):    31.17   0.141     2.17     3.37

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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 *****


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62c7-444e-9970-b426c92d6416\


DATE: 10-01-2025                          TIME: 11:55:27

USER:



COMMENTS: _____


--------------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 01_2yr                       **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 743.000
| Ptotal= 36.54 mm |                          B=   6.000
--------------------                          C=   0.799
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 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    2.31 |  1.00   19.47 |  2.00    5.62 |  3.00    2.77
                0.17    2.66 |  1.17   81.10 |  2.17    4.75 |  3.17    2.56
                0.33    3.15 |  1.33   25.63 |  2.33    4.13 |  3.33    2.39
                0.50    3.89 |  1.50   13.34 |  2.50    3.67 |  3.50    2.24
```

0.67	5.18	1.67	9.07	2.67	3.30	3.67	2.11
0.83	7.98	1.83	6.91	2.83	3.01	3.83	2.00

CALIB			
NASHYD (0103)	Area (ha)=	2.54	Curve Number (CN)= 75.6
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.23	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

Unit Hyd Qpeak (cms)= 0.422

PEAK FLOW (cms)= 0.059 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 8.754
TOTAL RAINFALL (mm)= 36.541
RUNOFF COEFFICIENT = 0.240

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

CALIB			
NASHYD (0102)	Area (ha)=	22.50	Curve Number (CN)= 72.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.50	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

Unit Hyd Qpeak (cms)= 1.719

PEAK FLOW (cms)= 0.280 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 7.634
TOTAL RAINFALL (mm)= 36.541
RUNOFF COEFFICIENT = 0.209

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

CALIB

```
| NASHYD   (  0101)|   Area     (ha)=   8.67   Curve Number    (CN)= 72.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.47

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 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
              0.083    2.31 | 1.083   19.47 | 2.083    5.62 |  3.08    2.77
              0.167    2.31 | 1.167   19.47 | 2.167    5.62 |  3.17    2.77
              0.250    2.66 | 1.250   81.10 | 2.250    4.75 |  3.25    2.56
              0.333    2.66 | 1.333   81.10 | 2.333    4.75 |  3.33    2.56
              0.417    3.15 | 1.417   25.63 | 2.417    4.13 |  3.42    2.39
              0.500    3.15 | 1.500   25.63 | 2.500    4.13 |  3.50    2.39
              0.583    3.89 | 1.583   13.34 | 2.583    3.67 |  3.58    2.24
              0.667    3.89 | 1.667   13.34 | 2.667    3.67 |  3.67    2.24
              0.750    5.18 | 1.750    9.07 | 2.750    3.30 |  3.75    2.11
              0.833    5.18 | 1.833    9.07 | 2.833    3.30 |  3.83    2.11
              0.917    7.98 | 1.917    6.91 | 2.917    3.01 |  3.92    2.00
              1.000    7.98 | 2.000    6.91 | 3.000    3.01 |  4.00    2.00

     Unit Hyd Qpeak  (cms)=   0.705

     PEAK FLOW       (cms)=   0.113 (i)
     TIME TO PEAK    (hrs)=   1.917
     RUNOFF VOLUME    (mm)=   7.633
     TOTAL RAINFALL   (mm)=  36.541
     RUNOFF COEFFICIENT   =   0.209

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

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0101):     8.67   0.113     1.92     7.63
      + ID2= 2 (  0102):    22.50   0.280     2.00     7.63
        ================================================
        ID = 3 (  0001):    31.17   0.392     1.92     7.63

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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 *****


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29fa-490d-bd8e-1f485fe1e931\


DATE: 10-01-2025                          TIME: 11:55:28

USER:
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COMMENTS: _____

****
** SIMULATION : 02_5yr **
****

CHICAGO STORM
Ptotal= 49.55 mm

IDF curve parameters: A=1593.000
B= 11.000
C= 0.879
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.35	1.00	30.47	2.00	7.17	3.00	2.93
0.17	2.80	1.17	109.68	2.17	5.81	3.17	2.67
0.33	3.46	1.33	40.71	2.33	4.87	3.33	2.45
0.50	4.52	1.50	20.28	2.50	4.19	3.50	2.26
0.67	6.48	1.67	12.91	2.67	3.67	3.67	2.10
0.83	11.07	1.83	9.28	2.83	3.26	3.83	1.96

CALIB
NASHYD (0103)
ID= 1 DT= 5.0 min

Area (ha)= 2.54 Curve Number (CN)= 75.6
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.23

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.422

PEAK FLOW (cms)= 0.118 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 15.670
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.316

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

CALIB
NASHYD (0102)
ID= 1 DT= 5.0 min

Area (ha)= 22.50 Curve Number (CN)= 72.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.50

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93

0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 1.719

PEAK FLOW (cms)= 0.568 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 13.848
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.279

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

CALIB			
NASHYD (0101)	Area (ha)=	8.67	Curve Number (CN)= 72.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.47	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.705

PEAK FLOW (cms)= 0.228 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 13.848
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.279

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

ADD HYD (0001)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0101):	8.67	0.228	1.92	13.85
+	ID2= 2 (0102):	22.50	0.568	1.92	13.85
	ID = 3 (0001):	31.17	0.797	1.92	13.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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 *****

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DATE: 10-01-2025 TIME: 11:55:27

USER:

COMMENTS: _____

****
** SIMULATION : 03_10yr **
****

| CHICAGO STORM |
| Ptotal= 58.62 mm |

IDF curve parameters: A=2221.000
B= 12.000
C= 0.908
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.39	1.00	37.17	2.00	8.06	3.00	3.05
0.17	2.89	1.17	134.16	2.17	6.42	3.17	2.75
0.33	3.65	1.33	50.03	2.33	5.30	3.33	2.50
0.50	4.89	1.50	24.37	2.50	4.50	3.50	2.29
0.67	7.23	1.67	15.14	2.67	3.89	3.67	2.11
0.83	12.87	1.83	10.64	2.83	3.42	3.83	1.96

| CALIB |
| NASHYD (0103) |
| ID= 1 DT= 5.0 min |

Area (ha)= 2.54 Curve Number (CN)= 75.6
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.23

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.422

PEAK FLOW (cms)= 0.169 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 21.177
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.361

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

CALIB			
NASHYD (0102)	Area (ha)=	22.50	Curve Number (CN)= 72.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.50	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 1.719

PEAK FLOW (cms)= 0.814 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 18.862
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.322

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

CALIB			
NASHYD (0101)	Area (ha)=	8.67	Curve Number (CN)= 72.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.47	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.705

PEAK FLOW (cms)= 0.327 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 18.862
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.322

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

```
--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0101):     8.67   0.327     1.92    18.86
      + ID2= 2 (  0102):    22.50   0.814     1.92    18.86
        ================================================
        ID = 3 (  0001):    31.17   1.141     1.92    18.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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 *****

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DATE: 10-01-2025 TIME: 11:55:28

USER:

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : 04_25yr                      **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=3158.000
| Ptotal= 70.80 mm |                          B=  15.000
--------------------                          C=   0.936
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.61	1.00	47.29	2.00	9.94	3.00	3.43
0.17	3.23	1.17	155.47	2.17	7.78	3.17	3.05
0.33	4.19	1.33	63.30	2.33	6.32	3.33	2.74
0.50	5.78	1.50	31.36	2.50	5.27	3.50	2.49
0.67	8.84	1.67	19.30	2.67	4.49	3.67	2.27
0.83	16.30	1.83	13.35	2.83	3.90	3.83	2.09

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--------------------
| CALIB            |
```

| NASHYD (0103)| Area (ha)= 2.54 Curve Number (CN)= 75.6
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.23

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.61	1.083	47.29	2.083	9.94	3.08	3.43
0.167	2.61	1.167	47.29	2.167	9.94	3.17	3.43
0.250	3.23	1.250	155.47	2.250	7.78	3.25	3.05
0.333	3.23	1.333	155.47	2.333	7.78	3.33	3.05
0.417	4.19	1.417	63.30	2.417	6.32	3.42	2.74
0.500	4.19	1.500	63.30	2.500	6.32	3.50	2.74
0.583	5.78	1.583	31.36	2.583	5.27	3.58	2.49
0.667	5.78	1.667	31.36	2.667	5.27	3.67	2.49
0.750	8.84	1.750	19.30	2.750	4.49	3.75	2.27
0.833	8.84	1.833	19.30	2.833	4.49	3.83	2.27
0.917	16.30	1.917	13.35	2.917	3.90	3.92	2.09
1.000	16.30	2.000	13.35	3.000	3.90	4.00	2.09

Unit Hyd Qpeak (cms)= 0.422

PEAK FLOW (cms)= 0.236 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 29.266
TOTAL RAINFALL (mm)= 70.800
RUNOFF COEFFICIENT = 0.413

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

| CALIB |
| NASHYD (0102)| Area (ha)= 22.50 Curve Number (CN)= 72.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.50

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.61	1.083	47.29	2.083	9.94	3.08	3.43
0.167	2.61	1.167	47.29	2.167	9.94	3.17	3.43
0.250	3.23	1.250	155.47	2.250	7.78	3.25	3.05
0.333	3.23	1.333	155.47	2.333	7.78	3.33	3.05
0.417	4.19	1.417	63.30	2.417	6.32	3.42	2.74
0.500	4.19	1.500	63.30	2.500	6.32	3.50	2.74
0.583	5.78	1.583	31.36	2.583	5.27	3.58	2.49
0.667	5.78	1.667	31.36	2.667	5.27	3.67	2.49
0.750	8.84	1.750	19.30	2.750	4.49	3.75	2.27
0.833	8.84	1.833	19.30	2.833	4.49	3.83	2.27
0.917	16.30	1.917	13.35	2.917	3.90	3.92	2.09
1.000	16.30	2.000	13.35	3.000	3.90	4.00	2.09

Unit Hyd Qpeak (cms)= 1.719

PEAK FLOW (cms)= 1.157 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 26.306
TOTAL RAINFALL (mm)= 70.800
RUNOFF COEFFICIENT = 0.372

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

| CALIB |
| NASHYD (0101)| Area (ha)= 8.67 Curve Number (CN)= 72.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.47

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.61	1.083	47.29	2.083	9.94	3.08	3.43
0.167	2.61	1.167	47.29	2.167	9.94	3.17	3.43
0.250	3.23	1.250	155.47	2.250	7.78	3.25	3.05
0.333	3.23	1.333	155.47	2.333	7.78	3.33	3.05
0.417	4.19	1.417	63.30	2.417	6.32	3.42	2.74
0.500	4.19	1.500	63.30	2.500	6.32	3.50	2.74
0.583	5.78	1.583	31.36	2.583	5.27	3.58	2.49
0.667	5.78	1.667	31.36	2.667	5.27	3.67	2.49
0.750	8.84	1.750	19.30	2.750	4.49	3.75	2.27
0.833	8.84	1.833	19.30	2.833	4.49	3.83	2.27
0.917	16.30	1.917	13.35	2.917	3.90	3.92	2.09
1.000	16.30	2.000	13.35	3.000	3.90	4.00	2.09

Unit Hyd Qpeak (cms)= 0.705

PEAK FLOW (cms)= 0.464 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 26.306
TOTAL RAINFALL (mm)= 70.800
RUNOFF COEFFICIENT = 0.372

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

ADD HYD (0001)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	8.67	0.464	1.92	26.31
+ ID2= 2 (0102):	22.50	1.157	1.92	26.31
ID = 3 (0001):	31.17	1.621	1.92	26.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\7774ac3a-2c22-43b0-b3de-7f07c7f7c4dc\
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DATE: 10-01-2025 TIME: 11:55:27

USER:

COMMENTS: _____

****
** SIMULATION : 05_50yr **
****

```
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=3886.000
| Ptotal= 80.32 mm |                          B=  16.000
--------------------                          C=   0.950
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.76	1.00	54.62	2.00	11.20	3.00	3.68
0.17	3.46	1.17	176.19	2.17	8.68	3.17	3.25
0.33	4.54	1.33	73.10	2.33	6.99	3.33	2.91
0.50	6.37	1.50	36.22	2.50	5.78	3.50	2.62
0.67	9.92	1.67	22.14	2.67	4.89	3.67	2.38
0.83	18.63	1.83	15.18	2.83	4.21	3.83	2.18

```
--------------------
| CALIB            |
| NASHYD   (  0103)|   Area    (ha)=   2.54   Curve Number   (CN)= 75.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.23

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

```
     Unit Hyd Qpeak  (cms)=   0.422

     PEAK FLOW       (cms)=   0.296 (i)
     TIME TO PEAK    (hrs)=   1.583
     RUNOFF VOLUME    (mm)=  36.026
     TOTAL RAINFALL   (mm)=  80.320
     RUNOFF COEFFICIENT   =   0.449

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

```
--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=  22.50   Curve Number   (CN)= 72.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38

0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 1.719

PEAK FLOW (cms)= 1.458 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 32.584
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.406

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

CALIB			
NASHYD (0101)	Area (ha)=	8.67	Curve Number (CN)= 72.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.47	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.705

PEAK FLOW (cms)= 0.584 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 32.583
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.406

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

ADD HYD (0001)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0101):	8.67	0.584	1.92	32.58
	+ ID2= 2 (0102):	22.50	1.458	1.92	32.58
	ID = 3 (0001):	31.17	2.042	1.92	32.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\d721bb4a-b310-44b3-b317-a1a0fc690137\
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DATE: 10-01-2025 TIME: 11:55:28

USER:

COMMENTS: _____

****
** SIMULATION : 06_100yr **
****

| CHICAGO STORM |
| Ptotal= 89.87 mm |

IDF curve parameters: A=4688.000
B= 17.000
C= 0.962
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.89	1.00	62.12	2.00	12.48	3.00	3.91
0.17	3.67	1.17	196.54	2.17	9.60	3.17	3.44
0.33	4.88	1.33	83.09	2.33	7.66	3.33	3.05
0.50	6.96	1.50	41.25	2.50	6.29	3.50	2.73
0.67	11.02	1.67	25.07	2.67	5.28	3.67	2.47
0.83	21.03	1.83	17.06	2.83	4.51	3.83	2.24

| CALIB |
| NASHYD (0103) |
|ID= 1 DT= 5.0 min |

Area (ha)= 2.54 Curve Number (CN)= 75.6
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.23

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.422

PEAK FLOW (cms)= 0.359 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 43.122
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.480

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

CALIB					
NASHYD (0102)	Area (ha)=	22.50	Curve Number (CN)=	72.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.50			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 1.719

PEAK FLOW (cms)= 1.778 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 39.219
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.436

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

CALIB					
NASHYD (0101)	Area (ha)=	8.67	Curve Number (CN)=	72.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.47			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.705

PEAK FLOW (cms)= 0.712 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 39.218
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.436

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

ADD HYD (0001)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.

```
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):     8.67   0.712     1.92    39.22
      + ID2= 2 (  0102):    22.50   1.778     1.92    39.22
        ================================================
        ID = 3 (  0001):    31.17   2.491     1.92    39.22

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------

 FINISH
===============================================================================================================

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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 *****


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  Output  filename: C:\Users\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\a22e8743-
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3967-4078-a9e9-d60b287b2189\


DATE: 10-01-2025                          TIME: 11:55:28

USER:



COMMENTS: _____________________________________________________________


-------------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 07_HAZEL.STM                 **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\workstation\AppD
|                  |              ata\Local\Temp\
|                  |              dd95caaf-843e-4750-a898-133500217177\afca88ca
| Ptotal=212.00 mm |    Comments: HURRICANE HAZEL
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    6.00 |  3.00   13.00 |  6.00   23.00 |  9.00   53.00
                0.17    6.00 |  3.17   13.00 |  6.17   23.00 |  9.17   53.00
                0.33    6.00 |  3.33   13.00 |  6.33   23.00 |  9.33   53.00
                0.50    6.00 |  3.50   13.00 |  6.50   23.00 |  9.50   53.00
                0.67    6.00 |  3.67   13.00 |  6.67   23.00 |  9.67   53.00
                0.83    6.00 |  3.83   13.00 |  6.83   23.00 |  9.83   53.00
                1.00    4.00 |  4.00   17.00 |  7.00   13.00 | 10.00   38.00
                1.17    4.00 |  4.17   17.00 |  7.17   13.00 | 10.17   38.00
                1.33    4.00 |  4.33   17.00 |  7.33   13.00 | 10.33   38.00
                1.50    4.00 |  4.50   17.00 |  7.50   13.00 | 10.50   38.00
                1.67    4.00 |  4.67   17.00 |  7.67   13.00 | 10.67   38.00
                1.83    4.00 |  4.83   17.00 |  7.83   13.00 | 10.83   38.00
                2.00    6.00 |  5.00   13.00 |  8.00   13.00 | 11.00   13.00
                2.17    6.00 |  5.17   13.00 |  8.17   13.00 | 11.17   13.00
                2.33    6.00 |  5.33   13.00 |  8.33   13.00 | 11.33   13.00
                2.50    6.00 |  5.50   13.00 |  8.50   13.00 | 11.50   13.00
                2.67    6.00 |  5.67   13.00 |  8.67   13.00 | 11.67   13.00
```

2.83	6.00	5.83	13.00	8.83	13.00	11.83	13.00

CALIB					
NASHYD (0103)	Area (ha)=	2.54	Curve Number (CN)=	75.6	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.23			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.422

PEAK FLOW (cms)= 0.321 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 148.114
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.699

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

CALIB					
NASHYD (0102)	Area (ha)=	22.50	Curve Number (CN)=	72.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.50			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00

0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.719

PEAK FLOW (cms)= 2.400 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 140.124
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.661

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

CALIB			
NASHYD (0101)	Area (ha)=	8.67	Curve Number (CN)= 72.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.47	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00

1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

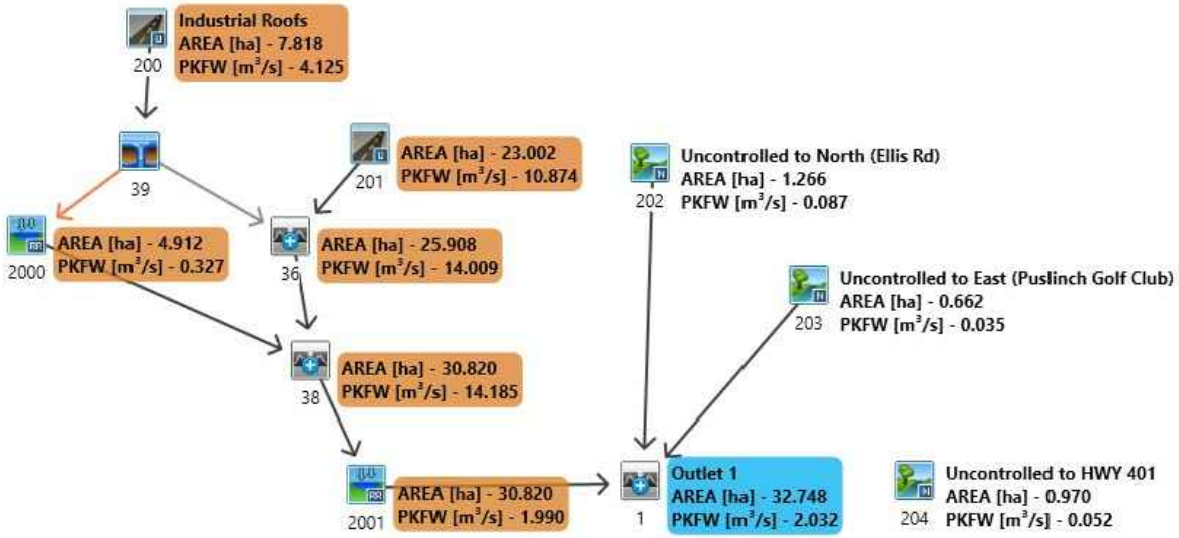
Unit Hyd Qpeak (cms)= 0.705

PEAK FLOW (cms)= 0.940 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 140.122
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.661

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

ADD HYD (0001)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	8.67	0.940	10.25	140.12
+ ID2= 2 (0102):	22.50	2.400	10.25	140.12
ID = 3 (0001):	31.17	3.340	10.25	140.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



HUSSON
ENGINEERING + MANAGEMENT
P 905.709.5825
209 CACHET WOODS COURT, SUITE 204
MARKHAM, ON L6C 0Z8
HUSSON.CA

FIGURE C2

2509 TOWNLINE ROAD

PROPOSED DEVELOPMENT VO6 SCHEMATIC - ROOFTOP CONTROLLED

DATE: OCTOBER 2025 SCALE: NTS PROJECT: 251619

Proposed VO Modelling Output for Site Plan A – With Rooftop Control

```
       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\d5eee8b4-05e0-4ea9-ab20-1461504795d2\
Summary filename: C:\Users\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\d5eee8b4-05e0-4ea9-ab20-1461504795d2\

DATE: 11-04-2025 TIME: 09:07:25

USER:

COMMENTS: _____

****
** SIMULATION : 00_25MM4HR.STM **
****

READ STORM	Filename: C:\Users\workstation\AppData\Local\Temp\554d38e8-b6f6-48f4-b75a-a8e38d55dd16\2c18ad34
Ptotal= 25.00 mm	Comments: Twenty five mm Four Hour Chicago Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.07	1.00	5.70	2.00	5.19	3.00	2.80
0.17	2.27	1.17	10.78	2.17	4.47	3.17	2.62
0.33	2.52	1.33	50.21	2.33	3.95	3.33	2.48
0.50	2.88	1.50	13.37	2.50	3.56	3.50	2.35
0.67	3.38	1.67	8.29	2.67	3.25	3.67	2.23
0.83	4.18	1.83	6.30	2.83	3.01	3.83	2.14

CALIB			
NASHYD (0204)	Area (ha)= 0.97	Curve Number (CN)= 39.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.16		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35

0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.18	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.30	3.000	3.01	4.00	2.14

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.002 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 0.954
TOTAL RAINFALL (mm)= 24.997
RUNOFF COEFFICIENT = 0.038

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

CALIB			
NASHYD (0202)	Area (ha)=	1.27	Curve Number (CN)= 43.8
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.12	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.18	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.30	3.000	3.01	4.00	2.14

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.004 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 1.140
TOTAL RAINFALL (mm)= 24.997
RUNOFF COEFFICIENT = 0.046

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

CALIB			
NASHYD (0203)	Area (ha)=	0.66	Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.04	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.18	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.30	3.000	3.01	4.00	2.14

Unit Hyd Qpeak (cms)= 0.632

```
     PEAK FLOW       (cms)=   0.002 (i)
     TIME TO PEAK    (hrs)=   1.500
     RUNOFF VOLUME    (mm)=   0.572
     TOTAL RAINFALL   (mm)=  24.997
     RUNOFF COEFFICIENT   =   0.023

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   7.82
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.74         0.08
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00        11.23
     Length            (m)=     228.30        35.23
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 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
              0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
              0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
              0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
              0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
              0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
              0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
              0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
              0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
              0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
              0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
              0.917    4.18 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
              1.000    4.18 | 2.000    6.30 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21        14.26
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      5.52 (ii)    6.34 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.20         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.94         0.00          0.940 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.58           1.50
     RUNOFF VOLUME    (mm)=     24.00         8.08          23.84
     TOTAL RAINFALL   (mm)=     25.00        25.00          25.00
     RUNOFF COEFFICIENT   =      0.96         0.32           0.95


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0039)|
| Inlet Cap.= 0.990|
| #of Inlets=     1|
| Total(cms)=   1.0|      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):   7.82      0.94      1.50   23.84
     ==================================================
     MAJOR SYS.(ID= 2):   0.00      0.00      0.00    0.00
     MINOR SYS.(ID= 3):   7.82      0.94      1.50   23.84

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2000)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
```

```
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                        0.0000     0.0000   |   0.3280      0.2606

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0039)      7.818     0.940      1.50      23.84
   OUTFLOW: ID= 1 (  2000)      7.818     0.131      2.08      23.81

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 13.97
                    TIME SHIFT OF PEAK FLOW         (min)= 35.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.1044

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=  23.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  87.00   Dir. Conn.(%)=  87.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.01         2.99
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00        11.23
     Length            (m)=     391.60        35.23
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 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
              0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
              0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
              0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
              0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
              0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
              0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
              0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
              0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
              0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
              0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
              0.917    4.18 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
              1.000    4.18 | 2.000    6.30 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21        14.26
                over (min)       10.00        15.00
     Storage Coeff.  (min)=       7.63 (ii)   10.03 (ii)
     Unit Hyd. Tpeak (min)=      10.00        15.00
     Unit Hyd. peak  (cms)=       0.13         0.10
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.90         0.07          1.961 (iii)
     TIME TO PEAK    (hrs)=       1.58         1.67           1.58
     RUNOFF VOLUME    (mm)=      24.00         8.08          21.93
     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =       0.96         0.32           0.88


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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  (  0036)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0039 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
        ID1= 1 (  0201):    23.00   1.961     1.58    21.93
      + ID2= 2 (  0039):     0.00   0.000     0.00     0.00
        ================================================
        ID = 3 (  0036):    23.00   1.961     1.58    21.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
```

```
--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  2000):     7.82   0.131     2.08    23.81
      + ID2= 2 (  0036):    23.00   1.961     1.58    21.93
        ================================================
        ID = 3 (  0038):    30.82   2.062     1.58    22.41

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   1.7438      1.6000
                           0.3142     0.8000   |   2.2242      1.6504

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     30.820      2.062      1.58      22.41
   OUTFLOW: ID= 1 (  2001)     30.820      0.182      4.08      22.38

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.84
                  TIME SHIFT OF PEAK FLOW         (min)=150.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.4644

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  2001):    30.82   0.182     4.08    22.38
      + ID2= 2 (  0202):     1.27   0.004     1.58     1.14
        ================================================
        ID = 3 (  0001):    32.09   0.183     4.08    21.55

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0001):    32.09   0.183     4.08    21.55
      + ID2= 2 (  0203):     0.66   0.002     1.50     0.57
        ================================================
        ID = 1 (  0001):    32.75   0.183     4.00    21.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\5fa8f871-
4b57-4833-b4a8-91466e4da1f4\
  Summary filename: C:\Users\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\5fa8f871-
4b57-4833-b4a8-91466e4da1f4\
```

DATE: 11-04-2025 TIME: 09:07:24

USER:

COMMENTS: _____

****
** SIMULATION : 01_2yr **
****

CHICAGO STORM	Ptotal= 36.54 mm

IDF curve parameters: A= 743.000
B= 6.000
C= 0.799
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.31	1.00	19.47	2.00	5.62	3.00	2.77
0.17	2.66	1.17	81.10	2.17	4.75	3.17	2.56
0.33	3.15	1.33	25.63	2.33	4.13	3.33	2.39
0.50	3.89	1.50	13.34	2.50	3.67	3.50	2.24
0.67	5.18	1.67	9.07	2.67	3.30	3.67	2.11
0.83	7.98	1.83	6.91	2.83	3.01	3.83	2.00

CALIB	NASHYD (0204)	ID= 1 DT= 5.0 min

Area (ha)= 0.97 Curve Number (CN)= 39.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.007 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 2.309
TOTAL RAINFALL (mm)= 36.541
RUNOFF COEFFICIENT = 0.063

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

CALIB	NASHYD (0202)	ID= 1 DT= 5.0 min

Area (ha)= 1.27 Curve Number (CN)= 43.8
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.12

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.012 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 2.746
TOTAL RAINFALL (mm)= 36.541
RUNOFF COEFFICIENT = 0.075

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

CALIB	
NASHYD (0203)	Area (ha)= 0.66 Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.04

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.005 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 1.384
TOTAL RAINFALL (mm)= 36.541
RUNOFF COEFFICIENT = 0.038

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

CALIB	
STANDHYD (0200)	Area (ha)= 7.82
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	7.74	0.08
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	228.30	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

Max.Eff.Inten.(mm/hr)=	81.10	31.17		
over (min)	5.00	10.00		
Storage Coeff. (min)=	4.56 (ii)	5.23 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.23	0.16		
				TOTALS
PEAK FLOW (cms)=	1.59	0.01		1.597 (iii)
TIME TO PEAK (hrs)=	1.33	1.42		1.33
RUNOFF VOLUME (mm)=	35.54	15.37		35.34
TOTAL RAINFALL (mm)=	36.54	36.54		36.54
RUNOFF COEFFICIENT =	0.97	0.42		0.97

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

DUHYD (0039)
Inlet Cap.= 0.990
#of Inlets= 1
Total(cms)= 1.0

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	7.82	1.60	1.33	35.34
MAJOR SYS.(ID= 2):	0.77	0.61	1.33	35.34
MINOR SYS.(ID= 3):	7.04	0.99	1.25	35.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(2000)	OVERFLOW IS OFF
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3280	0.2606

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0039)	7.045	0.990	1.25	35.34
OUTFLOW: ID= 1 (2000)	7.045	0.185	1.92	35.31

PEAK FLOW REDUCTION [Qout/Qin](%)= 18.66
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 0.1470

CALIB	
STANDHYD (0201)	Area (ha)= 23.00
ID= 1 DT= 5.0 min	Total Imp(%)= 87.00 Dir. Conn.(%)= 87.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	20.01	2.99
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	11.23
Length (m)=	391.60	35.23

Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

			TOTALS
Max.Eff.Inten.(mm/hr)=	81.10	31.17	
over (min)	5.00	10.00	
Storage Coeff. (min)=	6.30 (ii)	8.28 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.19	0.13	
PEAK FLOW (cms)=	3.78	0.18	3.923 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	35.54	15.37	32.92
TOTAL RAINFALL (mm)=	36.54	36.54	36.54
RUNOFF COEFFICIENT =	0.97	0.42	0.90

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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 (0036)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):		23.00	3.923	1.33	32.92
+ ID2= 2 (0039):		0.77	0.607	1.33	35.34
ID = 3 (0036):		23.78	4.531	1.33	33.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0038)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2000):		7.04	0.185	1.92	35.31
+ ID2= 2 (0036):		23.78	4.531	1.33	33.00
ID = 3 (0038):		30.82	4.632	1.33	33.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(2001)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	1.7438	1.6000
	0.3142	0.8000	2.2242	1.6504

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0038)	30.820	4.632	1.33	33.53
OUTFLOW: ID= 1 (2001)	30.820	0.272	3.58	33.51

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.87

```
                  TIME SHIFT OF PEAK FLOW         (min)=135.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.6922

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  2001):    30.82   0.272     3.58    33.51
      + ID2= 2 (  0202):     1.27   0.012     1.42     2.75
        ================================================
        ID = 3 (  0001):    32.09   0.273     3.58    32.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0001):    32.09   0.273     3.58    32.29
      + ID2= 2 (  0203):     0.66   0.005     1.33     1.38
        ================================================
        ID = 1 (  0001):    32.75   0.274     3.50    31.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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 *****


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58ed-4837-9c3f-a615df1505f0\


DATE: 11-04-2025                          TIME: 09:07:24

USER:



COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 02_5yr                       **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1593.000
| Ptotal= 49.55 mm |                          B=  11.000
--------------------                          C=   0.879
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  4.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.35	1.00	30.47	2.00	7.17	3.00	2.93
0.17	2.80	1.17	109.68	2.17	5.81	3.17	2.67
0.33	3.46	1.33	40.71	2.33	4.87	3.33	2.45
0.50	4.52	1.50	20.28	2.50	4.19	3.50	2.26
0.67	6.48	1.67	12.91	2.67	3.67	3.67	2.10
0.83	11.07	1.83	9.28	2.83	3.26	3.83	1.96

CALIB			
NASHYD (0204)	Area (ha)=	0.97	Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.16	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.014 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 4.472
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.090

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

CALIB			
NASHYD (0202)	Area (ha)=	1.27	Curve Number (CN)= 43.8
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.12	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.025 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 5.286
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.107

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

CALIB			
NASHYD (0203)	Area (ha)=	0.66	Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.04	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.010 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 2.681
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.054

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

CALIB			
STANDHYD (0200)	Area (ha)=	7.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	99.00	Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	7.74	0.08
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	228.30	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Max.Eff.Inten.(mm/hr)=	109.68	52.32		
over (min)	5.00	5.00		
Storage Coeff. (min)=	4.04 (ii)	4.64 (ii)		
Unit Hyd. Tpeak (min)=	5.00	5.00		
Unit Hyd. peak (cms)=	0.24	0.22		
			TOTALS	
PEAK FLOW (cms)=	2.21	0.01	2.223 (iii)	
TIME TO PEAK (hrs)=	1.33	1.33	1.33	

```
     RUNOFF VOLUME    (mm)=      48.55        24.86          48.32
     TOTAL RAINFALL   (mm)=      49.55        49.55          49.55
     RUNOFF COEFFICIENT   =       0.98         0.50           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0039)|
| Inlet Cap.= 0.990|
| #of Inlets=     1|
| Total(cms)=   1.0|      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):   7.82      2.22      1.33   48.32
     ======================================================
     MAJOR SYS.(ID= 2):   1.48      1.23      1.33   48.32
     MINOR SYS.(ID= 3):   6.34      0.99      1.25   48.32

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2000)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.3280      0.2606

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0039)      6.335      0.990      1.25      48.32
   OUTFLOW: ID= 1 (  2000)      6.335      0.233      1.92      48.29

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 23.50
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1849

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=  23.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  87.00   Dir. Conn.(%)=  87.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.01         2.99
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00        11.23
     Length            (m)=     391.60        35.23
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 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
               0.083    2.35 | 1.083   30.47 | 2.083    7.17 |  3.08    2.93
               0.167    2.35 | 1.167   30.47 | 2.167    7.17 |  3.17    2.93
               0.250    2.80 | 1.250  109.68 | 2.250    5.81 |  3.25    2.67
               0.333    2.80 | 1.333  109.68 | 2.333    5.81 |  3.33    2.67
               0.417    3.46 | 1.417   40.71 | 2.417    4.87 |  3.42    2.45
               0.500    3.46 | 1.500   40.71 | 2.500    4.87 |  3.50    2.45
               0.583    4.52 | 1.583   20.28 | 2.583    4.19 |  3.58    2.26
               0.667    4.52 | 1.667   20.28 | 2.667    4.19 |  3.67    2.26
               0.750    6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
               0.833    6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
               0.917   11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
               1.000   11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     109.68        52.32
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       5.58 (ii)    7.34 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
```

```
     Unit Hyd. peak  (cms)=       0.20         0.13
                                                              *TOTALS*
     PEAK FLOW       (cms)=       5.33         0.32           5.594 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      48.55        24.86          45.47
     TOTAL RAINFALL   (mm)=      49.55        49.55          49.55
     RUNOFF COEFFICIENT   =       0.98         0.50           0.92


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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  (  0036)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0201):    23.00   5.594     1.33    45.47
      + ID2= 2 (  0039):     1.48   1.233     1.33    48.32
        ================================================
        ID = 3 (  0036):    24.48   6.827     1.33    45.65

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  2000):     6.34   0.233     1.92    48.29
      + ID2= 2 (  0036):    24.48   6.827     1.33    45.65
        ================================================
        ID = 3 (  0038):    30.82   6.950     1.33    46.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   1.7438      1.6000
                           0.3142     0.8000   |   2.2242      1.6504

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     30.820     6.950      1.33      46.19
   OUTFLOW: ID= 1 (  2001)     30.820     0.536      2.50      46.17

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.72
                  TIME SHIFT OF PEAK FLOW         (min)= 70.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.9245

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  2001):    30.82   0.536     2.50    46.17
      + ID2= 2 (  0202):     1.27   0.025     1.42     5.29
        ================================================
        ID = 3 (  0001):    32.09   0.540     2.50    44.55

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0001):    32.09   0.540     2.50    44.55
      + ID2= 2 (  0203):     0.66   0.010     1.33     2.68
        ================================================
        ID = 1 (  0001):    32.75   0.541     2.50    43.71
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       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 *****

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DATE: 11-04-2025 TIME: 09:07:26

USER:

COMMENTS: _____

****
** SIMULATION : 03_10yr **
****

| CHICAGO STORM | IDF curve parameters: A=2221.000
| Ptotal= 58.62 mm | B= 12.000
C= 0.908
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.39	1.00	37.17	2.00	8.06	3.00	3.05
0.17	2.89	1.17	134.16	2.17	6.42	3.17	2.75
0.33	3.65	1.33	50.03	2.33	5.30	3.33	2.50
0.50	4.89	1.50	24.37	2.50	4.50	3.50	2.29
0.67	7.23	1.67	15.14	2.67	3.89	3.67	2.11
0.83	12.87	1.83	10.64	2.83	3.42	3.83	1.96

| CALIB | NASHYD (0204) | ID= 1 DT= 5.0 min | Area (ha)= 0.97 | Curve Number (CN)= 39.0 | Ia (mm)= 5.00 | # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= 0.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05

0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.022 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 6.346
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.108

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

CALIB					
NASHYD (0202)	Area (ha)=	1.27	Curve Number (CN)=	43.8	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.12			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.037 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 7.473
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.127

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

CALIB					
NASHYD (0203)	Area (ha)=	0.66	Curve Number (CN)=	39.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.04			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11

0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.016 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 3.805
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.065

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

CALIB	
STANDHYD (0200)	Area (ha)= 7.82
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	7.74	0.08
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	228.30	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Max.Eff.Inten.(mm/hr)=	134.16	71.15		
over (min)	5.00	5.00		
Storage Coeff. (min)=	3.73 (ii)	4.28 (ii)		
Unit Hyd. Tpeak (min)=	5.00	5.00		
Unit Hyd. peak (cms)=	0.25	0.23		
			TOTALS	
PEAK FLOW (cms)=	2.74	0.02	2.755 (iii)	
TIME TO PEAK (hrs)=	1.33	1.33	1.33	
RUNOFF VOLUME (mm)=	57.62	32.00	57.36	
TOTAL RAINFALL (mm)=	58.62	58.62	58.62	
RUNOFF COEFFICIENT =	0.98	0.55	0.98	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

DUHYD (0039)
Inlet Cap.= 0.990
#of Inlets= 1
Total(cms)= 1.0

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	7.82	2.75	1.33	57.36
MAJOR SYS.(ID= 2):	2.01	1.76	1.33	57.36
MINOR SYS.(ID= 3):	5.80	0.99	1.25	57.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2000)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.3280      0.2606

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0039)      5.803      0.990      1.25      57.36
   OUTFLOW: ID= 1 (  2000)      5.803      0.254      1.92      57.33

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 25.61
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2015

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=  23.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  87.00   Dir. Conn.(%)=  87.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.01         2.99
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00        11.23
     Length            (m)=     391.60        35.23
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 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
              0.083    2.39 | 1.083   37.17 | 2.083    8.06 |  3.08    3.05
              0.167    2.39 | 1.167   37.17 | 2.167    8.06 |  3.17    3.05
              0.250    2.89 | 1.250  134.16 | 2.250    6.42 |  3.25    2.75
              0.333    2.89 | 1.333  134.16 | 2.333    6.42 |  3.33    2.75
              0.417    3.65 | 1.417   50.03 | 2.417    5.30 |  3.42    2.50
              0.500    3.65 | 1.500   50.03 | 2.500    5.30 |  3.50    2.50
              0.583    4.89 | 1.583   24.37 | 2.583    4.50 |  3.58    2.29
              0.667    4.89 | 1.667   24.37 | 2.667    4.50 |  3.67    2.29
              0.750    7.23 | 1.750   15.14 | 2.750    3.89 |  3.75    2.11
              0.833    7.23 | 1.833   15.14 | 2.833    3.89 |  3.83    2.11
              0.917   12.87 | 1.917   10.64 | 2.917    3.42 |  3.92    1.96
              1.000   12.87 | 2.000   10.64 | 3.000    3.42 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     134.16        71.15
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       5.15 (ii)    6.77 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.21         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       6.65         0.45          7.029 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      57.62        32.00          54.29
     TOTAL RAINFALL   (mm)=      58.62        58.62          58.62
     RUNOFF COEFFICIENT   =       0.98         0.55           0.93


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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  (  0036)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0201):    23.00   7.029     1.33    54.29
      + ID2= 2 (  0039):     2.01   1.765     1.33    57.36
        ================================================
        ID = 3 (  0036):    25.02   8.794     1.33    54.53
```

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     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  2000):     5.80   0.254     1.92    57.33
      + ID2= 2 (  0036):    25.02   8.794     1.33    54.53
        ================================================
        ID = 3 (  0038):    30.82   8.931     1.33    55.06

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |   1.7438      1.6000
                         0.3142     0.8000    |   2.2242      1.6504

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     30.820      8.931      1.33      55.06
   OUTFLOW: ID= 1 (  2001)     30.820      0.812      2.17      55.04

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.10
                  TIME SHIFT OF PEAK FLOW         (min)= 50.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.0792

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--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  2001):    30.82   0.812     2.17    55.04
      + ID2= 2 (  0202):     1.27   0.037     1.42     7.47
        ================================================
        ID = 3 (  0001):    32.09   0.821     2.08    53.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0001):    32.09   0.821     2.08    53.16
      + ID2= 2 (  0203):     0.66   0.016     1.33     3.80
        ================================================
        ID = 1 (  0001):    32.75   0.822     2.08    52.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

 FINISH
================================================================================================================

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       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\e2aa0c59-3255-453e-b2c4-c5f690178f68\
Summary filename: C:\Users\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\e2aa0c59-3255-453e-b2c4-c5f690178f68\

DATE: 11-04-2025 TIME: 09:07:26

USER:

COMMENTS: _____

****
** SIMULATION : 04_25yr **
****

| CHICAGO STORM |
| Ptotal= 70.80 mm |

IDF curve parameters: A=3158.000
B= 15.000
C= 0.936
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.61	1.00	47.29	2.00	9.94	3.00	3.43
0.17	3.23	1.17	155.47	2.17	7.78	3.17	3.05
0.33	4.19	1.33	63.30	2.33	6.32	3.33	2.74
0.50	5.78	1.50	31.36	2.50	5.27	3.50	2.49
0.67	8.84	1.67	19.30	2.67	4.49	3.67	2.27
0.83	16.30	1.83	13.35	2.83	3.90	3.83	2.09

| CALIB |
| NASHYD (0204)| Area (ha)= 0.97 Curve Number (CN)= 39.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.61	1.083	47.29	2.083	9.94	3.08	3.43
0.167	2.61	1.167	47.29	2.167	9.94	3.17	3.43
0.250	3.23	1.250	155.47	2.250	7.78	3.25	3.05
0.333	3.23	1.333	155.47	2.333	7.78	3.33	3.05
0.417	4.19	1.417	63.30	2.417	6.32	3.42	2.74
0.500	4.19	1.500	63.30	2.500	6.32	3.50	2.74
0.583	5.78	1.583	31.36	2.583	5.27	3.58	2.49
0.667	5.78	1.667	31.36	2.667	5.27	3.67	2.49
0.750	8.84	1.750	19.30	2.750	4.49	3.75	2.27
0.833	8.84	1.833	19.30	2.833	4.49	3.83	2.27
0.917	16.30	1.917	13.35	2.917	3.90	3.92	2.09
1.000	16.30	2.000	13.35	3.000	3.90	4.00	2.09

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.032 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 9.307
TOTAL RAINFALL (mm)= 70.800
RUNOFF COEFFICIENT = 0.131

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

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--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   1.27   Curve Number   (CN)= 43.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 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
               0.083    2.61 | 1.083   47.29 | 2.083    9.94 |  3.08    3.43
               0.167    2.61 | 1.167   47.29 | 2.167    9.94 |  3.17    3.43
               0.250    3.23 | 1.250  155.47 | 2.250    7.78 |  3.25    3.05
               0.333    3.23 | 1.333  155.47 | 2.333    7.78 |  3.33    3.05
               0.417    4.19 | 1.417   63.30 | 2.417    6.32 |  3.42    2.74
               0.500    4.19 | 1.500   63.30 | 2.500    6.32 |  3.50    2.74
               0.583    5.78 | 1.583   31.36 | 2.583    5.27 |  3.58    2.49
               0.667    5.78 | 1.667   31.36 | 2.667    5.27 |  3.67    2.49
               0.750    8.84 | 1.750   19.30 | 2.750    4.49 |  3.75    2.27
               0.833    8.84 | 1.833   19.30 | 2.833    4.49 |  3.83    2.27
               0.917   16.30 | 1.917   13.35 | 2.917    3.90 |  3.92    2.09
               1.000   16.30 | 2.000   13.35 | 3.000    3.90 |  4.00    2.09

     Unit Hyd Qpeak  (cms)=   0.403

     PEAK FLOW       (cms)=   0.054 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  10.905
     TOTAL RAINFALL   (mm)=  70.800
     RUNOFF COEFFICIENT   =   0.154

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0203)|   Area    (ha)=   0.66   Curve Number   (CN)= 39.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.04

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 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
               0.083    2.61 | 1.083   47.29 | 2.083    9.94 |  3.08    3.43
               0.167    2.61 | 1.167   47.29 | 2.167    9.94 |  3.17    3.43
               0.250    3.23 | 1.250  155.47 | 2.250    7.78 |  3.25    3.05
               0.333    3.23 | 1.333  155.47 | 2.333    7.78 |  3.33    3.05
               0.417    4.19 | 1.417   63.30 | 2.417    6.32 |  3.42    2.74
               0.500    4.19 | 1.500   63.30 | 2.500    6.32 |  3.50    2.74
               0.583    5.78 | 1.583   31.36 | 2.583    5.27 |  3.58    2.49
               0.667    5.78 | 1.667   31.36 | 2.667    5.27 |  3.67    2.49
               0.750    8.84 | 1.750   19.30 | 2.750    4.49 |  3.75    2.27
               0.833    8.84 | 1.833   19.30 | 2.833    4.49 |  3.83    2.27
               0.917   16.30 | 1.917   13.35 | 2.917    3.90 |  3.92    2.09
               1.000   16.30 | 2.000   13.35 | 3.000    3.90 |  4.00    2.09

     Unit Hyd Qpeak  (cms)=   0.632

     PEAK FLOW       (cms)=   0.022 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   5.580
     TOTAL RAINFALL   (mm)=  70.800
     RUNOFF COEFFICIENT   =   0.079

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

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| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   7.82
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
```

Surface Area	(ha)=	7.74	0.08
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	228.30	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.61	1.083	47.29	2.083	9.94	3.08	3.43
0.167	2.61	1.167	47.29	2.167	9.94	3.17	3.43
0.250	3.23	1.250	155.47	2.250	7.78	3.25	3.05
0.333	3.23	1.333	155.47	2.333	7.78	3.33	3.05
0.417	4.19	1.417	63.30	2.417	6.32	3.42	2.74
0.500	4.19	1.500	63.30	2.500	6.32	3.50	2.74
0.583	5.78	1.583	31.36	2.583	5.27	3.58	2.49
0.667	5.78	1.667	31.36	2.667	5.27	3.67	2.49
0.750	8.84	1.750	19.30	2.750	4.49	3.75	2.27
0.833	8.84	1.833	19.30	2.833	4.49	3.83	2.27
0.917	16.30	1.917	13.35	2.917	3.90	3.92	2.09
1.000	16.30	2.000	13.35	3.000	3.90	4.00	2.09

Max.Eff.Inten.(mm/hr)=		155.47	91.35	
over (min)		5.00	5.00	
Storage Coeff. (min)=		3.51 (ii)	4.03 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.26	0.24	
				TOTALS
PEAK FLOW	(cms)=	3.21	0.02	3.225 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	69.80	42.08	69.52
TOTAL RAINFALL	(mm)=	70.80	70.80	70.80
RUNOFF COEFFICIENT	=	0.99	0.59	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

DUHYD (0039)					
Inlet Cap.= 0.990					
#of Inlets= 1					
Total(cms)= 1.0		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
TOTAL HYD.(ID= 1):		7.82	3.22	1.33	69.52
MAJOR SYS.(ID= 2):		2.31	2.23	1.33	69.52
MINOR SYS.(ID= 3):		5.51	0.99	1.25	69.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(2000)		OVERFLOW IS OFF			
IN= 2---> OUT= 1					
DT= 5.0 min		OUTFLOW	STORAGE	OUTFLOW	STORAGE
		(cms)	(ha.m.)	(cms)	(ha.m.)
		0.0000	0.0000	0.3280	0.2606

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0039)	5.510	0.990	1.25	69.52
OUTFLOW: ID= 1 (2000)	5.510	0.290	2.00	69.49

PEAK FLOW REDUCTION [Qout/Qin](%)= 29.34
TIME SHIFT OF PEAK FLOW (min)= 45.00
MAXIMUM STORAGE USED (ha.m.)= 0.2309

CALIB

| STANDHYD (0201)| Area (ha)= 23.00
|ID= 1 DT= 5.0 min | Total Imp(%)= 87.00 Dir. Conn.(%)= 87.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	20.01	2.99
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	391.60	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.61	1.083	47.29	2.083	9.94	3.08	3.43
0.167	2.61	1.167	47.29	2.167	9.94	3.17	3.43
0.250	3.23	1.250	155.47	2.250	7.78	3.25	3.05
0.333	3.23	1.333	155.47	2.333	7.78	3.33	3.05
0.417	4.19	1.417	63.30	2.417	6.32	3.42	2.74
0.500	4.19	1.500	63.30	2.500	6.32	3.50	2.74
0.583	5.78	1.583	31.36	2.583	5.27	3.58	2.49
0.667	5.78	1.667	31.36	2.667	5.27	3.67	2.49
0.750	8.84	1.750	19.30	2.750	4.49	3.75	2.27
0.833	8.84	1.833	19.30	2.833	4.49	3.83	2.27
0.917	16.30	1.917	13.35	2.917	3.90	3.92	2.09
1.000	16.30	2.000	13.35	3.000	3.90	4.00	2.09

Max.Eff.Inten.(mm/hr)=		155.47	91.35	
over (min)		5.00	10.00	
Storage Coeff. (min)=		4.86 (ii)	6.38 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.22	0.15	
				TOTALS
PEAK FLOW	(cms)=	7.85	0.59	8.349 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	69.80	42.08	66.20
TOTAL RAINFALL	(mm)=	70.80	70.80	70.80
RUNOFF COEFFICIENT	=	0.99	0.59	0.93

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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 (0036)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	23.00	8.349	1.33	66.20
+ ID2= 2 (0039):	2.31	2.235	1.33	69.52
ID = 3 (0036):	25.31	10.584	1.33	66.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0038)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2000):	5.51	0.290	2.00	69.49
+ ID2= 2 (0036):	25.31	10.584	1.33	66.50
ID = 3 (0038):	30.82	10.743	1.33	67.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(2001)| OVERFLOW IS OFF
|---|
| IN= 2---> OUT= 1 |
| DT= 5.0 min |

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)

```
                          0.0000     0.0000   |   1.7438      1.6000
                          0.3142     0.8000   |   2.2242      1.6504

                                    AREA      QPEAK     TPEAK       R.V.
                                    (ha)      (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)      30.820     10.743      1.33       67.03
   OUTFLOW: ID= 1 (  2001)      30.820      1.181      2.00       67.01

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.00
                   TIME SHIFT OF PEAK FLOW         (min)= 40.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  1.2857

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  2001):    30.82   1.181     2.00    67.01
      + ID2= 2 (  0202):     1.27   0.054     1.42    10.91
        ==================================================
        ID = 3 (  0001):    32.09   1.196     2.00    64.80

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0001):    32.09   1.196     2.00    64.80
      + ID2= 2 (  0203):     0.66   0.022     1.33     5.58
        ==================================================
        ID = 1 (  0001):    32.75   1.200     2.00    63.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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 *****


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DATE: 11-04-2025                          TIME: 09:07:24

USER:



COMMENTS: _____________________________________________________________

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  ********************************************
  ** SIMULATION : 05_50yr                   **
  ********************************************

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| CHICAGO STORM | IDF curve parameters: A=3886.000
| Ptotal= 80.32 mm | B= 16.000
C= 0.950
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.76	1.00	54.62	2.00	11.20	3.00	3.68
0.17	3.46	1.17	176.19	2.17	8.68	3.17	3.25
0.33	4.54	1.33	73.10	2.33	6.99	3.33	2.91
0.50	6.37	1.50	36.22	2.50	5.78	3.50	2.62
0.67	9.92	1.67	22.14	2.67	4.89	3.67	2.38
0.83	18.63	1.83	15.18	2.83	4.21	3.83	2.18

CALIB	
NASHYD (0204)	Area (ha)= 0.97 Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.041 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 11.949
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.149

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

CALIB	
NASHYD (0202)	Area (ha)= 1.27 Curve Number (CN)= 43.8
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.12

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18

1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.070 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 13.950
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.174

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

CALIB			
NASHYD (0203)	Area (ha)=	0.66	Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.04	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.028 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 7.164
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.089

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

CALIB			
STANDHYD (0200)	Area (ha)=	7.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	99.00	Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	7.74	0.08
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	228.30	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

```
     Max.Eff.Inten.(mm/hr)=     176.19       110.25
                over (min)        5.00         5.00
     Storage Coeff.  (min)=       3.34 (ii)    3.84 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.26         0.25
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.65         0.02          3.679 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      79.32        50.25          79.03
     TOTAL RAINFALL   (mm)=      80.32        80.32          80.32
     RUNOFF COEFFICIENT   =       0.99         0.63           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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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--------------------
| DUHYD    (  0039)|
| Inlet Cap.= 0.990|
| #of Inlets=     1|
| Total(cms)=   1.0|      AREA     QPEAK     TPEAK    R.V.
-------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):   7.82      3.68      1.33   79.03
     ======================================================
     MAJOR SYS.(ID= 2):   2.59      2.69      1.33   79.03
     MINOR SYS.(ID= 3):   5.22      0.99      1.08   79.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| RESERVOIR(  2000)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.3280      0.2606

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0039)       5.224      0.990      1.08      79.03
   OUTFLOW: ID= 1 (  2000)       5.224      0.312      2.00      78.99

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 31.52
                  TIME SHIFT OF PEAK FLOW         (min)= 55.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2483

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=  23.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  87.00   Dir. Conn.(%)=  87.00
-------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      20.01         2.99
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00        11.23
     Length            (m)=     391.60        35.23
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 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
              0.083    2.76 | 1.083   54.62 | 2.083   11.20 |  3.08    3.68
              0.167    2.76 | 1.167   54.62 | 2.167   11.20 |  3.17    3.68
              0.250    3.46 | 1.250  176.19 | 2.250    8.68 |  3.25    3.25
              0.333    3.46 | 1.333  176.19 | 2.333    8.68 |  3.33    3.25
              0.417    4.54 | 1.417   73.10 | 2.417    6.99 |  3.42    2.91
              0.500    4.54 | 1.500   73.10 | 2.500    6.99 |  3.50    2.91
              0.583    6.37 | 1.583   36.22 | 2.583    5.78 |  3.58    2.62
              0.667    6.37 | 1.667   36.22 | 2.667    5.78 |  3.67    2.62
```

```
               0.750    9.92 | 1.750   22.14 | 2.750    4.89 |  3.75    2.38
               0.833    9.92 | 1.833   22.14 | 2.833    4.89 |  3.83    2.38
               0.917   18.63 | 1.917   15.18 | 2.917    4.21 |  3.92    2.18
               1.000   18.63 | 2.000   15.18 | 3.000    4.21 |  4.00    2.18

     Max.Eff.Inten.(mm/hr)=     176.19       110.25
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       4.62 (ii)    6.07 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.22         0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=       8.99         0.73          9.617 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      79.32        50.25          75.54
     TOTAL RAINFALL   (mm)=      80.32        80.32          80.32
     RUNOFF COEFFICIENT   =       0.99         0.63           0.94

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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  (  0036)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0201):    23.00   9.617     1.33    75.54
      + ID2= 2 (  0039):     2.59   2.689     1.33    79.03
        ================================================
        ID = 3 (  0036):    25.60  12.306     1.33    75.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  2000):     5.22   0.312     2.00    78.99
      + ID2= 2 (  0036):    25.60  12.306     1.33    75.89
        ================================================
        ID = 3 (  0038):    30.82  12.476     1.33    76.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   1.7438      1.6000
                          0.3142     0.8000   |   2.2242      1.6504

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     30.820     12.476      1.33      76.42
   OUTFLOW: ID= 1 (  2001)     30.820      1.488      1.92      76.40

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.93
                  TIME SHIFT OF PEAK FLOW         (min)= 35.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.4568

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  2001):    30.82   1.488     1.92    76.40
      + ID2= 2 (  0202):     1.27   0.070     1.42    13.95
        ================================================
        ID = 3 (  0001):    32.09   1.510     1.92    73.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

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--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0001):    32.09   1.510     1.92    73.93
     + ID2= 2 (  0203):     0.66   0.028     1.33     7.16
       ================================================
       ID = 1 (  0001):    32.75   1.515     1.92    72.58

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\98be76b3-
5357-4d71-8209-d8bba50731ac\
  Summary filename: C:\Users\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\98be76b3-
5357-4d71-8209-d8bba50731ac\


DATE: 11-04-2025                          TIME: 09:07:25

USER:



COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 06_100yr                     **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=4688.000
| Ptotal= 89.87 mm |                          B=  17.000
--------------------                          C=   0.962
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 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    2.89 |  1.00   62.12 |  2.00   12.48 |  3.00    3.91
               0.17    3.67 |  1.17  196.54 |  2.17    9.60 |  3.17    3.44
               0.33    4.88 |  1.33   83.09 |  2.33    7.66 |  3.33    3.05
               0.50    6.96 |  1.50   41.25 |  2.50    6.29 |  3.50    2.73
               0.67   11.02 |  1.67   25.07 |  2.67    5.28 |  3.67    2.47
               0.83   21.03 |  1.83   17.06 |  2.83    4.51 |  3.83    2.24


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0204)|   Area     (ha)=   0.97   Curve Number    (CN)= 39.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
```

---------- U.H. Tp(hrs)= 0.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.052 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 14.871
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.165

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

CALIB NASHYD (0202)	Area (ha)= 1.27	Curve Number (CN)= 43.8
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
----------	U.H. Tp(hrs)= 0.12	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.087 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 17.300
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.193

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

CALIB NASHYD (0203)	Area (ha)= 0.66	Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
----------	U.H. Tp(hrs)= 0.04	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.035 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 8.915
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.099

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

CALIB
STANDHYD (0200)
ID= 1 DT= 5.0 min

Area (ha)= 7.82
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	7.74	0.08
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	228.30	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Max.Eff.Inten.(mm/hr)=		196.54	129.47	
over (min)		5.00	5.00	
Storage Coeff. (min)=		3.20 (ii)	3.67 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.27	0.25	
				TOTALS
PEAK FLOW	(cms)=	4.10	0.03	4.125 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	88.87	58.63	88.57
TOTAL RAINFALL	(mm)=	89.87	89.87	89.87
RUNOFF COEFFICIENT	=	0.99	0.65	0.99

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

DUHYD (0039)

| Inlet Cap.= 0.990|
| #of Inlets= 1|
| Total(cms)= 1.0| AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	7.82	4.13	1.33	88.57
MAJOR SYS.(ID= 2):	2.91	3.14	1.33	88.57
MINOR SYS.(ID= 3):	4.91	0.99	1.08	88.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(2000)| OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min | OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.3280 0.2606

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0039)	4.912	0.990	1.08	88.57
OUTFLOW: ID= 1 (2000)	4.912	0.327	2.08	88.53

PEAK FLOW REDUCTION [Qout/Qin](%)= 33.05
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.2605

| CALIB |
| STANDHYD (0201)| Area (ha)= 23.00
|ID= 1 DT= 5.0 min | Total Imp(%)= 87.00 Dir. Conn.(%)= 87.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	20.01	2.99
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	391.60	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Max.Eff.Inten.(mm/hr)=	196.54	129.47		
over (min)	5.00	10.00		
Storage Coeff. (min)=	4.42 (ii)	5.81 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.23	0.15		
				TOTALS
PEAK FLOW (cms)=	10.12	0.86		10.874 (iii)
TIME TO PEAK (hrs)=	1.33	1.42		1.33
RUNOFF VOLUME (mm)=	88.87	58.63		84.94
TOTAL RAINFALL (mm)=	89.87	89.87		89.87
RUNOFF COEFFICIENT =	0.99	0.65		0.95

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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  (  0036)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0201):    23.00  10.874     1.33    84.94
     + ID2= 2 (  0039):     2.91   3.135     1.33    88.57
       ================================================
       ID = 3 (  0036):    25.91  14.009     1.33    85.35

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2000):     4.91   0.327     2.08    88.53
     + ID2= 2 (  0036):    25.91  14.009     1.33    85.35
       ================================================
       ID = 3 (  0038):    30.82  14.186     1.33    85.85

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   1.7438      1.6000
                           0.3142     0.8000   |   2.2242      1.6504

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     30.820     14.186      1.33      85.85
   OUTFLOW: ID= 1 (  2001)     30.820      1.990      1.83      85.83

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.03
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.6270

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2001):    30.82   1.990     1.83    85.83
     + ID2= 2 (  0202):     1.27   0.087     1.42    17.30
       ================================================
       ID = 3 (  0001):    32.09   2.024     1.83    83.13

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0001):    32.09   2.024     1.83    83.13
     + ID2= 2 (  0203):     0.66   0.035     1.33     8.92
       ================================================
       ID = 1 (  0001):    32.75   2.032     1.83    81.63

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================

      V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
      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
Developed and Distributed by Smart City Water Inc
```


***** 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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\e1ba6e17-
1506-45af-a62b-6a519cd55f8d\
  Summary filename: C:\Users\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\e1ba6e17-
1506-45af-a62b-6a519cd55f8d\


DATE: 11-04-2025                          TIME: 09:07:25

USER:


COMMENTS: _____________________________________________________________
```

```
  ***********************************************
  ** SIMULATION : 07_HAZEL.STM                 **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\workstation\AppD
|                  |              ata\Local\Temp\
|                  |              554d38e8-b6f6-48f4-b75a-a8e38d55dd16\afca88ca
| Ptotal=212.00 mm |    Comments: HURRICANE HAZEL
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.00	3.00	13.00	6.00	23.00	9.00	53.00
0.17	6.00	3.17	13.00	6.17	23.00	9.17	53.00
0.33	6.00	3.33	13.00	6.33	23.00	9.33	53.00
0.50	6.00	3.50	13.00	6.50	23.00	9.50	53.00
0.67	6.00	3.67	13.00	6.67	23.00	9.67	53.00
0.83	6.00	3.83	13.00	6.83	23.00	9.83	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
1.17	4.00	4.17	17.00	7.17	13.00	10.17	38.00
1.33	4.00	4.33	17.00	7.33	13.00	10.33	38.00
1.50	4.00	4.50	17.00	7.50	13.00	10.50	38.00
1.67	4.00	4.67	17.00	7.67	13.00	10.67	38.00
1.83	4.00	4.83	17.00	7.83	13.00	10.83	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00
2.17	6.00	5.17	13.00	8.17	13.00	11.17	13.00
2.33	6.00	5.33	13.00	8.33	13.00	11.33	13.00
2.50	6.00	5.50	13.00	8.50	13.00	11.50	13.00
2.67	6.00	5.67	13.00	8.67	13.00	11.67	13.00
2.83	6.00	5.83	13.00	8.83	13.00	11.83	13.00

```
--------------------
| CALIB            |
| NASHYD   (  0204)|   Area    (ha)=   0.97   Curve Number   (CN)= 39.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.16

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00

0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.066 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 70.589
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.333

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

CALIB			
NASHYD (0202)	Area (ha)= 1.27	Curve Number (CN)= 43.8	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.12		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00

2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.097 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 79.332
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.374

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

CALIB			
NASHYD (0203)	Area (ha)=	0.66	Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.04	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.028 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 42.317
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.200

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

CALIB			
STANDHYD (0200)	Area (ha)=	7.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	99.00	Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	7.74	0.08
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	228.30	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=		53.00	50.33	
over (min)		5.00	10.00	
Storage Coeff. (min)=		5.40 (ii)	6.20 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.21	0.15	
				TOTALS
PEAK FLOW	(cms)=	1.14	0.01	1.150 (iii)
TIME TO PEAK	(hrs)=	10.00	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	173.55	210.63
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	1.00	0.82	0.99

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

| DUHYD (0039)|
| Inlet Cap.= 0.990|
| #of Inlets= 1|
| Total(cms)= 1.0|

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	7.82	1.15	10.00	210.63
MAJOR SYS.(ID= 2):	0.22	0.16	10.00	210.63
MINOR SYS.(ID= 3):	7.60	0.99	9.17	210.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(2000)		OVERFLOW IS OFF
IN= 2---> OUT= 1		
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000

OUTFLOW (cms)	STORAGE (ha.m.)
0.3280	0.2606

**** WARNING : STORAGE-DISCHARGE TABLE WAS EXCEEDED.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0039)	7.600	0.990	9.17	210.63
OUTFLOW: ID= 1 (2000)	7.600	0.653	11.08	210.60

PEAK FLOW REDUCTION [Qout/Qin](%)= 65.99
TIME SHIFT OF PEAK FLOW (min)=115.00
MAXIMUM STORAGE USED (ha.m.)= 0.5214

CALIB	
STANDHYD (0201)|	Area (ha)= 23.00
ID= 1 DT= 5.0 min		Total Imp(%)= 87.00 Dir. Conn.(%)= 87.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	20.01	2.99
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	11.23
Length (m)=	391.60	35.23
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00

2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	50.33		
over (min)	5.00	10.00		
Storage Coeff. (min)=	7.47 (ii)	9.82 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.17	0.11		
			TOTALS	
PEAK FLOW (cms)=	2.95	0.42	3.361 (iii)	
TIME TO PEAK (hrs)=	10.00	10.00	10.00	
RUNOFF VOLUME (mm)=	211.00	173.55	206.13	
TOTAL RAINFALL (mm)=	212.00	212.00	212.00	
RUNOFF COEFFICIENT =	1.00	0.82	0.97	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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 (0036)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	23.00	3.361	10.00	206.13
+ ID2= 2 (0039):	0.22	0.160	10.00	210.63
ID = 3 (0036):	23.22	3.521	10.00	206.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0038)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2000):	7.60	0.653	11.08	210.60
+ ID2= 2 (0036):	23.22	3.521	10.00	206.17
ID = 3 (0038):	30.82	4.064	10.00	207.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(2001)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	1.7438	1.6000
	0.3142	0.8000	2.2242	1.6504

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0038)	30.820	4.064	10.00	207.26
OUTFLOW: ID= 1 (2001)	30.820	3.630	10.08	207.24

PEAK FLOW REDUCTION [Qout/Qin](%)= 89.32
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= 1.7999

ADD HYD (0001)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2001):	30.82	3.630	10.08	207.24
+ ID2= 2 (0202):	1.27	0.097	10.00	79.33
ID = 3 (0001):	32.09	3.719	10.08	202.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0001)					
3 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 3 (0001):	32.09	3.719	10.08	202.20
	+ ID2= 2 (0203):	0.66	0.028	10.00	42.32
	==========	==========	==========	==========	==========
	ID = 1 (0001):	32.75	3.739	10.08	198.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

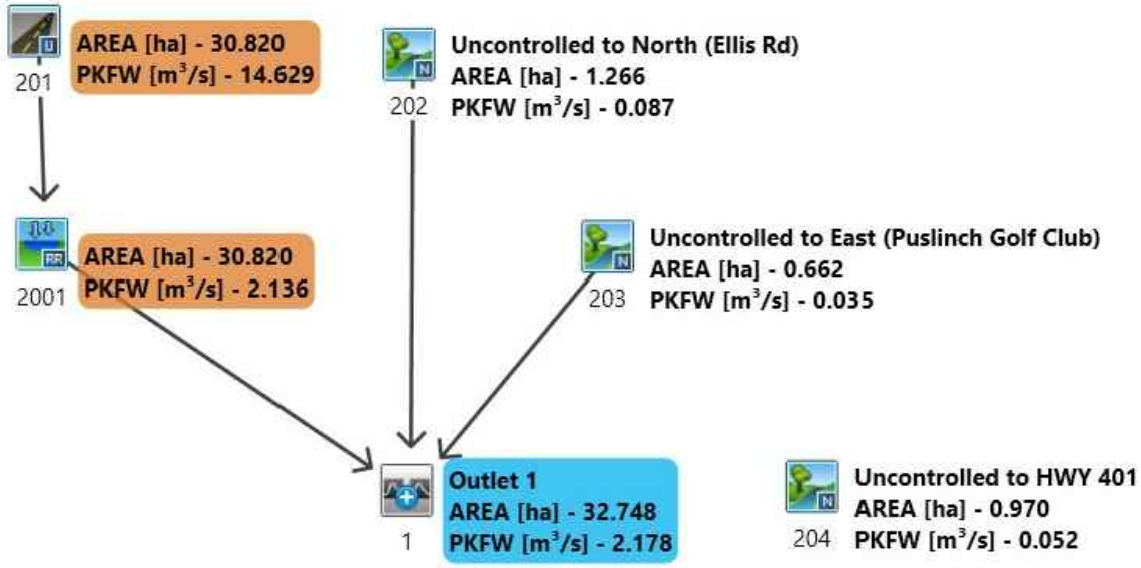

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FIGURE C3

2509 TOWNLINE ROAD

PROPOSED DEVELOPMENT VO6 SCHEMATIC - NO ROOFTOP CONTROL

DATE: OCTOBER 2025 SCALE: NTS PROJECT: 251619

Proposed VO Modelling Output for Site Plan A – With No Rooftop Control

```
       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       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 *****

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Summary filename: C:\Users\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\fda40a51-7b07-4dbe-b72a-c36adba64380\

DATE: 11-04-2025 TIME: 09:29:18

USER:

COMMENTS: _____

****
** SIMULATION : 00_25MM4HR.STM **
****

READ STORM	Filename: C:\Users\workstation\AppData\Local\Temp\3299be71-94d9-475a-a11e-4866053fda5a\2c18ad34
Ptotal= 25.00 mm	Comments: Twenty five mm Four Hour Chicago Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.07	1.00	5.70	2.00	5.19	3.00	2.80
0.17	2.27	1.17	10.78	2.17	4.47	3.17	2.62
0.33	2.52	1.33	50.21	2.33	3.95	3.33	2.48
0.50	2.88	1.50	13.37	2.50	3.56	3.50	2.35
0.67	3.38	1.67	8.29	2.67	3.25	3.67	2.23
0.83	4.18	1.83	6.30	2.83	3.01	3.83	2.14

CALIB			
NASHYD (0204)	Area (ha)= 0.97	Curve Number (CN)= 39.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.16		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35

0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.18	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.30	3.000	3.01	4.00	2.14

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.002 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 0.954
TOTAL RAINFALL (mm)= 24.997
RUNOFF COEFFICIENT = 0.038

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

CALIB			
NASHYD (0202)	Area (ha)=	1.27	Curve Number (CN)= 43.8
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.12	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.18	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.30	3.000	3.01	4.00	2.14

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.004 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 1.140
TOTAL RAINFALL (mm)= 24.997
RUNOFF COEFFICIENT = 0.046

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

CALIB			
NASHYD (0203)	Area (ha)=	0.66	Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.04	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.18	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.30	3.000	3.01	4.00	2.14

Unit Hyd Qpeak (cms)= 0.632

```
     PEAK FLOW       (cms)=   0.002 (i)
     TIME TO PEAK    (hrs)=   1.500
     RUNOFF VOLUME    (mm)=   0.572
     TOTAL RAINFALL   (mm)=  24.997
     RUNOFF COEFFICIENT   =   0.023

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=  30.82
|ID= 1 DT= 5.0 min |   Total Imp(%)=  91.00   Dir. Conn.(%)=  91.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      28.05         2.77
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00        11.23
     Length            (m)=     453.28        35.23
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 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
              0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
              0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
              0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
              0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
              0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
              0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
              0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
              0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
              0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
              0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
              0.917    4.18 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
              1.000    4.18 | 2.000    6.30 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21        14.26
               over (min)        10.00        15.00
     Storage Coeff.  (min)=       8.33 (ii)   10.37 (ii)
     Unit Hyd. Tpeak (min)=      10.00        15.00
     Unit Hyd. peak  (cms)=       0.13         0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.60         0.07          2.652 (iii)
     TIME TO PEAK    (hrs)=       1.58         1.67           1.58
     RUNOFF VOLUME    (mm)=      24.00         8.08          22.56
     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =       0.96         0.32           0.90


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   1.7822      1.8200
                          0.4695     0.9100   |   2.2536      1.8704

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0201)     30.820     2.652      1.58      22.56
   OUTFLOW: ID= 1 (  2001)     30.820     0.248      3.08      22.55

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.36
                  TIME SHIFT OF PEAK FLOW         (min)= 90.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.4810

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

```
--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  2001):     30.82   0.248     3.08     22.55
      + ID2= 2 (  0202):      1.27   0.004     1.58      1.14
        ================================================
        ID = 3 (  0001):     32.09   0.249     3.08     21.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0001):     32.09   0.249     3.08     21.70
      + ID2= 2 (  0203):      0.66   0.002     1.50      0.57
        ================================================
        ID = 1 (  0001):     32.75   0.249     3.08     21.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

 FINISH
================================================================================================================================

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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 *****


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DATE: 11-04-2025                          TIME: 09:29:17

USER:



COMMENTS: _____


--------------------------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 01_2yr                       **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 743.000
| Ptotal= 36.54 mm |                          B=   6.000
--------------------                          C=   0.799
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.31	1.00	19.47	2.00	5.62	3.00	2.77
0.17	2.66	1.17	81.10	2.17	4.75	3.17	2.56
0.33	3.15	1.33	25.63	2.33	4.13	3.33	2.39
0.50	3.89	1.50	13.34	2.50	3.67	3.50	2.24
0.67	5.18	1.67	9.07	2.67	3.30	3.67	2.11
0.83	7.98	1.83	6.91	2.83	3.01	3.83	2.00

CALIB			
NASHYD (0204)	Area (ha)=	0.97	Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.16	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.007 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 2.309
TOTAL RAINFALL (mm)= 36.541
RUNOFF COEFFICIENT = 0.063

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

CALIB			
NASHYD (0202)	Area (ha)=	1.27	Curve Number (CN)= 43.8
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.12	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.012 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 2.746
TOTAL RAINFALL (mm)= 36.541
RUNOFF COEFFICIENT = 0.075

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

CALIB			
NASHYD (0203)	Area (ha)=	0.66	Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.04	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.005 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 1.384
TOTAL RAINFALL (mm)= 36.541
RUNOFF COEFFICIENT = 0.038

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

CALIB			
STANDHYD (0201)	Area (ha)=	30.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	91.00	Dir. Conn.(%)= 91.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	28.05	2.77
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	453.28	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.31	1.083	19.47	2.083	5.62	3.08	2.77
0.167	2.31	1.167	19.47	2.167	5.62	3.17	2.77
0.250	2.66	1.250	81.10	2.250	4.75	3.25	2.56
0.333	2.66	1.333	81.10	2.333	4.75	3.33	2.56
0.417	3.15	1.417	25.63	2.417	4.13	3.42	2.39
0.500	3.15	1.500	25.63	2.500	4.13	3.50	2.39
0.583	3.89	1.583	13.34	2.583	3.67	3.58	2.24
0.667	3.89	1.667	13.34	2.667	3.67	3.67	2.24
0.750	5.18	1.750	9.07	2.750	3.30	3.75	2.11
0.833	5.18	1.833	9.07	2.833	3.30	3.83	2.11
0.917	7.98	1.917	6.91	2.917	3.01	3.92	2.00
1.000	7.98	2.000	6.91	3.000	3.01	4.00	2.00

Max.Eff.Inten.(mm/hr)=	81.10	31.17		
over (min)	5.00	10.00		
Storage Coeff. (min)=	6.88 (ii)	8.56 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.18	0.12		
			TOTALS	
PEAK FLOW (cms)=	5.14	0.17	5.275 (iii)	
TIME TO PEAK (hrs)=	1.33	1.42	1.33	

```
     RUNOFF VOLUME    (mm)=      35.54        15.37          33.73
     TOTAL RAINFALL   (mm)=      36.54        36.54          36.54
     RUNOFF COEFFICIENT   =       0.97         0.42           0.92


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   1.7822      1.8200
                         0.4695     0.9100   |   2.2536      1.8704

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0201)     30.820      5.275      1.33      33.73
   OUTFLOW: ID= 1 (  2001)     30.820      0.385      2.42      33.71

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.30
                  TIME SHIFT OF PEAK FLOW         (min)= 65.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7469

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2001):    30.82   0.385     2.42    33.71
     + ID2= 2 (  0202):     1.27   0.012     1.42     2.75
       ====================================================
       ID = 3 (  0001):    32.09   0.388     2.42    32.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0001):    32.09   0.388     2.42    32.49
     + ID2= 2 (  0203):     0.66   0.005     1.33     1.38
       ====================================================
       ID = 1 (  0001):    32.75   0.388     2.42    31.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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 *****


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DATE: 11-04-2025 TIME: 09:29:18

USER:

COMMENTS: _____

****
** SIMULATION : 02_5yr **
****

| CHICAGO STORM |
| Ptotal= 49.55 mm |

IDF curve parameters: A=1593.000
B= 11.000
C= 0.879
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.35	1.00	30.47	2.00	7.17	3.00	2.93
0.17	2.80	1.17	109.68	2.17	5.81	3.17	2.67
0.33	3.46	1.33	40.71	2.33	4.87	3.33	2.45
0.50	4.52	1.50	20.28	2.50	4.19	3.50	2.26
0.67	6.48	1.67	12.91	2.67	3.67	3.67	2.10
0.83	11.07	1.83	9.28	2.83	3.26	3.83	1.96

| CALIB |
| NASHYD (0204) |
|ID= 1 DT= 5.0 min |

Area (ha)= 0.97 Curve Number (CN)= 39.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.014 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 4.472
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.090

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

| CALIB |
| NASHYD (0202) |
|ID= 1 DT= 5.0 min |

Area (ha)= 1.27 Curve Number (CN)= 43.8
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.12

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.025 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 5.286
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.107

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

CALIB	
NASHYD (0203)	Area (ha)= 0.66 Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.04

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.010 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 2.681
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.054

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

CALIB	
STANDHYD (0201)	Area (ha)= 30.82
ID= 1 DT= 5.0 min	Total Imp(%)= 91.00 Dir. Conn.(%)= 91.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	28.05	2.77
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	453.28	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Max.Eff.Inten.(mm/hr)=		109.68	52.32	
over (min)		5.00	10.00	
Storage Coeff. (min)=		6.10 (ii)	7.59 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.19	0.13	
				TOTALS
PEAK FLOW	(cms)=	7.29	0.30	7.529 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	48.55	24.86	46.42
TOTAL RAINFALL	(mm)=	49.55	49.55	49.55
RUNOFF COEFFICIENT	=	0.98	0.50	0.94

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

RESERVOIR(2001)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	1.7822	1.8200
	0.4695	0.9100	2.2536	1.8704

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	30.820	7.529	1.33	46.42
OUTFLOW: ID= 1 (2001)	30.820	0.664	2.17	46.41

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.83
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 1.0452

ADD HYD (0001)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2001):	30.82	0.664	2.17	46.41
+ ID2= 2 (0202):	1.27	0.025	1.42	5.29
ID = 3 (0001):	32.09	0.670	2.17	44.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0001)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0001):	32.09	0.670	2.17	44.78
+ ID2= 2 (0203):	0.66	0.010	1.33	2.68
ID = 1 (0001):	32.75	0.671	2.17	43.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       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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DATE: 11-04-2025 TIME: 09:29:17

USER:

COMMENTS: _____

****
** SIMULATION : 03_10yr **
****

| CHICAGO STORM |
| Ptotal= 58.62 mm |

IDF curve parameters: A=2221.000
B= 12.000
C= 0.908
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.39	1.00	37.17	2.00	8.06	3.00	3.05
0.17	2.89	1.17	134.16	2.17	6.42	3.17	2.75
0.33	3.65	1.33	50.03	2.33	5.30	3.33	2.50
0.50	4.89	1.50	24.37	2.50	4.50	3.50	2.29
0.67	7.23	1.67	15.14	2.67	3.89	3.67	2.11
0.83	12.87	1.83	10.64	2.83	3.42	3.83	1.96

| CALIB |
| NASHYD (0204)| Area (ha)= 0.97 Curve Number (CN)= 39.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75

0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.022 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 6.346
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.108

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

CALIB					
NASHYD (0202)	Area (ha)=	1.27	Curve Number (CN)=	43.8	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.12			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.037 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 7.473
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.127

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

CALIB					
NASHYD (0203)	Area (ha)=	0.66	Curve Number (CN)=	39.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.04			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96

1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.016 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 3.805
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.065

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

CALIB	STANDHYD (0201)	ID= 1 DT= 5.0 min

Area (ha)= 30.82
Total Imp(%)= 91.00 Dir. Conn.(%)= 91.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	28.05	2.77
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	453.28	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Max.Eff.Inten.(mm/hr)=	134.16	71.15		
over (min)	5.00	10.00		
Storage Coeff. (min)=	5.62 (ii)	7.00 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.20	0.14		
			TOTALS	
PEAK FLOW (cms)=	9.12	0.41	9.461 (iii)	
TIME TO PEAK (hrs)=	1.33	1.42	1.33	
RUNOFF VOLUME (mm)=	57.62	32.00	55.31	
TOTAL RAINFALL (mm)=	58.62	58.62	58.62	
RUNOFF COEFFICIENT =	0.98	0.55	0.94	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

RESERVOIR(2001)	IN= 2---> OUT= 1	DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	1.7822	1.8200
0.4695	0.9100	2.2536	1.8704

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	30.820	9.461	1.33	55.31
OUTFLOW: ID= 1 (2001)	30.820	0.940	2.00	55.29

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.94
TIME SHIFT OF PEAK FLOW (min)= 40.00

```
                  MAXIMUM  STORAGE   USED      (ha.m.)=  1.2374

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  2001):    30.82   0.940     2.00    55.29
      + ID2= 2 (  0202):     1.27   0.037     1.42     7.47
        ================================================
        ID = 3 (  0001):    32.09   0.950     2.00    53.41

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0001):    32.09   0.950     2.00    53.41
      + ID2= 2 (  0203):     0.66   0.016     1.33     3.80
        ================================================
        ID = 1 (  0001):    32.75   0.953     2.00    52.41

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\3776d8b1-
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fdd4-4eaa-85e6-698726d01f8f\


DATE: 11-04-2025                          TIME: 09:29:17

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 04_25yr                      **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=3158.000
| Ptotal= 70.80 mm |                          B=  15.000
--------------------                          C=   0.936
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 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	2.61	1.00	47.29	2.00	9.94	3.00	3.43
0.17	3.23	1.17	155.47	2.17	7.78	3.17	3.05
0.33	4.19	1.33	63.30	2.33	6.32	3.33	2.74
0.50	5.78	1.50	31.36	2.50	5.27	3.50	2.49
0.67	8.84	1.67	19.30	2.67	4.49	3.67	2.27
0.83	16.30	1.83	13.35	2.83	3.90	3.83	2.09

CALIB			
NASHYD (0204)	Area (ha)=	0.97	Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.16	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.61	1.083	47.29	2.083	9.94	3.08	3.43
0.167	2.61	1.167	47.29	2.167	9.94	3.17	3.43
0.250	3.23	1.250	155.47	2.250	7.78	3.25	3.05
0.333	3.23	1.333	155.47	2.333	7.78	3.33	3.05
0.417	4.19	1.417	63.30	2.417	6.32	3.42	2.74
0.500	4.19	1.500	63.30	2.500	6.32	3.50	2.74
0.583	5.78	1.583	31.36	2.583	5.27	3.58	2.49
0.667	5.78	1.667	31.36	2.667	5.27	3.67	2.49
0.750	8.84	1.750	19.30	2.750	4.49	3.75	2.27
0.833	8.84	1.833	19.30	2.833	4.49	3.83	2.27
0.917	16.30	1.917	13.35	2.917	3.90	3.92	2.09
1.000	16.30	2.000	13.35	3.000	3.90	4.00	2.09

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.032 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 9.307
TOTAL RAINFALL (mm)= 70.800
RUNOFF COEFFICIENT = 0.131

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

CALIB			
NASHYD (0202)	Area (ha)=	1.27	Curve Number (CN)= 43.8
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.12	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.61	1.083	47.29	2.083	9.94	3.08	3.43
0.167	2.61	1.167	47.29	2.167	9.94	3.17	3.43
0.250	3.23	1.250	155.47	2.250	7.78	3.25	3.05
0.333	3.23	1.333	155.47	2.333	7.78	3.33	3.05
0.417	4.19	1.417	63.30	2.417	6.32	3.42	2.74
0.500	4.19	1.500	63.30	2.500	6.32	3.50	2.74
0.583	5.78	1.583	31.36	2.583	5.27	3.58	2.49
0.667	5.78	1.667	31.36	2.667	5.27	3.67	2.49
0.750	8.84	1.750	19.30	2.750	4.49	3.75	2.27
0.833	8.84	1.833	19.30	2.833	4.49	3.83	2.27
0.917	16.30	1.917	13.35	2.917	3.90	3.92	2.09
1.000	16.30	2.000	13.35	3.000	3.90	4.00	2.09

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.054 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 10.905
TOTAL RAINFALL (mm)= 70.800
RUNOFF COEFFICIENT = 0.154

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

CALIB					
NASHYD (0203)	Area (ha)=	0.66	Curve Number (CN)=	39.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.04			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.61	1.083	47.29	2.083	9.94	3.08	3.43
0.167	2.61	1.167	47.29	2.167	9.94	3.17	3.43
0.250	3.23	1.250	155.47	2.250	7.78	3.25	3.05
0.333	3.23	1.333	155.47	2.333	7.78	3.33	3.05
0.417	4.19	1.417	63.30	2.417	6.32	3.42	2.74
0.500	4.19	1.500	63.30	2.500	6.32	3.50	2.74
0.583	5.78	1.583	31.36	2.583	5.27	3.58	2.49
0.667	5.78	1.667	31.36	2.667	5.27	3.67	2.49
0.750	8.84	1.750	19.30	2.750	4.49	3.75	2.27
0.833	8.84	1.833	19.30	2.833	4.49	3.83	2.27
0.917	16.30	1.917	13.35	2.917	3.90	3.92	2.09
1.000	16.30	2.000	13.35	3.000	3.90	4.00	2.09

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.022 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 5.580
TOTAL RAINFALL (mm)= 70.800
RUNOFF COEFFICIENT = 0.079

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

CALIB			
STANDHYD (0201)	Area (ha)=	30.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	91.00	Dir. Conn.(%)= 91.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	28.05	2.77
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	453.28	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.61	1.083	47.29	2.083	9.94	3.08	3.43
0.167	2.61	1.167	47.29	2.167	9.94	3.17	3.43
0.250	3.23	1.250	155.47	2.250	7.78	3.25	3.05
0.333	3.23	1.333	155.47	2.333	7.78	3.33	3.05
0.417	4.19	1.417	63.30	2.417	6.32	3.42	2.74
0.500	4.19	1.500	63.30	2.500	6.32	3.50	2.74
0.583	5.78	1.583	31.36	2.583	5.27	3.58	2.49
0.667	5.78	1.667	31.36	2.667	5.27	3.67	2.49
0.750	8.84	1.750	19.30	2.750	4.49	3.75	2.27
0.833	8.84	1.833	19.30	2.833	4.49	3.83	2.27
0.917	16.30	1.917	13.35	2.917	3.90	3.92	2.09
1.000	16.30	2.000	13.35	3.000	3.90	4.00	2.09

Max.Eff.Inten.(mm/hr)=	155.47	91.35		
over (min)	5.00	10.00		
Storage Coeff. (min)=	5.30 (ii)	6.60 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.21	0.14		
			TOTALS	
PEAK FLOW (cms)=	10.78	0.55	11.236 (iii)	
TIME TO PEAK (hrs)=	1.33	1.42	1.33	
RUNOFF VOLUME (mm)=	69.80	42.08	67.31	

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     TOTAL RAINFALL   (mm)=      70.80        70.80          70.80
     RUNOFF COEFFICIENT   =       0.99         0.59           0.95


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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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--------------------
| RESERVOIR(  2001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   1.7822      1.8200
                          0.4695     0.9100   |   2.2536      1.8704

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0201)     30.820     11.236      1.33      67.31
   OUTFLOW: ID= 1 (  2001)     30.820      1.294      2.00      67.29

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.51
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.4820

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  2001):    30.82   1.294     2.00    67.29
      + ID2= 2 (  0202):     1.27   0.054     1.42    10.91
        ================================================
        ID = 3 (  0001):    32.09   1.309     1.92    65.06

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0001):    32.09   1.309     1.92    65.06
      + ID2= 2 (  0203):     0.66   0.022     1.33     5.58
        ================================================
        ID = 1 (  0001):    32.75   1.312     1.92    63.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2015)
       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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\a95b3f2a-
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  Summary filename: C:\Users\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\a95b3f2a-
4a4b-41b6-8ba3-b9ce0d69d4f0\
```

DATE: 11-04-2025 TIME: 09:29:17

USER:

COMMENTS: _____

****
** SIMULATION : 05_50yr **
****

CHICAGO STORM	Ptotal= 80.32 mm

IDF curve parameters: A=3886.000
B= 16.000
C= 0.950
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.76	1.00	54.62	2.00	11.20	3.00	3.68
0.17	3.46	1.17	176.19	2.17	8.68	3.17	3.25
0.33	4.54	1.33	73.10	2.33	6.99	3.33	2.91
0.50	6.37	1.50	36.22	2.50	5.78	3.50	2.62
0.67	9.92	1.67	22.14	2.67	4.89	3.67	2.38
0.83	18.63	1.83	15.18	2.83	4.21	3.83	2.18

CALIB	NASHYD (0204)	ID= 1 DT= 5.0 min

Area (ha)= 0.97 Curve Number (CN)= 39.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.041 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 11.949
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.149

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

CALIB	NASHYD (0202)	ID= 1 DT= 5.0 min

Area (ha)= 1.27 Curve Number (CN)= 43.8
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.12

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.070 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 13.950
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.174

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

CALIB	
NASHYD (0203)	Area (ha)= 0.66 Curve Number (CN)= 39.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.04

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.028 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 7.164
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.089

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

CALIB	
STANDHYD (0201)	Area (ha)= 30.82
ID= 1 DT= 5.0 min	Total Imp(%)= 91.00 Dir. Conn.(%)= 91.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	28.05	2.77
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	453.28	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

			TOTALS
Max.Eff.Inten.(mm/hr)=	176.19	110.25	
over (min)	5.00	10.00	
Storage Coeff. (min)=	5.04 (ii)	6.28 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.21	0.15	
PEAK FLOW (cms)=	12.37	0.67	12.939 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	79.32	50.25	76.70
TOTAL RAINFALL (mm)=	80.32	80.32	80.32
RUNOFF COEFFICIENT =	0.99	0.63	0.95

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

RESERVOIR(2001)	OVERFLOW IS OFF
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	1.7822	1.8200
0.4695	0.9100	2.2536	1.8704

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	30.820	12.939	1.33	76.70
OUTFLOW: ID= 1 (2001)	30.820	1.576	1.92	76.69

PEAK FLOW REDUCTION [Qout/Qin](%)= 12.18
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= 1.6775

ADD HYD (0001)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2001):	30.82	1.576	1.92	76.69
+ ID2= 2 (0202):	1.27	0.070	1.42	13.95
ID = 3 (0001):	32.09	1.598	1.92	74.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0001)
3 + 2 = 1

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0001):	32.09	1.598	1.92	74.21
+ ID2= 2 (0203):	0.66	0.028	1.33	7.16
ID = 1 (0001):	32.75	1.602	1.92	72.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\e2fdd1e9-0edd-434b-898a-ccda3daae6a8\
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DATE: 11-04-2025 TIME: 09:29:18

USER:

COMMENTS: _____

****
** SIMULATION : 06_100yr **
****

| CHICAGO STORM | IDF curve parameters: A=4688.000
| Ptotal= 89.87 mm | B= 17.000
C= 0.962
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.89	1.00	62.12	2.00	12.48	3.00	3.91
0.17	3.67	1.17	196.54	2.17	9.60	3.17	3.44
0.33	4.88	1.33	83.09	2.33	7.66	3.33	3.05
0.50	6.96	1.50	41.25	2.50	6.29	3.50	2.73
0.67	11.02	1.67	25.07	2.67	5.28	3.67	2.47
0.83	21.03	1.83	17.06	2.83	4.51	3.83	2.24

CALIB	NASHYD (0204)	ID= 1 DT= 5.0 min	Area (ha)= 0.97	Ia (mm)= 5.00	U.H. Tp(hrs)= 0.16	Curve Number (CN)= 39.0	# of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05

0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.052 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 14.871
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.165

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

CALIB					
NASHYD (0202)	Area (ha)=	1.27	Curve Number (CN)=	43.8	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.12			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.403

PEAK FLOW (cms)= 0.087 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 17.300
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.193

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

CALIB					
NASHYD (0203)	Area (ha)=	0.66	Curve Number (CN)=	39.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.04			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

```
     Unit Hyd Qpeak  (cms)=   0.632

     PEAK FLOW       (cms)=   0.035 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   8.915
     TOTAL RAINFALL   (mm)=  89.870
     RUNOFF COEFFICIENT   =   0.099

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=  30.82
|ID= 1 DT= 5.0 min |   Total Imp(%)=  91.00   Dir. Conn.(%)=  91.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      28.05         2.77
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00        11.23
     Length            (m)=     453.28        35.23
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 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
               0.083    2.89 | 1.083   62.12 | 2.083   12.48 |  3.08    3.91
               0.167    2.89 | 1.167   62.12 | 2.167   12.48 |  3.17    3.91
               0.250    3.67 | 1.250  196.54 | 2.250    9.60 |  3.25    3.44
               0.333    3.67 | 1.333  196.54 | 2.333    9.60 |  3.33    3.44
               0.417    4.88 | 1.417   83.09 | 2.417    7.66 |  3.42    3.05
               0.500    4.88 | 1.500   83.09 | 2.500    7.66 |  3.50    3.05
               0.583    6.96 | 1.583   41.25 | 2.583    6.29 |  3.58    2.73
               0.667    6.96 | 1.667   41.25 | 2.667    6.29 |  3.67    2.73
               0.750   11.02 | 1.750   25.07 | 2.750    5.28 |  3.75    2.47
               0.833   11.02 | 1.833   25.07 | 2.833    5.28 |  3.83    2.47
               0.917   21.03 | 1.917   17.06 | 2.917    4.51 |  3.92    2.24
               1.000   21.03 | 2.000   17.06 | 3.000    4.51 |  4.00    2.24

     Max.Eff.Inten.(mm/hr)=     196.54       129.47
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       4.83 (ii)    6.01 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.22         0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=      13.94         0.79         14.629 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      88.87        58.63          86.15
     TOTAL RAINFALL   (mm)=      89.87        89.87          89.87
     RUNOFF COEFFICIENT   =       0.99         0.65           0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   1.7822      1.8200
                           0.4695     0.9100   |   2.2536      1.8704

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0201)      30.820     14.629      1.33      86.15
   OUTFLOW: ID= 1 (  2001)      30.820      2.136      1.83      86.13

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.60
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
```

```
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.8618

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  2001):    30.82   2.136     1.83    86.13
      + ID2= 2 (  0202):     1.27   0.087     1.42    17.30
        ================================================
        ID = 3 (  0001):    32.09   2.171     1.83    83.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0001):    32.09   2.171     1.83    83.42
      + ID2= 2 (  0203):     0.66   0.035     1.33     8.92
        ================================================
        ID = 1 (  0001):    32.75   2.178     1.83    81.91

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================================================

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       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\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\1dfd9eba-
f027-498a-bbe3-eebe3bcc6edd\
  Summary filename: C:\Users\workstation\AppData\Local\Civica\VH5\194b2092-0da8-4fac-aa7d-f4c70f750bf8\1dfd9eba-
f027-498a-bbe3-eebe3bcc6edd\


DATE: 11-04-2025                          TIME: 09:29:16

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------------------------------------------
  ********************************************
  ** SIMULATION : 07_HAZEL.STM                **
  ********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\workstation\AppD
|                  |              ata\Local\Temp\
|                  |              3299be71-94d9-475a-a11e-4866053fda5a\afca88ca
| Ptotal=212.00 mm |    Comments: HURRICANE HAZEL
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    6.00 |  3.00   13.00 |  6.00   23.00 |  9.00   53.00
                0.17    6.00 |  3.17   13.00 |  6.17   23.00 |  9.17   53.00
```

0.33	6.00	3.33	13.00	6.33	23.00	9.33	53.00
0.50	6.00	3.50	13.00	6.50	23.00	9.50	53.00
0.67	6.00	3.67	13.00	6.67	23.00	9.67	53.00
0.83	6.00	3.83	13.00	6.83	23.00	9.83	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
1.17	4.00	4.17	17.00	7.17	13.00	10.17	38.00
1.33	4.00	4.33	17.00	7.33	13.00	10.33	38.00
1.50	4.00	4.50	17.00	7.50	13.00	10.50	38.00
1.67	4.00	4.67	17.00	7.67	13.00	10.67	38.00
1.83	4.00	4.83	17.00	7.83	13.00	10.83	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00
2.17	6.00	5.17	13.00	8.17	13.00	11.17	13.00
2.33	6.00	5.33	13.00	8.33	13.00	11.33	13.00
2.50	6.00	5.50	13.00	8.50	13.00	11.50	13.00
2.67	6.00	5.67	13.00	8.67	13.00	11.67	13.00
2.83	6.00	5.83	13.00	8.83	13.00	11.83	13.00

CALIB					
NASHYD (0204)	Area	(ha)=	0.97	Curve Number	(CN)= 39.0
ID= 1 DT= 5.0 min	Ia	(mm)=	5.00	# of Linear Res.	(N)= 3.00
	U.H. Tp	(hrs)=	0.16		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.232

PEAK FLOW (cms)= 0.066 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 70.589
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.333

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

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--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   1.27   Curve Number   (CN)= 43.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
     Unit Hyd Qpeak  (cms)=   0.403

     PEAK FLOW       (cms)=   0.097 (i)
     TIME TO PEAK    (hrs)=  10.000
     RUNOFF VOLUME    (mm)=  79.332
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.374

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

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--------------------
| CALIB            |
| NASHYD   (  0203)|   Area    (ha)=   0.66   Curve Number   (CN)= 39.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.04

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00

0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.632

PEAK FLOW (cms)= 0.028 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 42.317
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.200

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

CALIB	
STANDHYD (0201)	Area (ha)= 30.82
ID= 1 DT= 5.0 min	Total Imp(%)= 91.00 Dir. Conn.(%)= 91.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	28.05	2.77
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	11.23
Length	(m)=	453.28	35.23
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00

1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	50.33		
over (min)	10.00	15.00		
Storage Coeff. (min)=	8.16 (ii)	10.15 (ii)		
Unit Hyd. Tpeak (min)=	10.00	15.00		
Unit Hyd. peak (cms)=	0.13	0.10		
			TOTALS	
PEAK FLOW (cms)=	4.13	0.38	4.510 (iii)	
TIME TO PEAK (hrs)=	10.00	10.00	10.00	
RUNOFF VOLUME (mm)=	211.00	173.55	207.63	
TOTAL RAINFALL (mm)=	212.00	212.00	212.00	
RUNOFF COEFFICIENT =	1.00	0.82	0.98	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 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.

RESERVOIR(2001)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	1.7822	1.8200
	0.4695	0.9100	2.2536	1.8704

**** WARNING : STORAGE-DISCHARGE TABLE WAS EXCEEDED.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	30.820	4.510	10.00	207.63
OUTFLOW: ID= 1 (2001)	30.820	3.974	10.17	207.61

PEAK FLOW REDUCTION [Qout/Qin](%)= 88.11
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= 2.0565

ADD HYD (0001)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2001):	30.82	3.974	10.17	207.61
+ ID2= 2 (0202):	1.27	0.097	10.00	79.33
ID = 3 (0001):	32.09	4.054	10.17	202.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0001)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0001):	32.09	4.054	10.17	202.55
+ ID2= 2 (0203):	0.66	0.028	10.00	42.32
ID = 1 (0001):	32.75	4.075	10.17	199.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

APPENDIX D

FUNCTIONAL SEPTIC DESIGN – NORTHERN PORTION

55 Wyndham Street, North, Suite 215
Guelph, ON
N1H 7T8

T. 548.708.0022
cfcrozier.ca

MEMO

DATE	October 31, 2025	**PROJECT NO.**	2996-7616
RE	Private Servicing Assessment		

TO Jordan Dyer, Fieldgate Properties Limited

FROM Katherine Rentsch, P.Eng. – C.F. Crozier & Associates Inc.
Kyle Wetherall – C.F. Crozier & Associates Inc.
Caitlyn MacPhee, P.Geo. – C.F. Crozier & Associates Inc.

CC David Sharp, P.Eng. – Husson

1.0 Introduction and Background

C.F. Crozier & Associates Inc. (Crozier) has been retained by Fieldgate Properties Limited (Fieldgate) to provide onsite sewage system design services in support of the proposed development at 2809 Townline Road in the Township of Puslinch (Site). The purpose of this memo is to summarize the proposed private onsite sewage and water supply approach to service the Site.

The Site is approximately 0.224 ha in size and currently is an agricultural/rural property. The property is bounded by Ellis Road to the north, Puslinch Golf Club to the east, Highway 401 westbound off-ramp to the south and Townline Road to the west. A farm with multiple buildings and a home sales centre are located near the southern property boundary, adjacent to the off- ramp.

There are two (2) potential development concepts for the Site currently being contemplated by Fieldgate, as shown on the Conceptual Site Plans prepared by Ware Malcomb dated October 2025:

- **Concept A** includes the construction of three (3) industrial buildings (+/- 16,200 m^2 in size), three (3) industrial condominium buildings (+/- 9,814 m^2 to 10,427 m^2), one (1) commercial building (+/- 15,090 m^2), gas station, and associated parking areas. It is our understanding that municipal servicing is being explored to support the commercial building and gas station on the southern half of the property. The buildings on the northern half of the property will be privately serviced with an onsite sewage system and water supply well(s). Therefore, this assessment will be limited to the northern half of the property for Concept A.

- **Concept B** includes the construction of five (5) industrial buildings (+/- 16,200 m^2 to 19,510 m^2 in size), three (3) industrial condominium buildings (+/- 9,814 m^2 to 10,427 m^2), and associated parking areas. All site buildings will be privately serviced with an onsite sewage system and water supply well(s).

This memo has been prepared to support the Zoning By-Law Approval application for the Site. This memo should be read in conjunction with the Functional Servicing Report prepared by Husson Engineering Management (Husson, 2025).

2.0 Soils Evaluation

A geotechnical investigation has been conducted on the Site and a preliminary report has been prepared by Soil Engineers Ltd. dated September 2025. The field investigation included drilling and sampling of 10 boreholes to a maximum depth of 6.6 meters below ground surface (mbgs) in July 2025. In general, the following soil stratigraphy was encountered during drilling:

- Topsoil up to 36 cm thick
- Sandy Silt to Silty Sand Till below the topsoil layer to 6.6 mbgs (except Borehole 9)
- Silt below the topsoil and sandy silt, ranging from loose to compact; loose silt was encountered at a depth of 0.6 mbgs and gradually becomes compacted with depth. Wet silt is encountered below 4.6 mbgs (Boreholes 1, 6 – 10)
- Sand is found below the topsoil at Boreholes 2 – 4 or below the sandy silt till or silt in all other borehole locations. The deeper sands are found to be wet below 4.6 mbgs.

Although localized hydraulic conductivity testing and/or infiltration testing has yet to be completed on Site, the anticipated T-time of the soils can be estimated using the grain size distribution curves presented in the Geotechnical Investigation Report and comparing the curves to the Supplementary Standard SB-6 of the Ontario Building Code (OBC). Based on the curves presented, the soil type is interpreted to be ML per the Unified Soil Classification System (USCS). According to the Supplementary Standard SB-6, ML soils are described as silty or clayey fine sands or clayey silts with slight plasticity, with a medium to low permeability and a percolation rate of 20 to 50 min/cm. A T-time estimate of 35 min/cm has been assigned for preliminary design purposes.

3.0 Sewage System Design Flow

Following review of the Site Plans and discussions with Fieldgate, Industrial Buildings 1 to 3 will include warehousing/offices and will consist of 15,390 m^2 warehouse space and 810 m^2 office space. Industrial Condo Buildings 4 and 5 will each contain eleven (11) industrial warehousing/office units and will consist of 9,384 m^2 total warehouse space and 1,043 m^2 total office space. Industrial Condo Building 6 will contain eleven (11) industrial warehousing/office units and will consist of 8,833 m^2 total warehouse space and 981 m^2 total office space. In addition, it is estimated that Industrial Buildings 1 to 3 will contain up to eighteen (18) water closets, and Industrial Condo Buildings 4 to 6 will contain up to eleven (11) water closets each (one (1) water closet per unit), respectively. For Concept Plan B, Industrial Buildings 7 and 8 will include warehousing/offices and will consist of 18,535 m^2 of warehouse space and 975 m^2 of office space.

As the Site Plans are in the conceptual stage, a conservative approach was used to estimate the office area configuration and the number of employees working in each building per day. It is assumed that of the office areas described above, 50% will be designated as officed space, kitchen and meeting rooms with the remainder of the area being allocated for storage and other uses.

Maximum daily design sewage flows for non-residential occupancies are calculated using Table 8.2.1.3.B of the OBC. Table 1 summarizes the total daily design sewage flow for Concept Plan A. Table 2 summarizes the total daily design sewage flow for Concept Plan B. Refer to Attachment A for detailed sewage design flow calculations.

Table 1: Total Maximum Daily Sanitary Sewage Design Flow – Concept Plan A

Building	Area (m^2)	Occupancy	Unit	Unit Flow (L)	Total Flow (L/day)	Total Flow (L/day)
Industrial Building 1	15,390	Warehouse	Per water closet, and	950	18	17,100
			Per loading bay	150	46	6,900
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225
Industrial Building 2	15,390	Warehouse	Per water closet, and	950	18	17,100
			Per loading bay	150	46	6,900
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225
Industrial Building 3	15,390	Warehouse	Per water closet, and	950	18	17,100
			Per loading bay	150	46	6,900
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225
Industrial Condo Building 4	9,384	Warehouse	Per water closet, and	950	11	10,450
			Per loading bay	150	11	1,650
	522	Office	Per each 9.3 m^2 of floor space	75	56	4,200
Industrial Condo Building 5	9,384	Warehouse	Per water closet, and	950	11	10,450
			Per loading bay	150	11	1,650
	522	Office	Per each 9.3 m^2 of floor space	75	56	4,200
Industrial Condo Building 6	8,833	Warehouse	Per water closet, and	950	11	10,450
			Per loading bay	150	11	1,650
	491	Office	Per each 9.3 m^2 of floor space	75	52	3,900
Total Daily Sewage Design Flow:						130,275
Sewage System Design Flow:						**130,500**

Table 2: Total Maximum Daily Sanitary Sewage Design Flow – Concept Plan B

Building	Area (m^2)	Occupancy	Unit	Unit Flow (L)	Total Flow (L/day)	Total Flow (L/day)
Industrial Building 1	15,390	Warehouse	Per water closet, and	950	18	17,100
			Per loading bay	150	46	6,900
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225
Industrial Building 2	15,390	Warehouse	Per water closet, and	950	18	17,100
			Per loading bay	150	46	6,900
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225
Industrial Building 3	15,390	Warehouse	Per water closet, and	950	18	17,100
			Per loading bay	150	46	6,900
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225
Industrial Condo Building 4	9,384	Warehouse	Per water closet, and	950	11	10,450
			Per loading bay	150	11	1,650
	522	Office	Per each 9.3 m^2 of floor space	75	56	4,200
Industrial Condo Building 5	9,384	Warehouse	Per water closet, and	950	11	10,450
			Per loading bay	150	11	1,650
	522	Office	Per each 9.3 m^2 of floor space	75	56	4,200
Industrial Condo Building 6	8,833	Warehouse	Per water closet, and	950	11	10,450
			Per loading bay	150	11	1,650
	491	Office	Per each 9.3 m^2 of floor space	75	52	3,900
Industrial Building 7	18,535	Warehouse	Per water closet, and	950	22	20,900
			Per loading bay	150	33	4,950
	488	Office	Per each 9.3 m^2 of floor space	75	52	3935
Industrial Building 8	18,535	Warehouse	Per water closet, and	950	22	20900
			Per loading bay	150	33	4950

Building	Area (m^2)	Occupancy	Unit	Unit Flow (L)	Total Flow (L/day)	Total Flow (L/day)
	488	Office	Per each 9.3 m^2 of floor space	75	52	3935
					Total Daily Sewage Design Flow:	189,720
					Sewage System Design Flow:	**190,000**

As shown in Tables 1 and 2, the sewage system design flow ranges from 130,500 L/day (Concept Plan A) to 190,000 L/day (Concept Plan B). Properties with a total daily design sanitary sewage flow exceeding 10,000 L/day are subject to Section 53 of the Ontario Water Resources Act and require an Environmental Compliance Approval (ECA) issued by the Ministry of Environment, Conservation and Parks (MECP). Given that the maximum daily design sewage flow is over 10,000 L/day in both concepts, an ECA will be required for the onsite sewage system.

An ECA application form, design brief and supporting studies will be prepared in upcoming stages of the project and submitted to the MECP for review at the appropriate time.

4.0 Proposed Onsite Sewage System

Potential onsite sewage system options for the Site include an onsite sewage system with subsurface disposal via leaching bed, or an onsite sewage system with discharge of treated effluent to a surface water receiver. According to the Preliminary Site Grading Plan prepared by Husson, a stormwater outlet is proposed to discharge to a dry ditch located in the northeast corner of the property along Ellis Road towards Puslinch Golf Club. Based on a review of available online mapping tools, there are two nearby water bodies that could be the receiver depending on the ultimate drainage path of the dry ditch; Irish Creek to the north and Puslinch Lake to the southeast. However, due to the current uncertainty regarding the ultimate receiver for the surface runoff outlet, an onsite sewage system with subsurface disposal via leaching bed is the preferred solution for the Site.

Centralized onsite sewage system(s) are proposed, which will consist of an advanced treatment system with discharge of treated effluent to a leaching bed. The centralized sewage system(s) will receive sanitary sewage from each building through a combination of gravity sewers, sewage pumping stations, and forcemains, where required. Refer to the Site Servicing Plans within the Functional Servicing Report, prepared by Husson for an overview of the collection system.

For Concept Plan A, one (1) centralized sewage treatment block is proposed. For Concept Plan B, two (2) sewage treatment blocks are proposed (1 block for Buildings 1 through 6 and a 1 block for Buildings 7 and 8). The treatment blocks are shown on the attached Private Servicing Strategy figures.

A hydrogeological study, which is currently ongoing, and impact assessment in accordance with Chapter 22 of the MECP Design Guidelines for Sewage Works (2008) will be required to establish the effluent criteria that the treatment system(s) will need to achieve prior to discharge. The following effluent limits are anticipated (Table 3).

Table 3: Anticipated Effluent Criteria for Advanced Treatment System

Parameter	Effluent Limits (Monthly Average)
Carbonaceous Biological Oxygen Demand	10 mg/L
Total Suspended Solids	10 mg/L
Nitrate-Nitrogen	5 mg/L

The effluent criteria will be refined through the completion of the hydrogeological study and impact assessment and are subject to the approval of the MECP.

4.1 Proposed Treatment Unit

An advanced treatment unit is proposed for the onsite sewage treatment system. There are different technologies available on the market that can achieve the anticipated effluent criteria noted in Table 3, including a biological trickling filter with enhanced denitrification as designed and supplied by Waterloo Biofilter.

Other technologies that are also able to achieve this effluent quality include a Moving Bed Biofilter Reactor (MBBR) system as designed and supplied by BNA Inc. Selection of the treatment supplier and detailed design of the treatment system will be completed in the upcoming stages of the project, after the impact assessment has been completed and effluent criteria have been approved by MECP. The proposed treatment system blocks are shown on the Private Servicing Strategy figures.

4.2 Proposed Leaching Bed

The treated effluent from the advanced treatment system will be discharged to a leaching bed. For Concept Plan A, two (2) equally sized Type A dispersal beds are proposed. For Concept Plan B, a third Type A dispersal bed is proposed.

The Type A dispersal beds will consist of a stone and sand layer as sized in accordance with Section 8.7.7 of the OBC. The stone shall be washed septic stone meeting the gradation requirements of Table 8.7.3.3 and installed to accommodate the effluent distribution piping. The sand shall be poorly graded material with less than 5% silt content per 8.7.7.1(4)(a). Tables 4 and 5 summarize the Type A dispersal bed sizing for each concept plan. Detailed calculations are included in Attachment A.

Table 4: Type A Dispersal Bed Sizing – Concept Plan A

	Type A Dispersal Beds 1 & 2 (each)	
	Minimum Area (m^2)	**Provided Area** (m^2)
Stone Layer (m^2)	1,305	1,350
Sand Layer (m^2)	5,710	5,890

Table 5: Type A Dispersal Bed Sizing – Concept Plan B

	Type A Dispersal Beds 1 & 2 (each)		Type A Dispersal Bed 3	
	Minimum Area (m^2)	**Provided Area** (m^2)	**Minimum Area** (m^2)	**Provided Area** (m^2)
Stone Layer (m^2)	1,305	1,350	1,190	1,260
Sand Layer (m^2)	5,710	5,890	5,206	5,250

The proposed leaching bed blocks are shown on the Private Servicing Strategy figures.

4.3 Preliminary Cost Estimate

A preliminary cost estimate for the onsite sewage system for each concept is provided below in Table 6. Note that these costs should be considered "order of magnitude" cost estimates.

Table 6: Preliminary Cost Estimate

Description	**Preliminary Capital Cost Estimate[1] (+ HST)**	
	Concept Plan A	**Concept Plan B**
Advanced Treatment System	$ 1,000,000	$ 1,500,000
Leaching Beds	$ 1,000,000	$ 1,500,000
Total	$ 2,000,000	$ 3,000,000
Contingency	+/- 20%	

1. Does not include professional engineering fees.

4.4 Regulatory Requirements

An ECA will be required for the sewage treatment system, encompassing the treatment works and effluent discharge to the subsurface leaching bed. Crozier recommends engaging in discussions with the MECP to determine what additional studies will be required to support the ECA and their scope. For a subsurface discharge system, Crozier anticipates that at a minimum an impact assessment will be required to confirm the effluent criteria for the treatment system.

If a detailed assessment confirms that surface discharge is a feasible alternative based on the evaluation of nearby potential surface water receivers, the MECP should also be consulted to identify the additional studies required to support the ECA and their scope with this type of effluent discharge option. For a system with surface discharge, Crozier anticipates that at a minimum an assimilative capacity assessment of the identified surface water receiver will be necessary to establish the effluent criteria. The GRCA should also be consulted as the nearby surface water bodies, including Irish Creek to the north of the Site or Puslinch Lake to the southeast of the Site are both potential receivers for the final effluent and are regulated by the GRCA.

4.5 Next Steps and Supporting Studies

The following list outlines the next steps and supporting studies to implement an onsite sewage system with subsurface discharge to a leaching bed.

- Engagement and Pre-Consultation with the MECP
- Impact Assessment (once Hydrogeological Study is complete)
- Detailed Design of the Onsite Sewage System
- Application for an ECA with the MECP

For informational purposes, the following list outlines the next steps and supporting studies to implement an onsite sewage system with surface discharge to a suitable surface water receiver (if pursued).

- Engagement and Pre-Consultation with the MECP and GRCA
- Assimilative Capacity Assessment
- Detailed Design of the Collection System (if required), Advanced Treatment System and Surface Discharge
- Application for an ECA with the MECP

5.0 Private Water Supply Investigation

The following sections describe the feasibility of servicing the proposed development on the northern portion of the Site via private water supply, supporting estimated water demands, and water supply recommendations.

5.1 MECP Water Supply Wells

Within 1 km of the Site, there are 136 water well records available through the MECP Well Record database. The well records describe wells installed from 1952 to 2022 surrounding the Site and can be described in detail below.

- Eighty-one (81) records are identified to be wells for domestic purposes. The remaining records identify monitoring wells, specialty wells (dewatering, injection) or abandonment records within the area.
- Approximately 50% of water supply wells draw from bedrock sources and 50% draw from overburden sources. The wells north of Highway 401are primarily installed in “rock” or “limestone” as described in the well records. South of Highway 401, the majority of private wells service the community surrounding Puslinch Lake and draw from both bedrock sources and gravel or sand.

- Pumping rates of water supply wells that were installed after 1990 range from 15.1 liters per minute (LPM) to 95.6 LPM. Any pumping rates reported before 1990 pre-date the guidelines for testing set out in Ontario Well Regulation (O.Reg. 903) and may not be a true representation of water quantity.

- Where water quality was reported, all well records note a "clear" sample and no additional water quality notes are mentioned.

The nearest municipal wells are part of the Hespeler Wellfield—H3, H3A, H4A, H5A and H5. H4A is located at 189 Hungerford Road, approximately 1 km west of the Northern Site boundary. H4A is installed 125 mbgs within limestone and on average produces 13.5 L/s.

5.2 Water Demand

As described in Section 3.0 above, the total onsite daily sewage flow is calculated to be 130,500 L/day for the Site. Since all wastewater from the buildings will be directed to the proposed onsite sewage system, it can be reasonably assumed that maximum water demand for Concept A is equal to the maximum daily onsite sewage flow of 130,500 L/day or 90.6 LPM and Concept B is equal to the maximum daily onsite sewage flow of 190,000 L/day or 131.9 LPM.

Using a peaking factor of 2.5, the average daily water demand for Concept A is to 36.2 LPM and for Concept B is 52.76 LPM.

5.3 Hydrostratigraphy

In general, the hydrostratigraphy of the Site and surrounding area is described in detail within the Grand River Source Protection Plan Assessment Report. The water bearing and water restrictive units from youngest to oldest (shallowest to deepest) are described in Table 7 below.

Table 7: Hydrostratigraphy of the Cambridge Area (GRCA, 2010)

Name	Estimated Elevation (masl)	Description	Hydrogeologic Properties
Overburden	~ 320 -290	Sandy silt, till, sand, gravel	Aquifer/aquitard
Guelph Formation	~ 290 -280	Medium to thick bedded dolostone, fossiliferous	Aquifer
Eramosa Formation	absent	Thinly bedded fine dolostone	Aquitard
Goat Island Formation	~ 280 – 260	Chert-rich, fine dolostone and grainstone	Aquifer/Aquitard
Gasport Formation	~ 260 – 190	Cross bedded Grainstone and dolostone	Aquifer

The Guelph and Gasport Formations are significant regional aquifers across the Cambridge area. The Guelph Formation is a medium bedded fossiliferous dolostone that supplies significant water to domestic water wells and municipal wells in the south areas of Cambridge (Galt).

In the Hespeler area near to the Site, the Guelph Formation is interpreted to be relatively thin based on cross section mapping conducted for regional studies. However, the Gasport Formation contains numerous fractures and is highly transmissible, leading to high water supplies from this unit in the Hespeler area.

The Gasport Formation is believed to have a top elevation of roughly 260 masl in the area of the Site. This unit is characterized by light grey, grainstone and dolostone, often field identified in well records as "limestone" or "grey rock". The Gasport Formation is a significant regional aquifer and supplies numerous municipal wells across the City of Cambridge.

5.4 Proposed Water Supply Recommendations

Based on nearby well records and the estimated water demand for the Site, servicing the proposed buildings on the northern portion of the property is functionally feasible. The majority of water supply wells in the area that draw from bedrock—either the shallower Guelph Formation or the deeper Gasport Formation reportedly produce in excess of 37.8 LPM, greater than the average estimated water demand for the Site of 36.2 LPM and 52.76 LPM. Some wells reportedly produce greater than the maximum daily water demand of 90.6 LPM, installed greater than 50 mbgs.

Preliminary water supply recommendations for the proposed development based on this desktop analysis are as follows:

- During detailed design, a water supply study should be conducted including the construction and testing of test water supply wells. This study will determine the actual capacity of the aquifer to support the proposed development and inform the ultimate private servicing strategy (e.g. one well, multiple wells etc.).

- Please note that an Environmental Activity Sector Registration will be required to facilitate the testing of the proposed water supply well or wells. A Permit to Take Water (PTTW) will be required to continue the operation of the well since the pumping rate will exceed 50,000 L/day.

- During the water supply study, groundwater quality samples from each well, before and after pump testing shall be submitted to a licensed laboratory for analysis. Results shall be compared to the Ontario Drinking Water Quality Standards to determine raw groundwater potability or if treatment or filtration is required.

- An impact assessment for the zone of influence of the proposed onsite water supply well(s) should be completed during detailed design.

- The onsite water supply well(s) should be constructed within the Gasport Formation to a minimum depth of approximately 50 mbgs. The well shall be constructed by a licensed well contractor in accordance with Ontario Regulation 903.

- The onsite water supply well(s) shall be constructed upgradient from the proposed onsite sewage treatment system to prevent contamination. A proposed location has been shown on the Private Servicing Strategy Figure.

- The wellhead shall remain accessible for maintenance and repair in perpetuity.

- No salt or snow storage shall be conducted with the immediate vicinity of the wellhead. Best practices shall be upheld at the Site in terms of Winter Maintenance practices. The Owner should consult with the Source Protection Official to determine a winter maintenance strategy for the Site.

6.0 Conclusions & Recommendations

This assessment was prepared in support of the Zoning By-Law Amendment for the property located at 2809 Townline Road in the Township of Puslinch. Two (2) concept plans are being explored, both of which can be serviced via an onsite sewage system and water supply wells. Our conclusions include:

Proposed Sanitary Services

- The total daily design sewage flow for the proposed development ranges from 130,500 L/day (Concept Plan A) to 190,000 L/day (Concept Plan B). Sanitary servicing will be provided via an onsite sewage system, consisting of an advanced treatment system with discharge of treated effluent to Type A dispersal beds.

Proposed Water Services

- Nearby private services and hydrogeological information suggest a peak daily water demand of 90.6 LPM and 131.9 LPM is theoretically feasible using one to multiple wells respectively. Localized testing shall be completed by the applicant at detailed design and will include quantity and quality testing of the proposed well(s). An impact assessment of the proposed well(s) will be conducted at that time.

Respectively submitted,

C.F. CROZIER & ASSOCIATES INC.

Kyle Wetherall
Specialist, Private Services, Land Development

C.F. CROZIER & ASSOCIATES INC.

Katherine Rentsch, P.Eng.
Manager, Private Services, Land Development

C.F. CROZIER & ASSOCIATES INC.

Caitlyn MacPhee, P.Geo., EIT
Hydrogeology

KW:CM/cj

Encl.
Attachment A – Preliminary Design Flows (Concept A and B)
Figures – Private Servicing Strategy (Concept A and B)

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ONSITE SEWAGE SYSTEM NON-RESIDENTIAL CALCULATION SHEET - CONCEPT A

Project Name: 2809 Townline Road
Project Number: 2996-7616
Date: 2025.09.22
Designed By: KW
Checked By: JD

PRELIMINARY FLOW ESTIMATES

Description	Area (m^2)	Occupancy	Unit	Unit Flow	Number of Units	Total Flow (L/day)	References/Notes
Industrial Building 1	15,390	Warehouse	Per water closet, and	950	18	17,100	
			Per loading bay	150	46	6,900	
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225	Assume half of the office floor area is usable work space
Industrial Building 2	15,390	Warehouse	Per water closet, and	950	18	17,100	
			Per loading bay	150	46	6,900	
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225	Assume half of the office floor area is usable work space
Industrial Building 3	15,390	Warehouse	Per water closet, and	950	18	17,100	
			Per loading bay	150	46	6,900	
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225	Assume half of the office floor area is usable work space
Industrial Condo Building 4	9,384	Warehouse	Per water closet, and	950	11	10,450	
			Per loading bay	150	11	1,650	
	522	Office	Per each 9.3 m^2 of floor space	75	56	4,200	Assume half of the office floor area is usable work space
Industrial Condo Building 5	9,384	Warehouse	Per water closet, and	950	11	10,450	
			Per loading bay	150	11	1,650	
	522	Office	Per each 9.3 m^2 of floor space	75	56	4,200	Assume half of the office floor area is usable work space
Industrial Condo Building 6	8,833	Warehouse	Per water closet, and	950	11	10,450	
			Per loading bay	150	11	1,650	
	491	Office	Per each 9.3 m^2 of floor space	75	52	3,900	Assume half of the office floor area is usable work space
					Total Daily Sewage Design Flow	130,275	
					Sewage System Design Flow:	**130,500**	

Pre-Treatment Options

Required septic tank size =	391500	L minimum
Propose Level IV Treatment (Y/N):	Y	

Native Percolation time, T =	35	min/cm
Imported Percolation time =	10	min/cm

Type A Dispersal Bed

Stone area required =	2610	m^2
Sand area required =	11419	m^2

ONSITE SEWAGE SYSTEM NON-RESIDENTIAL CALCULATION SHEET - CONCEPT B

Project Name: 2809 Townline Road
Project Number: 2996-7616
Date: 2025.09.22
Designed By: KW
Checked By: JD

PRELIMINARY FLOW ESTIMATES

Description	Area (m^2)	Occupancy	Unit	Unit Flow	Number of Units	Total Flow (L/day)	References/Notes
Industrial Building 1	15,390	Warehouse	Per water closet, and	950	18	17,100	
			Per loading bay	150	46	6,900	
	405	Office	Per each 9.3 m^2 of floor space	75	41	3,099	Assume half of the office floor area is usable work space
Industrial Building 2	15,390	Warehouse	Per water closet, and	950	18	17,100	
			Per loading bay	150	46	6,900	
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225	Assume half of the office floor area is usable work space
Industrial Building 3	15,390	Warehouse	Per water closet, and	950	18	17,100	
			Per loading bay	150	46	6,900	
	405	Office	Per each 9.3 m^2 of floor space	75	43	3,225	Assume half of the office floor area is usable work space
Industrial Condo Building 4	9,384	Warehouse	Per water closet, and	950	11	10,450	
			Per loading bay	150	11	1,650	
	522	Office	Per each 9.3 m^2 of floor space	75	56	4,200	Assume half of the office floor area is usable work space
Industrial Condo Building 5	9,384	Warehouse	Per water closet, and	950	11	10,450	
			Per loading bay	150	11	1,650	
	522	Office	Per each 9.3 m^2 of floor space	75	56	4,200	Assume half of the office floor area is usable work space
Industrial Condo Building 6	8,833	Warehouse	Per water closet, and	950	11	10,450	
			Per loading bay	150	11	1,650	
	491	Office	Per each 9.3 m^2 of floor space	75	52	3,900	Assume half of the office floor area is usable work space
Industrial Condo Building 7	18,535	Warehouse	Per water closet, and	950	22	20,900	
			Per loading bay	150	33	4,950	
	488	Office	Per each 9.3 m^2 of floor space	75	52	3935	Assume half of the office floor area is usable work space
Industrial Condo Building 8	18,535	Warehouse	Per water closet, and	950	22	20900	
			Per loading bay	150	33	4950	
	488	Office	Per each 9.3 m^2 of floor space	75	52	3935	Assume half of the office floor area is usable work space
					Total Daily Sewage Design Flow	189,720	
					Sewage System Design Flow:	**190,000**	

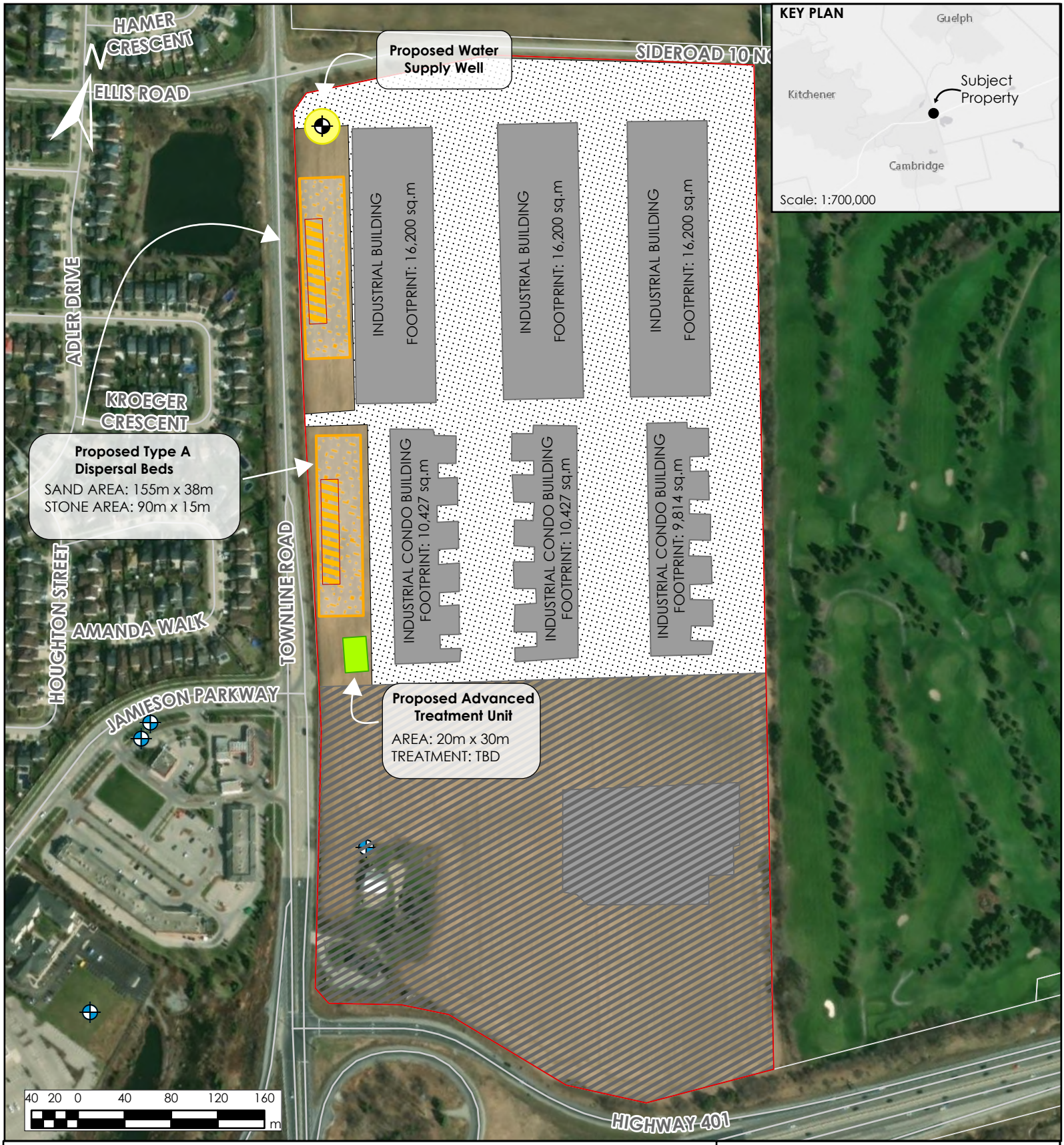
Pre-Treatment Options

Required septic tank size =	570000	L minimum
Propose Level IV Treatment (Y/N):	Y	

Native Percolation time, T =	35	min/cm
Imported Percolation time =	10	min/cm

Type A Dispersal Bed

Stone area required =	3800	m^2
Sand area required =	16625	m^2



LEGEND

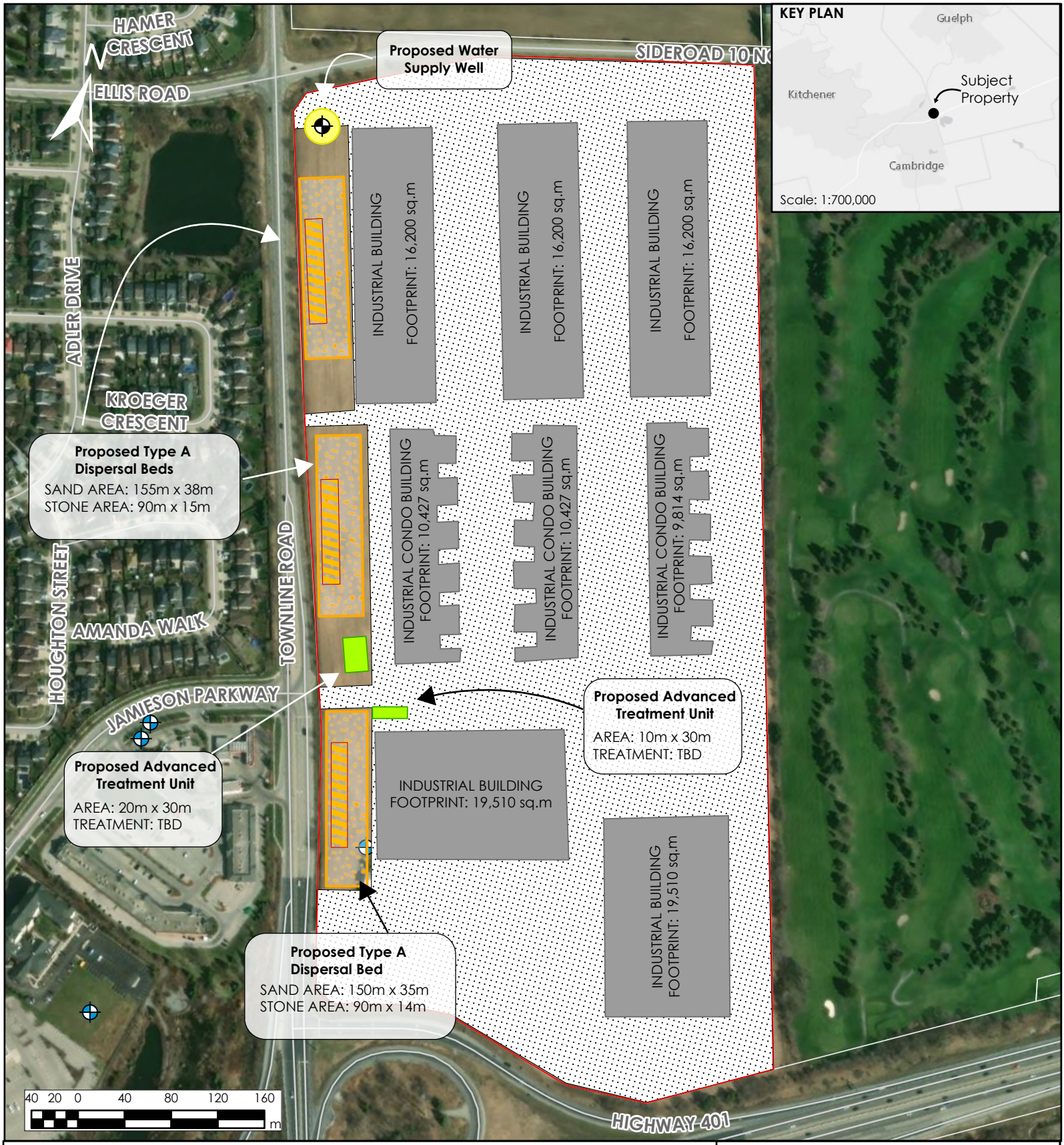
- Subject Property
- Road
- Proposed Water Supply Well
- MECP Wells
- 15 m Minimum Setback
- Proposed Buildings
- Proposed Advanced Treatment Unit
- Proposed Type A Dispersal Bed (Stone Area)
- Proposed Type A Dispersal Bed (Sand Area)
- Assessment Parcel (Wellington County)
- Proposed Municipally Serviced Area
- Proposed Parking/Internal Road

2809 TOWNLINE ROAD TOWN OF PUSLINCH

Proposed Private Servicing Strategy - Concept A

CROZIER

October 2025



LEGEND

- Subject Property
- Road
- Proposed Water Supply Well
- MECP Wells
- 15 m Minimum Setback
- Proposed Buildings
- Proposed Advanced Treatment Unit
- Proposed Type A Dispersal Bed (Stone Area)
- Proposed Type A Dispersal Bed (Sand Area)
- Assessment Parcel (Wellington County)
- Proposed Parking/Internal Road

2809 TOWNLINE ROAD TOWN OF PUSLINCH

Proposed Private Servicing Strategy - Concept B

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October 2025

APPENDIX E

FUS CALCULATION

Domestic Flow Requirements

Project:	2809 Townline Road
Project No.:	251619
Municipality:	Township of Puslinch

Per Capita Demand:	225	L/c/d
Commercial Flow:	50	ppha

Peaking Factors (Residential):
- Peak Hour Demand
- Maximum Day Demand

Peaking Factors Commercial):

Peak Hour Demand	3.75
Maximum Day Demand	2.5

Unit Type	Number of Units	People per Unit	Population
Bachelor/1 BR	0	1.4	0
2BR	0	2.1	0
3BR	0	3.1	0
Total	**0**		**0**

Average Daily Demand Res. (L/day) -

Commercial Flow:

Unit Type	Building Area (m^2)	Building Area (ha)	Population
Industrial Building 1	16200	1.6200	81
Industrial Building 2	16200	1.6200	81
Industrial Building 3	16200	1.6200	81
Industrial Building 4	10427	1.0427	52
Industrial Building 5	10427	1.0427	52
Industrial Building 6	9814	0.9814	49
Commercial Building	15090	1.5090	75
Total	94358	9.4358	**472**

Average Daily Demand Comm. (L/s)	
Industrial Building 1	0.21
Industrial Building 2	0.21
Industrial Building 3	0.21
Industrial Building 4	0.14
Industrial Building 5	0.14
Industrial Building 6	0.13
Commercial Building	0.20
Average Daily Demand Total (L/s)	**1.23**

Peak Hour Demand (L/s)	
Industrial Building 1	0.79
Industrial Building 2	0.79
Industrial Building 3	0.79
Industrial Building 4	0.51
Industrial Building 5	0.51
Industrial Building 6	0.48
Commercial Building	0.74
Total (L/s)	**4.61**

Maximum Day Demand (L/s)	
Industrial Building 1	0.53
Industrial Building 2	0.53
Industrial Building 3	0.53
Industrial Building 4	0.34
Industrial Building 5	0.34
Industrial Building 6	0.32
Commercial Building	0.49
Total (L/s)	**3.07**

Fire Flow Requirements

Project:	2809 Townline Road
Project No.:	251619
Municipality:	Township of Puslinch
Building :	Industrial Building 1

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 2020 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)	The required fire flow in litres per minute.
Total Effective (A) =	16200 m^2	Total Above Grade GFA
Coefficient (C) =	0.8	Coefficient related to the type of construction.

- 1.5 for Type V Wood Frame Construction
- 0.8 for Type IV-A Mass Timber Construction
- 0.9 for Type IV-B Mass Timber Construction
- 1.0 for Type IV-C Mass Timber Construction
- 1.5 for Type IV-D Mass Timber Construction
- 1.0 for Type III Ordinary Construction
- 0.8 for Type II Noncombustible Construction
- 0.6 for Type I Fire Resistive Construction

F = 22500 L/min.

STEP 2
Determine the increase or decrease for occupancy.

	0%	No adjustment assumed
Decrease	0 L/min.	

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	50%	30% for sprinklered as per NFPA 13.
Decrease	11250 L/min.	50% for fully automatic sprinkler.

STEP 4
Determine the total increase for exposures.

0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	0%	100
East	0%	100
South	10%	24.4
West	0%	100
	10.0%	Maximum exposure increase is 75%.
Increase	2250 L/min.	

STEP 5
Determine the minimum required fire flow.

F = 14,000 L/min. **Round to the nearest 1000L/min.**

Fire Flow Requirements

Project:	2809 Townline Road
Project No.:	251619
Municipality:	Township of Puslinch
Building :	Industrial Building 2

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 2020 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)	The required fire flow in litres per minute.
Total Effective (A) =	16200 m^2	Total Above Grade GFA
Coefficient (C) =	0.8	Coefficient related to the type of construction.

1.5 for Type V Wood Frame Construction
0.8 for Type IV-A Mass Timber Construction
0.9 for Type IV-B Mass Timber Construction
1.0 for Type IV-C Mass Timber Construction
1.5 for Type IV-D Mass Timber Construction
1.0 for Type III Ordinary Construction
0.8 for Type II Noncombustible Construction
0.6 for Type I Fire Resistive Construction

F = 22500 L/min.

STEP 2
Determine the increase or decrease for occupancy.

	0%	No adjustment assumed
Decrease	0 L/min.	

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	50%	30% for sprinklered as per NFPA 13.
Decrease	11250 L/min.	50% for fully automatic sprinkler.

STEP 4
Determine the total increase for exposures.

0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	0%	100
East	0%	100
South	10%	24.4
West	0%	100
	10.0%	Maximum exposure increase is 75%.
Increase	2250 L/min.	

STEP 5
Determine the minimum required fire flow.

F =	**14,000 L/min.**	**Round to the nearest 1000L/min.**

Fire Flow Requirements

Project:	2809 Townline Road
Project No.:	251619
Municipality:	Township of Puslinch
Building :	Industrial Building 3

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 2020 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)	The required fire flow in litres per minute.
Total Effective (A) =	16200 m^2	Total Above Grade GFA
Coefficient (C) =	0.8	Coefficient related to the type of construction.

1.5 for Type V Wood Frame Construction
0.8 for Type IV-A Mass Timber Construction
0.9 for Type IV-B Mass Timber Construction
1.0 for Type IV-C Mass Timber Construction
1.5 for Type IV-D Mass Timber Construction
1.0 for Type III Ordinary Construction
0.8 for Type II Noncombustible Construction
0.6 for Type I Fire Resistive Construction

F = 22500 L/min.

STEP 2
Determine the increase or decrease for occupancy.

	0%	No adjustment assumed
Decrease	0 L/min.	

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	50%	30% for sprinklered as per NFPA 13.
Decrease	11250 L/min.	50% for fully automatic sprinkler.

STEP 4
Determine the total increase for exposures.

0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	0%	100
East	0%	100
South	10%	24.4
West	0%	100
	10.0%	Maximum exposure increase is 75%.
Increase	2250 L/min.	

STEP 5
Determine the minimum required fire flow.

F =	**14,000 L/min.**	**Round to the nearest 1000L/min.**

Fire Flow Requirements

Project:	2809 Townline Road
Project No.:	251619
Municipality:	Township of Puslinch
Building :	Industrial Building 3

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 2020 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)	The required fire flow in litres per minute.
Total Effective (A) =	10427 m^2	Total Above Grade GFA
Coefficient (C) =	0.8	Coefficient related to the type of construction.

1.5 for Type V Wood Frame Construction
0.8 for Type IV-A Mass Timber Construction
0.9 for Type IV-B Mass Timber Construction
1.0 for Type IV-C Mass Timber Construction
1.5 for Type IV-D Mass Timber Construction
1.0 for Type III Ordinary Construction
0.8 for Type II Noncombustible Construction
0.6 for Type I Fire Resistive Construction

F = 18000 L/min.

STEP 2
Determine the increase or decrease for occupancy.

	0%	No adjustment assumed
Decrease	0 L/min.	

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	50%	30% for sprinklered as per NFPA 13.
Decrease	9000 L/min.	50% for fully automatic sprinkler.

STEP 4
Determine the total increase for exposures.

0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	0%	100
East	0%	100
South	10%	24.4
West	0%	100
	10.0%	Maximum exposure increase is 75%.
Increase	1800 L/min.	

STEP 5
Determine the minimum required fire flow.

F =	**11,000 L/min.**	**Round to the nearest 1000L/min.**

Fire Flow Requirements

Project:	2809 Townline Road
Project No.:	251619
Municipality:	Township of Puslinch
Building :	Industrial Building 3

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 2020 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)	The required fire flow in litres per minute.
Total Effective (A) =	10427 m^2	Total Above Grade GFA
Coefficient (C) =	0.8	Coefficient related to the type of construction.

1.5 for Type V Wood Frame Construction
0.8 for Type IV-A Mass Timber Construction
0.9 for Type IV-B Mass Timber Construction
1.0 for Type IV-C Mass Timber Construction
1.5 for Type IV-D Mass Timber Construction
1.0 for Type III Ordinary Construction
0.8 for Type II Noncombustible Construction
0.6 for Type I Fire Resistive Construction

F = 18000 L/min.

STEP 2
Determine the increase or decrease for occupancy.

	0%	No adjustment assumed
Decrease	0 L/min.	

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	50%	30% for sprinklered as per NFPA 13.
Decrease	9000 L/min.	50% for fully automatic sprinkler.

STEP 4
Determine the total increase for exposures.

0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	0%	100
East	0%	100
South	10%	24.4
West	0%	100
	10.0%	Maximum exposure increase is 75%.
Increase	1800 L/min.	

STEP 5
Determine the minimum required fire flow.

F =	**11,000 L/min.**	**Round to the nearest 1000L/min.**

Fire Flow Requirements

Project:	2809 Townline Road
Project No.:	251619
Municipality:	Township of Puslinch
Building :	Industrial Building 3

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 2020 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)	The required fire flow in litres per minute.
Total Effective (A) =	9814 m^2	Total Above Grade GFA
Coefficient (C) =	0.8	Coefficient related to the type of construction.

1.5 for Type V Wood Frame Construction
0.8 for Type IV-A Mass Timber Construction
0.9 for Type IV-B Mass Timber Construction
1.0 for Type IV-C Mass Timber Construction
1.5 for Type IV-D Mass Timber Construction
1.0 for Type III Ordinary Construction
0.8 for Type II Noncombustible Construction
0.6 for Type I Fire Resistive Construction

F = 17500 L/min.

STEP 2
Determine the increase or decrease for occupancy.

	0%	No adjustment assumed
Decrease	0 L/min.	

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	50%	30% for sprinklered as per NFPA 13.
Decrease	8750 L/min.	50% for fully automatic sprinkler.

STEP 4
Determine the total increase for exposures.

0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	0%	100
East	0%	100
South	10%	24.4
West	0%	100
	10.0%	Maximum exposure increase is 75%.
Increase	1750 L/min.	

STEP 5
Determine the minimum required fire flow.

F =	**11,000 L/min.**	**Round to the nearest 1000L/min.**

Fire Flow Requirements

Project:	2809 Townline Road
Project No.:	251619
Municipality:	Township of Puslinch
Building :	Industrial Building 3

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 2020 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)	The required fire flow in litres per minute.
Total Effective (A) =	15090 m^2	Total Above Grade GFA
Coefficient (C) =	0.8	Coefficient related to the type of construction.

1.5 for Type V Wood Frame Construction
0.8 for Type IV-A Mass Timber Construction
0.9 for Type IV-B Mass Timber Construction
1.0 for Type IV-C Mass Timber Construction
1.5 for Type IV-D Mass Timber Construction
1.0 for Type III Ordinary Construction
0.8 for Type II Noncombustible Construction
0.6 for Type I Fire Resistive Construction

F = 21700 L/min.

STEP 2
Determine the increase or decrease for occupancy.

	0%	No adjustment assumed
Decrease	0 L/min.	

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	50%	30% for sprinklered as per NFPA 13.
Decrease	10850 L/min.	50% for fully automatic sprinkler.

STEP 4
Determine the total increase for exposures.

0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	0%	100
East	0%	100
South	10%	24.4
West	0%	100
	10.0%	Maximum exposure increase is 75%.
Increase	2170 L/min.	

STEP 5
Determine the minimum required fire flow.

F =	**13,000 L/min.**	**Round to the nearest 1000L/min.**

DRAWINGS

HUSSON

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