SERVICING & STORMWATER MANAGEMENT IMPLEMENTATION REPORT

SOUTHGATE – BWDSB NEW SCHOOL

TOWNSHIP OF SOUTHGATE
VILLAGE OF DUNDALK

PREPARED FOR:

+VG ARCHITECTS, THE VENTIN GROUP LTD.

PREPARED BY:

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CROZIER

TABLE OF CONTENTS

1.0 INTRODUCTION **1**

2.0 SITE DESCRIPTION **1**

3.0 PROPOSED DEVELOPMENT **1**

4.0 PROPOSED SERVICING STRATEGY **1**

4.1 Sanitary Servicing **1**
4.2 Water Servicing **2**
4.3 Utility Servicing **2**

5.0 STORMWATER MANAGEMENT & SITE DRAINAGE **2**

5.1 Design Criteria **2**
5.2 Pre-Development Drainage Conditions **3**
5.3 Proposed Drainage Conditions **3**
5.4 Hydrologic Analysis **4**
5.4.1 Pre-Development Model Setup 5
5.4.2 Post-Development Model Setup 5
5.5 Stormwater Quality Control **6**
5.6 Stormwater Management Facility Operating Characteristics **7**
5.7 Site Wide Water Balance **7**

6.0 EROSION & SEDIMENTATION CONTROLS DURING CONSTRUCTION **8**

7.0 CONCLUSIONS & RECOMMENDATIONS **8**

LIST OF TABLES

Table 1: Pre-Development Flow Rates

Table 2: Quantity Control Flow Rates

Table 3: Storage Tank Operating Characteristics

Table 4: Side Wide Water Balance Summary

LIST OF APPENDICES

Appendix A: Sanitary Design Flow Calculations & Sanitary Sewer Design Sheet

Appendix B: Water Demand and Fire Flow Calculations

Appendix C: Storm Sewer Design Sheet

Appendix D: Hydrologic Model

Appendix E: Storage Tank Sizing

Appendix F: Infiltration Trench Sizing

Appendix G: Water Balance Calculations

LIST OF FIGURES & DRAWINGS

Figure 1: Site Location Plan

Figure 2: Glenelg Phase 3 Draft Plan

Figure 3: School Block Site Plan

Figure 4: Pre-Development Drainage Plan

Figure 5: Post-Development Drainage Plan

Figure 6: Glenelg Phase 3 Pre-Development Drainage Plan

Figure 7: Glenelg Phase 3 Post-Development Drainage Plan

Drawing C101: General Site Servicing Plan

Drawing C102: Preliminary Site Grading Plan

Drawing C103: Stormwater Management Concept Plan

Drawing C104: Sanitary Drainage Plan

Drawing C105: Storm Drainage Plan

Drawing C106: Erosion and Sediment Control Plan

1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) has been retained by +VG Architects (Architect) to complete a Servicing and Stormwater Management Implementation Report and engineering design to support the Site Plan Application for a proposed elementary school, referred to in this report as the Subject Development.

The Subject Development is located within the Draft Plan Approved Glenelg Phase 3 Development, herein referred to as Glenelg Phase 3. The general location of the Subject Development is shown in **Figure 1**.

2.0 Site Description

The Subject Development is located within the Glenelg Phase 3 Development, which is bounded by agricultural lands to the north, a wetland to the east, existing residential development to the south, and the draft plan approved Glenelg Phase 2 Development to the west. Glenelg Phase 3 is legally described as Part of Lot 225 and Lot 226, Concession 2, Village of Dundalk, Township of Southgate, County of Grey. The Glenelg Phase 3 Draft Plan is shown in **Figure 2**. Block 323 of the Glenelg Phase 3 Draft Plan is the location of the proposed new elementary school. The detailed design of Block 323 will be the subject of this report, and the site plan of the school block is shown in **Figure 3**.

3.0 Proposed Development

The Subject Development is approximately 3.3 ha and is bounded by Street A to the north, Street E to the west, Street C to the south and the Bradley Street Extension to the east. The site plan will be comprised of:

- A 3-storey elementary school K-8
- A child care facility
- Soccer / play field
- Area for 12 future portables
- 77 parking spaces

4.0 Proposed Servicing Strategy

4.1 Sanitary Servicing

Sanitary flows from the Subject Development will discharge by gravity to the existing Dundalk sanitary sewer collection network via a connection to a future 200 mm diameter sanitary sewer stub that is located along Street C within the Glenelg Phase 3 Development.

The peak daily sanitary flow generated by the Subject Development is estimated to be 3.05 L/sec. The total population was determined by the architect to be 1049 people. Please see Drawing A0.2 completed by +VG Architects which is submitted under separate cover. A sewage generational rate of 140 L/student/day was used based on MECP Sewage Works Design Standards. Please refer to **Appendix A** for detailed sanitary demand calculations.

Sanitary flows will be conveyed west along Street C, through Glenelg Phase 2A before discharging to the sanitary sewers along Aitchison Avenue. The sanitary sewer design sheet has been provided within

Appendix A. The preliminary assessment of downstream infrastructure was completed within the sanitary sewer design sheet and downstream sewers were determined to be adequate up to the southern limits of Aitchison Avenue at Glenelg Street. The conveyance capacity of all downstream infrastructure will be subject to confirmation by the Township's Engineering Consultant.

4.2 Water Servicing

The Subject Development will connect to the Township's water distribution system using the future 150 mm diameter watermain that will be installed along Street C within the Glenelg Phase 3 Development. There will be an 80 mm and a 150 mm diameter watermain stub at the limits of the Subject Development along Street C which will be extended to the school's water/utility room located at the south end of the school. The two watermains will provide potable water and fire flow to the entire school and child care facility.

Average total daily water flow was calculated to be 1.70 L/s based on an institutional population of 1049 and a unit flow rate of 140 L/student/day based on MECP Design Standards. The max day demand was calculated to be 4.25 L/s using a max day peak factor of 2.50 using Table 3-1 in the MECP Design of Water Works (2008). The peak hour water flow was calculated to be 6.37 L/sec using a peak hour factor of 3.75. Please refer to **Appendix B** for detailed water demand calculations.

Fire flow requirements were determined by the mechanical consultant and architect which has been provided in Drawing A.02 (+VG Architects). Available fire flows at the limits of the Subject Development are to be confirmed with the Township's engineering consultant. The fire flow requirements for the school were calculated based on Water Supply for Public Fire Protection - Fire Underwriters Survey (FUS) and was determined to be 66.7 L/s. The fire flow requirement was also calculated using Ontario Building Code (OBC) and the minimum water supply flow rate was determined to be 150 L/s. There the governing fire flow rate is 150 L/s. Please refer to **Appendix B** for detailed FUS and OBC fire flow calculations.

4.3 Utility Servicing

The Subject Development will be serviced with natural gas, telephone, cable, TV and hydro. Coordination will be required with utility companies to ensure that sufficient capacity will exist within future facilities along future adjacent roadways.

5.0 Stormwater Management & Site Drainage

5.1 Design Criteria

The stormwater management features for this subject development have been designed to comply with the policies and standards of the various agencies including the Township of Southgate, Ministry of the Environment, Conservation, and Parks, and the Grand River Conservation Authority.

The stormwater management strategies for the proposed development are listed below:

- Water Quantity Control
    - Control of the post development peak flows to pre-development levels for all storms up to and including the 100-year at the selected points of interest.

- Water Quality Control

  80% removal efficiency of total suspended solids per MECP "Enhanced Protection" requirements.

- Development Standard
    - Minor and major drainage system to convey frequent and infrequent rainfall and runoff events, respectively.

In meeting the applicable policies and standards of the aforementioned agencies, the development will also be required to meet the following criteria:

- Manage the internal stormwater by safely conveying peak flows to suitable outlets and provide the necessary water quality controls.

- Manage any external drainage entering the site by providing safe conveyance across the Subject Development.

5.2 Pre-Development Drainage Conditions

The entire Glenelg Phase 3 lands drains to five different outlets under pre-development conditions. The five outlets have been delineated based on the existing drainage patterns and are described below:

- **Outlet #1**: This outlet is located along the west border of the site. It consists of active agricultural fields. Stormwater from this catchment drains to the west towards the Grey County CP trail.

- **Outlet #2**: This outlet contains the largest drainage area for the site and currently consists of active agricultural fields. Stormwater from this catchment drains to the north tile drain, where it is discharged to the northeast wetland.

- **Outlet #3**: This outlet is located along the eastern corner of the site and consists of active agricultural fields. Stormwater from this catchment drains to the east tile drain.

- **Outlet #4**: This outlet is located along the southeastern corner of the site and consists of active agricultural fields. Stormwater from this catchment drains to the southeast tile drain. Flows entering the southeast tile drain are conveyed to a wetland located within the GRCA regulation area.

- **Outlet #5**: This outlet is located along the south boundary of the site and consists of active agricultural fields. Stormwater from this catchment drains to the residential subdivision to the south and ultimately to a wetland located within the GRCA regulation area.

As the Subject Development only makes up a small portion of the overall Glenelg Phase 3 Development, only two of the five outlets (Outlet #2 and Outlet #4) are used in the Subject Development stormwater design. The existing drainage patterns of the site have been reflected in the pre-development drainage plan shown in **Figure 4**, and the overall Glenelg Phase 3 existing drainage patterns are shown in **Figure 6**.

5.3 Proposed Drainage Conditions

The internal drainage system for the Subject Development will be split into two catchments, with the post development drainage plan shown in **Figure 5**:

- **Catchment POST-7A**: Located on the east side of the Subject Development, it consists of the asphalt play area and grassed fields. Stormwater from this catchment will be captured in an on-site storage tank via swales and storm pipes, which will ultimately outlet to the southeast tile drain (Outlet #4). Additionally, an infiltration trench will be included to facilitate site-wide infiltration, with any overflow being conveyed to the storage tank.

- **Catchment POST-7B**: Located on the west side of the Subject Development, it consists of the rooftop of the school, the childcare facility, child drop off road, parking lots, and landscaped areas. Stormwater from this catchment will be captured into storm sewers that connect to Glenelg Phase 3 Development's sewer network draining into a SWM Pond and ultimately discharging into the north tile drain (Outlet #2). Additionally, an infiltration trench will be included to facilitate site-wide infiltration, with any overflow ultimately being conveyed to the SWM Pond.

The catchment split of the Subject Development serves to limit the amount of stormwater going to Glenelg Phase 3's SWM Pond, as well to better mimicking the pre development drainage conditions to the southeast tile drain and ultimately the wetland. Refer to **Drawing C103** for the stormwater management concept plan. Refer to **Figure 7** for the post development drainage plan for the full Glenelg Phase 3 development.

The storm sewer systems for Catchment POST-7A can convey flows generated from storm events up to and including the 100-year design storms. The underground storage tank detains and controls the peak flow rates for all storm events up to and including the 100-year event.

For Catchment POST-7B the 100-year storm event from the school rooftop will be conveyed in the storm sewer system uncontrolled. For the remainder of Catchment POST-7B consisting of parking lots, the bus loop and landscaped areas, the 5-year design storm will be conveyed through the storm sewer network and ultimately to the SWM Pond. The runoff generated from the major storms will be conveyed through overland flow routes that direct flow towards the SWM Pond through the internal road network of the Glenelg Phase 3 Development. Refer to **Drawing C102** for site grading and overland flow routes of the Subject Development.

The storm sewer design sheet for Catchment POST-7A and Catchment POST-7B are presented in **Appendix C**. Please note that the storm sewer design sheet only accounts for the sewers within the Subject Development area and does not include the Glenelg Phase 3 Lands. Sewer capacities downstream of the School Block will be confirmed during the Glenelg Phase 3 design and submitted under a separate cover.

5.4 Hydrologic Analysis

Using the stormwater management hydrologic computer program Visual OTTHYMO 6.1 (VO6), a hydrologic model was prepared for the pre-development and post-development scenarios. The purpose of the modelling was to demonstrate that quantity control requirements are met (i.e., post-development peak flow rates do not exceed the pre-development flows to the respective drainage areas) for the Glenelg Phase 3 Development.

Design storms were generated for the 2-, 5-, 10-, 25-, 50-, and 100-year storm events utilizing both 3-hour Chicago and 24-hour SCS Type II rainfall distributions. The Township of Southgate Engineering Standards requires only the modeling of the 3-hour Chicago distribution storms for quantity control facilities, but the 24-hour SCS distribution has been included in the design to verify the quantity control is sufficiently sized. The 25mm Chicago quality event was also modeled within VO6. Intensity-Duration-Frequency (IDF) values were derived from the Ministry of Transportation IDF tool for the Community of Dundalk and are provided in **Appendix D.**

The stormwater management design for the Subject Development has been assessed as part of the overall design of Glenelg Phase 3 Development. The Subject Development has been included in the sizing calculations for the stormwater management facility that releases to Outlet #4. The overall stormwater management design for the Glenelg Phase 3 Development is included under separate cover.

5.4.1 Pre-Development Model Setup

The modelling of the pre-development conditions is to establish pre-development peak flow conditions through the Subject Development. Peak flows will be used as targets for the proposed stormwater management controls. The pre-development peak flows for the northeast wetland (Outlet #2) and the southeast tile drain (Outlet #4) are provided below in **Table 1**. The peak flows for the remaining tile drains are utilized by the Glenelg Phase 3 Development and provided under a separate cover.

Table 1: Pre-Development Flow Rates

Return Period (Years)	Pre-Dev Flows Outlet #2 – Northeast Wetland (m^3/s)	Pre-Dev Flows Outlet #4 – Southeast Tile Drain (m^3/s)
3 Hour Chicago		
2	0.120	0.031
5	0.226	0.062
10	0.310	0.086
25	0.425	0.120
50	0.516	0.147
100	0.613	0.177
24 Hour SCS Type II		
2	0.348	0.106
5	0.575	0.173
10	0.739	0.221
25	0.952	0.283
50	1.115	0.331
100	1.282	0.379

Pre-development VO input schematic and output files have been provided in **Appendix D**.

5.4.2 Post-Development Model Setup

The post-development model for Outlet #4 was created using Catchment POST-7A as described in Section 5.3 as well as Catchment POST-4, which includes the back lots along the southeast side of the Phase 3 Development. Please refer to **Figure 7** for the Glenelg Phase 3 post-development drainage plan.

As required, the post development peak flows are to be controlled to pre-development levels for all storms up to and including the 100-year storm. The peak flows to Outlet #4 are controlled through the storage tanks in Catchment POST-7A, with Catchment POST-4 draining uncontrolled.

As evident by **Table 2** below, the 'Post-to-Pre' quantity control has been provided for storm events up to and including the 100-year events.

Table 2: Quantity Control Flow Rates

Outlet	Return Period (Years)	Pre-Development Flows (m^3/s)	Post-Development Flows (m^3/s)	Difference (m^3/s)
3-Hour Chicago				
Southeast Tile Drain (Outlet #4)	2	0.031	0.013	0.018
	5	0.062	0.023	0.039
	10	0.086	0.032	0.054
	25	0.120	0.044	0.076
	50	0.147	0.053	0.094
	100	0.177	0.063	0.114
24-Hour SCS Type II				
Southeast Tile Drain (Outlet #4)	2	0.106	0.040	0.066
	5	0.173	0.065	0.108
	10	0.221	0.084	0.137
	25	0.283	0.108	0.175
	50	0.331	0.132	0.199
	100	0.379	0.156	0.223

For the area draining to the Northeast Wetland (Outlet #2), the VO6 model included in this submission only looks at flows from the Subject Development itself and does not include the remaining areas within the Glenelg Phase 3 lands. The design of the Glenelg Phase 3 SWM Pond, captures peak flows from Catchment POST-7B as well as all additional areas that drain to Outlet #2, will be assessed under a separate cover for the Glenelg Phase 3 Development report.

5.5 Stormwater Quality Control

Since The Grand River is the ultimate receiver from the Subject Development, the development will incorporate measures to provide "enhanced protection" quality control (*Stormwater Management Planning and Design Manual*, Ministry of the Environment, 2003). Enhanced protection provides an 80% long-term total suspended solids removal rate.

Catchment POST-7A primarily consists of grass fields and an asphalt play area. Water from these areas flows overland through grassed sections before being captured by either the infiltration trench or the dry swales along the proposed soccer field. The stormwater from this catchment is considered "clean water" and does not require quality control. Nevertheless, the infiltration trench, dry swales, and grassed areas will still provide additional water quality treatment for the catchment.

For Catchment POST-7B, quality control will be provided by the incorporation of extended detention into the SWM Pond design, which is designed under a separate cover. With an impervious percentage

of 58% over 2.02 ha of area and a runoff volume of 11.32 mm, Catchment POST-7B will contribute requirements of 229 m^3 and 318 m^3 of extended detention and permanent pool respectively to the SWM Pond. See **Appendix D** for contribution calculations. In addition to the SWM Pond, an infiltration trench has been designed along the southeast property line that will provide additional water quality treatment.

5.6 Stormwater Management Facility Operating Characteristics

A preliminary design for the storage tank has been completed using ADS StormTech Design Tool to demonstrate that the tank is adequately sized for stormwater management requirements. Preliminary operating profiles of the storage tank is presented in **Table 3**.

Table 3: Storage Tank Operating Characteristics

Component	Elevation (m)	Storage Provided (m^3)	Storage Required (m^3)
Bottom of Tank	521.21	-	-
Top of Tank	522.15	301	299

As evident by **Table 3**, the storage tank SC-310 is sufficiently sized to provide the required stormwater management controls. Permits and other regulatory instruments such as an Environmental Compliance Approval (MECP) and Fill Permit (HCA/NEC) will be secured at the detailed design stage.

The ADS StormTech Design Tool was used for the preliminary design of the underground stormwater management tanks, with details shown in **Appendix E**, as part of this application. However, alternative underground stormwater management tanks, including Cupolex, StormCon, Triton, etc., may be investigated during the detailed design process.

5.7 Site Wide Water Balance

Water balance calculations were conducted for the development to compare the annual infiltration volumes pre- and post-development. An infiltration trench is proposed in each of POST-7A and POST-7B catchments to facilitate additional infiltration. See **Drawing C103** for the locations of the proposed infiltration trenches.

The infiltration trenches for Catchments POST-7A and POST-7B have been designed to store 65 m^3 and 42 m^3 of stormwater respectively with a 24-hour drawdown time. Any volume exceeding the trench capacity in Catchment POST-7A will bypass directly into the storage tank, and any exceeding volume in Catchment POST-7B will bypass directly into the storm sewers leading to the SWM Pond. See calculations for the infiltration trenches in **Appendix F**.

Table 4 outlines the site wide water balance summary, with detailed calculations located in **Appendix G**.

Table 4: Site Wide Water Balance Summary

Area (ha)	Total Infiltration (m^3/yr)			Design Storm (mm)
	Pre-Development	Post-Development	Post-Development (with mitigation)	
3.31	10,437	5,953	8,322	22

6.0 Erosion & Sedimentation Controls During Construction

Erosion and sediment controls will be implemented on-site prior to construction where required and as directed by the Developer and their site representative. See **Drawing C106** for the Erosion & Sediment Control Plan. The following controls are to be implemented:

- Stone Mud Mats
  - A mud mat will be installed to reduce the amount of mud tracking onto existing paved roadways during site servicing operations.

- Silt Fencing
  - Silt fencing will be constructed in accordance with GRCA's Typical Detail of Silt/Sediment Fence (BSD-23 Draft). It should be noted that additional silt fencing may be added based on field decisions by the Engineer and Developer prior to, during, and following earthworks operations.

7.0 Conclusions & Recommendations

The analysis presented above provides a comprehensive servicing and stormwater management assessment in support of the proposed elementary school Site Plan Application.

- An underground stormwater management facility is proposed to meet the stormwater management quantity criteria which will outlet southeast to an existing wetland.
- Water quality control to an 'enhanced' level of protection will be provided by Glenelg Phase 3's stormwater management pond.
- A 200 mm diameter sanitary sewer connection for the Subject Development will be provided by connection to the Street C sanitary sewer within Glenelg Phase 3. The sanitary sewer system has adequate capacity for the Subject Development.
- An 80 mm and a 150 mm diameter watermain will connect to the school's mechanical room and will provide potable water and fire flow for the Subject Development.
- Sediment and erosion controls as specified, will be effective in preventing and controlling sediment from migrating into nearby swales, ditches, and watercourses.

Given the above noted conclusions, we support the development of the Subject Development from the perspective of engineering servicing and stormwater management requirements.

Respectfully submitted,

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APPENDIX A

Sanitary Design Flow Calculations & Sanitary Sewer Design Sheet

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File: 1060-6220
Date: 2025.05.05
By: AM
Check By: JL'A

Glenelg Phase 3 Development (School Block) - Sanitary Design Criteria

Person Per Equivalent Residential Unit (2022 DC Background Study)	2.61	persons/unit
Institutional Population		
School Students	1049	students/staff
Institutional Area	3.31	ha
Unit Sewage Flows		
Residential (Per New Development Unit Flow Rates, Triton Engineering (2024))	300	L/C/day
Institutional (Per MOE Sewage Works Design Stds.)	140	L/student/day
Infiltration (typical)	0.15	L/s/ha
Total Design Sewage Flows		
Infiltration/Inflow	0.50	L/sec
Average Daily Institutional Flow	**1.70**	L/sec
Institutional Peak Factor (Per MOE Guidelines)	1.50	
Peak Daily Institutional Flow	**3.05**	**L/sec**
Average Daily Institutional Flow	314,700	L/day
Equivalent Residential Population	1049	persons
Equivalent Residential Units	402	units

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File: 1060-6220
Date: 2025.05.05
By: AM
Check By: JL'A

Glenelg Phase 3A Development (Glenelg Connection) - Sanitary Design Criteria

Developed Site Area (not including school block)	6.15	ha
Number of Residential Units	120	units
Person Per Unit	2.61	persons/unit
Residential Population	314	persons
Unit Sewage flows		
Residential (Per New Development Unit Flow Rates, Triton Engineering (2022))	300	L/C/day
Infiltration (typical)	0.15	L/s/ha
Total Design Sewage Flows		
Infiltration/Inflow Residential	0.92	L/sec
Average Daily Residential Flow	1.09	L/sec
Residential Peak Factor (Harmon Formula)	4.07	
Total Peak Daily Flow	**5.36**	**L/sec**

GLENELG DEVELOPMENT - PHASE 3

1060-6220

SANITARY SEWER DESIGN SHEET

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Unit Type	PPU
Single & Semi Detached & Townhouse	2.61

Mannings 'n':	0.013
Peak Factor (M):	1+(14/4+(P/1000)^0.5)
Residential Avg. Daily/Capita Flow (L/cap.d):	300
Institutional Avg. Daily/Capita Flow (L/s.UNIT):	140
Infiltration Q (L/ha.s):	0.15

DESIGNED BY: AM
CHECKED BY: RW/AW
DATE: 2022.12.19
REVISED BY: AM
DATE: 2025.05.06

	CATCHMENT I.D.	FROM MH NO	TO MH NO	AREA (Ha)	SINGLE/SEMI/TOWNHOUSE UNITS	INSTITUTIONAL UNITS (STUDENTS+STAFF)	POP.	TOTAL TRIB. POP.	RESIDENTIAL PEAK FACTOR	RESIDENTIAL AVG. FLOW (l/s)	RESIDENTIAL MAX. FLOW (l/s)	INSTUTIONAL PEAK FACTOR	INSTITUTIONAL AVG. FLOW (l/s)	INSTITUTIONAL MAX. FLOW (l/s)	MAX FLOW (l/s)	INFILT. (l/s)	TOTAL INFILT. (l/s)	TOTAL FLOW (l/s)	LENGTH (m)	PIPE DIAM. (mm)	UPPER INV. EL.	LOWER INV. EL.	UPPER OBV. EL.	LOWER OBV. EL.	SLOPE (%)	CAP. (l/s)	CAP. (%)	FULL FLOW VELOCITY (m/s)	(q/Q)	(d/D) From HEG	(v/V) From HEG	ACT. VEL. (m/s)	GROUND UPPER	GROUND LOWER	COVER UPPER	COVER LOWER
Phase 3	12	SAN1-PH3A	SAN2-PH3A	0.33	6		16	16.0	4.00	0.06	0.22				0.22	0.05	0.05	**0.27**	60.9	200	519.18	518.57	519.38	518.77	1.00%	**32.80**	**1%**	1.04	0.01	0.07	0.32	0.33	521.89	521.59	2.52	2.82
	11	SAN2-PH3A	SAN3-PH3A	0.46	8		21	37.0	4.00	0.13	0.51				0.51	0.07	0.12	**0.63**	90.0	200	518.55	518.19	518.75	518.39	0.40%	**20.74**	**3%**	0.66	0.03	0.12	0.44	0.29	521.59	521.19	2.84	2.80
	10	SAN3-PH3A	SAN4-PH3A	0.46	8		21	58.0	4.00	0.20	0.81				0.81	0.07	0.19	**0.99**	90.0	200	518.17	517.81	518.37	518.01	0.40%	**20.74**	**5%**	0.66	0.05	0.15	0.52	0.34	521.19	521.27	2.82	3.26
	FUT2	SAN PLUG1-PH3A	SAN4-PH3A	1.59	27		71	71.0	4.00	0.25	0.99				0.99	0.24	0.24	**1.22**	41.5	200	517.95	517.78	518.15	517.98	0.40%	**20.74**	**6%**	0.66	0.06	0.16	0.54	0.36	518.35	521.27	0.21	3.29
	13	SAN4-PH3A	SAN5-PH3A	0.15	0		0	129.0	4.00	0.45	1.79				1.79	0.02	0.45	**2.24**	79.5	200	517.73	517.41	517.93	517.61	0.40%	**20.74**	**11%**	0.66	0.11	0.22	0.65	0.43	521.27	521.30	3.34	3.69
	14	SAN5-PH3A	SAN10-PH3A	0.14	0		0	129.0	4.00	0.45	1.79				1.79	0.02	0.47	**2.26**	79.5	200	517.39	517.07	517.59	517.27	0.40%	**20.74**	**11%**	0.66	0.11	0.22	0.65	0.43	521.30	521.83	3.71	4.56
	17	SAN6-PH3A	SAN7-PH3A	0.43	7		19	19.0	4.00	0.07	0.26				0.26	0.065	0.065	**0.33**	81.7	200	518.57	517.75	518.77	517.95	1.00%	**32.80**	**1%**	1.04	0.01	0.07	0.32	0.33	522.99	522.43	4.22	4.48
	15	SAN7-PH3A	SAN8-PH3A	0.34	6		16	35.0	4.00	0.12	0.49				0.49	0.05	0.12	**0.60**	62.9	200	517.72	517.47	517.92	517.67	0.40%	**20.74**	**3%**	0.66	0.03	0.12	0.44	0.29	522.43	522.17	4.51	4.50
	7	SAN PLUG3-PH3A	SAN8-PH3A	3.31	0	1049	0	0.0	4.00	0.00	0.00	1.5	1.70	2.55	2.55	0.50	0.50	**3.05**	11.6	200	517.57	517.53	517.77	517.73	0.40%	**20.74**	**15%**	0.66	0.15	0.26	0.72	0.48	517.78	522.17	0.01	4.44
	15A	SAN8-PH3A	SAN9-PH3A	0.19	3		8	43.0	4.00	0.15	0.60				0.60	0.029	0.64	**3.79**	43.1	200	517.45	517.28	517.65	517.48	0.40%	**20.74**	**18%**	0.66	0.18	0.29	0.76	0.50	522.17	521.96	4.52	4.48
	16	SAN9-PH3A	SAN10-PH3A	0.28	5		14	57.0	4.00	0.20	0.79				0.79	0.04	0.68	**4.02**	53.2	200	517.26	517.04	517.46	517.24	0.40%	**20.74**	**19%**	0.66	0.19	0.30	0.78	0.52	521.96	521.83	4.50	4.59
	2	SAN10-PH3A	SAN17-PH3A	0.69	15		40	226.0	4.00	0.78	3.14				3.14	0.10	1.26	**6.94**	89.3	200	517.02	516.67	517.22	516.87	0.40%	**20.74**	**33%**	0.66	0.33	0.40	0.90	0.59	521.83	521.69	4.61	4.82
	9	SAN11-PH3A	SAN12-PH3A	0.48	14		37	37.0	4.00	0.13	0.51				0.51	0.07	0.07	**0.59**	52.1	200	518.24	517.72	518.44	517.92	1.00%	**32.80**	**2%**	1.04	0.02	0.10	0.40	0.42	521.19	521.21	2.75	3.29
	8	SAN12-PH3A	SAN13-PH3A	0.46	11		29	66.0	4.00	0.23	0.92				0.92	0.07	0.14	**1.06**	67.4	200	517.70	517.43	517.90	517.63	0.40%	**20.74**	**5%**	0.66	0.05	0.15	0.52	0.34	521.21	521.27	3.31	3.64
	FUT1	SAN PLUG2-PH3A	SAN13-PH3A	3.42	79		207	207.0	4.00	0.72	2.88				2.88	0.51	0.51	**3.39**	23.1	200	517.46	517.37	517.66	517.57	0.40%	**20.74**	**16%**	0.66	0.16	0.27	0.73	0.48	517.89	521.27	0.23	3.70
	6	SAN13-PH3A	SAN16-PH3A	0.38	6		16	289.0	4.00	1.00	4.01				4.01	0.06	0.71	**4.72**	82.7	200	517.35	517.02	517.55	517.22	0.40%	**20.74**	**23%**	0.66	0.23	0.33	0.82	0.54	521.27	521.46	3.72	4.25
	5	SAN14-PH3A	SAN15-PH3A	0.36	11		29	29.0	4.00	0.10	0.40				0.40	0.05	0.05	**0.46**	43.7	200	517.76	517.32	517.96	517.52	1.00%	**32.80**	**1%**	1.04	0.01	0.07	0.32	0.33	521.24	521.33	3.28	3.81
	4	SAN15-PH3A	SAN16-PH3A	0.39	11		29	58.0	4.00	0.20	0.81				0.81	0.06	0.11	**0.92**	56.0	200	517.30	517.08	517.50	517.28	0.40%	**20.74**	**4%**	0.66	0.04	0.14	0.50	0.33	521.33	521.46	3.83	4.19
	3	SAN16-PH3A	SAN17-PH3A	0.37	6		16	363.0	4.04	1.26	5.09				5.09	0.06	0.88	**8.52**	82.7	200	517.00	516.67	517.20	516.87	0.40%	**20.74**	**41%**	0.66	0.41	0.45	0.95	0.63	521.46	521.69	4.27	4.82
	1	SAN17-PH3A	SAN18-PH3A	0.23	3		8	597.0	3.93	2.07	8.15				8.15	0.03	2.17	**12.87**	64.0	250	516.62	516.42	516.87	516.67	0.30%	**32.57**	**40%**	0.66	0.40	0.44	0.94	0.62	521.69	520.11	4.82	3.44
		SAN18-PH3A	SAN PLUG3-PH2A	0	0		0	597.0	3.93	2.07	8.15				8.15	0.00	2.17	**12.87**	24.6	250	516.40	516.33	516.65	516.58	0.30%	**32.57**	**40%**	0.66	0.40	0.44	0.94	0.62	520.11	N/A	3.46	N/A
	FUT3	SAN PLUG7-PH3A	SAN19-PH3A	3.76	79		207	207.0	4.00	0.72	2.88				2.88	0.56	0.56	**3.44**	18.2	200	517.64	517.56	517.84	517.76	0.40%	**20.74**	**17%**	0.66	0.17	0.28	0.74	0.49	518.04	521.99	0.21	4.23
	FUT4	SAN PLUG6-PH3A	SAN19-PH3A	1.78	32		84	84.0	4.00	0.29	1.17				1.17	0.27	0.27	**1.43**	17.8	250	517.65	517.59	517.90	517.84	0.30%	**32.57**	**4%**	0.66	0.04	0.14	0.50	0.33	518.11	521.99	0.21	4.15
	19	SAN19-PH3A	SAN20-PH3A	0	0		0	291.0	4.00	1.01	4.04				4.04	0.00	0.83	**4.87**	81.5	250	517.51	517.27	517.76	517.52	0.30%	**32.57**	**15%**	0.66	0.15	0.26	0.72	0.48	521.99	522.40	4.23	4.88
	FUT5	SAN PLUG5-PH3A	SAN20-PH3A	1.16	27		71	71.0	4.00	0.25	0.99				0.99	0.17	0.17	**1.16**	17.7	200	517.36	517.29	517.56	517.49	0.40%	**20.74**	**6%**	0.66	0.06	0.16	0.54	0.36	517.77	522.40	0.21	4.91
	20	SAN20-PH3A	SAN21-PH3A	0.19	0		0	362.0	4.00	1.26	5.03				5.03	0.03	1.03	**6.06**	80.0	250	517.24	517.00	517.49	517.25	0.30%	**32.57**	**19%**	0.66	0.19	0.30	0.78	0.52	522.40	523.12	4.91	5.87
	FUT6	SAN PLUG4-PH3A	SAN21-PH3A	1.56	33		87	87.0	4.00	0.30	1.21				1.21	0.23	0.23	**1.44**	18.6	200	517.09	517.02	517.29	517.22	0.40%	**20.74**	**7%**	0.66	0.07	0.18	0.58	0.38	517.50	523.12	0.21	5.90
	21	SAN21-PH3A	SAMH3	0.11	0		0	449.0	4.00	1.56	6.23				6.23	0.02	1.28	**7.52**	82.8	250	516.97	516.72	517.22	516.97	0.30%	**32.57**	**23%**	0.66	0.23	0.33	0.82	0.54	523.12	523.82	5.90	6.85

GLENELG DEVELOPMENT - PHASE 3

1060-6220

SANITARY SEWER DESIGN SHEET

CROZIER

Unit Type	PPU
Single & Semi Detached & Townhouse	2.61

Mannings 'n':	0.013
Peak Factor (M):	1+(14/4+(P/1000)^0.5)
Residential Avg. Daily/Capita Flow (L/cap.d):	300
Institutional Avg. Daily/Capita Flow (L/s.UNIT):	140
Infiltration Q (L/ha.s):	0.15

DESIGNED BY: AM
CHECKED BY: RW/AW
DATE: 2022.12.19
REVISED BY: AM
DATE: 2025.05.06

	CATCHMENT I.D.	FROM MH NO	TO MH NO	AREA (Ha)	SINGLE/SEMI/TOWNHOUSE UNITS	INSTITUTIONAL UNITS (STUDENTS+STAFF)	POP.	TOTAL TRIB. POP.	RESIDENTIAL PEAK FACTOR	RESIDENTIAL AVG. FLOW (l/s)	RESIDENTIAL MAX. FLOW (l/s)	INSTUTIONAL PEAK FACTOR	INSTITUTIONAL AVG. FLOW (l/s)	INSTITUTIONAL MAX. FLOW (l/s)	MAX FLOW (l/s)	INFILT. (l/s)	TOTAL INFILT. (l/s)	TOTAL FLOW (l/s)	LENGTH (m)	PIPE DIAM. (mm)	UPPER INV. EL.	LOWER INV. EL.	UPPER OBV. EL.	LOWER OBV. EL.	SLOPE (%)	CAP. (l/s)	CAP. (%)	FULL FLOW VELOCITY (m/s)	(q/Q)	(d/D) From HEG	(v/V) From HEG	ACT. VEL. (m/s)	GROUND UPPER	GROUND LOWER	COVER UPPER	COVER LOWER
Phase 2	5	SAN8-PH2	SAN7-PH2	0.27	5		14	14.0	4.00	0.05	0.19				0.19	0.04	0.04	**0.23**	42.8	200	517.52	517.10	517.72	517.30	1.00%	**32.80**	**1%**	1.04	0.01	0.07	0.32	0.33	520.16	519.73	2.44	2.44
	1	SAN7-PH2	SAN6-PH2	0.18	3		8	22.0	4.00	0.08	0.31				0.31	0.03	0.07	**0.37**	13.4	200	517.05	516.99	517.25	517.19	0.40%	**20.74**	**2%**	0.66	0.02	0.10	0.40	0.26	519.73	519.64	2.49	2.45
	2	SAN6-PH2	SAN5-PH2	0.61	13		34	56.0	4.00	0.19	0.78				0.78	0.09	0.16	**0.94**	64.5	200	516.94	516.69	517.14	516.89	0.40%	**20.74**	**5%**	0.66	0.05	0.15	0.52	0.34	519.64	519.31	2.50	2.42
	3	SAN5-PH2	SAN4-PH2	0.19	0		0	56.0	4.00	0.19	0.78				0.78	0.03	0.19	**0.97**	16.9	200	516.64	516.57	516.84	516.77	0.40%	**20.74**	**5%**	0.66	0.05	0.15	0.52	0.34	519.31	519.30	2.47	2.53
	4	SAN4-PH2	SAN3-PH2	0.64	11		29	85.0	4.00	0.30	1.18				1.18	0.10	0.28	**1.46**	99.3	250	516.49	516.19	516.74	516.44	0.30%	**32.57**	**4%**	0.66	0.04	0.14	0.50	0.33	519.30	519.72	2.56	3.28
	6	SAN8-PH2	SAN9-PH2	0.38	6		16	16.0	4.00	0.06	0.22				0.22	0.06	0.06	**0.28**	61.2	200	517.32	516.71	517.52	516.91	1.00%	**32.80**	**1%**	1.04	0.01	0.07	0.32	0.33	520.16	519.98	2.65	3.07
		SAN PLUG 1-PH2	SAN9-PH2				0	0.0	4.00	0.00	0.00				0.00	0.00	0.00	**0.00**	21.1	250	N/A	516.65	N/A	516.90	0.30%	**32.57**	**0%**	0.66	0.00	0.00	0.00	0.00	519.55	519.98	N/A	3.08
	10	SAN10-PH2	SAN9-PH2	0.38	6		16	16.0	4.00	0.06	0.22				0.22	0.06	0.06	**0.28**	83.3	200	517.54	516.71	517.74	516.91	1.00%	**32.80**	**1%**	1.04	0.01	0.07	0.32	0.33	520.39	519.98	2.65	3.07
	7	SAN9-PH2	SAN15-PH2	0.42	10		27	59.0	4.00	0.20	0.82				0.82	0.06	0.18	**1.00**	59.7	250	516.63	516.45	516.88	516.70	0.30%	**32.57**	**3%**	0.66	0.03	0.12	0.44	0.29	519.98	519.81	3.10	3.12
	8	SAN15-PH2	SAN3-PH2	0.4	10		27	86.0	4.00	0.30	1.19				1.19	0.06	0.24	**1.43**	58.9	250	516.43	516.25	516.68	516.50	0.30%	**32.57**	**4%**	0.66	0.04	0.14	0.50	0.33	519.81	519.72	3.14	3.22
	9	SAN3-PH2	SAN2-PH2	0.4	7		19	190.0	4.00	0.66	2.64				2.64	0.06	0.58	**3.22**	80.0	250	516.17	515.93	516.42	516.18	0.30%	**32.57**	**10%**	0.66	0.10	0.21	0.63	0.42	519.72	520.12	3.30	3.94
	11	SAN10-PH2	SAN14-PH2	0.62	19		50	50.0	4.00	0.17	0.69				0.69	0.09	0.09	**0.79**	87.7	200	517.16	516.28	517.36	516.48	1.00%	**32.80**	**2%**	1.04	0.02	0.10	0.40	0.42	520.39	520.19	3.03	3.71
	12	SAN14-PH2	SAN2-PH2	0.39	12		32	82.0	4.00	0.28	1.14				1.14	0.06	0.15	**1.29**	54.1	200	516.26	515.99	516.46	516.19	0.50%	**23.19**	**6%**	0.74	0.06	0.16	0.54	0.40	520.19	520.12	3.73	3.93
	13	SAN2-PH2	SAN1-PH2	0.35	6		16	288.0	4.00	1.00	4.00				4.00	0.05	0.78	**4.78**	80.0	250	515.91	515.67	516.16	515.92	0.30%	**32.57**	**15%**	0.66	0.15	0.26	0.72	0.48	520.12	520.31	3.96	4.39
	14	SAN10-PH2	SAN11-PH2	0.39	7		19	19.0	4.00	0.07	0.26				0.26	0.06	0.06	**0.32**	83.3	200	517.16	516.33	517.36	516.53	1.00%	**32.80**	**1%**	1.04	0.01	0.07	0.32	0.33	520.39	520.81	3.03	4.28
	Glenelg Phase 3	SAN PLUG 2-PH2	SAN11-PH2				0	0.0	4.50	0.00	0.00				0.00	0.00	0.00	**12.87**	21.1	250	N/A	516.27	N/A	516.52	0.30%	**32.57**	**40%**	0.66	0.40	0.44	0.92	0.61	516.79	520.81	N/A	4.29
	19	SANMH13	SAN12-PH2	0.11	2		6	6.0	4.00	0.02	0.08				0.08	0.02	0.02	**0.10**	41.6	200	518.01	517.11	518.21	517.31	2.18%	**48.43**	**0%**	1.54	0.01	0.07	0.32	0.49	518.23	521.23	0.02	3.92
	17	SAN12-PH2	SAN11-PH2	0.24	2		6	12.0	4.00	0.04	0.17				0.17	0.04	0.05	**0.22**	41.6	200	517.09	516.33	517.29	516.53	1.82%	**44.25**	**0%**	1.41	0.00	0.00	0.00	0.00	521.23	520.81	3.94	4.28
	15	SAN11-PH2	SAN13-PH2	0.62	15		40	71.0	4.28	0.25	1.06				1.06	0.09	0.20	**14.13**	88.1	250	516.25	515.98	516.50	516.23	0.30%	**32.57**	**43%**	0.66	0.43	0.46	0.96	0.64	520.81	520.50	4.31	4.27
	16	SAN13-PH2	SAN1-PH2	0.58	15		40	111.0	4.23	0.39	1.63				1.63	0.09	0.29	**14.79**	77.7	250	515.96	515.73	516.21	515.98	0.30%	**32.57**	**45%**	0.66	0.45	0.47	0.97	0.64	520.50	520.31	4.29	4.33
	18	SAN1-PH2	SANPLUG1	0.34	6		16	415.0	4.01	1.44	5.78				5.78	0.05	1.13	**19.78**	61.3	250	515.65	515.46	515.90	515.71	0.35%	**35.18**	**56%**	0.72	0.56	0.54	1.03	0.74	520.31	N/A	4.41	N/A
	All of Phase 2	SANPLUG1	SANMH2	0	0		0	415.0	4.01	1.44	5.78				5.78	0.00	1.13	**19.78**	18.1	250	515.46	515.39	515.71	515.64	0.39%	**37.14**	**53%**	0.76	0.53	0.52	1.02	0.77	N/A	520.60	N/A	4.96

GLENELG DEVELOPMENT - PHASE 3

1060-6220

SANITARY SEWER DESIGN SHEET

CROZIER

Unit Type	PPU
Single & Semi Detached & Townhouse	2.61

Mannings 'n':	0.013
Peak Factor (M):	1+(14/4+(P/1000)^0.5)
Residential Avg. Daily/Capita Flow (L/cap.d):	300
Institutional Avg. Daily/Capita Flow (L/s.UNIT):	140
Infiltration Q (L/ha.s):	0.15

DESIGNED BY: AM
CHECKED BY: RW/AW
DATE: 2022.12.19
REVISED BY: AM
DATE: 2025.05.06

	CATCHMENT I.D.	FROM MH NO	TO MH NO	AREA (Ha)	SINGLE/SEMI/TOWNHOUSE UNITS	INSTITUTIONAL UNITS (STUDENTS+STAFF)	POP.	TOTAL TRIB. POP.	RESIDENTIAL PEAK FACTOR	RESIDENTIAL AVG. FLOW (l/s)	RESIDENTIAL MAX. FLOW (l/s)	INSTUTIONAL PEAK FACTOR	INSTITUTIONAL AVG. FLOW (l/s)	INSTITUTIONAL MAX. FLOW (l/s)	MAX FLOW (l/s)	INFILT. (l/s)	TOTAL INFILT. (l/s)	TOTAL FLOW (l/s)	LENGTH (m)	PIPE DIAM. (mm)	UPPER INV. EL.	LOWER INV. EL.	UPPER OBV. EL.	LOWER OBV. EL.	SLOPE (%)	CAP. (l/s)	CAP. (%)	FULL FLOW VELOCITY (m/s)	(q/Q)	(d/D) From HEG	(v/V) From HEG	ACT. VEL. (m/s)	GROUND UPPER	GROUND LOWER	COVER UPPER	COVER LOWER
Phase 1	14, 15	SANMH13	SANMH6	1.18	11		29	29.0	4.00	0.10	0.40				0.40	0.18	0.18	**0.58**	83.29	200	517.72	516.89	517.92	517.09	1.00%	**32.80**	**2%**	1.04	0.02	0.10	0.40	0.42	521.38	521.22	3.46	4.14
	13	SANMH13	SANMH1	0.6	14		37	37.0	4.00	0.13	0.51				0.51	0.09	0.09	**0.60**	93.96	200	517.81	516.87	518.01	517.07	1.00%	**32.80**	**2%**	1.04	0.02	0.10	0.40	0.42	521.38	520.81	3.37	3.73
	1	SANMH1	SANMH2	0.58	14		37	74.0	4.00	0.26	1.03				1.03	0.09	0.18	**1.20**	95.07	200	516.84	515.89	517.04	516.09	1.00%	**32.80**	**4%**	1.04	0.04	0.14	0.50	0.52	520.81	520.60	3.76	4.51
	2	SANMH2	SANMH3	0.79	12		32	521.0	3.96	1.81	7.17				7.17	0.12	1.42	**21.47**	80	250	515.34	515.10	515.59	515.35	0.30%	**32.57**	**66%**	0.66	0.66	0.59	1.07	0.71	520.60	520.46	5.01	5.11
	16	SANMH14	SANMH6	0.58	11		29	29.0	4.00	0.10	0.40				0.40	0.09	0.09	**0.49**	87.81	200	518.43	516.89	518.63	517.09	1.75%	**43.39**	**1%**	1.38	0.01	0.07	0.32	0.44	521.45	521.22	2.83	4.14
	5A	SANMH6	SANMH5A	0.1	1		3	61.0	4.00	0.21	0.85				0.85	0.02	0.28	**1.13**	26.09	200	516.81	516.68	517.01	516.88	0.50%	**23.19**	**5%**	0.74	0.05	0.15	0.52	0.38	521.22	520.97	4.22	4.09
	5	SANMH5A	SANMH5	0.37	8		21	82.0	4.00	0.28	1.14				1.14	0.06	0.33	**1.47**	57.2	200	516.65	516.36	516.85	516.56	0.50%	**23.19**	**6%**	0.74	0.06	0.16	0.54	0.40	520.97	520.67	4.12	4.10
	4	SANMH5	SANMH4	0.38	12		32	114.0	4.00	0.40	1.58				1.58	0.06	0.39	**1.97**	64.46	200	516.33	516.01	516.53	516.21	0.50%	**23.19**	**9%**	0.74	0.09	0.20	0.62	0.46	520.67	520.56	4.13	4.35
	3	SANMH4	SANMH3	0.26	7		19	133.0	4.00	0.46	1.85				1.85	0.04	0.43	**2.28**	64.46	200	515.98	515.66	516.18	515.86	0.50%	**23.19**	**10%**	0.74	0.10	0.21	0.63	0.47	520.56	520.46	4.38	4.60
	7	SANMH3	SANMH8	0.56	10		27	681.0	3.90	2.36	9.23				9.23	0.08	1.94	**24.03**	80	250	515.07	514.83	515.32	515.08	0.30%	**32.57**	**74%**	0.66	0.74	0.64	1.10	0.73	520.46	520.34	5.14	5.26
	17	SANMH14	SANMH15	0.64	12		32	32.0	4.00	0.11	0.44				0.44	0.10	0.10	**0.54**	87.66	200	518.43	517.37	518.63	517.57	1.20%	**35.93**	**2%**	1.14	0.02	0.10	0.40	0.46	521.45	520.95	2.83	3.38
	18	SANMH15	SANMH16	0.11	0		0	32.0	4.00	0.11	0.44				0.44	0.02	0.11	**0.56**	18.59	200	517.32	517.03	517.52	517.23	1.60%	**41.49**	**1%**	1.32	0.01	0.07	0.32	0.42	520.95	520.84	3.43	3.62
	19	SANMH16	SANMH12	0.43	4		11	43.0	4.00	0.15	0.60				0.60	0.06	0.18	**0.77**	66.74	200	516.98	516.15	517.18	516.35	1.24%	**36.52**	**2%**	1.16	0.02	0.10	0.40	0.47	520.84	520.71	3.67	4.36
	21	SANMH18	SANMH17	0.33	6		16	16.0	4.00	0.06	0.22				0.22	0.05	0.05	**0.27**	25.8	200	516.52	516.27	516.72	516.47	1.00%	**32.80**	**1%**	1.04	0.01	0.07	0.32	0.33	519.16	520.45	2.43	3.99
	20	SANMH17	SANMH12	0.16	2		6	22.0	4.00	0.08	0.31				0.31	0.02	0.07	**0.38**	24.74	200	516.25	516.12	516.45	516.32	0.50%	**23.19**	**2%**	0.74	0.02	0.10	0.40	0.30	520.45	520.71	4.01	4.39
	12	SANMH12	SANMH11	0.34	6		16	81.0	4.00	0.28	1.13				1.13	0.05	0.30	**1.43**	58.04	200	516.07	515.84	516.27	516.04	0.40%	**20.74**	**7%**	0.66	0.07	0.18	0.58	0.38	520.71	520.62	4.44	4.58
	11	SANMH11	SANMH7	0.32	5		14	95.0	4.00	0.33	1.32				1.32	0.05	0.35	**1.67**	58.03	200	515.82	515.59	516.02	515.79	0.40%	**20.74**	**8%**	0.66	0.08	0.19	0.60	0.40	520.62	520.41	4.60	4.63
	6	SANMH5	SANMH7	0.48	7		19	19.0	4.00	0.07	0.26				0.26	0.07	0.41	**0.67**	83.29	200	517.19	515.53	517.39	515.73	2.00%	**46.38**	**1%**	1.48	0.01	0.07	0.32	0.47	520.67	520.41	3.27	4.69
	10	SANMH7	SANMH10	0.46	13		34	148.0	4.00	0.51	2.06				2.06	0.07	0.83	**2.88**	76.05	200	515.51	515.20	515.71	515.40	0.40%	**20.74**	**14%**	0.66	0.14	0.25	0.70	0.46	520.41	519.95	4.70	4.55
	9	SANMH10	SANMH8	0.43	12		32	180.0	4.00	0.63	2.50				2.50	0.06	0.89	**3.39**	76.05	200	515.18	514.88	515.38	515.08	0.40%	**20.74**	**16%**	0.66	0.16	0.27	0.73	0.48	519.95	520.34	4.57	5.26
	8	SANMH8	SANMH9	0.43	8		21	882.0	3.83	3.06	11.74				11.74	0.06	2.89	**27.51**	65.5	250	514.80	514.60	515.05	514.85	0.30%	**32.57**	**84%**	0.66	0.84	0.70	1.12	0.74	520.34	520.50	5.29	5.64
	8A	SANMH9	SANMH106	0.45	8		21	903.0	3.83	3.14	12.00				12.00	0.07	2.96	**27.83**	69.95	250	514.55	514.34	514.80	514.59	0.30%	**32.57**	**85%**	0.66	0.85	0.71	1.13	0.75	520.50	517.98	5.69	3.38
External	MH153	*SANMH106*	*SANMH105*	0.00	0		0	903.0	3.83	3.14	12.00				12.00	0.00	2.96	**27.83**	65.85	250	514.26	514.07	514.51	514.32	0.30%	**32.57**	**85%**	0.66	0.85	0.71	1.13	0.75	517.98	517.95	3.46	3.63
		SANMH105	*SANMH104*	0.00	0		0	903.0	3.83	3.14	12.00				12.00	0.00	2.96	**27.83**	100	250	513.99	513.69	514.24	513.94	0.30%	**32.57**	**85%**	0.66	0.85	0.71	1.13	0.75	517.95	517.81	3.71	3.87
		SANMH104	*SANMH103*	0.00	0		0	903.0	3.83	3.14	12.00				12.00	0.00	2.96	**27.83**	100	250	513.67	513.37	513.92	513.62	0.30%	**32.57**	**85%**	0.66	0.85	0.71	1.13	0.75	517.81	517.02	3.89	3.40
		SANMH103	*SANMH102*	0.00	0		0	903.0	3.83	3.14	12.00				12.00	0.00	2.96	**27.83**	100	250	513.35	513.05	513.60	513.30	0.30%	**32.57**	**85%**	0.66	0.85	0.71	1.13	0.75	517.02	517.06	3.42	3.77
		SANMH102	*SANMH101*	0.00	0		0	903.0	3.83	3.14	12.00				12.00	0.00	2.96	**27.83**	91.98	250	513.03	513.75	513.28	514.00	0.30%	**32.57**	**85%**	0.66	0.85	0.71	1.13	0.75	517.06	517.03	3.79	3.03
		SANMH101	*EX. SANMH*	0.00	0		0	903.0	3.83	3.14	12.00				12.00	0.00	2.96	**27.83**	97.03	250	512.73	512.44	512.98	512.69	0.30%	**32.57**	**85%**	0.66	0.85	0.71	1.13	0.75	517.03	516.40	4.05	3.71

NOTE: SANITARY MH 100 SERIES REPRESENT EXTERNAL MANHOLES

APPENDIX B

Water Demand and Fire Flow Calculations

Project:	Southgate School
Project No.:	2243-7223
Date:	January 30, 2025
Prepared By:	AM
Checked By:	RW

Preliminary Water Design Flow
(School Block)

Institutional Population & Area		
Institutional Population	1049	student/staff
Unit Water Flows		
Institutional per Student (per City of Toronto Engineering Stds.)	140	L/student/day
Total Design Water Flows		
Average Institutional Daily Flow	1.70	L/s
Average Total Daily Flow	**1.70**	**L/s**
Max Day Peak Factor (per MOE Design of Water Works Table 3-1)	2.50	
Max Day Demand Flow	**4.25**	**L/s**
Peak Hour Factor (Min. per Township Engineering Stds.)	3.75	
Peak Hour Flow	**6.37**	**L/s**

CROZIER CONSULTING ENGINEERS

Project Name: Glenelg Phase 3 -School Block
Project No: 1060-6220
Prepared By: AM
Checked By:
Date: 1/30/2025

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey
Part II - Guide for Determination of Required Fire Flows for Public Fire Protection in Canada

An estimate of fire flow required for a given area may be determined by the formula:

RFF = 220 * C * sqrt A

where:

RFF = the required fire flow in litres per minute (L/min)
C = the construction coefficient is related to the type of construction of the building
= 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 Non-combustible Construction
= 0.6 for Type I Fire Resistive Construction
A = the total effective floor area (effective building area) in square metres (excluding basements at least 50 percent below grade) in the building considered

Step A. **Construction Coefficient (C)** 0.8 Non Combustible

	Yes/No/Unknown	
Is basement at least 50% below grade?	No	If yes, basement floor area excluded
Vertical openings protected?	Yes	*For consideration for effective area calculations

Step B. **Proposed Building** School

Calculate Effective Floor Area based on the highlighted cell
-C value from 1.0 to 1.5: 100% of all floor areas are used
-C value below 1 and vertical openings are not protected: Consider two largest floors plus 50% of all floor above to a max of eight
-C value below 1 and vertical openings are protected: Consider single largest floor plus 25% of the two immediately adjoining floors

Floors Above Grade	Total Floor Area (m^2)	% of Area Considered	Effective Floor Area (m^2)
Basement		NA	NA
Ground Floor	3537.0	100%	3537.0
Level 2	2049.0	100%	2049.0
Level 3	1089.0	100%	1089.0
Level 4		100%	0.0
Level 5			0.0
Level 6			0.0
Level 7			0.0
Level 8			0.0
Total	**6675.0**		**6675.0**

*A building may be subdivided if there is a vertical firewall with a fire-resistance rating greater than 2 hours, and meets the requirements of the National Building Code.

Total Effective Floor Area **6675.0** m^2

Step C. **Therefore RFF =** **14,000** **L/min (rounded to nearest 1000 L/min)**

Step D. The required fire flow may be reduced by as much as -25% for occupancies having contents with very low fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Type of Occupancy	Adjustment Factor	
Institutional	Non-Combustible	-25%
	-3,500	L/min (reduction)
RFF =	**10,500**	**L/min (not rounded)**

Occupancy and Contents Adjustment Factor	
Non-Combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Step E. Sprinklers - The required fire flow may be reduced by up to 50% for complete automatic sprinkler protection depending upon adequacy of system.

	Yes/No/Unknown	Possible Reduction Available	Actual Reduction Provided
Automatic sprinkler protection designed and installed in accordance with NFPA 13?	Yes	-30%	**-30%**
Water supply is standard for both the system and Fire Department hose lines?	Yes	-10%	**-10%**
Fully supervised system?	Yes	-10%	**-10%**

*Reduction available assumes complete building coverage
*30% reduction typical for building requiring sprinkler system

Total Reduction % **-50%** (reduction)

Total Reduced Flow **-5,250** **L/min (reduction, not rounded)**

Step F. Exposure - A percentage of water for the exposures should be added to the required fire flow for the subject building to provide adequate flow rates for hose streams used to reduce the spreading of fire from the subject building to exposed risks. The required fire flow of a subject building may be increased depending on the severity of exposed risks to the subject building and the distance between the exposed risks and the subject building. This charge considers the usage of water supplies to prevent exposed risks from igniting or being damaged during a major fire incident in the subject building.

Separation Distance	Maximum Exposure Adjustment Charge
0 to 3m	25%
3.1 to 10m	20%
10.1 to 20m	15%
20.1 to 30m	10%
Greater than 30m	0%

*If a vertical fire wall is properly constructed and has a rating of no less than 2 hours, then the boundary can be treated as protected with no exposure charge

*The maximum exposure adjustment charge to be applied to a subject building is 75%

Exposed buildings

Name		Distance	Surcharge	
North	Adjacent Dwelling	31	0%	0
East	Adjacent Dwelling	31	0%	0
South	Adjacent Dwelling	31	0%	0
West	Adjacent Dwelling	31	0%	0
				0 **L/min Surcharge (not rounded)**

Step G. Final Required Fire Flow

Step D - Occupancy Adjusted Fire Flow Demand	10,500	L/min
Step E - Sprinkler (Reduction)	-5,250	L/min
Step F - Exposure Charge	0	L/min
Final Required Fire Flow:	**5,250**	**L/min**
	5,000	**1000L/min)**

or **83.3** **L/s**
1,321 USGPM

Determine Required Fire Storage Volume

Flow from above	5,000	L/min
Required duration	1.75	hours

*Refer to **Table 1** for Duration*

Therefore: 525,000 Litres or
525 m^3 is the required fire storage volume.

Table 1 - FUS 2020
Required Duration of Fire Flow

Flow Required L/min	Duration (hours)
2,000 or l 2000	1.0
3,000	1.25
4,000	1.5
5,000	1.75
6,000	2.0
8,000	2.0
10,000	2.0
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 ar 40,000	9.5

Interpolate for intermediate figures

APPENDIX C

Storm Sewer Design Sheets

BWDSB School Block

2243-7223

STORM SEWER DESIGN SHEET

CROZIER

FREQUENCY - 5 YEAR - MTO LOOKUP TOOL					
Coef. A=	30.6	Coef. B=	-0.699	Coef. C=	
FREQUENCY - 100 YEAR - MTO LOOKUP TOOL					
Coef. A=	51	Coef. B=	-0.699	Coef. C=	

MATERIAL	MANNINGS "n"
PVC	0.013
CONC.	0.013
CSP	0.024

DESIGNED BY:	CB
CHECKED BY:	
DATE:	2025.06.25
ISUED FOR:	2nd Submission

INITIAL TIME OF CONCENTRATION (minutes) = 10.00

CATCHMENT I.D.	STREET	FROM MH	TO MH	AREA (A) (Ha)	5 YEAR RUN-OFF COEFF (C_5)	100 YEAR RUN-OFF COEFF (C_{100})	DESIGN STORM	A x C	5 YEAR CUMUL. A x C_5	100 YEAR CUMUL. A x C_{100}	TIME OF CONC. (min.)	5 YEAR I (mm/hr)	100 YEAR I (mm/hr)	CONTROLLED FLOW (L/sec)	CONTROLLED FLOW CUMUL. (L/sec)	Q (RUNOFF) (L/sec)	DESIGN FLOW (L/sec)	SLOPE (%)	PIPE DIA. (mm)	MANNING'S "n"	VEL. (m/sec)	LENGTH (m)	TIME OF FLOW (min)	PIPE CAPACITY (L/sec)	CAPACITY (%)	PIPE INV ELEV. UPPER END	PIPE INV ELEV. LOWER END	PIPE OBV ELEV. UPPER END	PIPE OBV ELEV. LOWER END	GROUND ELEV. UPPER END	GROUND ELEV. LOWER END	COVER UPPER END	COVER LOWER END
TO SWM FACILITY (OUTLET #2)																																	
202		CB2	CBMH2	0.56	0.61	0.77	5 year	0.34	0.34	0.00	10.00	107.07	178.44		**0.00**	**102.49**	**102.49**	0.50%	450	0.013	1.3	66.0	0.87	**201.60**	**51%**	519.83	519.50	520.28	519.95	521.85	521.75	1.57	1.80
203A		CHILDCARE ROOF	CBMH2	0.05	0.90	1.00	100 year	0.05	0.00	0.05	10.00	107.07	178.44		**0.00**	**24.80**	**24.80**	3.70%	300	0.013	2.6	36.9	0.23	**186.01**	**13%**	520.88	519.52	521.18	519.82	#N/A	521.75	#N/A	1.93
203		CBMH2	CBMH3	0.21	0.80	1.00	5 year	0.17	0.51	0.05	10.87	101.02	168.36		**0.00**	**167.43**	**167.43**	1.00%	450	0.013	1.8	29.6	0.28	**285.11**	**59%**	519.45	519.15	519.90	519.60	521.75	521.25	1.85	1.65
204		CBMH3	DCBMH19-PH3A	0.10	0.32	0.39	5 year	0.03	0.54	0.05	11.14	99.27	165.44		**0.00**	**173.22**	**173.22**	0.47%	525	0.013	1.4	21.6	0.26	**294.84**	**59%**	519.08	518.89	519.61	519.42	521.25	521.44	1.64	2.03
208		CB3	CBMH5	0.19	0.58	0.72	5 year	0.11	0.11	0.00	10.00	107.07	178.44		**0.00**	**32.52**	**32.52**	1.00%	300	0.013	1.4	60.0	0.73	**96.70**	**34%**	519.91	519.31	520.21	519.61	521.81	522.15	1.60	2.54
207A		SCHOOL ROOF	CBMH5	0.31	0.90	1.00	100 year	0.31	0.00	0.31	10.00	107.07	178.44		**0.00**	**153.78**	**153.78**	6.00%	375	0.013	3.9	35.7	0.15	**429.47**	**36%**	520.88	518.74	521.26	519.11	#N/A	522.15	#N/A	3.03
205		CB4	CBMH4	0.18	0.54	0.67	5 year	0.10	0.10	0.00	10.00	107.07	178.44		**0.00**	**28.87**	**28.87**	1.00%	300	0.013	1.4	45.0	0.55	**96.70**	**30%**	520.22	519.77	520.52	520.07	522.12	522.27	1.60	2.20
206		CBMH4	CBMH5	0.07	0.81	1.00	5 year	0.06	0.15	0.00	10.55	103.14	171.91		**0.00**	**44.01**	**44.01**	2.00%	300	0.013	1.9	38.2	0.33	**136.76**	**32%**	519.65	518.89	519.95	519.19	522.27	522.15	2.32	2.96
207		CBMH5	CBMH17-PH3A	0.17	0.67	0.84	5 year	0.11	0.38	0.31	10.88	100.96	168.26		**0.00**	**250.74**	**250.74**	2.00%	450	0.013	2.5	14.0	0.09	**403.20**	**62%**	518.64	518.36	519.09	518.81	522.15	521.89	3.06	3.08
TO SOUTHEAST TILE DRAIN (OUTLET #4)																																	
201		TANK	DIMH1	1.29	0.37	0.46	Regional							**105.00**	**105.00**	**0.00**	**105.00**	0.40%	450	0.013	1.1	10.0	0.15	**180.32**	**58%**	521.44	521.40	521.89	521.85	#N/A	522.53	#N/A	0.68
		DIMH1	STMH6-PH3A			0.00		0.00	0.00	0.00	0.15	2044.97	3408.29		**105.00**	**0.00**	**105.00**	0.40%	525	0.013	1.3	21.6	0.29	**272.00**	**39%**	521.37	521.29	521.90	521.82	522.53	523.05	0.63	1.24

APPENDIX D

Hydrologic Model

Ontario IDF CURVE LOOKUP

Active coordinate

44° 10' 15" N, 80° 24' 15" W (44.170833,-80.404167)

Retrieved: Fri, 19 Nov 2021 13:58:13 GMT

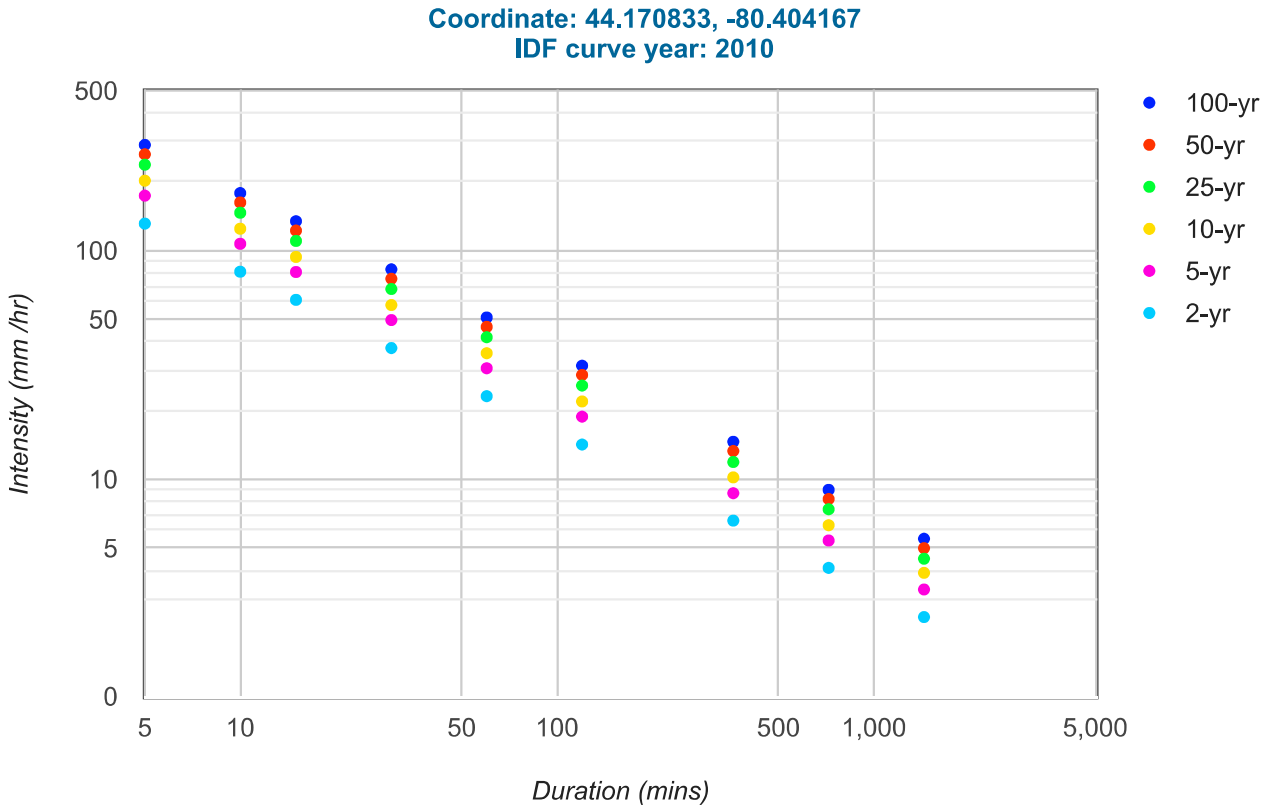
Location summary

These are the locations in the selection.

IDF Curve: 44° 10' 15" N, 80° 24' 15" W (44.170833,-80.404167)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 44° 10' 15" N, 80° 24' 15" W (44.170833,-80.404167)

Retrieved: Fri, 19 Nov 2021 13:58:13 GMT

Data year: 2010
IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	23.1	30.6	35.6	41.8	46.4	51.0
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

Rainfall intensity (mm hr^{-1})

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	131.2	80.8	60.9	37.5	23.1	14.2	6.6	4.1	2.5
5-yr	173.8	107.1	80.6	49.7	30.6	18.8	8.7	5.4	3.3
10-yr	202.2	124.6	93.8	57.8	35.6	21.9	10.2	6.3	3.9
25-yr	237.4	146.3	110.2	67.9	41.8	25.7	11.9	7.4	4.5
50-yr	263.6	162.3	122.3	75.3	46.4	28.6	13.3	8.2	5.0
100-yr	289.7	178.4	134.4	82.8	51.0	31.4	14.6	9.0	5.5

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	10.9	13.5	15.2	18.8	23.1	28.5	39.6	48.8	60.1
5-yr	14.5	17.8	20.2	24.8	30.6	37.7	52.5	64.6	79.6
10-yr	16.9	20.8	23.5	28.9	35.6	43.9	61.0	75.2	92.7
25-yr	19.8	24.4	27.5	33.9	41.8	51.5	71.7	88.3	108.8
50-yr	22.0	27.1	30.6	37.7	46.4	57.2	79.6	98.0	120.8
100-yr	24.1	29.7	33.6	41.4	51.0	62.8	87.5	107.7	132.7

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CROZIER

Project Name: Glenelg Expansion Lands
Project Number: 1060-6220
Date: 2025-04-15
By: KS

D.A. NAME	PRE-2
D.A. AREA (ha)	13.41

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment PRE-2
To North Tile Drain (Outlet #2)

Curve Number Calculation

Soil Types Present:

Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	BC	100.0%	13.4
				0
				0
				0
Total Area				13.4

Impervious Landuses Present:

	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0	98	0	98	0	98	0	98	0	98	0.00	0.00
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0		0		0		0		0			

Pervious Landuses Present:

	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0.00		0.00		0.00		0.00		13.41	78	13.41	1045.98
0											0.00	0.00
0											0.00	0.00
0											0.00	0.00
Subtotal Area	0.00		0.00		0.00		0.00		13.41			

Composite Area Calculations		
	Total Pervious Area	13.4
	Total Impervious Area	0.0
	% Impervious	0.0%
	Composite Curve Number	78.0
	Total Area Check	13.41

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
				Listowel Silt Loam		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0	0		0		0		0		0	0.000
Cultivated	7	13	93.87	0.35	13		0		0		0	4.694
Impervious	2	0	0		0		0		0		0	0.000
Composite IA		13.41	7	Composite Runoff Coefficient								0.350

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Overland	458.7	4	0.87%	2.7	0.25	0.51	0.34	0.34	0.35	0.23	0.91	0.61

Appropriate calculated time to	0.61	Appropriate Method:	Airport

CROZIER

Project Name: Glenelg Expansion Lands
Project Number: 1060-6220
Date: 2025-04-15
By: KS

D.A. NAME **PRE-4**
D.A. AREA (ha) **1.73**

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment PRE-4
To Southeast Tile Drain (Outlet #4)

Curve Number Calculation

Soil Types Present:

Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	BC	100.0%	1.7
				0
				0
				0
Total Area				1.7

Impervious Landuses Present:

	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0	98	0	98	0	98	0	98	0	98	0.00	0.00
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0		0		0		0		0			

Pervious Landuses Present:

	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0.00		0.00		0.00		0.00		1.73	78	1.73	134.94
0											0.00	0.00
0											0.00	0.00
0											0.00	0.00
Subtotal Area	0.00		0.00		0.00		0.00		1.73			

Composite Area Calculations		
	Total Pervious Area	1.7
	Total Impervious Area	0.0
	% Impervious	0.0%
	Composite Curve Number	78.0
	Total Area Check	1.73

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
				Listowel Silt Loam		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0	0		0		0		0		0	0.000
Cultivated	7	2	12.11	0.35	2		0		0		0	0.606
Impervious	2	0	0		0		0		0		0	0.000
Composite IA		1.73	7	Composite Runoff Coefficient								0.350

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Overland	106.1	4	3.77%	2.7	0.52	0.06	0.04	0.04	0.07	0.05	0.27	0.18

Appropriate calculated time to	0.18	Appropriate Method:	Airport

CROZIER

Project Name: Glenelg Expansion Lands
Project Number: 1060-6220
Date: 2025-04-17
By: KS

D.A. NAME **POST-4**
D.A. AREA (ha) **0.52**

Hydrologic Parameters: CALIB NASHYD Command
Post Development (Ultimate Condition) Drainage Area: Catchment POST-4
To Outlet #4

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	BC	100.0%	0.5
				0
				0
				0
Total Area				0.5

Impervious Landuses Present:

	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0	98	0.014	98	0	98	0.0000	98	0	98	0.01	1.41
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0		0.0144		0		0.0000		0			

Pervious Landuses Present:

	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
LTW	0.00		0.00		0.00		0.51	74	0.0		0.51	37.41
0											0.00	0.00
0											0.00	0.00
0											0.00	0.00
Subtotal Area	0.00		0.00		0.00		0.51		0.0			

Composite Area Calculations		
	Total Pervious Area	0.5
	Total Impervious Area	0.0
	% Impervious	2.8%
	Composite Curve Number	74.7
	Total Area Check	0.5

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
				Listowel Silt		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0.5056	2.528	0.15	0.51		0		0		0	0.076
Cultivated	7	0	0		0		0		0		0	0.000
Impervious	2	0.0144	0.0288	0.90	0.01		0		0		0	0.013
Composite IA		0.52	4.91692	Composite Runoff Coefficient								0.171

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Overland	25	0.5	2.00%	2.7	0.38	0.02	0.01	0.01	0.02	0.01	0.20	0.13

Appropriate calculated time to	0.13	Appropriate Method:	Airport

CROZIER

Project Name: BWDSB School Block
Project No.: 2243-7223
Date: 2025.04.17
By: CB / KS

D.A. NAME **POST-7A**
D.A. AREA (ha) **1.29**

Hydrologic Parameters: CALIB NASHYD Command
Post Development Drainage Area: Catchment POST-7A

Curve Number Calculation

Soil Types Present:

Type	ID	Hydrologic	% Area	Area
Listowel Silt Loam	LTW	BC	100.0%	1.29
				0
				0
				0
Total Area				1.29

Impervious Landuses Present:

Soils	Roadway Area	Roadway CN	Sidewalk Area	Sidewalk CN	Driveway Area (ha)	Driveway CN	Building Area (ha)	Building CN	Paved Park Area (ha)	Paved Park CN	Subtotals Area	Subtotals A*CN
LTW	0	98	0.000	98	0	98	0.054	98	0.193	98	0.25	24.21
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0		0		0		0.054		0.193			

Pervious Landuses Present:

Soils	Woodland Area	Woodland CN	Meadow Area	Meadow CN	Wetland Area (ha)	Wetland CN	Lawn Area (ha)	Lawn CN	Cultivated Area (ha)	Cultivated CN	Subtotals Area	Subtotals A*CN
LTW	0.00		0.00		0.00		1.04	74	0.0		1.043	77.18
0											0.00	0.00
0											0.00	0.00
0											0.00	0.00
Subtotal Area	0.00		0.00		0.00		1.04		0.0			

Composite Area Calculations		
	Total Pervious Area	1.043
	Total Impervious Area	0.247
	% Impervious	19.1%
	Composite Curve Number	78.6
	Total Area Check	1.3

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Curve Number								
				Listowel Silt Loam		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.00	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	1.043	5.215	0.15	1.043		0		0		0	0.156
Cultivated	7	0	0	0.35	0		0		0		0	0.000
Impervious	2	0.247	0.494	0.90	0.247		0		0		0	0.222
Composite IA		1.29	4.42558	Composite Runoff Coefficient								0.294

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Overland	87.39	0.26	0.30%	2.7	0.15	0.16	0.11	0.11	0.10	0.07	0.61	0.41

Appropriate calculated time to	0.41	Appropriate Method:	Airport

CROZIER

Project Name: BWDSB School Block
Project No.: 2243-7223
Date: 2025.06.17
By: CB / KS

D.A. NAME **POST-7B**
D.A. AREA (ha) **2.02**

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment POST-7B

Curve Number Calculation

Soil Types Present:

Type	ID	Hydrologic Group	% Area	Area
Listowel Silt Loam	LTW	BC	100%	2.02
Total Area Check				2.02

Impervious Landuses Present:

Soils	Roadway Area (ha)	Roadway CN	Sidewalk Area (ha)	Sidewalk CN	Driveway Area (ha)	Driveway CN	Building Area (ha)	Building CN	Paved Park Area (ha)	Paved Park CN	Subtotals Area	Subtotals A*CN
LTW	0.00	98	0.123	98	0.00	98	0.470	98	0.582	98	1.17	115.121
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0.000		0.123		0.000		0.470		0.582			

Pervious Landuses Present:

Soils	Woodland Area (ha)	Woodland CN	Meadow Area (ha)	Meadow CN	Wetland Area (ha)	Wetland CN	Lawn Area (ha)	Lawn CN	Cultivated Area (ha)	Cultivated CN	Subtotals Area	Subtotals A*CN
LTW	0		0		0		0.845	74	0		0.845	62.552
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
Subtotal Area	0		0		0		0.845		0			

Pervious Area Calculations	Total Pervious Area	0.85
	Composite Pervious Curve Number	74
Impervious Area Calculations	Total Directly Connected Area	0.593
	Total Indirectly Connected Area	0.582
	Total Impervious Area	1.17
	% X imp	29.3
	% T imp	58.2
	Total Area Check	2.02

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.85	4.23
Cultivated	7	0	0

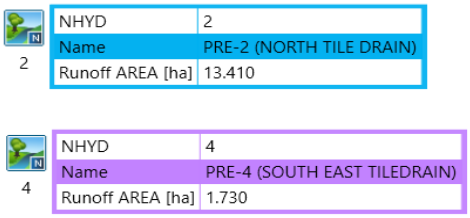
Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	25	0.25
Impervious	2.0	1	116	0.013

CROZIER

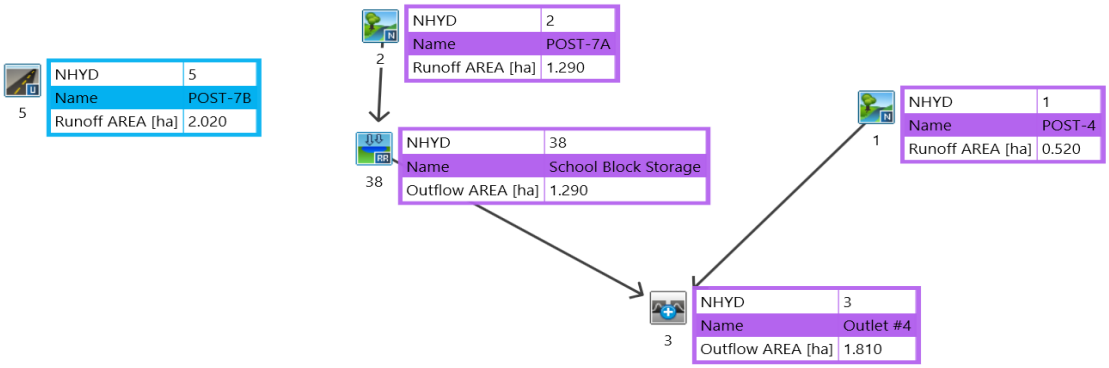
Project: DWDSB School Block
Project No.: 2243-7223
Design by: CB
Date: 2025.06.26

Visual OTTHYMO 6.2 Model Schematic

Pre-Development



Post-Development



PRE-DEVELOPMENT
VO OUTPUT

```
****************************************
** SIMULATION:A. 2yr 3hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 404.147
| Ptotal= 32.13 mm |                          B=   0.000
--------------------                          C=   0.699
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  3.00 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    3.76 |  0.83   80.82 |  1.67    5.83 |  2.50    3.63
                0.17    4.42 |  1.00   17.11 |  1.83    5.15 |  2.67    3.39
                0.33    5.48 |  1.17   10.79 |  2.00    4.63 |  2.83    3.20
                0.50    7.50 |  1.33    8.23 |  2.17    4.23 |
                0.67   13.95 |  1.50    6.78 |  2.33    3.90 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

         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    3.76 | 0.833   13.95 | 1.583    6.78 |  2.33    4.23
               0.167    3.76 | 0.917   80.82 | 1.667    6.78 |  2.42    3.90
               0.250    4.42 | 1.000   80.82 | 1.750    5.83 |  2.50    3.90
               0.333    4.42 | 1.083   17.11 | 1.833    5.83 |  2.58    3.63
               0.417    5.48 | 1.167   17.11 | 1.917    5.15 |  2.67    3.63
               0.500    5.48 | 1.250   10.79 | 2.000    5.15 |  2.75    3.39
               0.583    7.50 | 1.333   10.79 | 2.083    4.63 |  2.83    3.39
               0.667    7.50 | 1.417    8.23 | 2.167    4.63 |  2.92    3.20
               0.750   13.95 | 1.500    8.23 | 2.250    4.23 |  3.00    3.20

     Unit Hyd Qpeak  (cms)=   0.840

     PEAK FLOW       (cms)=   0.120 (i)
     TIME TO PEAK    (hrs)=   1.833
     RUNOFF VOLUME    (mm)=   6.527
     TOTAL RAINFALL   (mm)=  32.132
     RUNOFF COEFFICIENT   =   0.203

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   1.73   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         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    3.76 | 0.833   13.95 | 1.583    6.78 |  2.33    4.23
               0.167    3.76 | 0.917   80.82 | 1.667    6.78 |  2.42    3.90
               0.250    4.42 | 1.000   80.82 | 1.750    5.83 |  2.50    3.90
               0.333    4.42 | 1.083   17.11 | 1.833    5.83 |  2.58    3.63
               0.417    5.48 | 1.167   17.11 | 1.917    5.15 |  2.67    3.63
               0.500    5.48 | 1.250   10.79 | 2.000    5.15 |  2.75    3.39
               0.583    7.50 | 1.333   10.79 | 2.083    4.63 |  2.83    3.39
               0.667    7.50 | 1.417    8.23 | 2.167    4.63 |  2.92    3.20
               0.750   13.95 | 1.500    8.23 | 2.250    4.23 |  3.00    3.20

     Unit Hyd Qpeak  (cms)=   0.367

     PEAK FLOW       (cms)=   0.031 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=   6.508
     TOTAL RAINFALL   (mm)=  32.132
     RUNOFF COEFFICIENT   =   0.203

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

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****************************************
** SIMULATION:B. 5yr 3hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 535.364
| Ptotal= 42.56 mm |                          B=   0.000
--------------------                          C=   0.699
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  3.00 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    4.98 |  0.83  107.07 |  1.67    7.72 |  2.50    4.80
                0.17    5.86 |  1.00   22.67 |  1.83    6.82 |  2.67    4.50
                0.33    7.26 |  1.17   14.30 |  2.00    6.14 |  2.83    4.24
                0.50    9.93 |  1.33   10.90 |  2.17    5.60 |
                0.67   18.47 |  1.50    8.98 |  2.33    5.16 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

         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    4.98 | 0.833   18.47 | 1.583    8.98 |  2.33    5.60
               0.167    4.98 | 0.917  107.07 | 1.667    8.98 |  2.42    5.16
               0.250    5.86 | 1.000  107.07 | 1.750    7.72 |  2.50    5.16
               0.333    5.86 | 1.083   22.67 | 1.833    7.72 |  2.58    4.80
               0.417    7.26 | 1.167   22.67 | 1.917    6.82 |  2.67    4.80
               0.500    7.26 | 1.250   14.30 | 2.000    6.82 |  2.75    4.50
               0.583    9.93 | 1.333   14.30 | 2.083    6.14 |  2.83    4.50
               0.667    9.93 | 1.417   10.90 | 2.167    6.14 |  2.92    4.24
               0.750   18.47 | 1.500   10.90 | 2.250    5.60 |  3.00    4.24

     Unit Hyd Qpeak  (cms)=   0.840

     PEAK FLOW       (cms)=   0.226 (i)
     TIME TO PEAK    (hrs)=   1.833
     RUNOFF VOLUME    (mm)=  11.798
     TOTAL RAINFALL   (mm)=  42.565
     RUNOFF COEFFICIENT   =   0.277

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   1.73   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         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    4.98 | 0.833   18.47 | 1.583    8.98 |  2.33    5.60
               0.167    4.98 | 0.917  107.07 | 1.667    8.98 |  2.42    5.16
               0.250    5.86 | 1.000  107.07 | 1.750    7.72 |  2.50    5.16
               0.333    5.86 | 1.083   22.67 | 1.833    7.72 |  2.58    4.80
               0.417    7.26 | 1.167   22.67 | 1.917    6.82 |  2.67    4.80
               0.500    7.26 | 1.250   14.30 | 2.000    6.82 |  2.75    4.50
               0.583    9.93 | 1.333   14.30 | 2.083    6.14 |  2.83    4.50
               0.667    9.93 | 1.417   10.90 | 2.167    6.14 |  2.92    4.24
               0.750   18.47 | 1.500   10.90 | 2.250    5.60 |  3.00    4.24

     Unit Hyd Qpeak  (cms)=   0.367
```

PRE-DEVELOPMENT
VO OUTPUT

```
     PEAK FLOW       (cms)=   0.062 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  11.764
     TOTAL RAINFALL   (mm)=  42.565
     RUNOFF COEFFICIENT   =   0.276

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

--------------------------------------------------------------------------------
*****************************************
** SIMULATION:C. 10yr 3hr 10min Chicago **
*****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 622.842
| Ptotal= 49.52 mm |                          B=   0.000
--------------------                          C=   0.699
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  3.00 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    5.79 |  0.83  124.56 |  1.67    8.98 |  2.50    5.59
                 0.17    6.82 |  1.00   26.38 |  1.83    7.93 |  2.67    5.23
                 0.33    8.45 |  1.17   16.63 |  2.00    7.14 |  2.83    4.93
                 0.50   11.56 |  1.33   12.68 |  2.17    6.51 |
                 0.67   21.49 |  1.50   10.45 |  2.33    6.01 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

         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    5.79 | 0.833   21.49 | 1.583   10.45 |  2.33    6.51
                0.167    5.79 | 0.917  124.56 | 1.667   10.45 |  2.42    6.01
                0.250    6.82 | 1.000  124.56 | 1.750    8.98 |  2.50    6.01
                0.333    6.82 | 1.083   26.38 | 1.833    8.98 |  2.58    5.59
                0.417    8.45 | 1.167   26.38 | 1.917    7.93 |  2.67    5.59
                0.500    8.45 | 1.250   16.63 | 2.000    7.93 |  2.75    5.23
                0.583   11.56 | 1.333   16.63 | 2.083    7.14 |  2.83    5.23
                0.667   11.56 | 1.417   12.68 | 2.167    7.14 |  2.92    4.93
                0.750   21.49 | 1.500   12.68 | 2.250    6.51 |  3.00    4.93

     Unit Hyd Qpeak  (cms)=   0.840

     PEAK FLOW       (cms)=   0.310 (i)
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  15.836
     TOTAL RAINFALL   (mm)=  49.520
     RUNOFF COEFFICIENT   =   0.320

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   1.73   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         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    5.79 | 0.833   21.49 | 1.583   10.45 |  2.33    6.51
                0.167    5.79 | 0.917  124.56 | 1.667   10.45 |  2.42    6.01
                0.250    6.82 | 1.000  124.56 | 1.750    8.98 |  2.50    6.01
                0.333    6.82 | 1.083   26.38 | 1.833    8.98 |  2.58    5.59
                0.417    8.45 | 1.167   26.38 | 1.917    7.93 |  2.67    5.59
                0.500    8.45 | 1.250   16.63 | 2.000    7.93 |  2.75    5.23
```

```
                0.583   11.56 | 1.333   16.63 | 2.083    7.14 |  2.83    5.23
                0.667   11.56 | 1.417   12.68 | 2.167    7.14 |  2.92    4.93
                0.750   21.49 | 1.500   12.68 | 2.250    6.51 |  3.00    4.93

     Unit Hyd Qpeak  (cms)=   0.367

     PEAK FLOW       (cms)=   0.086 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  15.791
     TOTAL RAINFALL   (mm)=  49.520
     RUNOFF COEFFICIENT   =   0.319

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

--------------------------------------------------------------------------------
*****************************************
** SIMULATION:D. 25yr 3hr 10min Chicago **
*****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 731.314
| Ptotal= 58.14 mm |                          B=   0.000
--------------------                          C=   0.699
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  3.00 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    6.80 |  0.83  146.25 |  1.67   10.54 |  2.50    6.56
                 0.17    8.01 |  1.00   30.97 |  1.83    9.31 |  2.67    6.14
                 0.33    9.92 |  1.17   19.53 |  2.00    8.38 |  2.83    5.79
                 0.50   13.57 |  1.33   14.89 |  2.17    7.65 |
                 0.67   25.24 |  1.50   12.27 |  2.33    7.05 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

         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    6.80 | 0.833   25.24 | 1.583   12.27 |  2.33    7.65
                0.167    6.80 | 0.917  146.25 | 1.667   12.27 |  2.42    7.05
                0.250    8.01 | 1.000  146.25 | 1.750   10.54 |  2.50    7.05
                0.333    8.01 | 1.083   30.97 | 1.833   10.54 |  2.58    6.56
                0.417    9.92 | 1.167   30.97 | 1.917    9.31 |  2.67    6.56
                0.500    9.92 | 1.250   19.53 | 2.000    9.31 |  2.75    6.14
                0.583   13.57 | 1.333   19.53 | 2.083    8.38 |  2.83    6.14
                0.667   13.57 | 1.417   14.89 | 2.167    8.38 |  2.92    5.79
                0.750   25.24 | 1.500   14.89 | 2.250    7.65 |  3.00    5.79

     Unit Hyd Qpeak  (cms)=   0.840

     PEAK FLOW       (cms)=   0.425 (i)
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  21.302
     TOTAL RAINFALL   (mm)=  58.144
     RUNOFF COEFFICIENT   =   0.366

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

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--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   1.73   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         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    6.80 | 0.833   25.24 | 1.583   12.27 |  2.33    7.65
```

PRE-DEVELOPMENT
VO OUTPUT

```
                0.167    6.80 | 0.917  146.25 | 1.667   12.27 |  2.42    7.05
                0.250    8.01 | 1.000  146.25 | 1.750   10.54 |  2.50    7.05
                0.333    8.01 | 1.083   30.97 | 1.833   10.54 |  2.58    6.56
                0.417    9.92 | 1.167   30.97 | 1.917    9.31 |  2.67    6.56
                0.500    9.92 | 1.250   19.53 | 2.000    9.31 |  2.75    6.14
                0.583   13.57 | 1.333   19.53 | 2.083    8.38 |  2.83    6.14
                0.667   13.57 | 1.417   14.89 | 2.167    8.38 |  2.92    5.79
                0.750   25.24 | 1.500   14.89 | 2.250    7.65 |  3.00    5.79

     Unit Hyd Qpeak  (cms)=   0.367

     PEAK FLOW       (cms)=   0.120 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  21.242
     TOTAL RAINFALL   (mm)=  58.144
     RUNOFF COEFFICIENT   =   0.365

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

--------------------------------------------------------------------------------
*****************************************
** SIMULATION:E. 50yr 3hr 10min Chicago **
*****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 811.794
| Ptotal= 64.54 mm |                          B=   0.000
--------------------                          C=   0.699
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  3.00 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    7.55 |  0.83  162.35 |  1.67   11.70 |  2.50    7.28
                 0.17    8.89 |  1.00   34.38 |  1.83   10.34 |  2.67    6.82
                 0.33   11.01 |  1.17   21.68 |  2.00    9.30 |  2.83    6.42
                 0.50   15.06 |  1.33   16.53 |  2.17    8.49 |
                 0.67   28.01 |  1.50   13.62 |  2.33    7.83 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

         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    7.55 | 0.833   28.01 | 1.583   13.62 |  2.33    8.49
                0.167    7.55 | 0.917  162.35 | 1.667   13.62 |  2.42    7.83
                0.250    8.89 | 1.000  162.35 | 1.750   11.70 |  2.50    7.83
                0.333    8.89 | 1.083   34.38 | 1.833   11.70 |  2.58    7.28
                0.417   11.01 | 1.167   34.38 | 1.917   10.34 |  2.67    7.28
                0.500   11.01 | 1.250   21.68 | 2.000   10.34 |  2.75    6.82
                0.583   15.06 | 1.333   21.68 | 2.083    9.30 |  2.83    6.82
                0.667   15.06 | 1.417   16.53 | 2.167    9.30 |  2.92    6.42
                0.750   28.01 | 1.500   16.53 | 2.250    8.49 |  3.00    6.42

     Unit Hyd Qpeak  (cms)=   0.840

     PEAK FLOW       (cms)=   0.516 (i)
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  25.630
     TOTAL RAINFALL   (mm)=  64.542
     RUNOFF COEFFICIENT   =   0.397

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   1.73   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         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    7.55 | 0.833   28.01 | 1.583   13.62 |  2.33    8.49
                0.167    7.55 | 0.917  162.35 | 1.667   13.62 |  2.42    7.83
                0.250    8.89 | 1.000  162.35 | 1.750   11.70 |  2.50    7.83
                0.333    8.89 | 1.083   34.38 | 1.833   11.70 |  2.58    7.28
                0.417   11.01 | 1.167   34.38 | 1.917   10.34 |  2.67    7.28
                0.500   11.01 | 1.250   21.68 | 2.000   10.34 |  2.75    6.82
                0.583   15.06 | 1.333   21.68 | 2.083    9.30 |  2.83    6.82
                0.667   15.06 | 1.417   16.53 | 2.167    9.30 |  2.92    6.42
                0.750   28.01 | 1.500   16.53 | 2.250    8.49 |  3.00    6.42

     Unit Hyd Qpeak  (cms)=   0.367

     PEAK FLOW       (cms)=   0.147 (i)
     TIME TO PEAK    (hrs)=   1.083
     RUNOFF VOLUME    (mm)=  25.558
     TOTAL RAINFALL   (mm)=  64.542
     RUNOFF COEFFICIENT   =   0.396

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

--------------------------------------------------------------------------------
*****************************************
** SIMULATION:F. 100yr 3hr 10min Chicago **
*****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 892.273
| Ptotal= 70.94 mm |                          B=   0.000
--------------------                          C=   0.699
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  3.00 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    8.30 |  0.83  178.44 |  1.67   12.86 |  2.50    8.00
                 0.17    9.77 |  1.00   37.79 |  1.83   11.36 |  2.67    7.50
                 0.33   12.10 |  1.17   23.83 |  2.00   10.23 |  2.83    7.06
                 0.50   16.55 |  1.33   18.17 |  2.17    9.33 |
                 0.67   30.79 |  1.50   14.97 |  2.33    8.61 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

         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    8.30 | 0.833   30.79 | 1.583   14.97 |  2.33    9.33
                0.167    8.30 | 0.917  178.44 | 1.667   14.97 |  2.42    8.61
                0.250    9.77 | 1.000  178.44 | 1.750   12.86 |  2.50    8.61
                0.333    9.77 | 1.083   37.79 | 1.833   12.86 |  2.58    8.00
                0.417   12.10 | 1.167   37.79 | 1.917   11.36 |  2.67    8.00
                0.500   12.10 | 1.250   23.83 | 2.000   11.36 |  2.75    7.50
                0.583   16.55 | 1.333   23.83 | 2.083   10.23 |  2.83    7.50
                0.667   16.55 | 1.417   18.17 | 2.167   10.23 |  2.92    7.06
                0.750   30.79 | 1.500   18.17 | 2.250    9.33 |  3.00    7.06

     Unit Hyd Qpeak  (cms)=   0.840

     PEAK FLOW       (cms)=   0.613 (i)
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  30.154
     TOTAL RAINFALL   (mm)=  70.941
     RUNOFF COEFFICIENT   =   0.425

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   1.73   Curve Number   (CN)= 78.0
```

PRE-DEVELOPMENT
VO OUTPUT

```
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         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    8.30 | 0.833   30.79 | 1.583   14.97 |  2.33    9.33
                0.167    8.30 | 0.917  178.44 | 1.667   14.97 |  2.42    8.61
                0.250    9.77 | 1.000  178.44 | 1.750   12.86 |  2.50    8.61
                0.333    9.77 | 1.083   37.79 | 1.833   12.86 |  2.58    8.00
                0.417   12.10 | 1.167   37.79 | 1.917   11.36 |  2.67    8.00
                0.500   12.10 | 1.250   23.83 | 2.000   11.36 |  2.75    7.50
                0.583   16.55 | 1.333   23.83 | 2.083   10.23 |  2.83    7.50
                0.667   16.55 | 1.417   18.17 | 2.167   10.23 |  2.92    7.06
                0.750   30.79 | 1.500   18.17 | 2.250    9.33 |  3.00    7.06

     Unit Hyd Qpeak  (cms)=   0.367

     PEAK FLOW       (cms)=   0.177 (i)
     TIME TO PEAK    (hrs)=   1.083
     RUNOFF VOLUME    (mm)=  30.068
     TOTAL RAINFALL   (mm)=  70.941
     RUNOFF COEFFICIENT   =   0.424

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

--------------------------------------------------------------------------------
************************************************
** SIMULATION:G. 2yr 24hr 15min SCS Type II **
************************************************

--------------------
|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              1efe7ebf-9833-4646-8513-d85df50f339b\719a2500
| Ptotal= 60.13 mm |    Comments: G. 2yr 24hr 15min SCS Type II
--------------------
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  6.25    1.08 | 12.50    8.66 | 18.75    1.08
                0.25    0.66 |  6.50    1.08 | 12.75    4.45 | 19.00    1.08
                0.50    0.66 |  6.75    1.08 | 13.00    4.45 | 19.25    1.08
                0.75    0.66 |  7.00    1.08 | 13.25    3.25 | 19.50    1.08
                1.00    0.66 |  7.25    1.32 | 13.50    3.25 | 19.75    1.08
                1.25    0.66 |  7.50    1.32 | 13.75    2.53 | 20.00    1.08
                1.50    0.66 |  7.75    1.32 | 14.00    2.53 | 20.25    0.72
                1.75    0.66 |  8.00    1.32 | 14.25    1.80 | 20.50    0.72
                2.00    0.66 |  8.25    1.56 | 14.50    1.80 | 20.75    0.72
                2.25    0.78 |  8.50    1.56 | 14.75    1.80 | 21.00    0.72
                2.50    0.78 |  8.75    1.68 | 15.00    1.80 | 21.25    0.72
                2.75    0.78 |  9.00    1.68 | 15.25    1.80 | 21.50    0.72
                3.00    0.78 |  9.25    1.92 | 15.50    1.80 | 21.75    0.72
                3.25    0.78 |  9.50    1.92 | 15.75    1.80 | 22.00    0.72
                3.50    0.78 |  9.75    2.16 | 16.00    1.80 | 22.25    0.72
                3.75    0.78 | 10.00    2.16 | 16.25    1.08 | 22.50    0.72
                4.00    0.78 | 10.25    2.77 | 16.50    1.08 | 22.75    0.72
                4.25    0.96 | 10.50    2.77 | 16.75    1.08 | 23.00    0.72
                4.50    0.96 | 10.75    3.73 | 17.00    1.08 | 23.25    0.72
                4.75    0.96 | 11.00    3.73 | 17.25    1.08 | 23.50    0.72
                5.00    0.96 | 11.25    5.77 | 17.50    1.08 | 23.75    0.72
                5.25    0.96 | 11.50    5.77 | 17.75    1.08 | 24.00    0.72
                5.50    0.96 | 11.75   17.80 | 18.00    1.08 |
                5.75    0.96 | 12.00   73.60 | 18.25    1.08 |
                6.00    0.96 | 12.25    8.66 | 18.50    1.08 |

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| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

         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    0.00 | 6.167    0.96 |12.250   73.60 | 18.33    1.08
                0.167    0.00 | 6.250    0.96 |12.333    8.67 | 18.42    1.08
                0.250    0.00 | 6.333    1.08 |12.417    8.66 | 18.50    1.08
                0.333    0.66 | 6.417    1.08 |12.500    8.66 | 18.58    1.08
                0.417    0.66 | 6.500    1.08 |12.583    8.66 | 18.67    1.08
                0.500    0.66 | 6.583    1.08 |12.667    8.66 | 18.75    1.08
                0.583    0.66 | 6.667    1.08 |12.750    8.66 | 18.83    1.08
                0.667    0.66 | 6.750    1.08 |12.833    4.45 | 18.92    1.08
                0.750    0.66 | 6.833    1.08 |12.917    4.45 | 19.00    1.08
                0.833    0.66 | 6.917    1.08 |13.000    4.45 | 19.08    1.08
                0.917    0.66 | 7.000    1.08 |13.083    4.45 | 19.17    1.08
                1.000    0.66 | 7.083    1.08 |13.167    4.45 | 19.25    1.08
                1.083    0.66 | 7.167    1.08 |13.250    4.45 | 19.33    1.08
                1.167    0.66 | 7.250    1.08 |13.333    3.25 | 19.42    1.08
                1.250    0.66 | 7.333    1.32 |13.417    3.25 | 19.50    1.08
                1.333    0.66 | 7.417    1.32 |13.500    3.25 | 19.58    1.08
                1.417    0.66 | 7.500    1.32 |13.583    3.25 | 19.67    1.08
                1.500    0.66 | 7.583    1.32 |13.667    3.25 | 19.75    1.08
                1.583    0.66 | 7.667    1.32 |13.750    3.25 | 19.83    1.08
                1.667    0.66 | 7.750    1.32 |13.833    2.53 | 19.92    1.08
                1.750    0.66 | 7.833    1.32 |13.917    2.53 | 20.00    1.08
                1.833    0.66 | 7.917    1.32 |14.000    2.53 | 20.08    1.08
                1.917    0.66 | 8.000    1.32 |14.083    2.53 | 20.17    1.08
                2.000    0.66 | 8.083    1.32 |14.167    2.53 | 20.25    1.08
                2.083    0.66 | 8.167    1.32 |14.250    2.53 | 20.33    0.72
                2.167    0.66 | 8.250    1.32 |14.333    1.80 | 20.42    0.72
                2.250    0.66 | 8.333    1.56 |14.417    1.80 | 20.50    0.72
                2.333    0.78 | 8.417    1.56 |14.500    1.80 | 20.58    0.72
                2.417    0.78 | 8.500    1.56 |14.583    1.80 | 20.67    0.72
                2.500    0.78 | 8.583    1.56 |14.667    1.80 | 20.75    0.72
                2.583    0.78 | 8.667    1.56 |14.750    1.80 | 20.83    0.72
                2.667    0.78 | 8.750    1.56 |14.833    1.80 | 20.92    0.72
                2.750    0.78 | 8.833    1.68 |14.917    1.80 | 21.00    0.72
                2.833    0.78 | 8.917    1.68 |15.000    1.80 | 21.08    0.72
                2.917    0.78 | 9.000    1.68 |15.083    1.80 | 21.17    0.72
                3.000    0.78 | 9.083    1.68 |15.167    1.80 | 21.25    0.72
                3.083    0.78 | 9.167    1.68 |15.250    1.80 | 21.33    0.72
                3.167    0.78 | 9.250    1.68 |15.333    1.80 | 21.42    0.72
                3.250    0.78 | 9.333    1.92 |15.417    1.80 | 21.50    0.72
                3.333    0.78 | 9.417    1.92 |15.500    1.80 | 21.58    0.72
                3.417    0.78 | 9.500    1.92 |15.583    1.80 | 21.67    0.72
                3.500    0.78 | 9.583    1.92 |15.667    1.80 | 21.75    0.72
                3.583    0.78 | 9.667    1.92 |15.750    1.80 | 21.83    0.72
                3.667    0.78 | 9.750    1.92 |15.833    1.80 | 21.92    0.72
                3.750    0.78 | 9.833    2.16 |15.917    1.80 | 22.00    0.72
                3.833    0.78 | 9.917    2.16 |16.000    1.80 | 22.08    0.72
                3.917    0.78 |10.000    2.16 |16.083    1.80 | 22.17    0.72
                4.000    0.78 |10.083    2.16 |16.167    1.80 | 22.25    0.72
                4.083    0.78 |10.167    2.16 |16.250    1.80 | 22.33    0.72
                4.167    0.78 |10.250    2.16 |16.333    1.08 | 22.42    0.72
                4.250    0.78 |10.333    2.77 |16.417    1.08 | 22.50    0.72
                4.333    0.96 |10.417    2.77 |16.500    1.08 | 22.58    0.72
                4.417    0.96 |10.500    2.77 |16.583    1.08 | 22.67    0.72
                4.500    0.96 |10.583    2.77 |16.667    1.08 | 22.75    0.72
                4.583    0.96 |10.667    2.77 |16.750    1.08 | 22.83    0.72
                4.667    0.96 |10.750    2.77 |16.833    1.08 | 22.92    0.72
                4.750    0.96 |10.833    3.73 |16.917    1.08 | 23.00    0.72
                4.833    0.96 |10.917    3.73 |17.000    1.08 | 23.08    0.72
                4.917    0.96 |11.000    3.73 |17.083    1.08 | 23.17    0.72
                5.000    0.96 |11.083    3.73 |17.167    1.08 | 23.25    0.72
                5.083    0.96 |11.167    3.73 |17.250    1.08 | 23.33    0.72
                5.167    0.96 |11.250    3.73 |17.333    1.08 | 23.42    0.72
                5.250    0.96 |11.333    5.77 |17.417    1.08 | 23.50    0.72
                5.333    0.96 |11.417    5.77 |17.500    1.08 | 23.58    0.72
                5.417    0.96 |11.500    5.77 |17.583    1.08 | 23.67    0.72
                5.500    0.96 |11.583    5.77 |17.667    1.08 | 23.75    0.72
                5.583    0.96 |11.667    5.77 |17.750    1.08 | 23.83    0.72
                5.667    0.96 |11.750    5.77 |17.833    1.08 | 23.92    0.72
                5.750    0.96 |11.833   17.80 |17.917    1.08 | 24.00    0.72
                5.833    0.96 |11.917   17.80 |18.000    1.08 | 24.08    0.72
                5.917    0.96 |12.000   17.80 |18.083    1.08 | 24.17    0.72
                6.000    0.96 |12.083   73.59 |18.167    1.08 | 24.25    0.72
                6.083    0.96 |12.167   73.60 |18.250    1.08 |

     Unit Hyd Qpeak  (cms)=   0.840

     PEAK FLOW       (cms)=   0.348 (i)
     TIME TO PEAK    (hrs)=  12.750
     RUNOFF VOLUME    (mm)=  22.623
     TOTAL RAINFALL   (mm)=  60.130
     RUNOFF COEFFICIENT   =   0.376

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

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PRE-DEVELOPMENT
VO OUTPUT

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| CALIB              |
| NASHYD   (  0004)|   Area    (ha)=   1.73   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.60	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.67	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.66	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.66	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.66	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.66	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.66	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.45	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.45	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.45	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.45	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.45	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.45	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.25	19.42	1.08
1.250	0.66	7.333	1.32	13.417	3.25	19.50	1.08
1.333	0.66	7.417	1.32	13.500	3.25	19.58	1.08
1.417	0.66	7.500	1.32	13.583	3.25	19.67	1.08
1.500	0.66	7.583	1.32	13.667	3.25	19.75	1.08
1.583	0.66	7.667	1.32	13.750	3.25	19.83	1.08
1.667	0.66	7.750	1.32	13.833	2.53	19.92	1.08
1.750	0.66	7.833	1.32	13.917	2.53	20.00	1.08
1.833	0.66	7.917	1.32	14.000	2.53	20.08	1.08
1.917	0.66	8.000	1.32	14.083	2.53	20.17	1.08
2.000	0.66	8.083	1.32	14.167	2.53	20.25	1.08
2.083	0.66	8.167	1.32	14.250	2.53	20.33	0.72
2.167	0.66	8.250	1.32	14.333	1.80	20.42	0.72
2.250	0.66	8.333	1.56	14.417	1.80	20.50	0.72
2.333	0.78	8.417	1.56	14.500	1.80	20.58	0.72
2.417	0.78	8.500	1.56	14.583	1.80	20.67	0.72
2.500	0.78	8.583	1.56	14.667	1.80	20.75	0.72
2.583	0.78	8.667	1.56	14.750	1.80	20.83	0.72
2.667	0.78	8.750	1.56	14.833	1.80	20.92	0.72
2.750	0.78	8.833	1.68	14.917	1.80	21.00	0.72
2.833	0.78	8.917	1.68	15.000	1.80	21.08	0.72
2.917	0.78	9.000	1.68	15.083	1.80	21.17	0.72
3.000	0.78	9.083	1.68	15.167	1.80	21.25	0.72
3.083	0.78	9.167	1.68	15.250	1.80	21.33	0.72
3.167	0.78	9.250	1.68	15.333	1.80	21.42	0.72
3.250	0.78	9.333	1.92	15.417	1.80	21.50	0.72
3.333	0.78	9.417	1.92	15.500	1.80	21.58	0.72
3.417	0.78	9.500	1.92	15.583	1.80	21.67	0.72
3.500	0.78	9.583	1.92	15.667	1.80	21.75	0.72
3.583	0.78	9.667	1.92	15.750	1.80	21.83	0.72
3.667	0.78	9.750	1.92	15.833	1.80	21.92	0.72
3.750	0.78	9.833	2.16	15.917	1.80	22.00	0.72
3.833	0.78	9.917	2.16	16.000	1.80	22.08	0.72
3.917	0.78	10.000	2.16	16.083	1.80	22.17	0.72
4.000	0.78	10.083	2.16	16.167	1.80	22.25	0.72
4.083	0.78	10.167	2.16	16.250	1.80	22.33	0.72
4.167	0.78	10.250	2.16	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.77	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.77	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.77	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.77	16.667	1.08	22.75	0.72
4.583	0.96	10.667	2.77	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.77	16.833	1.08	22.92	0.72
4.750	0.96	10.833	3.73	16.917	1.08	23.00	0.72
4.833	0.96	10.917	3.73	17.000	1.08	23.08	0.72
4.917	0.96	11.000	3.73	17.083	1.08	23.17	0.72
5.000	0.96	11.083	3.73	17.167	1.08	23.25	0.72
5.083	0.96	11.167	3.73	17.250	1.08	23.33	0.72
5.167	0.96	11.250	3.73	17.333	1.08	23.42	0.72
5.250	0.96	11.333	5.77	17.417	1.08	23.50	0.72
5.333	0.96	11.417	5.77	17.500	1.08	23.58	0.72
5.417	0.96	11.500	5.77	17.583	1.08	23.67	0.72
5.500	0.96	11.583	5.77	17.667	1.08	23.75	0.72
5.583	0.96	11.667	5.77	17.750	1.08	23.83	0.72
5.667	0.96	11.750	5.77	17.833	1.08	23.92	0.72
5.750	0.96	11.833	17.80	17.917	1.08	24.00	0.72
5.833	0.96	11.917	17.80	18.000	1.08	24.08	0.72
5.917	0.96	12.000	17.80	18.083	1.08	24.17	0.72
6.000	0.96	12.083	73.59	18.167	1.08	24.25	0.72
6.083	0.96	12.167	73.60	18.250	1.08		

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     Unit Hyd Qpeak  (cms)=   0.367

     PEAK FLOW       (cms)=   0.106 (i)
     TIME TO PEAK    (hrs)=  12.333
     RUNOFF VOLUME    (mm)=  22.559
     TOTAL RAINFALL   (mm)=  60.130
     RUNOFF COEFFICIENT   =   0.375

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

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**********************************************
** SIMULATION:H. 5yr 24hr 15min SCS Type II **
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|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              1efe7ebf-9833-4646-8513-d85df50f339b\7c8cbce6
| Ptotal= 79.65 mm |    Comments: H. 5yr 24hr 15min SCS Type II
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.43	12.50	11.47	18.75	1.43
0.25	0.88	6.50	1.43	12.75	5.89	19.00	1.43
0.50	0.88	6.75	1.43	13.00	5.89	19.25	1.43
0.75	0.88	7.00	1.43	13.25	4.30	19.50	1.43
1.00	0.88	7.25	1.75	13.50	4.30	19.75	1.43
1.25	0.88	7.50	1.75	13.75	3.35	20.00	1.43
1.50	0.88	7.75	1.75	14.00	3.35	20.25	0.96
1.75	0.88	8.00	1.75	14.25	2.39	20.50	0.96
2.00	0.88	8.25	2.07	14.50	2.39	20.75	0.96
2.25	1.04	8.50	2.07	14.75	2.39	21.00	0.96
2.50	1.04	8.75	2.23	15.00	2.39	21.25	0.96
2.75	1.04	9.00	2.23	15.25	2.39	21.50	0.96
3.00	1.04	9.25	2.55	15.50	2.39	21.75	0.96
3.25	1.04	9.50	2.55	15.75	2.39	22.00	0.96
3.50	1.04	9.75	2.87	16.00	2.39	22.25	0.96
3.75	1.04	10.00	2.87	16.25	1.43	22.50	0.96
4.00	1.04	10.25	3.66	16.50	1.43	22.75	0.96
4.25	1.27	10.50	3.66	16.75	1.43	23.00	0.96
4.50	1.27	10.75	4.94	17.00	1.43	23.25	0.96
4.75	1.27	11.00	4.94	17.25	1.43	23.50	0.96
5.00	1.27	11.25	7.65	17.50	1.43	23.75	0.96
5.25	1.27	11.50	7.65	17.75	1.43	24.00	0.96
5.50	1.27	11.75	23.58	18.00	1.43		
5.75	1.27	12.00	97.49	18.25	1.43		
6.00	1.27	12.25	11.47	18.50	1.43		

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| CALIB              |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.27	12.250	97.49	18.33	1.43
0.167	0.00	6.250	1.27	12.333	11.48	18.42	1.43
0.250	0.00	6.333	1.43	12.417	11.47	18.50	1.43
0.333	0.88	6.417	1.43	12.500	11.47	18.58	1.43
0.417	0.88	6.500	1.43	12.583	11.47	18.67	1.43
0.500	0.88	6.583	1.43	12.667	11.47	18.75	1.43
0.583	0.88	6.667	1.43	12.750	11.47	18.83	1.43
0.667	0.88	6.750	1.43	12.833	5.89	18.92	1.43
0.750	0.88	6.833	1.43	12.917	5.89	19.00	1.43
0.833	0.88	6.917	1.43	13.000	5.89	19.08	1.43
0.917	0.88	7.000	1.43	13.083	5.89	19.17	1.43
1.000	0.88	7.083	1.43	13.167	5.89	19.25	1.43
1.083	0.88	7.167	1.43	13.250	5.89	19.33	1.43
1.167	0.88	7.250	1.43	13.333	4.30	19.42	1.43
1.250	0.88	7.333	1.75	13.417	4.30	19.50	1.43
1.333	0.88	7.417	1.75	13.500	4.30	19.58	1.43
1.417	0.88	7.500	1.75	13.583	4.30	19.67	1.43
1.500	0.88	7.583	1.75	13.667	4.30	19.75	1.43
1.583	0.88	7.667	1.75	13.750	4.30	19.83	1.43
1.667	0.88	7.750	1.75	13.833	3.35	19.92	1.43

PRE-DEVELOPMENT
VO OUTPUT

1.750	0.88	7.833	1.75	13.917	3.35	20.00	1.43
1.833	0.88	7.917	1.75	14.000	3.35	20.08	1.43
1.917	0.88	8.000	1.75	14.083	3.35	20.17	1.43
2.000	0.88	8.083	1.75	14.167	3.35	20.25	1.43
2.083	0.88	8.167	1.75	14.250	3.35	20.33	0.96
2.167	0.88	8.250	1.75	14.333	2.39	20.42	0.96
2.250	0.88	8.333	2.07	14.417	2.39	20.50	0.96
2.333	1.04	8.417	2.07	14.500	2.39	20.58	0.96
2.417	1.04	8.500	2.07	14.583	2.39	20.67	0.96
2.500	1.04	8.583	2.07	14.667	2.39	20.75	0.96
2.583	1.04	8.667	2.07	14.750	2.39	20.83	0.96
2.667	1.04	8.750	2.07	14.833	2.39	20.92	0.96
2.750	1.04	8.833	2.23	14.917	2.39	21.00	0.96
2.833	1.04	8.917	2.23	15.000	2.39	21.08	0.96
2.917	1.04	9.000	2.23	15.083	2.39	21.17	0.96
3.000	1.04	9.083	2.23	15.167	2.39	21.25	0.96
3.083	1.04	9.167	2.23	15.250	2.39	21.33	0.96
3.167	1.04	9.250	2.23	15.333	2.39	21.42	0.96
3.250	1.04	9.333	2.55	15.417	2.39	21.50	0.96
3.333	1.04	9.417	2.55	15.500	2.39	21.58	0.96
3.417	1.04	9.500	2.55	15.583	2.39	21.67	0.96
3.500	1.04	9.583	2.55	15.667	2.39	21.75	0.96
3.583	1.04	9.667	2.55	15.750	2.39	21.83	0.96
3.667	1.04	9.750	2.55	15.833	2.39	21.92	0.96
3.750	1.04	9.833	2.87	15.917	2.39	22.00	0.96
3.833	1.04	9.917	2.87	16.000	2.39	22.08	0.96
3.917	1.04	10.000	2.87	16.083	2.39	22.17	0.96
4.000	1.04	10.083	2.87	16.167	2.39	22.25	0.96
4.083	1.04	10.167	2.87	16.250	2.39	22.33	0.96
4.167	1.04	10.250	2.87	16.333	1.43	22.42	0.96
4.250	1.04	10.333	3.66	16.417	1.43	22.50	0.96
4.333	1.27	10.417	3.66	16.500	1.43	22.58	0.96
4.417	1.27	10.500	3.66	16.583	1.43	22.67	0.96
4.500	1.27	10.583	3.66	16.667	1.43	22.75	0.96
4.583	1.27	10.667	3.66	16.750	1.43	22.83	0.96
4.667	1.27	10.750	3.66	16.833	1.43	22.92	0.96
4.750	1.27	10.833	4.94	16.917	1.43	23.00	0.96
4.833	1.27	10.917	4.94	17.000	1.43	23.08	0.96
4.917	1.27	11.000	4.94	17.083	1.43	23.17	0.96
5.000	1.27	11.083	4.94	17.167	1.43	23.25	0.96
5.083	1.27	11.167	4.94	17.250	1.43	23.33	0.96
5.167	1.27	11.250	4.94	17.333	1.43	23.42	0.96
5.250	1.27	11.333	7.65	17.417	1.43	23.50	0.96
5.333	1.27	11.417	7.65	17.500	1.43	23.58	0.96
5.417	1.27	11.500	7.65	17.583	1.43	23.67	0.96
5.500	1.27	11.583	7.65	17.667	1.43	23.75	0.96
5.583	1.27	11.667	7.65	17.750	1.43	23.83	0.96
5.667	1.27	11.750	7.65	17.833	1.43	23.92	0.96
5.750	1.27	11.833	23.57	17.917	1.43	24.00	0.96
5.833	1.27	11.917	23.58	18.000	1.43	24.08	0.96
5.917	1.27	12.000	23.58	18.083	1.43	24.17	0.96
6.000	1.27	12.083	97.48	18.167	1.43	24.25	0.96
6.083	1.27	12.167	97.49	18.250	1.43		

Unit Hyd Qpeak (cms)= 0.840

PEAK FLOW (cms)= 0.575 (i)
TIME TO PEAK (hrs)= 12.750
RUNOFF VOLUME (mm)= 36.578
TOTAL RAINFALL (mm)= 79.650
RUNOFF COEFFICIENT = 0.459

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

CALIB				
NASHYD (0004)	Area (ha)=	1.73	Curve Number (CN)=	78.0
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.18		

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	0.00	6.167	1.27	12.250	97.49	18.33	1.43
0.167	0.00	6.250	1.27	12.333	11.48	18.42	1.43
0.250	0.00	6.333	1.43	12.417	11.47	18.50	1.43
0.333	0.88	6.417	1.43	12.500	11.47	18.58	1.43
0.417	0.88	6.500	1.43	12.583	11.47	18.67	1.43
0.500	0.88	6.583	1.43	12.667	11.47	18.75	1.43
0.583	0.88	6.667	1.43	12.750	11.47	18.83	1.43
0.667	0.88	6.750	1.43	12.833	5.89	18.92	1.43
0.750	0.88	6.833	1.43	12.917	5.89	19.00	1.43
0.833	0.88	6.917	1.43	13.000	5.89	19.08	1.43
0.917	0.88	7.000	1.43	13.083	5.89	19.17	1.43
1.000	0.88	7.083	1.43	13.167	5.89	19.25	1.43
1.083	0.88	7.167	1.43	13.250	5.89	19.33	1.43
1.167	0.88	7.250	1.43	13.333	4.30	19.42	1.43
1.250	0.88	7.333	1.75	13.417	4.30	19.50	1.43
1.333	0.88	7.417	1.75	13.500	4.30	19.58	1.43
1.417	0.88	7.500	1.75	13.583	4.30	19.67	1.43
1.500	0.88	7.583	1.75	13.667	4.30	19.75	1.43
1.583	0.88	7.667	1.75	13.750	4.30	19.83	1.43
1.667	0.88	7.750	1.75	13.833	3.35	19.92	1.43
1.750	0.88	7.833	1.75	13.917	3.35	20.00	1.43
1.833	0.88	7.917	1.75	14.000	3.35	20.08	1.43
1.917	0.88	8.000	1.75	14.083	3.35	20.17	1.43
2.000	0.88	8.083	1.75	14.167	3.35	20.25	1.43
2.083	0.88	8.167	1.75	14.250	3.35	20.33	0.96
2.167	0.88	8.250	1.75	14.333	2.39	20.42	0.96
2.250	0.88	8.333	2.07	14.417	2.39	20.50	0.96
2.333	1.04	8.417	2.07	14.500	2.39	20.58	0.96
2.417	1.04	8.500	2.07	14.583	2.39	20.67	0.96
2.500	1.04	8.583	2.07	14.667	2.39	20.75	0.96
2.583	1.04	8.667	2.07	14.750	2.39	20.83	0.96
2.667	1.04	8.750	2.07	14.833	2.39	20.92	0.96
2.750	1.04	8.833	2.23	14.917	2.39	21.00	0.96
2.833	1.04	8.917	2.23	15.000	2.39	21.08	0.96
2.917	1.04	9.000	2.23	15.083	2.39	21.17	0.96
3.000	1.04	9.083	2.23	15.167	2.39	21.25	0.96
3.083	1.04	9.167	2.23	15.250	2.39	21.33	0.96
3.167	1.04	9.250	2.23	15.333	2.39	21.42	0.96
3.250	1.04	9.333	2.55	15.417	2.39	21.50	0.96
3.333	1.04	9.417	2.55	15.500	2.39	21.58	0.96
3.417	1.04	9.500	2.55	15.583	2.39	21.67	0.96
3.500	1.04	9.583	2.55	15.667	2.39	21.75	0.96
3.583	1.04	9.667	2.55	15.750	2.39	21.83	0.96
3.667	1.04	9.750	2.55	15.833	2.39	21.92	0.96
3.750	1.04	9.833	2.87	15.917	2.39	22.00	0.96
3.833	1.04	9.917	2.87	16.000	2.39	22.08	0.96
3.917	1.04	10.000	2.87	16.083	2.39	22.17	0.96
4.000	1.04	10.083	2.87	16.167	2.39	22.25	0.96
4.083	1.04	10.167	2.87	16.250	2.39	22.33	0.96
4.167	1.04	10.250	2.87	16.333	1.43	22.42	0.96
4.250	1.04	10.333	3.66	16.417	1.43	22.50	0.96
4.333	1.27	10.417	3.66	16.500	1.43	22.58	0.96
4.417	1.27	10.500	3.66	16.583	1.43	22.67	0.96
4.500	1.27	10.583	3.66	16.667	1.43	22.75	0.96
4.583	1.27	10.667	3.66	16.750	1.43	22.83	0.96
4.667	1.27	10.750	3.66	16.833	1.43	22.92	0.96
4.750	1.27	10.833	4.94	16.917	1.43	23.00	0.96
4.833	1.27	10.917	4.94	17.000	1.43	23.08	0.96
4.917	1.27	11.000	4.94	17.083	1.43	23.17	0.96
5.000	1.27	11.083	4.94	17.167	1.43	23.25	0.96
5.083	1.27	11.167	4.94	17.250	1.43	23.33	0.96
5.167	1.27	11.250	4.94	17.333	1.43	23.42	0.96
5.250	1.27	11.333	7.65	17.417	1.43	23.50	0.96
5.333	1.27	11.417	7.65	17.500	1.43	23.58	0.96
5.417	1.27	11.500	7.65	17.583	1.43	23.67	0.96
5.500	1.27	11.583	7.65	17.667	1.43	23.75	0.96
5.583	1.27	11.667	7.65	17.750	1.43	23.83	0.96
5.667	1.27	11.750	7.65	17.833	1.43	23.92	0.96
5.750	1.27	11.833	23.57	17.917	1.43	24.00	0.96
5.833	1.27	11.917	23.58	18.000	1.43	24.08	0.96
5.917	1.27	12.000	23.58	18.083	1.43	24.17	0.96
6.000	1.27	12.083	97.48	18.167	1.43	24.25	0.96
6.083	1.27	12.167	97.49	18.250	1.43		

Unit Hyd Qpeak (cms)= 0.367

PEAK FLOW (cms)= 0.173 (i)
TIME TO PEAK (hrs)= 12.333
RUNOFF VOLUME (mm)= 36.474
TOTAL RAINFALL (mm)= 79.650
RUNOFF COEFFICIENT = 0.458

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

****
** SIMULATION:I. 10yr 24hr 15min SCS Type II **
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READ STORM	Filename: C:\Users\cbuscher\AppD

PRE-DEVELOPMENT
VO OUTPUT

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|                  |              ata\Local\Temp\
|                  |              1efe7ebf-9833-4646-8513-d85df50f339b\a944daaa
| Ptotal= 92.66 mm |    Comments: I. 10yr 24hr 15min SCS Type II
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.67	12.50	13.34	18.75	1.67
0.25	1.02	6.50	1.67	12.75	6.86	19.00	1.67
0.50	1.02	6.75	1.67	13.00	6.86	19.25	1.67
0.75	1.02	7.00	1.67	13.25	5.00	19.50	1.67
1.00	1.02	7.25	2.04	13.50	5.00	19.75	1.67
1.25	1.02	7.50	2.04	13.75	3.89	20.00	1.67
1.50	1.02	7.75	2.04	14.00	3.89	20.25	1.11
1.75	1.02	8.00	2.04	14.25	2.78	20.50	1.11
2.00	1.02	8.25	2.41	14.50	2.78	20.75	1.11
2.25	1.20	8.50	2.41	14.75	2.78	21.00	1.11
2.50	1.20	8.75	2.59	15.00	2.78	21.25	1.11
2.75	1.20	9.00	2.59	15.25	2.78	21.50	1.11
3.00	1.20	9.25	2.97	15.50	2.78	21.75	1.11
3.25	1.20	9.50	2.97	15.75	2.78	22.00	1.11
3.50	1.20	9.75	3.34	16.00	2.78	22.25	1.11
3.75	1.20	10.00	3.34	16.25	1.67	22.50	1.11
4.00	1.20	10.25	4.26	16.50	1.67	22.75	1.11
4.25	1.48	10.50	4.26	16.75	1.67	23.00	1.11
4.50	1.48	10.75	5.74	17.00	1.67	23.25	1.11
4.75	1.48	11.00	5.74	17.25	1.67	23.50	1.11
5.00	1.48	11.25	8.90	17.50	1.67	23.75	1.11
5.25	1.48	11.50	8.90	17.75	1.67	24.00	1.11
5.50	1.48	11.75	27.43	18.00	1.67		
5.75	1.48	12.00	113.42	18.25	1.67		
6.00	1.48	12.25	13.34	18.50	1.67		

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| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61
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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	0.00	6.167	1.48	12.250	113.42	18.33	1.67
0.167	0.00	6.250	1.48	12.333	13.36	18.42	1.67
0.250	0.00	6.333	1.67	12.417	13.34	18.50	1.67
0.333	1.02	6.417	1.67	12.500	13.34	18.58	1.67
0.417	1.02	6.500	1.67	12.583	13.34	18.67	1.67
0.500	1.02	6.583	1.67	12.667	13.34	18.75	1.67
0.583	1.02	6.667	1.67	12.750	13.34	18.83	1.67
0.667	1.02	6.750	1.67	12.833	6.86	18.92	1.67
0.750	1.02	6.833	1.67	12.917	6.86	19.00	1.67
0.833	1.02	6.917	1.67	13.000	6.86	19.08	1.67
0.917	1.02	7.000	1.67	13.083	6.86	19.17	1.67
1.000	1.02	7.083	1.67	13.167	6.86	19.25	1.67
1.083	1.02	7.167	1.67	13.250	6.86	19.33	1.67
1.167	1.02	7.250	1.67	13.333	5.00	19.42	1.67
1.250	1.02	7.333	2.04	13.417	5.00	19.50	1.67
1.333	1.02	7.417	2.04	13.500	5.00	19.58	1.67
1.417	1.02	7.500	2.04	13.583	5.00	19.67	1.67
1.500	1.02	7.583	2.04	13.667	5.00	19.75	1.67
1.583	1.02	7.667	2.04	13.750	5.00	19.83	1.67
1.667	1.02	7.750	2.04	13.833	3.89	19.92	1.67
1.750	1.02	7.833	2.04	13.917	3.89	20.00	1.67
1.833	1.02	7.917	2.04	14.000	3.89	20.08	1.67
1.917	1.02	8.000	2.04	14.083	3.89	20.17	1.67
2.000	1.02	8.083	2.04	14.167	3.89	20.25	1.67
2.083	1.02	8.167	2.04	14.250	3.89	20.33	1.11
2.167	1.02	8.250	2.04	14.333	2.78	20.42	1.11
2.250	1.02	8.333	2.41	14.417	2.78	20.50	1.11
2.333	1.20	8.417	2.41	14.500	2.78	20.58	1.11
2.417	1.20	8.500	2.41	14.583	2.78	20.67	1.11
2.500	1.20	8.583	2.41	14.667	2.78	20.75	1.11
2.583	1.20	8.667	2.41	14.750	2.78	20.83	1.11
2.667	1.20	8.750	2.41	14.833	2.78	20.92	1.11
2.750	1.20	8.833	2.59	14.917	2.78	21.00	1.11
2.833	1.20	8.917	2.59	15.000	2.78	21.08	1.11
2.917	1.20	9.000	2.59	15.083	2.78	21.17	1.11
3.000	1.20	9.083	2.59	15.167	2.78	21.25	1.11
3.083	1.20	9.167	2.59	15.250	2.78	21.33	1.11
3.167	1.20	9.250	2.59	15.333	2.78	21.42	1.11
3.250	1.20	9.333	2.97	15.417	2.78	21.50	1.11
3.333	1.20	9.417	2.97	15.500	2.78	21.58	1.11
3.417	1.20	9.500	2.97	15.583	2.78	21.67	1.11
3.500	1.20	9.583	2.97	15.667	2.78	21.75	1.11
3.583	1.20	9.667	2.97	15.750	2.78	21.83	1.11
3.667	1.20	9.750	2.97	15.833	2.78	21.92	1.11
3.750	1.20	9.833	3.34	15.917	2.78	22.00	1.11
3.833	1.20	9.917	3.34	16.000	2.78	22.08	1.11
3.917	1.20	10.000	3.34	16.083	2.78	22.17	1.11
4.000	1.20	10.083	3.34	16.167	2.78	22.25	1.11
4.083	1.20	10.167	3.34	16.250	2.78	22.33	1.11
4.167	1.20	10.250	3.34	16.333	1.67	22.42	1.11
4.250	1.20	10.333	4.26	16.417	1.67	22.50	1.11
4.333	1.48	10.417	4.26	16.500	1.67	22.58	1.11
4.417	1.48	10.500	4.26	16.583	1.67	22.67	1.11
4.500	1.48	10.583	4.26	16.667	1.67	22.75	1.11
4.583	1.48	10.667	4.26	16.750	1.67	22.83	1.11
4.667	1.48	10.750	4.26	16.833	1.67	22.92	1.11
4.750	1.48	10.833	5.74	16.917	1.67	23.00	1.11
4.833	1.48	10.917	5.74	17.000	1.67	23.08	1.11
4.917	1.48	11.000	5.74	17.083	1.67	23.17	1.11
5.000	1.48	11.083	5.74	17.167	1.67	23.25	1.11
5.083	1.48	11.167	5.74	17.250	1.67	23.33	1.11
5.167	1.48	11.250	5.74	17.333	1.67	23.42	1.11
5.250	1.48	11.333	8.90	17.417	1.67	23.50	1.11
5.333	1.48	11.417	8.90	17.500	1.67	23.58	1.11
5.417	1.48	11.500	8.90	17.583	1.67	23.67	1.11
5.500	1.48	11.583	8.90	17.667	1.67	23.75	1.11
5.583	1.48	11.667	8.90	17.750	1.67	23.83	1.11
5.667	1.48	11.750	8.90	17.833	1.67	23.92	1.11
5.750	1.48	11.833	27.43	17.917	1.67	24.00	1.11
5.833	1.48	11.917	27.43	18.000	1.67	24.08	1.11
5.917	1.48	12.000	27.43	18.083	1.67	24.17	1.11
6.000	1.48	12.083	113.41	18.167	1.67	24.25	1.11
6.083	1.48	12.167	113.42	18.250	1.67		

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Unit Hyd Qpeak  (cms)=   0.840

PEAK FLOW       (cms)=   0.739 (i)
TIME TO PEAK    (hrs)=  12.750
RUNOFF VOLUME    (mm)=  46.646
TOTAL RAINFALL   (mm)=  92.660
RUNOFF COEFFICIENT   =   0.503

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   1.73   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18
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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	0.00	6.167	1.48	12.250	113.42	18.33	1.67
0.167	0.00	6.250	1.48	12.333	13.36	18.42	1.67
0.250	0.00	6.333	1.67	12.417	13.34	18.50	1.67
0.333	1.02	6.417	1.67	12.500	13.34	18.58	1.67
0.417	1.02	6.500	1.67	12.583	13.34	18.67	1.67
0.500	1.02	6.583	1.67	12.667	13.34	18.75	1.67
0.583	1.02	6.667	1.67	12.750	13.34	18.83	1.67
0.667	1.02	6.750	1.67	12.833	6.86	18.92	1.67
0.750	1.02	6.833	1.67	12.917	6.86	19.00	1.67
0.833	1.02	6.917	1.67	13.000	6.86	19.08	1.67
0.917	1.02	7.000	1.67	13.083	6.86	19.17	1.67
1.000	1.02	7.083	1.67	13.167	6.86	19.25	1.67
1.083	1.02	7.167	1.67	13.250	6.86	19.33	1.67
1.167	1.02	7.250	1.67	13.333	5.00	19.42	1.67
1.250	1.02	7.333	2.04	13.417	5.00	19.50	1.67
1.333	1.02	7.417	2.04	13.500	5.00	19.58	1.67
1.417	1.02	7.500	2.04	13.583	5.00	19.67	1.67
1.500	1.02	7.583	2.04	13.667	5.00	19.75	1.67
1.583	1.02	7.667	2.04	13.750	5.00	19.83	1.67
1.667	1.02	7.750	2.04	13.833	3.89	19.92	1.67
1.750	1.02	7.833	2.04	13.917	3.89	20.00	1.67
1.833	1.02	7.917	2.04	14.000	3.89	20.08	1.67
1.917	1.02	8.000	2.04	14.083	3.89	20.17	1.67
2.000	1.02	8.083	2.04	14.167	3.89	20.25	1.67
2.083	1.02	8.167	2.04	14.250	3.89	20.33	1.11

PRE-DEVELOPMENT
VO OUTPUT

2.167	1.02	8.250	2.04	14.333	2.78	20.42	1.11
2.250	1.02	8.333	2.41	14.417	2.78	20.50	1.11
2.333	1.20	8.417	2.41	14.500	2.78	20.58	1.11
2.417	1.20	8.500	2.41	14.583	2.78	20.67	1.11
2.500	1.20	8.583	2.41	14.667	2.78	20.75	1.11
2.583	1.20	8.667	2.41	14.750	2.78	20.83	1.11
2.667	1.20	8.750	2.41	14.833	2.78	20.92	1.11
2.750	1.20	8.833	2.59	14.917	2.78	21.00	1.11
2.833	1.20	8.917	2.59	15.000	2.78	21.08	1.11
2.917	1.20	9.000	2.59	15.083	2.78	21.17	1.11
3.000	1.20	9.083	2.59	15.167	2.78	21.25	1.11
3.083	1.20	9.167	2.59	15.250	2.78	21.33	1.11
3.167	1.20	9.250	2.59	15.333	2.78	21.42	1.11
3.250	1.20	9.333	2.97	15.417	2.78	21.50	1.11
3.333	1.20	9.417	2.97	15.500	2.78	21.58	1.11
3.417	1.20	9.500	2.97	15.583	2.78	21.67	1.11
3.500	1.20	9.583	2.97	15.667	2.78	21.75	1.11
3.583	1.20	9.667	2.97	15.750	2.78	21.83	1.11
3.667	1.20	9.750	2.97	15.833	2.78	21.92	1.11
3.750	1.20	9.833	3.34	15.917	2.78	22.00	1.11
3.833	1.20	9.917	3.34	16.000	2.78	22.08	1.11
3.917	1.20	10.000	3.34	16.083	2.78	22.17	1.11
4.000	1.20	10.083	3.34	16.167	2.78	22.25	1.11
4.083	1.20	10.167	3.34	16.250	2.78	22.33	1.11
4.167	1.20	10.250	3.34	16.333	1.67	22.42	1.11
4.250	1.20	10.333	4.26	16.417	1.67	22.50	1.11
4.333	1.48	10.417	4.26	16.500	1.67	22.58	1.11
4.417	1.48	10.500	4.26	16.583	1.67	22.67	1.11
4.500	1.48	10.583	4.26	16.667	1.67	22.75	1.11
4.583	1.48	10.667	4.26	16.750	1.67	22.83	1.11
4.667	1.48	10.750	4.26	16.833	1.67	22.92	1.11
4.750	1.48	10.833	5.74	16.917	1.67	23.00	1.11
4.833	1.48	10.917	5.74	17.000	1.67	23.08	1.11
4.917	1.48	11.000	5.74	17.083	1.67	23.17	1.11
5.000	1.48	11.083	5.74	17.167	1.67	23.25	1.11
5.083	1.48	11.167	5.74	17.250	1.67	23.33	1.11
5.167	1.48	11.250	5.74	17.333	1.67	23.42	1.11
5.250	1.48	11.333	8.90	17.417	1.67	23.50	1.11
5.333	1.48	11.417	8.90	17.500	1.67	23.58	1.11
5.417	1.48	11.500	8.90	17.583	1.67	23.67	1.11
5.500	1.48	11.583	8.90	17.667	1.67	23.75	1.11
5.583	1.48	11.667	8.90	17.750	1.67	23.83	1.11
5.667	1.48	11.750	8.90	17.833	1.67	23.92	1.11
5.750	1.48	11.833	27.43	17.917	1.67	24.00	1.11
5.833	1.48	11.917	27.43	18.000	1.67	24.08	1.11
5.917	1.48	12.000	27.43	18.083	1.67	24.17	1.11
6.000	1.48	12.083	113.41	18.167	1.67	24.25	1.11
6.083	1.48	12.167	113.42	18.250	1.67		

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Unit Hyd Qpeak  (cms)=   0.367

PEAK FLOW       (cms)=   0.221 (i)
TIME TO PEAK    (hrs)=  12.333
RUNOFF VOLUME    (mm)=  46.513
TOTAL RAINFALL   (mm)=  92.660
RUNOFF COEFFICIENT   =   0.502

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

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**********************************************
** SIMULATION:J. 25yr 24hr 15min SCS Type II **
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|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              1efe7ebf-9833-4646-8513-d85df50f339b\110417ef
| Ptotal=108.80 mm |    Comments: J. 25yr 24hr 15min SCS Type II
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.96	12.50	15.67	18.75	1.96
0.25	1.20	6.50	1.96	12.75	8.05	19.00	1.96
0.50	1.20	6.75	1.96	13.00	8.05	19.25	1.96
0.75	1.20	7.00	1.96	13.25	5.88	19.50	1.96
1.00	1.20	7.25	2.39	13.50	5.88	19.75	1.96
1.25	1.20	7.50	2.39	13.75	4.57	20.00	1.96
1.50	1.20	7.75	2.39	14.00	4.57	20.25	1.31
1.75	1.20	8.00	2.39	14.25	3.26	20.50	1.31
2.00	1.20	8.25	2.83	14.50	3.26	20.75	1.31
2.25	1.41	8.50	2.83	14.75	3.26	21.00	1.31
2.50	1.41	8.75	3.05	15.00	3.26	21.25	1.31
2.75	1.41	9.00	3.05	15.25	3.26	21.50	1.31
3.00	1.41	9.25	3.48	15.50	3.26	21.75	1.31
3.25	1.41	9.50	3.48	15.75	3.26	22.00	1.31
3.50	1.41	9.75	3.92	16.00	3.26	22.25	1.31
3.75	1.41	10.00	3.92	16.25	1.96	22.50	1.31
4.00	1.41	10.25	5.00	16.50	1.96	22.75	1.31
4.25	1.74	10.50	5.00	16.75	1.96	23.00	1.31
4.50	1.74	10.75	6.75	17.00	1.96	23.25	1.31
4.75	1.74	11.00	6.75	17.25	1.96	23.50	1.31
5.00	1.74	11.25	10.44	17.50	1.96	23.75	1.31
5.25	1.74	11.50	10.44	17.75	1.96	24.00	1.31
5.50	1.74	11.75	32.20	18.00	1.96		
5.75	1.74	12.00	133.17	18.25	1.96		
6.00	1.74	12.25	15.67	18.50	1.96		

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| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.74	12.250	133.17	18.33	1.96
0.167	0.00	6.250	1.74	12.333	15.68	18.42	1.96
0.250	0.00	6.333	1.96	12.417	15.67	18.50	1.96
0.333	1.20	6.417	1.96	12.500	15.67	18.58	1.96
0.417	1.20	6.500	1.96	12.583	15.67	18.67	1.96
0.500	1.20	6.583	1.96	12.667	15.67	18.75	1.96
0.583	1.20	6.667	1.96	12.750	15.67	18.83	1.96
0.667	1.20	6.750	1.96	12.833	8.05	18.92	1.96
0.750	1.20	6.833	1.96	12.917	8.05	19.00	1.96
0.833	1.20	6.917	1.96	13.000	8.05	19.08	1.96
0.917	1.20	7.000	1.96	13.083	8.05	19.17	1.96
1.000	1.20	7.083	1.96	13.167	8.05	19.25	1.96
1.083	1.20	7.167	1.96	13.250	8.05	19.33	1.96
1.167	1.20	7.250	1.96	13.333	5.88	19.42	1.96
1.250	1.20	7.333	2.39	13.417	5.88	19.50	1.96
1.333	1.20	7.417	2.39	13.500	5.88	19.58	1.96
1.417	1.20	7.500	2.39	13.583	5.88	19.67	1.96
1.500	1.20	7.583	2.39	13.667	5.88	19.75	1.96
1.583	1.20	7.667	2.39	13.750	5.88	19.83	1.96
1.667	1.20	7.750	2.39	13.833	4.57	19.92	1.96
1.750	1.20	7.833	2.39	13.917	4.57	20.00	1.96
1.833	1.20	7.917	2.39	14.000	4.57	20.08	1.96
1.917	1.20	8.000	2.39	14.083	4.57	20.17	1.96
2.000	1.20	8.083	2.39	14.167	4.57	20.25	1.96
2.083	1.20	8.167	2.39	14.250	4.57	20.33	1.31
2.167	1.20	8.250	2.39	14.333	3.26	20.42	1.31
2.250	1.20	8.333	2.83	14.417	3.26	20.50	1.31
2.333	1.41	8.417	2.83	14.500	3.26	20.58	1.31
2.417	1.41	8.500	2.83	14.583	3.26	20.67	1.31
2.500	1.41	8.583	2.83	14.667	3.26	20.75	1.31
2.583	1.41	8.667	2.83	14.750	3.26	20.83	1.31
2.667	1.41	8.750	2.83	14.833	3.26	20.92	1.31
2.750	1.41	8.833	3.05	14.917	3.26	21.00	1.31
2.833	1.41	8.917	3.05	15.000	3.26	21.08	1.31
2.917	1.41	9.000	3.05	15.083	3.26	21.17	1.31
3.000	1.41	9.083	3.05	15.167	3.26	21.25	1.31
3.083	1.41	9.167	3.05	15.250	3.26	21.33	1.31
3.167	1.41	9.250	3.05	15.333	3.26	21.42	1.31
3.250	1.41	9.333	3.48	15.417	3.26	21.50	1.31
3.333	1.41	9.417	3.48	15.500	3.26	21.58	1.31
3.417	1.41	9.500	3.48	15.583	3.26	21.67	1.31
3.500	1.41	9.583	3.48	15.667	3.26	21.75	1.31
3.583	1.41	9.667	3.48	15.750	3.26	21.83	1.31
3.667	1.41	9.750	3.48	15.833	3.26	21.92	1.31
3.750	1.41	9.833	3.92	15.917	3.26	22.00	1.31
3.833	1.41	9.917	3.92	16.000	3.26	22.08	1.31
3.917	1.41	10.000	3.92	16.083	3.26	22.17	1.31
4.000	1.41	10.083	3.92	16.167	3.26	22.25	1.31
4.083	1.41	10.167	3.92	16.250	3.26	22.33	1.31
4.167	1.41	10.250	3.92	16.333	1.96	22.42	1.31
4.250	1.41	10.333	5.00	16.417	1.96	22.50	1.31
4.333	1.74	10.417	5.00	16.500	1.96	22.58	1.31
4.417	1.74	10.500	5.00	16.583	1.96	22.67	1.31
4.500	1.74	10.583	5.00	16.667	1.96	22.75	1.31
4.583	1.74	10.667	5.00	16.750	1.96	22.83	1.31
4.667	1.74	10.750	5.00	16.833	1.96	22.92	1.31

PRE-DEVELOPMENT
VO OUTPUT

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                4.750    1.74 |10.833    6.75 |16.917    1.96 | 23.00    1.31
                4.833    1.74 |10.917    6.75 |17.000    1.96 | 23.08    1.31
                4.917    1.74 |11.000    6.75 |17.083    1.96 | 23.17    1.31
                5.000    1.74 |11.083    6.75 |17.167    1.96 | 23.25    1.31
                5.083    1.74 |11.167    6.75 |17.250    1.96 | 23.33    1.31
                5.167    1.74 |11.250    6.75 |17.333    1.96 | 23.42    1.31
                5.250    1.74 |11.333   10.44 |17.417    1.96 | 23.50    1.31
                5.333    1.74 |11.417   10.44 |17.500    1.96 | 23.58    1.31
                5.417    1.74 |11.500   10.44 |17.583    1.96 | 23.67    1.31
                5.500    1.74 |11.583   10.44 |17.667    1.96 | 23.75    1.31
                5.583    1.74 |11.667   10.44 |17.750    1.96 | 23.83    1.31
                5.667    1.74 |11.750   10.44 |17.833    1.96 | 23.92    1.31
                5.750    1.74 |11.833   32.20 |17.917    1.96 | 24.00    1.31
                5.833    1.74 |11.917   32.20 |18.000    1.96 | 24.08    1.31
                5.917    1.74 |12.000   32.20 |18.083    1.96 | 24.17    1.31
                6.000    1.74 |12.083  133.16 |18.167    1.96 | 24.25    1.31
                6.083    1.74 |12.167  133.17 |18.250    1.96 |

     Unit Hyd Qpeak  (cms)=   0.840

     PEAK FLOW       (cms)=   0.952 (i)
     TIME TO PEAK    (hrs)=  12.750
     RUNOFF VOLUME    (mm)=  59.749
     TOTAL RAINFALL   (mm)= 108.800
     RUNOFF COEFFICIENT   =   0.549

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

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| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   1.73   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         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    0.00 | 6.167    1.74 |12.250  133.17 | 18.33    1.96
                0.167    0.00 | 6.250    1.74 |12.333   15.68 | 18.42    1.96
                0.250    0.00 | 6.333    1.96 |12.417   15.67 | 18.50    1.96
                0.333    1.20 | 6.417    1.96 |12.500   15.67 | 18.58    1.96
                0.417    1.20 | 6.500    1.96 |12.583   15.67 | 18.67    1.96
                0.500    1.20 | 6.583    1.96 |12.667   15.67 | 18.75    1.96
                0.583    1.20 | 6.667    1.96 |12.750   15.67 | 18.83    1.96
                0.667    1.20 | 6.750    1.96 |12.833    8.05 | 18.92    1.96
                0.750    1.20 | 6.833    1.96 |12.917    8.05 | 19.00    1.96
                0.833    1.20 | 6.917    1.96 |13.000    8.05 | 19.08    1.96
                0.917    1.20 | 7.000    1.96 |13.083    8.05 | 19.17    1.96
                1.000    1.20 | 7.083    1.96 |13.167    8.05 | 19.25    1.96
                1.083    1.20 | 7.167    1.96 |13.250    8.05 | 19.33    1.96
                1.167    1.20 | 7.250    1.96 |13.333    5.88 | 19.42    1.96
                1.250    1.20 | 7.333    2.39 |13.417    5.88 | 19.50    1.96
                1.333    1.20 | 7.417    2.39 |13.500    5.88 | 19.58    1.96
                1.417    1.20 | 7.500    2.39 |13.583    5.88 | 19.67    1.96
                1.500    1.20 | 7.583    2.39 |13.667    5.88 | 19.75    1.96
                1.583    1.20 | 7.667    2.39 |13.750    5.88 | 19.83    1.96
                1.667    1.20 | 7.750    2.39 |13.833    4.57 | 19.92    1.96
                1.750    1.20 | 7.833    2.39 |13.917    4.57 | 20.00    1.96
                1.833    1.20 | 7.917    2.39 |14.000    4.57 | 20.08    1.96
                1.917    1.20 | 8.000    2.39 |14.083    4.57 | 20.17    1.96
                2.000    1.20 | 8.083    2.39 |14.167    4.57 | 20.25    1.96
                2.083    1.20 | 8.167    2.39 |14.250    4.57 | 20.33    1.31
                2.167    1.20 | 8.250    2.39 |14.333    3.26 | 20.42    1.31
                2.250    1.20 | 8.333    2.83 |14.417    3.26 | 20.50    1.31
                2.333    1.41 | 8.417    2.83 |14.500    3.26 | 20.58    1.31
                2.417    1.41 | 8.500    2.83 |14.583    3.26 | 20.67    1.31
                2.500    1.41 | 8.583    2.83 |14.667    3.26 | 20.75    1.31
                2.583    1.41 | 8.667    2.83 |14.750    3.26 | 20.83    1.31
                2.667    1.41 | 8.750    2.83 |14.833    3.26 | 20.92    1.31
                2.750    1.41 | 8.833    3.05 |14.917    3.26 | 21.00    1.31
                2.833    1.41 | 8.917    3.05 |15.000    3.26 | 21.08    1.31
                2.917    1.41 | 9.000    3.05 |15.083    3.26 | 21.17    1.31
                3.000    1.41 | 9.083    3.05 |15.167    3.26 | 21.25    1.31
                3.083    1.41 | 9.167    3.05 |15.250    3.26 | 21.33    1.31
                3.167    1.41 | 9.250    3.05 |15.333    3.26 | 21.42    1.31
                3.250    1.41 | 9.333    3.48 |15.417    3.26 | 21.50    1.31
                3.333    1.41 | 9.417    3.48 |15.500    3.26 | 21.58    1.31
                3.417    1.41 | 9.500    3.48 |15.583    3.26 | 21.67    1.31
                3.500    1.41 | 9.583    3.48 |15.667    3.26 | 21.75    1.31
                3.583    1.41 | 9.667    3.48 |15.750    3.26 | 21.83    1.31
                3.667    1.41 | 9.750    3.48 |15.833    3.26 | 21.92    1.31
                3.750    1.41 | 9.833    3.92 |15.917    3.26 | 22.00    1.31
                3.833    1.41 | 9.917    3.92 |16.000    3.26 | 22.08    1.31
                3.917    1.41 |10.000    3.92 |16.083    3.26 | 22.17    1.31
                4.000    1.41 |10.083    3.92 |16.167    3.26 | 22.25    1.31
                4.083    1.41 |10.167    3.92 |16.250    3.26 | 22.33    1.31
                4.167    1.41 |10.250    3.92 |16.333    1.96 | 22.42    1.31
                4.250    1.41 |10.333    5.00 |16.417    1.96 | 22.50    1.31
                4.333    1.74 |10.417    5.00 |16.500    1.96 | 22.58    1.31
                4.417    1.74 |10.500    5.00 |16.583    1.96 | 22.67    1.31
                4.500    1.74 |10.583    5.00 |16.667    1.96 | 22.75    1.31
                4.583    1.74 |10.667    5.00 |16.750    1.96 | 22.83    1.31
                4.667    1.74 |10.750    5.00 |16.833    1.96 | 22.92    1.31
                4.750    1.74 |10.833    6.75 |16.917    1.96 | 23.00    1.31
                4.833    1.74 |10.917    6.75 |17.000    1.96 | 23.08    1.31
                4.917    1.74 |11.000    6.75 |17.083    1.96 | 23.17    1.31
                5.000    1.74 |11.083    6.75 |17.167    1.96 | 23.25    1.31
                5.083    1.74 |11.167    6.75 |17.250    1.96 | 23.33    1.31
                5.167    1.74 |11.250    6.75 |17.333    1.96 | 23.42    1.31
                5.250    1.74 |11.333   10.44 |17.417    1.96 | 23.50    1.31
                5.333    1.74 |11.417   10.44 |17.500    1.96 | 23.58    1.31
                5.417    1.74 |11.500   10.44 |17.583    1.96 | 23.67    1.31
                5.500    1.74 |11.583   10.44 |17.667    1.96 | 23.75    1.31
                5.583    1.74 |11.667   10.44 |17.750    1.96 | 23.83    1.31
                5.667    1.74 |11.750   10.44 |17.833    1.96 | 23.92    1.31
                5.750    1.74 |11.833   32.20 |17.917    1.96 | 24.00    1.31
                5.833    1.74 |11.917   32.20 |18.000    1.96 | 24.08    1.31
                5.917    1.74 |12.000   32.20 |18.083    1.96 | 24.17    1.31
                6.000    1.74 |12.083  133.16 |18.167    1.96 | 24.25    1.31
                6.083    1.74 |12.167  133.17 |18.250    1.96 |

     Unit Hyd Qpeak  (cms)=   0.367

     PEAK FLOW       (cms)=   0.283 (i)
     TIME TO PEAK    (hrs)=  12.333
     RUNOFF VOLUME    (mm)=  59.579
     TOTAL RAINFALL   (mm)= 108.800
     RUNOFF COEFFICIENT   =   0.548

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

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**********************************************
** SIMULATION:K. 50yr 24hr 15min SCS Type II **
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--------------------
|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              1efe7ebf-9833-4646-8513-d85df50f339b\15b81333
| Ptotal=120.77 mm |    Comments: K. 50yr 24hr 15min SCS Type II
--------------------
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.00    0.00 |  6.25    2.17 | 12.50   17.39 | 18.75    2.17
                 0.25    1.33 |  6.50    2.17 | 12.75    8.94 | 19.00    2.17
                 0.50    1.33 |  6.75    2.17 | 13.00    8.94 | 19.25    2.17
                 0.75    1.33 |  7.00    2.17 | 13.25    6.52 | 19.50    2.17
                 1.00    1.33 |  7.25    2.66 | 13.50    6.52 | 19.75    2.17
                 1.25    1.33 |  7.50    2.66 | 13.75    5.07 | 20.00    2.17
                 1.50    1.33 |  7.75    2.66 | 14.00    5.07 | 20.25    1.45
                 1.75    1.33 |  8.00    2.66 | 14.25    3.62 | 20.50    1.45
                 2.00    1.33 |  8.25    3.14 | 14.50    3.62 | 20.75    1.45
                 2.25    1.57 |  8.50    3.14 | 14.75    3.62 | 21.00    1.45
                 2.50    1.57 |  8.75    3.38 | 15.00    3.62 | 21.25    1.45
                 2.75    1.57 |  9.00    3.38 | 15.25    3.62 | 21.50    1.45
                 3.00    1.57 |  9.25    3.86 | 15.50    3.62 | 21.75    1.45
                 3.25    1.57 |  9.50    3.86 | 15.75    3.62 | 22.00    1.45
                 3.50    1.57 |  9.75    4.35 | 16.00    3.62 | 22.25    1.45
                 3.75    1.57 | 10.00    4.35 | 16.25    2.17 | 22.50    1.45
                 4.00    1.57 | 10.25    5.56 | 16.50    2.17 | 22.75    1.45
                 4.25    1.93 | 10.50    5.56 | 16.75    2.17 | 23.00    1.45
                 4.50    1.93 | 10.75    7.49 | 17.00    2.17 | 23.25    1.45
                 4.75    1.93 | 11.00    7.49 | 17.25    2.17 | 23.50    1.45
                 5.00    1.93 | 11.25   11.59 | 17.50    2.17 | 23.75    1.45
                 5.25    1.93 | 11.50   11.59 | 17.75    2.17 | 24.00    1.45
                 5.50    1.93 | 11.75   35.75 | 18.00    2.17 |
                 5.75    1.93 | 12.00  147.82 | 18.25    2.17 |
                 6.00    1.93 | 12.25   17.39 | 18.50    2.17 |

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| CALIB            |
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PRE-DEVELOPMENT
VO OUTPUT

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| NASHYD   (  0002)|   Area     (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61
```

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	0.00	6.167	1.93	12.250	147.82	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.41	18.42	2.17
0.250	0.00	6.333	2.17	12.417	17.39	18.50	2.17
0.333	1.33	6.417	2.17	12.500	17.39	18.58	2.17
0.417	1.33	6.500	2.17	12.583	17.39	18.67	2.17
0.500	1.33	6.583	2.17	12.667	17.39	18.75	2.17
0.583	1.33	6.667	2.17	12.750	17.39	18.83	2.17
0.667	1.33	6.750	2.17	12.833	8.94	18.92	2.17
0.750	1.33	6.833	2.17	12.917	8.94	19.00	2.17
0.833	1.33	6.917	2.17	13.000	8.94	19.08	2.17
0.917	1.33	7.000	2.17	13.083	8.94	19.17	2.17
1.000	1.33	7.083	2.17	13.167	8.94	19.25	2.17
1.083	1.33	7.167	2.17	13.250	8.94	19.33	2.17
1.167	1.33	7.250	2.17	13.333	6.52	19.42	2.17
1.250	1.33	7.333	2.66	13.417	6.52	19.50	2.17
1.333	1.33	7.417	2.66	13.500	6.52	19.58	2.17
1.417	1.33	7.500	2.66	13.583	6.52	19.67	2.17
1.500	1.33	7.583	2.66	13.667	6.52	19.75	2.17
1.583	1.33	7.667	2.66	13.750	6.52	19.83	2.17
1.667	1.33	7.750	2.66	13.833	5.07	19.92	2.17
1.750	1.33	7.833	2.66	13.917	5.07	20.00	2.17
1.833	1.33	7.917	2.66	14.000	5.07	20.08	2.17
1.917	1.33	8.000	2.66	14.083	5.07	20.17	2.17
2.000	1.33	8.083	2.66	14.167	5.07	20.25	2.17
2.083	1.33	8.167	2.66	14.250	5.07	20.33	1.45
2.167	1.33	8.250	2.66	14.333	3.62	20.42	1.45
2.250	1.33	8.333	3.14	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.14	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.14	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.14	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.14	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.14	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.38	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.38	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.38	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.38	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.38	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.38	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.35	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.35	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.35	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.35	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.35	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.35	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.56	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.56	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.56	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.56	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.56	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.56	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.49	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.49	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.49	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.49	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.49	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.49	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.59	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.59	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.59	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.59	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.59	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.59	17.833	2.17	23.92	1.45
5.750	1.93	11.833	35.75	17.917	2.17	24.00	1.45
5.833	1.93	11.917	35.75	18.000	2.17	24.08	1.45
5.917	1.93	12.000	35.75	18.083	2.17	24.17	1.45
6.000	1.93	12.083	147.81	18.167	2.17	24.25	1.45
6.083	1.93	12.167	147.82	18.250	2.17		

```
Unit Hyd Qpeak  (cms)=   0.840

PEAK FLOW       (cms)=   1.115 (i)
TIME TO PEAK    (hrs)=  12.750
RUNOFF VOLUME    (mm)=  69.808
TOTAL RAINFALL   (mm)= 120.770
RUNOFF COEFFICIENT   =   0.578

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

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--------------------
| CALIB            |
| NASHYD   (  0004)|   Area     (ha)=   1.73   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18
```

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	0.00	6.167	1.93	12.250	147.82	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.41	18.42	2.17
0.250	0.00	6.333	2.17	12.417	17.39	18.50	2.17
0.333	1.33	6.417	2.17	12.500	17.39	18.58	2.17
0.417	1.33	6.500	2.17	12.583	17.39	18.67	2.17
0.500	1.33	6.583	2.17	12.667	17.39	18.75	2.17
0.583	1.33	6.667	2.17	12.750	17.39	18.83	2.17
0.667	1.33	6.750	2.17	12.833	8.94	18.92	2.17
0.750	1.33	6.833	2.17	12.917	8.94	19.00	2.17
0.833	1.33	6.917	2.17	13.000	8.94	19.08	2.17
0.917	1.33	7.000	2.17	13.083	8.94	19.17	2.17
1.000	1.33	7.083	2.17	13.167	8.94	19.25	2.17
1.083	1.33	7.167	2.17	13.250	8.94	19.33	2.17
1.167	1.33	7.250	2.17	13.333	6.52	19.42	2.17
1.250	1.33	7.333	2.66	13.417	6.52	19.50	2.17
1.333	1.33	7.417	2.66	13.500	6.52	19.58	2.17
1.417	1.33	7.500	2.66	13.583	6.52	19.67	2.17
1.500	1.33	7.583	2.66	13.667	6.52	19.75	2.17
1.583	1.33	7.667	2.66	13.750	6.52	19.83	2.17
1.667	1.33	7.750	2.66	13.833	5.07	19.92	2.17
1.750	1.33	7.833	2.66	13.917	5.07	20.00	2.17
1.833	1.33	7.917	2.66	14.000	5.07	20.08	2.17
1.917	1.33	8.000	2.66	14.083	5.07	20.17	2.17
2.000	1.33	8.083	2.66	14.167	5.07	20.25	2.17
2.083	1.33	8.167	2.66	14.250	5.07	20.33	1.45
2.167	1.33	8.250	2.66	14.333	3.62	20.42	1.45
2.250	1.33	8.333	3.14	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.14	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.14	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.14	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.14	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.14	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.38	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.38	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.38	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.38	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.38	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.38	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.35	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.35	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.35	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.35	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.35	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.35	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.56	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.56	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.56	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.56	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.56	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.56	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.49	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.49	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.49	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.49	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.49	17.250	2.17	23.33	1.45

PRE-DEVELOPMENT
VO OUTPUT

```
                5.167    1.93 |11.250    7.49 |17.333    2.17 | 23.42    1.45
                5.250    1.93 |11.333   11.59 |17.417    2.17 | 23.50    1.45
                5.333    1.93 |11.417   11.59 |17.500    2.17 | 23.58    1.45
                5.417    1.93 |11.500   11.59 |17.583    2.17 | 23.67    1.45
                5.500    1.93 |11.583   11.59 |17.667    2.17 | 23.75    1.45
                5.583    1.93 |11.667   11.59 |17.750    2.17 | 23.83    1.45
                5.667    1.93 |11.750   11.59 |17.833    2.17 | 23.92    1.45
                5.750    1.93 |11.833   35.75 |17.917    2.17 | 24.00    1.45
                5.833    1.93 |11.917   35.75 |18.000    2.17 | 24.08    1.45
                5.917    1.93 |12.000   35.75 |18.083    2.17 | 24.17    1.45
                6.000    1.93 |12.083  147.81 |18.167    2.17 | 24.25    1.45
                6.083    1.93 |12.167  147.82 |18.250    2.17 |

     Unit Hyd Qpeak  (cms)=   0.367

     PEAK FLOW       (cms)=   0.331 (i)
     TIME TO PEAK    (hrs)=  12.333
     RUNOFF VOLUME    (mm)=  69.610
     TOTAL RAINFALL   (mm)= 120.770
     RUNOFF COEFFICIENT   =   0.576

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

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************************************************
** SIMULATION:L. 100yr 24hr 15min SCS Type II **
************************************************

--------------------
|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              1efe7ebf-9833-4646-8513-d85df50f339b\15758074
| Ptotal=132.74 mm |    Comments: L. 100yr 24hr 15min SCS Type II
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  6.25    2.39 | 12.50   19.11 | 18.75    2.39
                0.25    1.46 |  6.50    2.39 | 12.75    9.82 | 19.00    2.39
                0.50    1.46 |  6.75    2.39 | 13.00    9.82 | 19.25    2.39
                0.75    1.46 |  7.00    2.39 | 13.25    7.17 | 19.50    2.39
                1.00    1.46 |  7.25    2.92 | 13.50    7.17 | 19.75    2.39
                1.25    1.46 |  7.50    2.92 | 13.75    5.58 | 20.00    2.39
                1.50    1.46 |  7.75    2.92 | 14.00    5.58 | 20.25    1.59
                1.75    1.46 |  8.00    2.92 | 14.25    3.98 | 20.50    1.59
                2.00    1.46 |  8.25    3.45 | 14.50    3.98 | 20.75    1.59
                2.25    1.73 |  8.50    3.45 | 14.75    3.98 | 21.00    1.59
                2.50    1.73 |  8.75    3.72 | 15.00    3.98 | 21.25    1.59
                2.75    1.73 |  9.00    3.72 | 15.25    3.98 | 21.50    1.59
                3.00    1.73 |  9.25    4.25 | 15.50    3.98 | 21.75    1.59
                3.25    1.73 |  9.50    4.25 | 15.75    3.98 | 22.00    1.59
                3.50    1.73 |  9.75    4.78 | 16.00    3.98 | 22.25    1.59
                3.75    1.73 | 10.00    4.78 | 16.25    2.39 | 22.50    1.59
                4.00    1.73 | 10.25    6.11 | 16.50    2.39 | 22.75    1.59
                4.25    2.12 | 10.50    6.11 | 16.75    2.39 | 23.00    1.59
                4.50    2.12 | 10.75    8.23 | 17.00    2.39 | 23.25    1.59
                4.75    2.12 | 11.00    8.23 | 17.25    2.39 | 23.50    1.59
                5.00    2.12 | 11.25   12.74 | 17.50    2.39 | 23.75    1.59
                5.25    2.12 | 11.50   12.74 | 17.75    2.39 | 24.00    1.59
                5.50    2.12 | 11.75   39.29 | 18.00    2.39 |
                5.75    2.12 | 12.00  162.47 | 18.25    2.39 |
                6.00    2.12 | 12.25   19.11 | 18.50    2.39 |

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| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=  13.41   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

         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    0.00 | 6.167    2.12 |12.250  162.47 | 18.33    2.39
                0.167    0.00 | 6.250    2.12 |12.333   19.13 | 18.42    2.39
                0.250    0.00 | 6.333    2.39 |12.417   19.11 | 18.50    2.39
                0.333    1.46 | 6.417    2.39 |12.500   19.11 | 18.58    2.39
                0.417    1.46 | 6.500    2.39 |12.583   19.11 | 18.67    2.39
                0.500    1.46 | 6.583    2.39 |12.667   19.11 | 18.75    2.39
                0.583    1.46 | 6.667    2.39 |12.750   19.11 | 18.83    2.39
                0.667    1.46 | 6.750    2.39 |12.833    9.82 | 18.92    2.39
                0.750    1.46 | 6.833    2.39 |12.917    9.82 | 19.00    2.39
                0.833    1.46 | 6.917    2.39 |13.000    9.82 | 19.08    2.39
                0.917    1.46 | 7.000    2.39 |13.083    9.82 | 19.17    2.39
                1.000    1.46 | 7.083    2.39 |13.167    9.82 | 19.25    2.39
                1.083    1.46 | 7.167    2.39 |13.250    9.82 | 19.33    2.39
                1.167    1.46 | 7.250    2.39 |13.333    7.17 | 19.42    2.39
                1.250    1.46 | 7.333    2.92 |13.417    7.17 | 19.50    2.39
                1.333    1.46 | 7.417    2.92 |13.500    7.17 | 19.58    2.39
                1.417    1.46 | 7.500    2.92 |13.583    7.17 | 19.67    2.39
                1.500    1.46 | 7.583    2.92 |13.667    7.17 | 19.75    2.39
                1.583    1.46 | 7.667    2.92 |13.750    7.17 | 19.83    2.39
                1.667    1.46 | 7.750    2.92 |13.833    5.58 | 19.92    2.39
                1.750    1.46 | 7.833    2.92 |13.917    5.58 | 20.00    2.39
                1.833    1.46 | 7.917    2.92 |14.000    5.58 | 20.08    2.39
                1.917    1.46 | 8.000    2.92 |14.083    5.58 | 20.17    2.39
                2.000    1.46 | 8.083    2.92 |14.167    5.58 | 20.25    2.39
                2.083    1.46 | 8.167    2.92 |14.250    5.58 | 20.33    1.59
                2.167    1.46 | 8.250    2.92 |14.333    3.98 | 20.42    1.59
                2.250    1.46 | 8.333    3.45 |14.417    3.98 | 20.50    1.59
                2.333    1.73 | 8.417    3.45 |14.500    3.98 | 20.58    1.59
                2.417    1.73 | 8.500    3.45 |14.583    3.98 | 20.67    1.59
                2.500    1.73 | 8.583    3.45 |14.667    3.98 | 20.75    1.59
                2.583    1.73 | 8.667    3.45 |14.750    3.98 | 20.83    1.59
                2.667    1.73 | 8.750    3.45 |14.833    3.98 | 20.92    1.59
                2.750    1.73 | 8.833    3.72 |14.917    3.98 | 21.00    1.59
                2.833    1.73 | 8.917    3.72 |15.000    3.98 | 21.08    1.59
                2.917    1.73 | 9.000    3.72 |15.083    3.98 | 21.17    1.59
                3.000    1.73 | 9.083    3.72 |15.167    3.98 | 21.25    1.59
                3.083    1.73 | 9.167    3.72 |15.250    3.98 | 21.33    1.59
                3.167    1.73 | 9.250    3.72 |15.333    3.98 | 21.42    1.59
                3.250    1.73 | 9.333    4.25 |15.417    3.98 | 21.50    1.59
                3.333    1.73 | 9.417    4.25 |15.500    3.98 | 21.58    1.59
                3.417    1.73 | 9.500    4.25 |15.583    3.98 | 21.67    1.59
                3.500    1.73 | 9.583    4.25 |15.667    3.98 | 21.75    1.59
                3.583    1.73 | 9.667    4.25 |15.750    3.98 | 21.83    1.59
                3.667    1.73 | 9.750    4.25 |15.833    3.98 | 21.92    1.59
                3.750    1.73 | 9.833    4.78 |15.917    3.98 | 22.00    1.59
                3.833    1.73 | 9.917    4.78 |16.000    3.98 | 22.08    1.59
                3.917    1.73 |10.000    4.78 |16.083    3.98 | 22.17    1.59
                4.000    1.73 |10.083    4.78 |16.167    3.98 | 22.25    1.59
                4.083    1.73 |10.167    4.78 |16.250    3.98 | 22.33    1.59
                4.167    1.73 |10.250    4.78 |16.333    2.39 | 22.42    1.59
                4.250    1.73 |10.333    6.11 |16.417    2.39 | 22.50    1.59
                4.333    2.12 |10.417    6.11 |16.500    2.39 | 22.58    1.59
                4.417    2.12 |10.500    6.11 |16.583    2.39 | 22.67    1.59
                4.500    2.12 |10.583    6.11 |16.667    2.39 | 22.75    1.59
                4.583    2.12 |10.667    6.11 |16.750    2.39 | 22.83    1.59
                4.667    2.12 |10.750    6.11 |16.833    2.39 | 22.92    1.59
                4.750    2.12 |10.833    8.23 |16.917    2.39 | 23.00    1.59
                4.833    2.12 |10.917    8.23 |17.000    2.39 | 23.08    1.59
                4.917    2.12 |11.000    8.23 |17.083    2.39 | 23.17    1.59
                5.000    2.12 |11.083    8.23 |17.167    2.39 | 23.25    1.59
                5.083    2.12 |11.167    8.23 |17.250    2.39 | 23.33    1.59
                5.167    2.12 |11.250    8.23 |17.333    2.39 | 23.42    1.59
                5.250    2.12 |11.333   12.74 |17.417    2.39 | 23.50    1.59
                5.333    2.12 |11.417   12.74 |17.500    2.39 | 23.58    1.59
                5.417    2.12 |11.500   12.74 |17.583    2.39 | 23.67    1.59
                5.500    2.12 |11.583   12.74 |17.667    2.39 | 23.75    1.59
                5.583    2.12 |11.667   12.74 |17.750    2.39 | 23.83    1.59
                5.667    2.12 |11.750   12.74 |17.833    2.39 | 23.92    1.59
                5.750    2.12 |11.833   39.29 |17.917    2.39 | 24.00    1.59
                5.833    2.12 |11.917   39.29 |18.000    2.39 | 24.08    1.59
                5.917    2.12 |12.000   39.29 |18.083    2.39 | 24.17    1.59
                6.000    2.12 |12.083  162.46 |18.167    2.39 | 24.25    1.59
                6.083    2.12 |12.167  162.47 |18.250    2.39 |

     Unit Hyd Qpeak  (cms)=   0.840

     PEAK FLOW       (cms)=   1.282 (i)
     TIME TO PEAK    (hrs)=  12.750
     RUNOFF VOLUME    (mm)=  80.100
     TOTAL RAINFALL   (mm)= 132.740
     RUNOFF COEFFICIENT   =   0.603

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

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--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   1.73   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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PRE-DEVELOPMENT
VO OUTPUT

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	2.12	12.250	162.47	18.33	2.39
0.167	0.00	6.250	2.12	12.333	19.13	18.42	2.39
0.250	0.00	6.333	2.39	12.417	19.11	18.50	2.39
0.333	1.46	6.417	2.39	12.500	19.11	18.58	2.39
0.417	1.46	6.500	2.39	12.583	19.11	18.67	2.39
0.500	1.46	6.583	2.39	12.667	19.11	18.75	2.39
0.583	1.46	6.667	2.39	12.750	19.11	18.83	2.39
0.667	1.46	6.750	2.39	12.833	9.82	18.92	2.39
0.750	1.46	6.833	2.39	12.917	9.82	19.00	2.39
0.833	1.46	6.917	2.39	13.000	9.82	19.08	2.39
0.917	1.46	7.000	2.39	13.083	9.82	19.17	2.39
1.000	1.46	7.083	2.39	13.167	9.82	19.25	2.39
1.083	1.46	7.167	2.39	13.250	9.82	19.33	2.39
1.167	1.46	7.250	2.39	13.333	7.17	19.42	2.39
1.250	1.46	7.333	2.92	13.417	7.17	19.50	2.39
1.333	1.46	7.417	2.92	13.500	7.17	19.58	2.39
1.417	1.46	7.500	2.92	13.583	7.17	19.67	2.39
1.500	1.46	7.583	2.92	13.667	7.17	19.75	2.39
1.583	1.46	7.667	2.92	13.750	7.17	19.83	2.39
1.667	1.46	7.750	2.92	13.833	5.58	19.92	2.39
1.750	1.46	7.833	2.92	13.917	5.58	20.00	2.39
1.833	1.46	7.917	2.92	14.000	5.58	20.08	2.39
1.917	1.46	8.000	2.92	14.083	5.58	20.17	2.39
2.000	1.46	8.083	2.92	14.167	5.58	20.25	2.39
2.083	1.46	8.167	2.92	14.250	5.58	20.33	1.59
2.167	1.46	8.250	2.92	14.333	3.98	20.42	1.59
2.250	1.46	8.333	3.45	14.417	3.98	20.50	1.59
2.333	1.73	8.417	3.45	14.500	3.98	20.58	1.59
2.417	1.73	8.500	3.45	14.583	3.98	20.67	1.59
2.500	1.73	8.583	3.45	14.667	3.98	20.75	1.59
2.583	1.73	8.667	3.45	14.750	3.98	20.83	1.59
2.667	1.73	8.750	3.45	14.833	3.98	20.92	1.59
2.750	1.73	8.833	3.72	14.917	3.98	21.00	1.59
2.833	1.73	8.917	3.72	15.000	3.98	21.08	1.59
2.917	1.73	9.000	3.72	15.083	3.98	21.17	1.59
3.000	1.73	9.083	3.72	15.167	3.98	21.25	1.59
3.083	1.73	9.167	3.72	15.250	3.98	21.33	1.59
3.167	1.73	9.250	3.72	15.333	3.98	21.42	1.59
3.250	1.73	9.333	4.25	15.417	3.98	21.50	1.59
3.333	1.73	9.417	4.25	15.500	3.98	21.58	1.59
3.417	1.73	9.500	4.25	15.583	3.98	21.67	1.59
3.500	1.73	9.583	4.25	15.667	3.98	21.75	1.59
3.583	1.73	9.667	4.25	15.750	3.98	21.83	1.59
3.667	1.73	9.750	4.25	15.833	3.98	21.92	1.59
3.750	1.73	9.833	4.78	15.917	3.98	22.00	1.59
3.833	1.73	9.917	4.78	16.000	3.98	22.08	1.59
3.917	1.73	10.000	4.78	16.083	3.98	22.17	1.59
4.000	1.73	10.083	4.78	16.167	3.98	22.25	1.59
4.083	1.73	10.167	4.78	16.250	3.98	22.33	1.59
4.167	1.73	10.250	4.78	16.333	2.39	22.42	1.59
4.250	1.73	10.333	6.11	16.417	2.39	22.50	1.59
4.333	2.12	10.417	6.11	16.500	2.39	22.58	1.59
4.417	2.12	10.500	6.11	16.583	2.39	22.67	1.59
4.500	2.12	10.583	6.11	16.667	2.39	22.75	1.59
4.583	2.12	10.667	6.11	16.750	2.39	22.83	1.59
4.667	2.12	10.750	6.11	16.833	2.39	22.92	1.59
4.750	2.12	10.833	8.23	16.917	2.39	23.00	1.59
4.833	2.12	10.917	8.23	17.000	2.39	23.08	1.59
4.917	2.12	11.000	8.23	17.083	2.39	23.17	1.59
5.000	2.12	11.083	8.23	17.167	2.39	23.25	1.59
5.083	2.12	11.167	8.23	17.250	2.39	23.33	1.59
5.167	2.12	11.250	8.23	17.333	2.39	23.42	1.59
5.250	2.12	11.333	12.74	17.417	2.39	23.50	1.59
5.333	2.12	11.417	12.74	17.500	2.39	23.58	1.59
5.417	2.12	11.500	12.74	17.583	2.39	23.67	1.59
5.500	2.12	11.583	12.74	17.667	2.39	23.75	1.59
5.583	2.12	11.667	12.74	17.750	2.39	23.83	1.59
5.667	2.12	11.750	12.74	17.833	2.39	23.92	1.59
5.750	2.12	11.833	39.29	17.917	2.39	24.00	1.59
5.833	2.12	11.917	39.29	18.000	2.39	24.08	1.59
5.917	2.12	12.000	39.29	18.083	2.39	24.17	1.59
6.000	2.12	12.083	162.46	18.167	2.39	24.25	1.59
6.083	2.12	12.167	162.47	18.250	2.39		

Unit Hyd Qpeak (cms)= 0.367

PEAK FLOW (cms)= 0.379 (i)
TIME TO PEAK (hrs)= 12.333
RUNOFF VOLUME (mm)= 79.873

TOTAL RAINFALL (mm)= 132.740
RUNOFF COEFFICIENT = 0.602

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

POST-DEVELOPMENT VO OUTPUT

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********************************
** SIMULATION:25mm            **
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--------------------
|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              6ff94430-c332-4994-803a-bcaaae5f0e27\6945257d
| Ptotal= 24.99 mm |    Comments: 25mm
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    1.36 |  1.00    6.91 |  2.00    4.18 |  3.00    1.86
                0.08    1.45 |  1.08   11.02 |  2.08    3.77 |  3.08    1.78
                0.17    1.55 |  1.17   26.16 |  2.17    3.43 |  3.17    1.71
                0.25    1.67 |  1.25   76.07 |  2.25    3.16 |  3.25    1.64
                0.33    1.81 |  1.33   33.71 |  2.33    2.92 |  3.33    1.58
                0.42    1.99 |  1.42   18.64 |  2.42    2.72 |  3.42    1.52
                0.50    2.20 |  1.50   12.61 |  2.50    2.55 |  3.50    1.47
                0.58    2.47 |  1.58    9.46 |  2.58    2.39 |  3.58    1.43
                0.67    2.82 |  1.67    7.55 |  2.67    2.26 |  3.67    1.38
                0.75    3.29 |  1.75    6.28 |  2.75    2.14 |  3.75    1.34
                0.83    3.97 |  1.83    5.38 |  2.83    2.04 |  3.83    1.30
                0.92    5.03 |  1.92    4.70 |  2.92    1.94 |  3.92    1.26

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| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.007 (i)
     TIME TO PEAK    (hrs)=   1.500
     RUNOFF VOLUME    (mm)=   3.759
     TOTAL RAINFALL   (mm)=  24.991
     RUNOFF COEFFICIENT   =   0.150

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

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--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

     Unit Hyd Qpeak  (cms)=   0.120

     PEAK FLOW       (cms)=   0.011 (i)
     TIME TO PEAK    (hrs)=   1.917
     RUNOFF VOLUME    (mm)=   4.711
     TOTAL RAINFALL   (mm)=  24.991
     RUNOFF COEFFICIENT   =   0.189

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

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--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                           0.0090      0.0082   |    0.0915      0.0263
                           0.0500      0.0176   |    0.1064      0.0301

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290     0.011      1.92       4.71
   OUTFLOW: ID= 1 (  0038)      1.290     0.004      3.17       4.54

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 31.82
                  TIME SHIFT OF PEAK FLOW         (min)= 75.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0033

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--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.007     1.50     3.76
      + ID2= 2 (  0038):     1.29   0.004     3.17     4.54
        ==================================================
        ID = 3 (  0003):     1.81   0.007     1.50     4.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18         0.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      76.07        21.87
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.12 (ii)   12.89 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.27         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.11         0.03        0.114 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58         1.33
     RUNOFF VOLUME    (mm)=      22.99         6.49        11.32
     TOTAL RAINFALL   (mm)=      24.99        24.99        24.99
     RUNOFF COEFFICIENT   =       0.92         0.26         0.45

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

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

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******************************************
** SIMULATION:A. 2yr 3hr 10min Chicago **
******************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 404.147
| Ptotal= 32.13 mm |                          B=   0.000
--------------------                          C=   0.699
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 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    3.76 |  0.83   80.82 |  1.67    5.83 |  2.50    3.63
                0.17    4.42 |  1.00   17.11 |  1.83    5.15 |  2.67    3.39
                0.33    5.48 |  1.17   10.79 |  2.00    4.63 |  2.83    3.20
                0.50    7.50 |  1.33    8.23 |  2.17    4.23 |
                0.67   13.95 |  1.50    6.78 |  2.33    3.90 |

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

         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    3.76 | 0.833   13.95 | 1.583    6.78 |  2.33    4.23
               0.167    3.76 | 0.917   80.82 | 1.667    6.78 |  2.42    3.90
               0.250    4.42 | 1.000   80.82 | 1.750    5.83 |  2.50    3.90
               0.333    4.42 | 1.083   17.11 | 1.833    5.83 |  2.58    3.63
               0.417    5.48 | 1.167   17.11 | 1.917    5.15 |  2.67    3.63
               0.500    5.48 | 1.250   10.79 | 2.000    5.15 |  2.75    3.39
               0.583    7.50 | 1.333   10.79 | 2.083    4.63 |  2.83    3.39
               0.667    7.50 | 1.417    8.23 | 2.167    4.63 |  2.92    3.20
```

POST-DEVELOPMENT VO OUTPUT

```
                0.750   13.95 | 1.500    8.23 | 2.250    4.23 |  3.00    3.20

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.012 (i)
     TIME TO PEAK    (hrs)=   1.083
     RUNOFF VOLUME    (mm)=   6.474
     TOTAL RAINFALL   (mm)=  32.132
     RUNOFF COEFFICIENT   =   0.201

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

         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    3.76 | 0.833   13.95 | 1.583    6.78 |  2.33    4.23
                0.167    3.76 | 0.917   80.82 | 1.667    6.78 |  2.42    3.90
                0.250    4.42 | 1.000   80.82 | 1.750    5.83 |  2.50    3.90
                0.333    4.42 | 1.083   17.11 | 1.833    5.83 |  2.58    3.63
                0.417    5.48 | 1.167   17.11 | 1.917    5.15 |  2.67    3.63
                0.500    5.48 | 1.250   10.79 | 2.000    5.15 |  2.75    3.39
                0.583    7.50 | 1.333   10.79 | 2.083    4.63 |  2.83    3.39
                0.667    7.50 | 1.417    8.23 | 2.167    4.63 |  2.92    3.20
                0.750   13.95 | 1.500    8.23 | 2.250    4.23 |  3.00    3.20

     Unit Hyd Qpeak  (cms)=   0.120

     PEAK FLOW       (cms)=   0.019 (i)
     TIME TO PEAK    (hrs)=   1.500
     RUNOFF VOLUME    (mm)=   7.921
     TOTAL RAINFALL   (mm)=  32.132
     RUNOFF COEFFICIENT   =   0.247

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                           0.0090      0.0082   |    0.0915      0.0263
                           0.0500      0.0176   |    0.1064      0.0301

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290     0.019      1.50       7.92
   OUTFLOW: ID= 1 (  0038)      1.290     0.006      3.08       7.74

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 34.15
                  TIME SHIFT OF PEAK FLOW         (min)= 95.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0058

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.012     1.08     6.47
      + ID2= 2 (  0038):     1.29   0.006     3.08     7.74
        ===================================================
        ID = 3 (  0003):     1.81   0.013     1.08     7.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18         0.84
```

```
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     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    3.76 | 0.833   13.95 | 1.583    6.78 |  2.33    4.23
                0.167    3.76 | 0.917   80.82 | 1.667    6.78 |  2.42    3.90
                0.250    4.42 | 1.000   80.82 | 1.750    5.83 |  2.50    3.90
                0.333    4.42 | 1.083   17.11 | 1.833    5.83 |  2.58    3.63
                0.417    5.48 | 1.167   17.11 | 1.917    5.15 |  2.67    3.63
                0.500    5.48 | 1.250   10.79 | 2.000    5.15 |  2.75    3.39
                0.583    7.50 | 1.333   10.79 | 2.083    4.63 |  2.83    3.39
                0.667    7.50 | 1.417    8.23 | 2.167    4.63 |  2.92    3.20
                0.750   13.95 | 1.500    8.23 | 2.250    4.23 |  3.00    3.20

     Max.Eff.Inten.(mm/hr)=      80.82        37.79
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.04 (ii)   10.90 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.27         0.09
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.13         0.05         0.152 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.17          1.00
     RUNOFF VOLUME    (mm)=      30.13        10.39         16.17
     TOTAL RAINFALL   (mm)=      32.13        32.13         32.13
     RUNOFF COEFFICIENT   =       0.94         0.32          0.50

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

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

--------------------------------------------------------------------------------
****************************************
** SIMULATION:B. 5yr 3hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 535.364
| Ptotal= 42.56 mm |                           B=   0.000
--------------------                           C=   0.699
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 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     4.98 |  0.83  107.07 |  1.67    7.72 |  2.50    4.80
                0.17     5.86 |  1.00   22.67 |  1.83    6.82 |  2.67    4.50
                0.33     7.26 |  1.17   14.30 |  2.00    6.14 |  2.83    4.24
                0.50     9.93 |  1.33   10.90 |  2.17    5.60 |
                0.67    18.47 |  1.50    8.98 |  2.33    5.16 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

         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    4.98 | 0.833   18.47 | 1.583    8.98 |  2.33    5.60
                0.167    4.98 | 0.917  107.07 | 1.667    8.98 |  2.42    5.16
                0.250    5.86 | 1.000  107.07 | 1.750    7.72 |  2.50    5.16
                0.333    5.86 | 1.083   22.67 | 1.833    7.72 |  2.58    4.80
                0.417    7.26 | 1.167   22.67 | 1.917    6.82 |  2.67    4.80
                0.500    7.26 | 1.250   14.30 | 2.000    6.82 |  2.75    4.50
                0.583    9.93 | 1.333   14.30 | 2.083    6.14 |  2.83    4.50
```

POST-DEVELOPMENT
VO OUTPUT

```
                0.667    9.93 | 1.417   10.90 | 2.167    6.14 |  2.92    4.24
                0.750   18.47 | 1.500   10.90 | 2.250    5.60 |  3.00    4.24

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.023 (i)
     TIME TO PEAK    (hrs)=   1.083
     RUNOFF VOLUME    (mm)=  11.345
     TOTAL RAINFALL   (mm)=  42.565
     RUNOFF COEFFICIENT   =   0.267

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

         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    4.98 | 0.833   18.47 | 1.583    8.98 |  2.33    5.60
                0.167    4.98 | 0.917  107.07 | 1.667    8.98 |  2.42    5.16
                0.250    5.86 | 1.000  107.07 | 1.750    7.72 |  2.50    5.16
                0.333    5.86 | 1.083   22.67 | 1.833    7.72 |  2.58    4.80
                0.417    7.26 | 1.167   22.67 | 1.917    6.82 |  2.67    4.80
                0.500    7.26 | 1.250   14.30 | 2.000    6.82 |  2.75    4.50
                0.583    9.93 | 1.333   14.30 | 2.083    6.14 |  2.83    4.50
                0.667    9.93 | 1.417   10.90 | 2.167    6.14 |  2.92    4.24
                0.750   18.47 | 1.500   10.90 | 2.250    5.60 |  3.00    4.24

     Unit Hyd Qpeak  (cms)=   0.120

     PEAK FLOW       (cms)=   0.033 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  13.552
     TOTAL RAINFALL   (mm)=  42.565
     RUNOFF COEFFICIENT   =   0.318

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                          0.0090      0.0082   |    0.0915      0.0263
                          0.0500      0.0176   |    0.1064      0.0301

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)     1.290     0.033      1.42      13.55
   OUTFLOW: ID= 1 (  0038)     1.290     0.014      2.58      13.38

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.31
                  TIME SHIFT OF PEAK FLOW         (min)= 70.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0093

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.023     1.08    11.34
      + ID2= 2 (  0038):     1.29   0.014     2.58    13.38
        ================================================
        ID = 3 (  0003):     1.81   0.023     1.08    12.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
--------------------
                             IMPERVIOUS    PERVIOUS (i)
```

```
     Surface Area     (ha)=       1.18         0.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     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    4.98 | 0.833   18.47 | 1.583    8.98 |  2.33    5.60
                0.167    4.98 | 0.917  107.07 | 1.667    8.98 |  2.42    5.16
                0.250    5.86 | 1.000  107.07 | 1.750    7.72 |  2.50    5.16
                0.333    5.86 | 1.083   22.67 | 1.833    7.72 |  2.58    4.80
                0.417    7.26 | 1.167   22.67 | 1.917    6.82 |  2.67    4.80
                0.500    7.26 | 1.250   14.30 | 2.000    6.82 |  2.75    4.50
                0.583    9.93 | 1.333   14.30 | 2.083    6.14 |  2.83    4.50
                0.667    9.93 | 1.417   10.90 | 2.167    6.14 |  2.92    4.24
                0.750   18.47 | 1.500   10.90 | 2.250    5.60 |  3.00    4.24

     Max.Eff.Inten.(mm/hr)=     107.07        64.93
           over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.72 (ii)    9.05 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.12
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.17         0.10          0.249 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.00
     RUNOFF VOLUME    (mm)=      40.56        16.98          23.89
     TOTAL RAINFALL   (mm)=      42.56        42.56          42.56
     RUNOFF COEFFICIENT   =       0.95         0.40           0.56

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

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

--------------------------------------------------------------------------------
*****************************************
** SIMULATION:C. 10yr 3hr 10min Chicago **
*****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 622.842
| Ptotal= 49.52 mm |                          B=   0.000
--------------------                          C=   0.699
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 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     5.79 |  0.83  124.56 |  1.67    8.98 |  2.50    5.59
                0.17     6.82 |  1.00   26.38 |  1.83    7.93 |  2.67    5.23
                0.33     8.45 |  1.17   16.63 |  2.00    7.14 |  2.83    4.93
                0.50    11.56 |  1.33   12.68 |  2.17    6.51 |
                0.67    21.49 |  1.50   10.45 |  2.33    6.01 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

         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    5.79 | 0.833   21.49 | 1.583   10.45 |  2.33    6.51
                0.167    5.79 | 0.917  124.56 | 1.667   10.45 |  2.42    6.01
                0.250    6.82 | 1.000  124.56 | 1.750    8.98 |  2.50    6.01
                0.333    6.82 | 1.083   26.38 | 1.833    8.98 |  2.58    5.59
                0.417    8.45 | 1.167   26.38 | 1.917    7.93 |  2.67    5.59
                0.500    8.45 | 1.250   16.63 | 2.000    7.93 |  2.75    5.23
```

POST-DEVELOPMENT
VO OUTPUT

```
                0.583   11.56 | 1.333   16.63 | 2.083    7.14 |  2.83    5.23
                0.667   11.56 | 1.417   12.68 | 2.167    7.14 |  2.92    4.93
                0.750   21.49 | 1.500   12.68 | 2.250    6.51 |  3.00    4.93

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.031 (i)
     TIME TO PEAK    (hrs)=   1.083
     RUNOFF VOLUME    (mm)=  15.076
     TOTAL RAINFALL   (mm)=  49.520
     RUNOFF COEFFICIENT   =   0.304

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

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

         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    5.79 | 0.833   21.49 | 1.583   10.45 |  2.33    6.51
                0.167    5.79 | 0.917  124.56 | 1.667   10.45 |  2.42    6.01
                0.250    6.82 | 1.000  124.56 | 1.750    8.98 |  2.50    6.01
                0.333    6.82 | 1.083   26.38 | 1.833    8.98 |  2.58    5.59
                0.417    8.45 | 1.167   26.38 | 1.917    7.93 |  2.67    5.59
                0.500    8.45 | 1.250   16.63 | 2.000    7.93 |  2.75    5.23
                0.583   11.56 | 1.333   16.63 | 2.083    7.14 |  2.83    5.23
                0.667   11.56 | 1.417   12.68 | 2.167    7.14 |  2.92    4.93
                0.750   21.49 | 1.500   12.68 | 2.250    6.51 |  3.00    4.93

     Unit Hyd Qpeak  (cms)=   0.120

     PEAK FLOW       (cms)=   0.045 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  17.793
     TOTAL RAINFALL   (mm)=  49.520
     RUNOFF COEFFICIENT   =   0.359

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                           0.0090      0.0082   |    0.0915      0.0263
                           0.0500      0.0176   |    0.1064      0.0301

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290     0.045      1.42      17.79
   OUTFLOW: ID= 1 (  0038)      1.290     0.021      2.33      17.62

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 47.81
                  TIME SHIFT OF PEAK FLOW         (min)= 55.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0110

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):      0.52   0.031     1.08    15.08
      + ID2= 2 (  0038):      1.29   0.021     2.33    17.62
        ================================================
        ID = 3 (  0003):      1.81   0.032     1.08    16.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
--------------------
```

```
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18         0.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     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    5.79 | 0.833   21.49 | 1.583   10.45 |  2.33    6.51
                0.167    5.79 | 0.917  124.56 | 1.667   10.45 |  2.42    6.01
                0.250    6.82 | 1.000  124.56 | 1.750    8.98 |  2.50    6.01
                0.333    6.82 | 1.083   26.38 | 1.833    8.98 |  2.58    5.59
                0.417    8.45 | 1.167   26.38 | 1.917    7.93 |  2.67    5.59
                0.500    8.45 | 1.250   16.63 | 2.000    7.93 |  2.75    5.23
                0.583   11.56 | 1.333   16.63 | 2.083    7.14 |  2.83    5.23
                0.667   11.56 | 1.417   12.68 | 2.167    7.14 |  2.92    4.93
                0.750   21.49 | 1.500   12.68 | 2.250    6.51 |  3.00    4.93

     Max.Eff.Inten.(mm/hr)=     124.56        85.39
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.56 (ii)    8.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.20         0.14        0.309 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08         1.00
     RUNOFF VOLUME    (mm)=      47.52        21.83        29.35
     TOTAL RAINFALL   (mm)=      49.52        49.52        49.52
     RUNOFF COEFFICIENT   =       0.96         0.44         0.59

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

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

--------------------------------------------------------------------------------
*****************************************
** SIMULATION:D. 25yr 3hr 10min Chicago **
*****************************************
--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 731.314
| Ptotal= 58.14 mm |                           B=   0.000
--------------------                           C=   0.699
                          used in:   INTENSITY =  A / (t + B)^C

                          Duration of storm  =  3.00 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    6.80 |  0.83  146.25 |  1.67   10.54 |  2.50    6.56
                 0.17    8.01 |  1.00   30.97 |  1.83    9.31 |  2.67    6.14
                 0.33    9.92 |  1.17   19.53 |  2.00    8.38 |  2.83    5.79
                 0.50   13.57 |  1.33   14.89 |  2.17    7.65 |
                 0.67   25.24 |  1.50   12.27 |  2.33    7.05 |


--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

         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    6.80 | 0.833   25.24 | 1.583   12.27 |  2.33    7.65
                0.167    6.80 | 0.917  146.25 | 1.667   12.27 |  2.42    7.05
                0.250    8.01 | 1.000  146.25 | 1.750   10.54 |  2.50    7.05
                0.333    8.01 | 1.083   30.97 | 1.833   10.54 |  2.58    6.56
                0.417    9.92 | 1.167   30.97 | 1.917    9.31 |  2.67    6.56
```

POST-DEVELOPMENT
VO OUTPUT

```
                0.500    9.92 | 1.250   19.53 | 2.000    9.31 |  2.75    6.14
                0.583   13.57 | 1.333   19.53 | 2.083    8.38 |  2.83    6.14
                0.667   13.57 | 1.417   14.89 | 2.167    8.38 |  2.92    5.79
                0.750   25.24 | 1.500   14.89 | 2.250    7.65 |  3.00    5.79

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.043 (i)
     TIME TO PEAK    (hrs)=   1.083
     RUNOFF VOLUME    (mm)=  20.141
     TOTAL RAINFALL   (mm)=  58.144
     RUNOFF COEFFICIENT   =   0.346

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

         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    6.80 | 0.833   25.24 | 1.583   12.27 |  2.33    7.65
                0.167    6.80 | 0.917  146.25 | 1.667   12.27 |  2.42    7.05
                0.250    8.01 | 1.000  146.25 | 1.750   10.54 |  2.50    7.05
                0.333    8.01 | 1.083   30.97 | 1.833   10.54 |  2.58    6.56
                0.417    9.92 | 1.167   30.97 | 1.917    9.31 |  2.67    6.56
                0.500    9.92 | 1.250   19.53 | 2.000    9.31 |  2.75    6.14
                0.583   13.57 | 1.333   19.53 | 2.083    8.38 |  2.83    6.14
                0.667   13.57 | 1.417   14.89 | 2.167    8.38 |  2.92    5.79
                0.750   25.24 | 1.500   14.89 | 2.250    7.65 |  3.00    5.79

     Unit Hyd Qpeak  (cms)=   0.120

     PEAK FLOW       (cms)=   0.060 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  23.478
     TOTAL RAINFALL   (mm)=  58.144
     RUNOFF COEFFICIENT   =   0.404

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                          0.0090      0.0082   |    0.0915      0.0263
                          0.0500      0.0176   |    0.1064      0.0301

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290     0.060      1.42      23.48
   OUTFLOW: ID= 1 (  0038)      1.290     0.031      2.17      23.30

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 52.26
                  TIME SHIFT OF PEAK FLOW         (min)= 45.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0133

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.043     1.08    20.14
      + ID2= 2 (  0038):     1.29   0.031     2.17    23.30
        ===================================================
        ID = 3 (  0003):     1.81   0.044     1.08    22.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30

--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18         0.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     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    6.80 | 0.833   25.24 | 1.583   12.27 |  2.33    7.65
                0.167    6.80 | 0.917  146.25 | 1.667   12.27 |  2.42    7.05
                0.250    8.01 | 1.000  146.25 | 1.750   10.54 |  2.50    7.05
                0.333    8.01 | 1.083   30.97 | 1.833   10.54 |  2.58    6.56
                0.417    9.92 | 1.167   30.97 | 1.917    9.31 |  2.67    6.56
                0.500    9.92 | 1.250   19.53 | 2.000    9.31 |  2.75    6.14
                0.583   13.57 | 1.333   19.53 | 2.083    8.38 |  2.83    6.14
                0.667   13.57 | 1.417   14.89 | 2.167    8.38 |  2.92    5.79
                0.750   25.24 | 1.500   14.89 | 2.250    7.65 |  3.00    5.79

     Max.Eff.Inten.(mm/hr)=     146.25       112.86
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.40 (ii)    7.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.24         0.19         0.389 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08          1.00
     RUNOFF VOLUME    (mm)=      56.14        28.21         36.39
     TOTAL RAINFALL   (mm)=      58.14        58.14         58.14
     RUNOFF COEFFICIENT   =       0.97         0.49          0.63

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

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

--------------------------------------------------------------------------------
*****************************************
** SIMULATION:E. 50yr 3hr 10min Chicago **
*****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 811.794
| Ptotal= 64.54 mm |                          B=   0.000
--------------------                          C=   0.699
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 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    7.55 |  0.83  162.35 |  1.67   11.70 |  2.50    7.28
                 0.17    8.89 |  1.00   34.38 |  1.83   10.34 |  2.67    6.82
                 0.33   11.01 |  1.17   21.68 |  2.00    9.30 |  2.83    6.42
                 0.50   15.06 |  1.33   16.53 |  2.17    8.49 |
                 0.67   28.01 |  1.50   13.62 |  2.33    7.83 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

         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    7.55 | 0.833   28.01 | 1.583   13.62 |  2.33    8.49
                0.167    7.55 | 0.917  162.35 | 1.667   13.62 |  2.42    7.83
                0.250    8.89 | 1.000  162.35 | 1.750   11.70 |  2.50    7.83
                0.333    8.89 | 1.083   34.38 | 1.833   11.70 |  2.58    7.28
```

POST-DEVELOPMENT
VO OUTPUT

```
                0.417   11.01 | 1.167   34.38 | 1.917   10.34 |  2.67    7.28
                0.500   11.01 | 1.250   21.68 | 2.000   10.34 |  2.75    6.82
                0.583   15.06 | 1.333   21.68 | 2.083    9.30 |  2.83    6.82
                0.667   15.06 | 1.417   16.53 | 2.167    9.30 |  2.92    6.42
                0.750   28.01 | 1.500   16.53 | 2.250    8.49 |  3.00    6.42

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.052 (i)
     TIME TO PEAK    (hrs)=   1.083
     RUNOFF VOLUME    (mm)=  24.164
     TOTAL RAINFALL   (mm)=  64.542
     RUNOFF COEFFICIENT   =   0.374

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

         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    7.55 | 0.833   28.01 | 1.583   13.62 |  2.33    8.49
                0.167    7.55 | 0.917  162.35 | 1.667   13.62 |  2.42    7.83
                0.250    8.89 | 1.000  162.35 | 1.750   11.70 |  2.50    7.83
                0.333    8.89 | 1.083   34.38 | 1.833   11.70 |  2.58    7.28
                0.417   11.01 | 1.167   34.38 | 1.917   10.34 |  2.67    7.28
                0.500   11.01 | 1.250   21.68 | 2.000   10.34 |  2.75    6.82
                0.583   15.06 | 1.333   21.68 | 2.083    9.30 |  2.83    6.82
                0.667   15.06 | 1.417   16.53 | 2.167    9.30 |  2.92    6.42
                0.750   28.01 | 1.500   16.53 | 2.250    8.49 |  3.00    6.42

     Unit Hyd Qpeak  (cms)=   0.120

     PEAK FLOW       (cms)=   0.072 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  27.950
     TOTAL RAINFALL   (mm)=  64.542
     RUNOFF COEFFICIENT   =   0.433

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                           0.0090      0.0082   |    0.0915      0.0263
                           0.0500      0.0176   |    0.1064      0.0301

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290     0.072      1.42      27.95
   OUTFLOW: ID= 1 (  0038)      1.290     0.039      2.17      27.78

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 54.31
                   TIME SHIFT OF PEAK FLOW         (min)= 45.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  0.0152

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.052     1.08    24.16
      + ID2= 2 (  0038):     1.29   0.039     2.17    27.78
        ===================================================
        ID = 3 (  0003):     1.81   0.053     1.08    26.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
```

```
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18         0.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     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    7.55 | 0.833   28.01 | 1.583   13.62 |  2.33    8.49
                0.167    7.55 | 0.917  162.35 | 1.667   13.62 |  2.42    7.83
                0.250    8.89 | 1.000  162.35 | 1.750   11.70 |  2.50    7.83
                0.333    8.89 | 1.083   34.38 | 1.833   11.70 |  2.58    7.28
                0.417   11.01 | 1.167   34.38 | 1.917   10.34 |  2.67    7.28
                0.500   11.01 | 1.250   21.68 | 2.000   10.34 |  2.75    6.82
                0.583   15.06 | 1.333   21.68 | 2.083    9.30 |  2.83    6.82
                0.667   15.06 | 1.417   16.53 | 2.167    9.30 |  2.92    6.42
                0.750   28.01 | 1.500   16.53 | 2.250    8.49 |  3.00    6.42

     Max.Eff.Inten.(mm/hr)=     162.35       134.46
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.30 (ii)    7.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.26         0.22         0.452 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08          1.00
     RUNOFF VOLUME    (mm)=      62.54        33.17         41.77
     TOTAL RAINFALL   (mm)=      64.54        64.54         64.54
     RUNOFF COEFFICIENT   =       0.97         0.51          0.65

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

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

--------------------------------------------------------------------------------
*****************************************
** SIMULATION:F. 100yr 3hr 10min Chicago **
*****************************************
--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 892.273
| Ptotal= 70.94 mm |                           B=   0.000
--------------------                           C=   0.699
                          used in:   INTENSITY =  A / (t + B)^C

                          Duration of storm  =  3.00 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    8.30 |  0.83  178.44 |  1.67   12.86 |  2.50    8.00
                 0.17    9.77 |  1.00   37.79 |  1.83   11.36 |  2.67    7.50
                 0.33   12.10 |  1.17   23.83 |  2.00   10.23 |  2.83    7.06
                 0.50   16.55 |  1.33   18.17 |  2.17    9.33 |
                 0.67   30.79 |  1.50   14.97 |  2.33    8.61 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

         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    8.30 | 0.833   30.79 | 1.583   14.97 |  2.33    9.33
                0.167    8.30 | 0.917  178.44 | 1.667   14.97 |  2.42    8.61
                0.250    9.77 | 1.000  178.44 | 1.750   12.86 |  2.50    8.61
```

POST-DEVELOPMENT VO OUTPUT

```
                0.333    9.77 | 1.083   37.79 | 1.833   12.86 |  2.58    8.00
                0.417   12.10 | 1.167   37.79 | 1.917   11.36 |  2.67    8.00
                0.500   12.10 | 1.250   23.83 | 2.000   11.36 |  2.75    7.50
                0.583   16.55 | 1.333   23.83 | 2.083   10.23 |  2.83    7.50
                0.667   16.55 | 1.417   18.17 | 2.167   10.23 |  2.92    7.06
                0.750   30.79 | 1.500   18.17 | 2.250    9.33 |  3.00    7.06

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.061 (i)
     TIME TO PEAK    (hrs)=   1.083
     RUNOFF VOLUME    (mm)=  28.382
     TOTAL RAINFALL   (mm)=  70.941
     RUNOFF COEFFICIENT   =   0.400

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

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-------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.41

         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    8.30 | 0.833   30.79 | 1.583   14.97 |  2.33    9.33
                0.167    8.30 | 0.917  178.44 | 1.667   14.97 |  2.42    8.61
                0.250    9.77 | 1.000  178.44 | 1.750   12.86 |  2.50    8.61
                0.333    9.77 | 1.083   37.79 | 1.833   12.86 |  2.58    8.00
                0.417   12.10 | 1.167   37.79 | 1.917   11.36 |  2.67    8.00
                0.500   12.10 | 1.250   23.83 | 2.000   11.36 |  2.75    7.50
                0.583   16.55 | 1.333   23.83 | 2.083   10.23 |  2.83    7.50
                0.667   16.55 | 1.417   18.17 | 2.167   10.23 |  2.92    7.06
                0.750   30.79 | 1.500   18.17 | 2.250    9.33 |  3.00    7.06

     Unit Hyd Qpeak  (cms)=   0.120

     PEAK FLOW       (cms)=   0.085 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  32.603
     TOTAL RAINFALL   (mm)=  70.941
     RUNOFF COEFFICIENT   =   0.460

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

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--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                           0.0090      0.0082   |    0.0915      0.0263
                           0.0500      0.0176   |    0.1064      0.0301

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290      0.085      1.42      32.60
   OUTFLOW: ID= 1 (  0038)      1.290      0.048      2.08      32.43

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 55.77
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0170

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--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.061     1.08    28.38
      + ID2= 2 (  0038):     1.29   0.048     2.08    32.43
        ==================================================
        ID = 3 (  0003):     1.81   0.063     1.08    31.27

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
-------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18         0.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     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    8.30 | 0.833   30.79 | 1.583   14.97 |  2.33    9.33
                0.167    8.30 | 0.917  178.44 | 1.667   14.97 |  2.42    8.61
                0.250    9.77 | 1.000  178.44 | 1.750   12.86 |  2.50    8.61
                0.333    9.77 | 1.083   37.79 | 1.833   12.86 |  2.58    8.00
                0.417   12.10 | 1.167   37.79 | 1.917   11.36 |  2.67    8.00
                0.500   12.10 | 1.250   23.83 | 2.000   11.36 |  2.75    7.50
                0.583   16.55 | 1.333   23.83 | 2.083   10.23 |  2.83    7.50
                0.667   16.55 | 1.417   18.17 | 2.167   10.23 |  2.92    7.06
                0.750   30.79 | 1.500   18.17 | 2.250    9.33 |  3.00    7.06

     Max.Eff.Inten.(mm/hr)=     178.44       156.94
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.22 (ii)    7.08 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.29         0.26         0.510 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08          1.00
     RUNOFF VOLUME    (mm)=      68.94        38.28         47.26
     TOTAL RAINFALL   (mm)=      70.94        70.94         70.94
     RUNOFF COEFFICIENT   =       0.97         0.54          0.67

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

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

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**********************************************
** SIMULATION:G. 2yr 24hr 15min SCS Type II **
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--------------------
|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              6ff94430-c332-4994-803a-bcaaae5f0e27\719a2500
| Ptotal= 60.13 mm |    Comments: G. 2yr 24hr 15min SCS Type II
--------------------
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  6.25    1.08 | 12.50    8.66 | 18.75    1.08
                0.25    0.66 |  6.50    1.08 | 12.75    4.45 | 19.00    1.08
                0.50    0.66 |  6.75    1.08 | 13.00    4.45 | 19.25    1.08
                0.75    0.66 |  7.00    1.08 | 13.25    3.25 | 19.50    1.08
                1.00    0.66 |  7.25    1.32 | 13.50    3.25 | 19.75    1.08
                1.25    0.66 |  7.50    1.32 | 13.75    2.53 | 20.00    1.08
                1.50    0.66 |  7.75    1.32 | 14.00    2.53 | 20.25    0.72
                1.75    0.66 |  8.00    1.32 | 14.25    1.80 | 20.50    0.72
                2.00    0.66 |  8.25    1.56 | 14.50    1.80 | 20.75    0.72
                2.25    0.78 |  8.50    1.56 | 14.75    1.80 | 21.00    0.72
                2.50    0.78 |  8.75    1.68 | 15.00    1.80 | 21.25    0.72
                2.75    0.78 |  9.00    1.68 | 15.25    1.80 | 21.50    0.72
                3.00    0.78 |  9.25    1.92 | 15.50    1.80 | 21.75    0.72
                3.25    0.78 |  9.50    1.92 | 15.75    1.80 | 22.00    0.72
                3.50    0.78 |  9.75    2.16 | 16.00    1.80 | 22.25    0.72
                3.75    0.78 | 10.00    2.16 | 16.25    1.08 | 22.50    0.72
                4.00    0.78 | 10.25    2.77 | 16.50    1.08 | 22.75    0.72
                4.25    0.96 | 10.50    2.77 | 16.75    1.08 | 23.00    0.72
                4.50    0.96 | 10.75    3.73 | 17.00    1.08 | 23.25    0.72
                4.75    0.96 | 11.00    3.73 | 17.25    1.08 | 23.50    0.72
                5.00    0.96 | 11.25    5.77 | 17.50    1.08 | 23.75    0.72
                5.25    0.96 | 11.50    5.77 | 17.75    1.08 | 24.00    0.72
                5.50    0.96 | 11.75   17.80 | 18.00    1.08 |
                5.75    0.96 | 12.00   73.60 | 18.25    1.08 |
                6.00    0.96 | 12.25    8.66 | 18.50    1.08 |
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POST-DEVELOPMENT
VO OUTPUT

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| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.60	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.67	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.66	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.66	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.66	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.66	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.66	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.45	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.45	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.45	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.45	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.45	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.45	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.25	19.42	1.08
1.250	0.66	7.333	1.32	13.417	3.25	19.50	1.08
1.333	0.66	7.417	1.32	13.500	3.25	19.58	1.08
1.417	0.66	7.500	1.32	13.583	3.25	19.67	1.08
1.500	0.66	7.583	1.32	13.667	3.25	19.75	1.08
1.583	0.66	7.667	1.32	13.750	3.25	19.83	1.08
1.667	0.66	7.750	1.32	13.833	2.53	19.92	1.08
1.750	0.66	7.833	1.32	13.917	2.53	20.00	1.08
1.833	0.66	7.917	1.32	14.000	2.53	20.08	1.08
1.917	0.66	8.000	1.32	14.083	2.53	20.17	1.08
2.000	0.66	8.083	1.32	14.167	2.53	20.25	1.08
2.083	0.66	8.167	1.32	14.250	2.53	20.33	0.72
2.167	0.66	8.250	1.32	14.333	1.80	20.42	0.72
2.250	0.66	8.333	1.56	14.417	1.80	20.50	0.72
2.333	0.78	8.417	1.56	14.500	1.80	20.58	0.72
2.417	0.78	8.500	1.56	14.583	1.80	20.67	0.72
2.500	0.78	8.583	1.56	14.667	1.80	20.75	0.72
2.583	0.78	8.667	1.56	14.750	1.80	20.83	0.72
2.667	0.78	8.750	1.56	14.833	1.80	20.92	0.72
2.750	0.78	8.833	1.68	14.917	1.80	21.00	0.72
2.833	0.78	8.917	1.68	15.000	1.80	21.08	0.72
2.917	0.78	9.000	1.68	15.083	1.80	21.17	0.72
3.000	0.78	9.083	1.68	15.167	1.80	21.25	0.72
3.083	0.78	9.167	1.68	15.250	1.80	21.33	0.72
3.167	0.78	9.250	1.68	15.333	1.80	21.42	0.72
3.250	0.78	9.333	1.92	15.417	1.80	21.50	0.72
3.333	0.78	9.417	1.92	15.500	1.80	21.58	0.72
3.417	0.78	9.500	1.92	15.583	1.80	21.67	0.72
3.500	0.78	9.583	1.92	15.667	1.80	21.75	0.72
3.583	0.78	9.667	1.92	15.750	1.80	21.83	0.72
3.667	0.78	9.750	1.92	15.833	1.80	21.92	0.72
3.750	0.78	9.833	2.16	15.917	1.80	22.00	0.72
3.833	0.78	9.917	2.16	16.000	1.80	22.08	0.72
3.917	0.78	10.000	2.16	16.083	1.80	22.17	0.72
4.000	0.78	10.083	2.16	16.167	1.80	22.25	0.72
4.083	0.78	10.167	2.16	16.250	1.80	22.33	0.72
4.167	0.78	10.250	2.16	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.77	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.77	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.77	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.77	16.667	1.08	22.75	0.72
4.583	0.96	10.667	2.77	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.77	16.833	1.08	22.92	0.72
4.750	0.96	10.833	3.73	16.917	1.08	23.00	0.72
4.833	0.96	10.917	3.73	17.000	1.08	23.08	0.72
4.917	0.96	11.000	3.73	17.083	1.08	23.17	0.72
5.000	0.96	11.083	3.73	17.167	1.08	23.25	0.72
5.083	0.96	11.167	3.73	17.250	1.08	23.33	0.72
5.167	0.96	11.250	3.73	17.333	1.08	23.42	0.72
5.250	0.96	11.333	5.77	17.417	1.08	23.50	0.72
5.333	0.96	11.417	5.77	17.500	1.08	23.58	0.72
5.417	0.96	11.500	5.77	17.583	1.08	23.67	0.72
5.500	0.96	11.583	5.77	17.667	1.08	23.75	0.72
5.583	0.96	11.667	5.77	17.750	1.08	23.83	0.72
5.667	0.96	11.750	5.77	17.833	1.08	23.92	0.72
5.750	0.96	11.833	17.80	17.917	1.08	24.00	0.72
5.833	0.96	11.917	17.80	18.000	1.08	24.08	0.72
5.917	0.96	12.000	17.80	18.083	1.08	24.17	0.72
6.000	0.96	12.083	73.59	18.167	1.08	24.25	0.72
6.083	0.96	12.167	73.60	18.250	1.08		

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     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.037 (i)
     TIME TO PEAK    (hrs)=  12.250
     RUNOFF VOLUME    (mm)=  21.367
     TOTAL RAINFALL   (mm)=  60.130
     RUNOFF COEFFICIENT   =   0.355

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

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| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.96	12.250	73.60	18.33	1.08
0.167	0.00	6.250	0.96	12.333	8.67	18.42	1.08
0.250	0.00	6.333	1.08	12.417	8.66	18.50	1.08
0.333	0.66	6.417	1.08	12.500	8.66	18.58	1.08
0.417	0.66	6.500	1.08	12.583	8.66	18.67	1.08
0.500	0.66	6.583	1.08	12.667	8.66	18.75	1.08
0.583	0.66	6.667	1.08	12.750	8.66	18.83	1.08
0.667	0.66	6.750	1.08	12.833	4.45	18.92	1.08
0.750	0.66	6.833	1.08	12.917	4.45	19.00	1.08
0.833	0.66	6.917	1.08	13.000	4.45	19.08	1.08
0.917	0.66	7.000	1.08	13.083	4.45	19.17	1.08
1.000	0.66	7.083	1.08	13.167	4.45	19.25	1.08
1.083	0.66	7.167	1.08	13.250	4.45	19.33	1.08
1.167	0.66	7.250	1.08	13.333	3.25	19.42	1.08
1.250	0.66	7.333	1.32	13.417	3.25	19.50	1.08
1.333	0.66	7.417	1.32	13.500	3.25	19.58	1.08
1.417	0.66	7.500	1.32	13.583	3.25	19.67	1.08
1.500	0.66	7.583	1.32	13.667	3.25	19.75	1.08
1.583	0.66	7.667	1.32	13.750	3.25	19.83	1.08
1.667	0.66	7.750	1.32	13.833	2.53	19.92	1.08
1.750	0.66	7.833	1.32	13.917	2.53	20.00	1.08
1.833	0.66	7.917	1.32	14.000	2.53	20.08	1.08
1.917	0.66	8.000	1.32	14.083	2.53	20.17	1.08
2.000	0.66	8.083	1.32	14.167	2.53	20.25	1.08
2.083	0.66	8.167	1.32	14.250	2.53	20.33	0.72
2.167	0.66	8.250	1.32	14.333	1.80	20.42	0.72
2.250	0.66	8.333	1.56	14.417	1.80	20.50	0.72
2.333	0.78	8.417	1.56	14.500	1.80	20.58	0.72
2.417	0.78	8.500	1.56	14.583	1.80	20.67	0.72
2.500	0.78	8.583	1.56	14.667	1.80	20.75	0.72
2.583	0.78	8.667	1.56	14.750	1.80	20.83	0.72
2.667	0.78	8.750	1.56	14.833	1.80	20.92	0.72
2.750	0.78	8.833	1.68	14.917	1.80	21.00	0.72
2.833	0.78	8.917	1.68	15.000	1.80	21.08	0.72
2.917	0.78	9.000	1.68	15.083	1.80	21.17	0.72
3.000	0.78	9.083	1.68	15.167	1.80	21.25	0.72
3.083	0.78	9.167	1.68	15.250	1.80	21.33	0.72
3.167	0.78	9.250	1.68	15.333	1.80	21.42	0.72
3.250	0.78	9.333	1.92	15.417	1.80	21.50	0.72
3.333	0.78	9.417	1.92	15.500	1.80	21.58	0.72
3.417	0.78	9.500	1.92	15.583	1.80	21.67	0.72
3.500	0.78	9.583	1.92	15.667	1.80	21.75	0.72
3.583	0.78	9.667	1.92	15.750	1.80	21.83	0.72
3.667	0.78	9.750	1.92	15.833	1.80	21.92	0.72
3.750	0.78	9.833	2.16	15.917	1.80	22.00	0.72
3.833	0.78	9.917	2.16	16.000	1.80	22.08	0.72
3.917	0.78	10.000	2.16	16.083	1.80	22.17	0.72
4.000	0.78	10.083	2.16	16.167	1.80	22.25	0.72
4.083	0.78	10.167	2.16	16.250	1.80	22.33	0.72
4.167	0.78	10.250	2.16	16.333	1.08	22.42	0.72
4.250	0.78	10.333	2.77	16.417	1.08	22.50	0.72
4.333	0.96	10.417	2.77	16.500	1.08	22.58	0.72
4.417	0.96	10.500	2.77	16.583	1.08	22.67	0.72
4.500	0.96	10.583	2.77	16.667	1.08	22.75	0.72
4.583	0.96	10.667	2.77	16.750	1.08	22.83	0.72
4.667	0.96	10.750	2.77	16.833	1.08	22.92	0.72

POST-DEVELOPMENT
VO OUTPUT

```
                4.750    0.96 |10.833    3.73 |16.917    1.08 | 23.00    0.72
                4.833    0.96 |10.917    3.73 |17.000    1.08 | 23.08    0.72
                4.917    0.96 |11.000    3.73 |17.083    1.08 | 23.17    0.72
                5.000    0.96 |11.083    3.73 |17.167    1.08 | 23.25    0.72
                5.083    0.96 |11.167    3.73 |17.250    1.08 | 23.33    0.72
                5.167    0.96 |11.250    3.73 |17.333    1.08 | 23.42    0.72
                5.250    0.96 |11.333    5.77 |17.417    1.08 | 23.50    0.72
                5.333    0.96 |11.417    5.77 |17.500    1.08 | 23.58    0.72
                5.417    0.96 |11.500    5.77 |17.583    1.08 | 23.67    0.72
                5.500    0.96 |11.583    5.77 |17.667    1.08 | 23.75    0.72
                5.583    0.96 |11.667    5.77 |17.750    1.08 | 23.83    0.72
                5.667    0.96 |11.750    5.77 |17.833    1.08 | 23.92    0.72
                5.750    0.96 |11.833   17.80 |17.917    1.08 | 24.00    0.72
                5.833    0.96 |11.917   17.80 |18.000    1.08 | 24.08    0.72
                5.917    0.96 |12.000   17.80 |18.083    1.08 | 24.17    0.72
                6.000    0.96 |12.083   73.59 |18.167    1.08 | 24.25    0.72
                6.083    0.96 |12.167   73.60 |18.250    1.08 |

     Unit Hyd Qpeak  (cms)=   0.120

     PEAK FLOW       (cms)=   0.049 (i)
     TIME TO PEAK    (hrs)=  12.500
     RUNOFF VOLUME    (mm)=  24.845
     TOTAL RAINFALL   (mm)=  60.130
     RUNOFF COEFFICIENT   =   0.413

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

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--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                           0.0090      0.0082   |    0.0915      0.0263
                           0.0500      0.0176   |    0.1064      0.0301

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290      0.049     12.50      24.85
   OUTFLOW: ID= 1 (  0038)      1.290      0.023     13.17      24.67

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 46.77
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0114

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--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.037    12.25    21.37
      + ID2= 2 (  0038):     1.29   0.023    13.17    24.67
        ==================================================
        ID = 3 (  0003):     1.81   0.040    12.25    23.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18         0.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     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    0.00 | 6.167    0.96 |12.250   73.60 | 18.33    1.08
                0.167    0.00 | 6.250    0.96 |12.333    8.67 | 18.42    1.08
                0.250    0.00 | 6.333    1.08 |12.417    8.66 | 18.50    1.08
                0.333    0.66 | 6.417    1.08 |12.500    8.66 | 18.58    1.08
                0.417    0.66 | 6.500    1.08 |12.583    8.66 | 18.67    1.08
                0.500    0.66 | 6.583    1.08 |12.667    8.66 | 18.75    1.08
                0.583    0.66 | 6.667    1.08 |12.750    8.66 | 18.83    1.08
                0.667    0.66 | 6.750    1.08 |12.833    4.45 | 18.92    1.08
                0.750    0.66 | 6.833    1.08 |12.917    4.45 | 19.00    1.08
                0.833    0.66 | 6.917    1.08 |13.000    4.45 | 19.08    1.08
                0.917    0.66 | 7.000    1.08 |13.083    4.45 | 19.17    1.08
                1.000    0.66 | 7.083    1.08 |13.167    4.45 | 19.25    1.08
                1.083    0.66 | 7.167    1.08 |13.250    4.45 | 19.33    1.08
                1.167    0.66 | 7.250    1.08 |13.333    3.25 | 19.42    1.08
                1.250    0.66 | 7.333    1.32 |13.417    3.25 | 19.50    1.08
                1.333    0.66 | 7.417    1.32 |13.500    3.25 | 19.58    1.08
                1.417    0.66 | 7.500    1.32 |13.583    3.25 | 19.67    1.08
                1.500    0.66 | 7.583    1.32 |13.667    3.25 | 19.75    1.08
                1.583    0.66 | 7.667    1.32 |13.750    3.25 | 19.83    1.08
                1.667    0.66 | 7.750    1.32 |13.833    2.53 | 19.92    1.08
                1.750    0.66 | 7.833    1.32 |13.917    2.53 | 20.00    1.08
                1.833    0.66 | 7.917    1.32 |14.000    2.53 | 20.08    1.08
                1.917    0.66 | 8.000    1.32 |14.083    2.53 | 20.17    1.08
                2.000    0.66 | 8.083    1.32 |14.167    2.53 | 20.25    1.08
                2.083    0.66 | 8.167    1.32 |14.250    2.53 | 20.33    0.72
                2.167    0.66 | 8.250    1.32 |14.333    1.80 | 20.42    0.72
                2.250    0.66 | 8.333    1.56 |14.417    1.80 | 20.50    0.72
                2.333    0.78 | 8.417    1.56 |14.500    1.80 | 20.58    0.72
                2.417    0.78 | 8.500    1.56 |14.583    1.80 | 20.67    0.72
                2.500    0.78 | 8.583    1.56 |14.667    1.80 | 20.75    0.72
                2.583    0.78 | 8.667    1.56 |14.750    1.80 | 20.83    0.72
                2.667    0.78 | 8.750    1.56 |14.833    1.80 | 20.92    0.72
                2.750    0.78 | 8.833    1.68 |14.917    1.80 | 21.00    0.72
                2.833    0.78 | 8.917    1.68 |15.000    1.80 | 21.08    0.72
                2.917    0.78 | 9.000    1.68 |15.083    1.80 | 21.17    0.72
                3.000    0.78 | 9.083    1.68 |15.167    1.80 | 21.25    0.72
                3.083    0.78 | 9.167    1.68 |15.250    1.80 | 21.33    0.72
                3.167    0.78 | 9.250    1.68 |15.333    1.80 | 21.42    0.72
                3.250    0.78 | 9.333    1.92 |15.417    1.80 | 21.50    0.72
                3.333    0.78 | 9.417    1.92 |15.500    1.80 | 21.58    0.72
                3.417    0.78 | 9.500    1.92 |15.583    1.80 | 21.67    0.72
                3.500    0.78 | 9.583    1.92 |15.667    1.80 | 21.75    0.72
                3.583    0.78 | 9.667    1.92 |15.750    1.80 | 21.83    0.72
                3.667    0.78 | 9.750    1.92 |15.833    1.80 | 21.92    0.72
                3.750    0.78 | 9.833    2.16 |15.917    1.80 | 22.00    0.72
                3.833    0.78 | 9.917    2.16 |16.000    1.80 | 22.08    0.72
                3.917    0.78 |10.000    2.16 |16.083    1.80 | 22.17    0.72
                4.000    0.78 |10.083    2.16 |16.167    1.80 | 22.25    0.72
                4.083    0.78 |10.167    2.16 |16.250    1.80 | 22.33    0.72
                4.167    0.78 |10.250    2.16 |16.333    1.08 | 22.42    0.72
                4.250    0.78 |10.333    2.77 |16.417    1.08 | 22.50    0.72
                4.333    0.96 |10.417    2.77 |16.500    1.08 | 22.58    0.72
                4.417    0.96 |10.500    2.77 |16.583    1.08 | 22.67    0.72
                4.500    0.96 |10.583    2.77 |16.667    1.08 | 22.75    0.72
                4.583    0.96 |10.667    2.77 |16.750    1.08 | 22.83    0.72
                4.667    0.96 |10.750    2.77 |16.833    1.08 | 22.92    0.72
                4.750    0.96 |10.833    3.73 |16.917    1.08 | 23.00    0.72
                4.833    0.96 |10.917    3.73 |17.000    1.08 | 23.08    0.72
                4.917    0.96 |11.000    3.73 |17.083    1.08 | 23.17    0.72
                5.000    0.96 |11.083    3.73 |17.167    1.08 | 23.25    0.72
                5.083    0.96 |11.167    3.73 |17.250    1.08 | 23.33    0.72
                5.167    0.96 |11.250    3.73 |17.333    1.08 | 23.42    0.72
                5.250    0.96 |11.333    5.77 |17.417    1.08 | 23.50    0.72
                5.333    0.96 |11.417    5.77 |17.500    1.08 | 23.58    0.72
                5.417    0.96 |11.500    5.77 |17.583    1.08 | 23.67    0.72
                5.500    0.96 |11.583    5.77 |17.667    1.08 | 23.75    0.72
                5.583    0.96 |11.667    5.77 |17.750    1.08 | 23.83    0.72
                5.667    0.96 |11.750    5.77 |17.833    1.08 | 23.92    0.72
                5.750    0.96 |11.833   17.80 |17.917    1.08 | 24.00    0.72
                5.833    0.96 |11.917   17.80 |18.000    1.08 | 24.08    0.72
                5.917    0.96 |12.000   17.80 |18.083    1.08 | 24.17    0.72
                6.000    0.96 |12.083   73.59 |18.167    1.08 | 24.25    0.72
                6.083    0.96 |12.167   73.60 |18.250    1.08 |

     Max.Eff.Inten.(mm/hr)=      73.60        74.56
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.16 (ii)    9.14 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.12
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.12         0.13         0.246 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25         12.25
     RUNOFF VOLUME    (mm)=      58.13        29.73         38.05
     TOTAL RAINFALL   (mm)=      60.13        60.13         60.13
     RUNOFF COEFFICIENT   =       0.97         0.49          0.63

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
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POST-DEVELOPMENT
VO OUTPUT

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      (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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************************************************
** SIMULATION:H. 5yr 24hr 15min SCS Type II **
************************************************

--------------------
|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              6ff94430-c332-4994-803a-bcaaae5f0e27\7c8cbce6
| Ptotal= 79.65 mm |    Comments: H. 5yr 24hr 15min SCS Type II
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.43	12.50	11.47	18.75	1.43
0.25	0.88	6.50	1.43	12.75	5.89	19.00	1.43
0.50	0.88	6.75	1.43	13.00	5.89	19.25	1.43
0.75	0.88	7.00	1.43	13.25	4.30	19.50	1.43
1.00	0.88	7.25	1.75	13.50	4.30	19.75	1.43
1.25	0.88	7.50	1.75	13.75	3.35	20.00	1.43
1.50	0.88	7.75	1.75	14.00	3.35	20.25	0.96
1.75	0.88	8.00	1.75	14.25	2.39	20.50	0.96
2.00	0.88	8.25	2.07	14.50	2.39	20.75	0.96
2.25	1.04	8.50	2.07	14.75	2.39	21.00	0.96
2.50	1.04	8.75	2.23	15.00	2.39	21.25	0.96
2.75	1.04	9.00	2.23	15.25	2.39	21.50	0.96
3.00	1.04	9.25	2.55	15.50	2.39	21.75	0.96
3.25	1.04	9.50	2.55	15.75	2.39	22.00	0.96
3.50	1.04	9.75	2.87	16.00	2.39	22.25	0.96
3.75	1.04	10.00	2.87	16.25	1.43	22.50	0.96
4.00	1.04	10.25	3.66	16.50	1.43	22.75	0.96
4.25	1.27	10.50	3.66	16.75	1.43	23.00	0.96
4.50	1.27	10.75	4.94	17.00	1.43	23.25	0.96
4.75	1.27	11.00	4.94	17.25	1.43	23.50	0.96
5.00	1.27	11.25	7.65	17.50	1.43	23.75	0.96
5.25	1.27	11.50	7.65	17.75	1.43	24.00	0.96
5.50	1.27	11.75	23.58	18.00	1.43		
5.75	1.27	12.00	97.49	18.25	1.43		
6.00	1.27	12.25	11.47	18.50	1.43		

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| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.27	12.250	97.49	18.33	1.43
0.167	0.00	6.250	1.27	12.333	11.48	18.42	1.43
0.250	0.00	6.333	1.43	12.417	11.47	18.50	1.43
0.333	0.88	6.417	1.43	12.500	11.47	18.58	1.43
0.417	0.88	6.500	1.43	12.583	11.47	18.67	1.43
0.500	0.88	6.583	1.43	12.667	11.47	18.75	1.43
0.583	0.88	6.667	1.43	12.750	11.47	18.83	1.43
0.667	0.88	6.750	1.43	12.833	5.89	18.92	1.43
0.750	0.88	6.833	1.43	12.917	5.89	19.00	1.43
0.833	0.88	6.917	1.43	13.000	5.89	19.08	1.43
0.917	0.88	7.000	1.43	13.083	5.89	19.17	1.43
1.000	0.88	7.083	1.43	13.167	5.89	19.25	1.43
1.083	0.88	7.167	1.43	13.250	5.89	19.33	1.43
1.167	0.88	7.250	1.43	13.333	4.30	19.42	1.43
1.250	0.88	7.333	1.75	13.417	4.30	19.50	1.43
1.333	0.88	7.417	1.75	13.500	4.30	19.58	1.43
1.417	0.88	7.500	1.75	13.583	4.30	19.67	1.43
1.500	0.88	7.583	1.75	13.667	4.30	19.75	1.43
1.583	0.88	7.667	1.75	13.750	4.30	19.83	1.43
1.667	0.88	7.750	1.75	13.833	3.35	19.92	1.43
1.750	0.88	7.833	1.75	13.917	3.35	20.00	1.43
1.833	0.88	7.917	1.75	14.000	3.35	20.08	1.43
1.917	0.88	8.000	1.75	14.083	3.35	20.17	1.43
2.000	0.88	8.083	1.75	14.167	3.35	20.25	1.43
2.083	0.88	8.167	1.75	14.250	3.35	20.33	0.96
2.167	0.88	8.250	1.75	14.333	2.39	20.42	0.96
2.250	0.88	8.333	2.07	14.417	2.39	20.50	0.96
2.333	1.04	8.417	2.07	14.500	2.39	20.58	0.96
2.417	1.04	8.500	2.07	14.583	2.39	20.67	0.96
2.500	1.04	8.583	2.07	14.667	2.39	20.75	0.96
2.583	1.04	8.667	2.07	14.750	2.39	20.83	0.96
2.667	1.04	8.750	2.07	14.833	2.39	20.92	0.96
2.750	1.04	8.833	2.23	14.917	2.39	21.00	0.96
2.833	1.04	8.917	2.23	15.000	2.39	21.08	0.96
2.917	1.04	9.000	2.23	15.083	2.39	21.17	0.96
3.000	1.04	9.083	2.23	15.167	2.39	21.25	0.96
3.083	1.04	9.167	2.23	15.250	2.39	21.33	0.96
3.167	1.04	9.250	2.23	15.333	2.39	21.42	0.96
3.250	1.04	9.333	2.55	15.417	2.39	21.50	0.96
3.333	1.04	9.417	2.55	15.500	2.39	21.58	0.96
3.417	1.04	9.500	2.55	15.583	2.39	21.67	0.96
3.500	1.04	9.583	2.55	15.667	2.39	21.75	0.96
3.583	1.04	9.667	2.55	15.750	2.39	21.83	0.96
3.667	1.04	9.750	2.55	15.833	2.39	21.92	0.96
3.750	1.04	9.833	2.87	15.917	2.39	22.00	0.96
3.833	1.04	9.917	2.87	16.000	2.39	22.08	0.96
3.917	1.04	10.000	2.87	16.083	2.39	22.17	0.96
4.000	1.04	10.083	2.87	16.167	2.39	22.25	0.96
4.083	1.04	10.167	2.87	16.250	2.39	22.33	0.96
4.167	1.04	10.250	2.87	16.333	1.43	22.42	0.96
4.250	1.04	10.333	3.66	16.417	1.43	22.50	0.96
4.333	1.27	10.417	3.66	16.500	1.43	22.58	0.96
4.417	1.27	10.500	3.66	16.583	1.43	22.67	0.96
4.500	1.27	10.583	3.66	16.667	1.43	22.75	0.96
4.583	1.27	10.667	3.66	16.750	1.43	22.83	0.96
4.667	1.27	10.750	3.66	16.833	1.43	22.92	0.96
4.750	1.27	10.833	4.94	16.917	1.43	23.00	0.96
4.833	1.27	10.917	4.94	17.000	1.43	23.08	0.96
4.917	1.27	11.000	4.94	17.083	1.43	23.17	0.96
5.000	1.27	11.083	4.94	17.167	1.43	23.25	0.96
5.083	1.27	11.167	4.94	17.250	1.43	23.33	0.96
5.167	1.27	11.250	4.94	17.333	1.43	23.42	0.96
5.250	1.27	11.333	7.65	17.417	1.43	23.50	0.96
5.333	1.27	11.417	7.65	17.500	1.43	23.58	0.96
5.417	1.27	11.500	7.65	17.583	1.43	23.67	0.96
5.500	1.27	11.583	7.65	17.667	1.43	23.75	0.96
5.583	1.27	11.667	7.65	17.750	1.43	23.83	0.96
5.667	1.27	11.750	7.65	17.833	1.43	23.92	0.96
5.750	1.27	11.833	23.57	17.917	1.43	24.00	0.96
5.833	1.27	11.917	23.58	18.000	1.43	24.08	0.96
5.917	1.27	12.000	23.58	18.083	1.43	24.17	0.96
6.000	1.27	12.083	97.48	18.167	1.43	24.25	0.96
6.083	1.27	12.167	97.49	18.250	1.43		

```
     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.060 (i)
     TIME TO PEAK    (hrs)=  12.250
     RUNOFF VOLUME    (mm)=  34.395
     TOTAL RAINFALL   (mm)=  79.650
     RUNOFF COEFFICIENT   =   0.432

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

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| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

         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	0.00	6.167	1.27	12.250	97.49	18.33	1.43
0.167	0.00	6.250	1.27	12.333	11.48	18.42	1.43
0.250	0.00	6.333	1.43	12.417	11.47	18.50	1.43
0.333	0.88	6.417	1.43	12.500	11.47	18.58	1.43
0.417	0.88	6.500	1.43	12.583	11.47	18.67	1.43
0.500	0.88	6.583	1.43	12.667	11.47	18.75	1.43
0.583	0.88	6.667	1.43	12.750	11.47	18.83	1.43
0.667	0.88	6.750	1.43	12.833	5.89	18.92	1.43
0.750	0.88	6.833	1.43	12.917	5.89	19.00	1.43
0.833	0.88	6.917	1.43	13.000	5.89	19.08	1.43
0.917	0.88	7.000	1.43	13.083	5.89	19.17	1.43
1.000	0.88	7.083	1.43	13.167	5.89	19.25	1.43
1.083	0.88	7.167	1.43	13.250	5.89	19.33	1.43
1.167	0.88	7.250	1.43	13.333	4.30	19.42	1.43

POST-DEVELOPMENT
VO OUTPUT

1.250	0.88	7.333	1.75	13.417	4.30	19.50	1.43
1.333	0.88	7.417	1.75	13.500	4.30	19.58	1.43
1.417	0.88	7.500	1.75	13.583	4.30	19.67	1.43
1.500	0.88	7.583	1.75	13.667	4.30	19.75	1.43
1.583	0.88	7.667	1.75	13.750	4.30	19.83	1.43
1.667	0.88	7.750	1.75	13.833	3.35	19.92	1.43
1.750	0.88	7.833	1.75	13.917	3.35	20.00	1.43
1.833	0.88	7.917	1.75	14.000	3.35	20.08	1.43
1.917	0.88	8.000	1.75	14.083	3.35	20.17	1.43
2.000	0.88	8.083	1.75	14.167	3.35	20.25	1.43
2.083	0.88	8.167	1.75	14.250	3.35	20.33	0.96
2.167	0.88	8.250	1.75	14.333	2.39	20.42	0.96
2.250	0.88	8.333	2.07	14.417	2.39	20.50	0.96
2.333	1.04	8.417	2.07	14.500	2.39	20.58	0.96
2.417	1.04	8.500	2.07	14.583	2.39	20.67	0.96
2.500	1.04	8.583	2.07	14.667	2.39	20.75	0.96
2.583	1.04	8.667	2.07	14.750	2.39	20.83	0.96
2.667	1.04	8.750	2.07	14.833	2.39	20.92	0.96
2.750	1.04	8.833	2.23	14.917	2.39	21.00	0.96
2.833	1.04	8.917	2.23	15.000	2.39	21.08	0.96
2.917	1.04	9.000	2.23	15.083	2.39	21.17	0.96
3.000	1.04	9.083	2.23	15.167	2.39	21.25	0.96
3.083	1.04	9.167	2.23	15.250	2.39	21.33	0.96
3.167	1.04	9.250	2.23	15.333	2.39	21.42	0.96
3.250	1.04	9.333	2.55	15.417	2.39	21.50	0.96
3.333	1.04	9.417	2.55	15.500	2.39	21.58	0.96
3.417	1.04	9.500	2.55	15.583	2.39	21.67	0.96
3.500	1.04	9.583	2.55	15.667	2.39	21.75	0.96
3.583	1.04	9.667	2.55	15.750	2.39	21.83	0.96
3.667	1.04	9.750	2.55	15.833	2.39	21.92	0.96
3.750	1.04	9.833	2.87	15.917	2.39	22.00	0.96
3.833	1.04	9.917	2.87	16.000	2.39	22.08	0.96
3.917	1.04	10.000	2.87	16.083	2.39	22.17	0.96
4.000	1.04	10.083	2.87	16.167	2.39	22.25	0.96
4.083	1.04	10.167	2.87	16.250	2.39	22.33	0.96
4.167	1.04	10.250	2.87	16.333	1.43	22.42	0.96
4.250	1.04	10.333	3.66	16.417	1.43	22.50	0.96
4.333	1.27	10.417	3.66	16.500	1.43	22.58	0.96
4.417	1.27	10.500	3.66	16.583	1.43	22.67	0.96
4.500	1.27	10.583	3.66	16.667	1.43	22.75	0.96
4.583	1.27	10.667	3.66	16.750	1.43	22.83	0.96
4.667	1.27	10.750	3.66	16.833	1.43	22.92	0.96
4.750	1.27	10.833	4.94	16.917	1.43	23.00	0.96
4.833	1.27	10.917	4.94	17.000	1.43	23.08	0.96
4.917	1.27	11.000	4.94	17.083	1.43	23.17	0.96
5.000	1.27	11.083	4.94	17.167	1.43	23.25	0.96
5.083	1.27	11.167	4.94	17.250	1.43	23.33	0.96
5.167	1.27	11.250	4.94	17.333	1.43	23.42	0.96
5.250	1.27	11.333	7.65	17.417	1.43	23.50	0.96
5.333	1.27	11.417	7.65	17.500	1.43	23.58	0.96
5.417	1.27	11.500	7.65	17.583	1.43	23.67	0.96
5.500	1.27	11.583	7.65	17.667	1.43	23.75	0.96
5.583	1.27	11.667	7.65	17.750	1.43	23.83	0.96
5.667	1.27	11.750	7.65	17.833	1.43	23.92	0.96
5.750	1.27	11.833	23.57	17.917	1.43	24.00	0.96
5.833	1.27	11.917	23.58	18.000	1.43	24.08	0.96
5.917	1.27	12.000	23.58	18.083	1.43	24.17	0.96
6.000	1.27	12.083	97.48	18.167	1.43	24.25	0.96
6.083	1.27	12.167	97.49	18.250	1.43		

```
Unit Hyd Qpeak  (cms)=   0.120

PEAK FLOW       (cms)=   0.079 (i)
TIME TO PEAK    (hrs)=  12.500
RUNOFF VOLUME    (mm)=  39.185
TOTAL RAINFALL   (mm)=  79.650
RUNOFF COEFFICIENT   =   0.492

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                           0.0090      0.0082   |    0.0915      0.0263
                           0.0500      0.0176   |    0.1064      0.0301

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290      0.079     12.50      39.19
   OUTFLOW: ID= 1 (  0038)      1.290      0.043     13.08      39.01

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 55.14
                    TIME SHIFT OF PEAK FLOW         (min)= 35.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0161

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--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):      0.52   0.060    12.25    34.39
      + ID2= 2 (  0038):      1.29   0.043    13.08    39.01
        ==================================================
        ID = 3 (  0003):      1.81   0.065    12.25    37.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18          0.84
     Dep. Storage     (mm)=       2.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     116.05         25.00
     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	0.00	6.167	1.27	12.250	97.49	18.33	1.43
0.167	0.00	6.250	1.27	12.333	11.48	18.42	1.43
0.250	0.00	6.333	1.43	12.417	11.47	18.50	1.43
0.333	0.88	6.417	1.43	12.500	11.47	18.58	1.43
0.417	0.88	6.500	1.43	12.583	11.47	18.67	1.43
0.500	0.88	6.583	1.43	12.667	11.47	18.75	1.43
0.583	0.88	6.667	1.43	12.750	11.47	18.83	1.43
0.667	0.88	6.750	1.43	12.833	5.89	18.92	1.43
0.750	0.88	6.833	1.43	12.917	5.89	19.00	1.43
0.833	0.88	6.917	1.43	13.000	5.89	19.08	1.43
0.917	0.88	7.000	1.43	13.083	5.89	19.17	1.43
1.000	0.88	7.083	1.43	13.167	5.89	19.25	1.43
1.083	0.88	7.167	1.43	13.250	5.89	19.33	1.43
1.167	0.88	7.250	1.43	13.333	4.30	19.42	1.43
1.250	0.88	7.333	1.75	13.417	4.30	19.50	1.43
1.333	0.88	7.417	1.75	13.500	4.30	19.58	1.43
1.417	0.88	7.500	1.75	13.583	4.30	19.67	1.43
1.500	0.88	7.583	1.75	13.667	4.30	19.75	1.43
1.583	0.88	7.667	1.75	13.750	4.30	19.83	1.43
1.667	0.88	7.750	1.75	13.833	3.35	19.92	1.43
1.750	0.88	7.833	1.75	13.917	3.35	20.00	1.43
1.833	0.88	7.917	1.75	14.000	3.35	20.08	1.43
1.917	0.88	8.000	1.75	14.083	3.35	20.17	1.43
2.000	0.88	8.083	1.75	14.167	3.35	20.25	1.43
2.083	0.88	8.167	1.75	14.250	3.35	20.33	0.96
2.167	0.88	8.250	1.75	14.333	2.39	20.42	0.96
2.250	0.88	8.333	2.07	14.417	2.39	20.50	0.96
2.333	1.04	8.417	2.07	14.500	2.39	20.58	0.96
2.417	1.04	8.500	2.07	14.583	2.39	20.67	0.96
2.500	1.04	8.583	2.07	14.667	2.39	20.75	0.96
2.583	1.04	8.667	2.07	14.750	2.39	20.83	0.96
2.667	1.04	8.750	2.07	14.833	2.39	20.92	0.96
2.750	1.04	8.833	2.23	14.917	2.39	21.00	0.96
2.833	1.04	8.917	2.23	15.000	2.39	21.08	0.96
2.917	1.04	9.000	2.23	15.083	2.39	21.17	0.96
3.000	1.04	9.083	2.23	15.167	2.39	21.25	0.96
3.083	1.04	9.167	2.23	15.250	2.39	21.33	0.96
3.167	1.04	9.250	2.23	15.333	2.39	21.42	0.96
3.250	1.04	9.333	2.55	15.417	2.39	21.50	0.96
3.333	1.04	9.417	2.55	15.500	2.39	21.58	0.96
3.417	1.04	9.500	2.55	15.583	2.39	21.67	0.96
3.500	1.04	9.583	2.55	15.667	2.39	21.75	0.96
3.583	1.04	9.667	2.55	15.750	2.39	21.83	0.96
3.667	1.04	9.750	2.55	15.833	2.39	21.92	0.96
3.750	1.04	9.833	2.87	15.917	2.39	22.00	0.96
3.833	1.04	9.917	2.87	16.000	2.39	22.08	0.96
3.917	1.04	10.000	2.87	16.083	2.39	22.17	0.96
4.000	1.04	10.083	2.87	16.167	2.39	22.25	0.96

POST-DEVELOPMENT
VO OUTPUT

4.083	1.04	10.167	2.87	16.250	2.39	22.33	0.96
4.167	1.04	10.250	2.87	16.333	1.43	22.42	0.96
4.250	1.04	10.333	3.66	16.417	1.43	22.50	0.96
4.333	1.27	10.417	3.66	16.500	1.43	22.58	0.96
4.417	1.27	10.500	3.66	16.583	1.43	22.67	0.96
4.500	1.27	10.583	3.66	16.667	1.43	22.75	0.96
4.583	1.27	10.667	3.66	16.750	1.43	22.83	0.96
4.667	1.27	10.750	3.66	16.833	1.43	22.92	0.96
4.750	1.27	10.833	4.94	16.917	1.43	23.00	0.96
4.833	1.27	10.917	4.94	17.000	1.43	23.08	0.96
4.917	1.27	11.000	4.94	17.083	1.43	23.17	0.96
5.000	1.27	11.083	4.94	17.167	1.43	23.25	0.96
5.083	1.27	11.167	4.94	17.250	1.43	23.33	0.96
5.167	1.27	11.250	4.94	17.333	1.43	23.42	0.96
5.250	1.27	11.333	7.65	17.417	1.43	23.50	0.96
5.333	1.27	11.417	7.65	17.500	1.43	23.58	0.96
5.417	1.27	11.500	7.65	17.583	1.43	23.67	0.96
5.500	1.27	11.583	7.65	17.667	1.43	23.75	0.96
5.583	1.27	11.667	7.65	17.750	1.43	23.83	0.96
5.667	1.27	11.750	7.65	17.833	1.43	23.92	0.96
5.750	1.27	11.833	23.57	17.917	1.43	24.00	0.96
5.833	1.27	11.917	23.58	18.000	1.43	24.08	0.96
5.917	1.27	12.000	23.58	18.083	1.43	24.17	0.96
6.000	1.27	12.083	97.48	18.167	1.43	24.25	0.96
6.083	1.27	12.167	97.49	18.250	1.43		

```
     Max.Eff.Inten.(mm/hr)=      97.49       113.10
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.82 (ii)    7.89 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.16         0.21         0.365 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25         12.25
     RUNOFF VOLUME    (mm)=      77.65        45.44         54.87
     TOTAL RAINFALL   (mm)=      79.65        79.65         79.65
     RUNOFF COEFFICIENT   =       0.97         0.57          0.69

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

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

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************************************************
** SIMULATION:I. 10yr 24hr 15min SCS Type II **
************************************************

--------------------
|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              6ff94430-c332-4994-803a-bcaaae5f0e27\a944daaa
| Ptotal= 92.66 mm |    Comments: I. 10yr 24hr 15min SCS Type II
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```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.67	12.50	13.34	18.75	1.67
0.25	1.02	6.50	1.67	12.75	6.86	19.00	1.67
0.50	1.02	6.75	1.67	13.00	6.86	19.25	1.67
0.75	1.02	7.00	1.67	13.25	5.00	19.50	1.67
1.00	1.02	7.25	2.04	13.50	5.00	19.75	1.67
1.25	1.02	7.50	2.04	13.75	3.89	20.00	1.67
1.50	1.02	7.75	2.04	14.00	3.89	20.25	1.11
1.75	1.02	8.00	2.04	14.25	2.78	20.50	1.11
2.00	1.02	8.25	2.41	14.50	2.78	20.75	1.11
2.25	1.20	8.50	2.41	14.75	2.78	21.00	1.11
2.50	1.20	8.75	2.59	15.00	2.78	21.25	1.11
2.75	1.20	9.00	2.59	15.25	2.78	21.50	1.11
3.00	1.20	9.25	2.97	15.50	2.78	21.75	1.11
3.25	1.20	9.50	2.97	15.75	2.78	22.00	1.11
3.50	1.20	9.75	3.34	16.00	2.78	22.25	1.11
3.75	1.20	10.00	3.34	16.25	1.67	22.50	1.11
4.00	1.20	10.25	4.26	16.50	1.67	22.75	1.11
4.25	1.48	10.50	4.26	16.75	1.67	23.00	1.11
4.50	1.48	10.75	5.74	17.00	1.67	23.25	1.11
4.75	1.48	11.00	5.74	17.25	1.67	23.50	1.11
5.00	1.48	11.25	8.90	17.50	1.67	23.75	1.11
5.25	1.48	11.50	8.90	17.75	1.67	24.00	1.11
5.50	1.48	11.75	27.43	18.00	1.67		
5.75	1.48	12.00	113.42	18.25	1.67		
6.00	1.48	12.25	13.34	18.50	1.67		

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| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.48	12.250	113.42	18.33	1.67
0.167	0.00	6.250	1.48	12.333	13.36	18.42	1.67
0.250	0.00	6.333	1.67	12.417	13.34	18.50	1.67
0.333	1.02	6.417	1.67	12.500	13.34	18.58	1.67
0.417	1.02	6.500	1.67	12.583	13.34	18.67	1.67
0.500	1.02	6.583	1.67	12.667	13.34	18.75	1.67
0.583	1.02	6.667	1.67	12.750	13.34	18.83	1.67
0.667	1.02	6.750	1.67	12.833	6.86	18.92	1.67
0.750	1.02	6.833	1.67	12.917	6.86	19.00	1.67
0.833	1.02	6.917	1.67	13.000	6.86	19.08	1.67
0.917	1.02	7.000	1.67	13.083	6.86	19.17	1.67
1.000	1.02	7.083	1.67	13.167	6.86	19.25	1.67
1.083	1.02	7.167	1.67	13.250	6.86	19.33	1.67
1.167	1.02	7.250	1.67	13.333	5.00	19.42	1.67
1.250	1.02	7.333	2.04	13.417	5.00	19.50	1.67
1.333	1.02	7.417	2.04	13.500	5.00	19.58	1.67
1.417	1.02	7.500	2.04	13.583	5.00	19.67	1.67
1.500	1.02	7.583	2.04	13.667	5.00	19.75	1.67
1.583	1.02	7.667	2.04	13.750	5.00	19.83	1.67
1.667	1.02	7.750	2.04	13.833	3.89	19.92	1.67
1.750	1.02	7.833	2.04	13.917	3.89	20.00	1.67
1.833	1.02	7.917	2.04	14.000	3.89	20.08	1.67
1.917	1.02	8.000	2.04	14.083	3.89	20.17	1.67
2.000	1.02	8.083	2.04	14.167	3.89	20.25	1.67
2.083	1.02	8.167	2.04	14.250	3.89	20.33	1.11
2.167	1.02	8.250	2.04	14.333	2.78	20.42	1.11
2.250	1.02	8.333	2.41	14.417	2.78	20.50	1.11
2.333	1.20	8.417	2.41	14.500	2.78	20.58	1.11
2.417	1.20	8.500	2.41	14.583	2.78	20.67	1.11
2.500	1.20	8.583	2.41	14.667	2.78	20.75	1.11
2.583	1.20	8.667	2.41	14.750	2.78	20.83	1.11
2.667	1.20	8.750	2.41	14.833	2.78	20.92	1.11
2.750	1.20	8.833	2.59	14.917	2.78	21.00	1.11
2.833	1.20	8.917	2.59	15.000	2.78	21.08	1.11
2.917	1.20	9.000	2.59	15.083	2.78	21.17	1.11
3.000	1.20	9.083	2.59	15.167	2.78	21.25	1.11
3.083	1.20	9.167	2.59	15.250	2.78	21.33	1.11
3.167	1.20	9.250	2.59	15.333	2.78	21.42	1.11
3.250	1.20	9.333	2.97	15.417	2.78	21.50	1.11
3.333	1.20	9.417	2.97	15.500	2.78	21.58	1.11
3.417	1.20	9.500	2.97	15.583	2.78	21.67	1.11
3.500	1.20	9.583	2.97	15.667	2.78	21.75	1.11
3.583	1.20	9.667	2.97	15.750	2.78	21.83	1.11
3.667	1.20	9.750	2.97	15.833	2.78	21.92	1.11
3.750	1.20	9.833	3.34	15.917	2.78	22.00	1.11
3.833	1.20	9.917	3.34	16.000	2.78	22.08	1.11
3.917	1.20	10.000	3.34	16.083	2.78	22.17	1.11
4.000	1.20	10.083	3.34	16.167	2.78	22.25	1.11
4.083	1.20	10.167	3.34	16.250	2.78	22.33	1.11
4.167	1.20	10.250	3.34	16.333	1.67	22.42	1.11
4.250	1.20	10.333	4.26	16.417	1.67	22.50	1.11
4.333	1.48	10.417	4.26	16.500	1.67	22.58	1.11
4.417	1.48	10.500	4.26	16.583	1.67	22.67	1.11
4.500	1.48	10.583	4.26	16.667	1.67	22.75	1.11
4.583	1.48	10.667	4.26	16.750	1.67	22.83	1.11
4.667	1.48	10.750	4.26	16.833	1.67	22.92	1.11
4.750	1.48	10.833	5.74	16.917	1.67	23.00	1.11
4.833	1.48	10.917	5.74	17.000	1.67	23.08	1.11
4.917	1.48	11.000	5.74	17.083	1.67	23.17	1.11
5.000	1.48	11.083	5.74	17.167	1.67	23.25	1.11
5.083	1.48	11.167	5.74	17.250	1.67	23.33	1.11
5.167	1.48	11.250	5.74	17.333	1.67	23.42	1.11
5.250	1.48	11.333	8.90	17.417	1.67	23.50	1.11
5.333	1.48	11.417	8.90	17.500	1.67	23.58	1.11
5.417	1.48	11.500	8.90	17.583	1.67	23.67	1.11
5.500	1.48	11.583	8.90	17.667	1.67	23.75	1.11
5.583	1.48	11.667	8.90	17.750	1.67	23.83	1.11
5.667	1.48	11.750	8.90	17.833	1.67	23.92	1.11
5.750	1.48	11.833	27.43	17.917	1.67	24.00	1.11

POST-DEVELOPMENT
VO OUTPUT

```
                5.833    1.48 |11.917   27.43 |18.000    1.67 | 24.08    1.11
                5.917    1.48 |12.000   27.43 |18.083    1.67 | 24.17    1.11
                6.000    1.48 |12.083  113.41 |18.167    1.67 | 24.25    1.11
                6.083    1.48 |12.167  113.42 |18.250    1.67 |

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.077 (i)
     TIME TO PEAK    (hrs)=  12.250
     RUNOFF VOLUME    (mm)=  43.863
     TOTAL RAINFALL   (mm)=  92.660
     RUNOFF COEFFICIENT   =   0.473

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

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--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

         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    0.00 | 6.167    1.48 |12.250  113.42 | 18.33    1.67
                0.167    0.00 | 6.250    1.48 |12.333   13.36 | 18.42    1.67
                0.250    0.00 | 6.333    1.67 |12.417   13.34 | 18.50    1.67
                0.333    1.02 | 6.417    1.67 |12.500   13.34 | 18.58    1.67
                0.417    1.02 | 6.500    1.67 |12.583   13.34 | 18.67    1.67
                0.500    1.02 | 6.583    1.67 |12.667   13.34 | 18.75    1.67
                0.583    1.02 | 6.667    1.67 |12.750   13.34 | 18.83    1.67
                0.667    1.02 | 6.750    1.67 |12.833    6.86 | 18.92    1.67
                0.750    1.02 | 6.833    1.67 |12.917    6.86 | 19.00    1.67
                0.833    1.02 | 6.917    1.67 |13.000    6.86 | 19.08    1.67
                0.917    1.02 | 7.000    1.67 |13.083    6.86 | 19.17    1.67
                1.000    1.02 | 7.083    1.67 |13.167    6.86 | 19.25    1.67
                1.083    1.02 | 7.167    1.67 |13.250    6.86 | 19.33    1.67
                1.167    1.02 | 7.250    1.67 |13.333    5.00 | 19.42    1.67
                1.250    1.02 | 7.333    2.04 |13.417    5.00 | 19.50    1.67
                1.333    1.02 | 7.417    2.04 |13.500    5.00 | 19.58    1.67
                1.417    1.02 | 7.500    2.04 |13.583    5.00 | 19.67    1.67
                1.500    1.02 | 7.583    2.04 |13.667    5.00 | 19.75    1.67
                1.583    1.02 | 7.667    2.04 |13.750    5.00 | 19.83    1.67
                1.667    1.02 | 7.750    2.04 |13.833    3.89 | 19.92    1.67
                1.750    1.02 | 7.833    2.04 |13.917    3.89 | 20.00    1.67
                1.833    1.02 | 7.917    2.04 |14.000    3.89 | 20.08    1.67
                1.917    1.02 | 8.000    2.04 |14.083    3.89 | 20.17    1.67
                2.000    1.02 | 8.083    2.04 |14.167    3.89 | 20.25    1.67
                2.083    1.02 | 8.167    2.04 |14.250    3.89 | 20.33    1.11
                2.167    1.02 | 8.250    2.04 |14.333    2.78 | 20.42    1.11
                2.250    1.02 | 8.333    2.41 |14.417    2.78 | 20.50    1.11
                2.333    1.20 | 8.417    2.41 |14.500    2.78 | 20.58    1.11
                2.417    1.20 | 8.500    2.41 |14.583    2.78 | 20.67    1.11
                2.500    1.20 | 8.583    2.41 |14.667    2.78 | 20.75    1.11
                2.583    1.20 | 8.667    2.41 |14.750    2.78 | 20.83    1.11
                2.667    1.20 | 8.750    2.41 |14.833    2.78 | 20.92    1.11
                2.750    1.20 | 8.833    2.59 |14.917    2.78 | 21.00    1.11
                2.833    1.20 | 8.917    2.59 |15.000    2.78 | 21.08    1.11
                2.917    1.20 | 9.000    2.59 |15.083    2.78 | 21.17    1.11
                3.000    1.20 | 9.083    2.59 |15.167    2.78 | 21.25    1.11
                3.083    1.20 | 9.167    2.59 |15.250    2.78 | 21.33    1.11
                3.167    1.20 | 9.250    2.59 |15.333    2.78 | 21.42    1.11
                3.250    1.20 | 9.333    2.97 |15.417    2.78 | 21.50    1.11
                3.333    1.20 | 9.417    2.97 |15.500    2.78 | 21.58    1.11
                3.417    1.20 | 9.500    2.97 |15.583    2.78 | 21.67    1.11
                3.500    1.20 | 9.583    2.97 |15.667    2.78 | 21.75    1.11
                3.583    1.20 | 9.667    2.97 |15.750    2.78 | 21.83    1.11
                3.667    1.20 | 9.750    2.97 |15.833    2.78 | 21.92    1.11
                3.750    1.20 | 9.833    3.34 |15.917    2.78 | 22.00    1.11
                3.833    1.20 | 9.917    3.34 |16.000    2.78 | 22.08    1.11
                3.917    1.20 |10.000    3.34 |16.083    2.78 | 22.17    1.11
                4.000    1.20 |10.083    3.34 |16.167    2.78 | 22.25    1.11
                4.083    1.20 |10.167    3.34 |16.250    2.78 | 22.33    1.11
                4.167    1.20 |10.250    3.34 |16.333    1.67 | 22.42    1.11
                4.250    1.20 |10.333    4.26 |16.417    1.67 | 22.50    1.11
                4.333    1.48 |10.417    4.26 |16.500    1.67 | 22.58    1.11
                4.417    1.48 |10.500    4.26 |16.583    1.67 | 22.67    1.11
                4.500    1.48 |10.583    4.26 |16.667    1.67 | 22.75    1.11
                4.583    1.48 |10.667    4.26 |16.750    1.67 | 22.83    1.11
                4.667    1.48 |10.750    4.26 |16.833    1.67 | 22.92    1.11
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                4.750    1.48 |10.833    5.74 |16.917    1.67 | 23.00    1.11
                4.833    1.48 |10.917    5.74 |17.000    1.67 | 23.08    1.11
                4.917    1.48 |11.000    5.74 |17.083    1.67 | 23.17    1.11
                5.000    1.48 |11.083    5.74 |17.167    1.67 | 23.25    1.11
                5.083    1.48 |11.167    5.74 |17.250    1.67 | 23.33    1.11
                5.167    1.48 |11.250    5.74 |17.333    1.67 | 23.42    1.11
                5.250    1.48 |11.333    8.90 |17.417    1.67 | 23.50    1.11
                5.333    1.48 |11.417    8.90 |17.500    1.67 | 23.58    1.11
                5.417    1.48 |11.500    8.90 |17.583    1.67 | 23.67    1.11
                5.500    1.48 |11.583    8.90 |17.667    1.67 | 23.75    1.11
                5.583    1.48 |11.667    8.90 |17.750    1.67 | 23.83    1.11
                5.667    1.48 |11.750    8.90 |17.833    1.67 | 23.92    1.11
                5.750    1.48 |11.833   27.43 |17.917    1.67 | 24.00    1.11
                5.833    1.48 |11.917   27.43 |18.000    1.67 | 24.08    1.11
                5.917    1.48 |12.000   27.43 |18.083    1.67 | 24.17    1.11
                6.000    1.48 |12.083  113.41 |18.167    1.67 | 24.25    1.11
                6.083    1.48 |12.167  113.42 |18.250    1.67 |

     Unit Hyd Qpeak  (cms)=   0.120

     PEAK FLOW       (cms)=   0.100 (i)
     TIME TO PEAK    (hrs)=  12.500
     RUNOFF VOLUME    (mm)=  49.455
     TOTAL RAINFALL   (mm)=  92.660
     RUNOFF COEFFICIENT   =   0.534

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

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--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                           0.0090      0.0082   |    0.0915      0.0263
                           0.0500      0.0176   |    0.1064      0.0301

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290      0.100     12.50      49.46
   OUTFLOW: ID= 1 (  0038)      1.290      0.058     13.00      49.28

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 58.16
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0194

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--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.077    12.25    43.86
      + ID2= 2 (  0038):     1.29   0.058    13.00    49.28
        ==================================================
        ID = 3 (  0003):     1.81   0.084    12.25    47.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18         0.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     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    0.00 | 6.167    1.48 |12.250  113.42 | 18.33    1.67
                0.167    0.00 | 6.250    1.48 |12.333   13.36 | 18.42    1.67
                0.250    0.00 | 6.333    1.67 |12.417   13.34 | 18.50    1.67
                0.333    1.02 | 6.417    1.67 |12.500   13.34 | 18.58    1.67
                0.417    1.02 | 6.500    1.67 |12.583   13.34 | 18.67    1.67
                0.500    1.02 | 6.583    1.67 |12.667   13.34 | 18.75    1.67
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POST-DEVELOPMENT
VO OUTPUT

0.583	1.02	6.667	1.67	12.750	13.34	18.83	1.67
0.667	1.02	6.750	1.67	12.833	6.86	18.92	1.67
0.750	1.02	6.833	1.67	12.917	6.86	19.00	1.67
0.833	1.02	6.917	1.67	13.000	6.86	19.08	1.67
0.917	1.02	7.000	1.67	13.083	6.86	19.17	1.67
1.000	1.02	7.083	1.67	13.167	6.86	19.25	1.67
1.083	1.02	7.167	1.67	13.250	6.86	19.33	1.67
1.167	1.02	7.250	1.67	13.333	5.00	19.42	1.67
1.250	1.02	7.333	2.04	13.417	5.00	19.50	1.67
1.333	1.02	7.417	2.04	13.500	5.00	19.58	1.67
1.417	1.02	7.500	2.04	13.583	5.00	19.67	1.67
1.500	1.02	7.583	2.04	13.667	5.00	19.75	1.67
1.583	1.02	7.667	2.04	13.750	5.00	19.83	1.67
1.667	1.02	7.750	2.04	13.833	3.89	19.92	1.67
1.750	1.02	7.833	2.04	13.917	3.89	20.00	1.67
1.833	1.02	7.917	2.04	14.000	3.89	20.08	1.67
1.917	1.02	8.000	2.04	14.083	3.89	20.17	1.67
2.000	1.02	8.083	2.04	14.167	3.89	20.25	1.67
2.083	1.02	8.167	2.04	14.250	3.89	20.33	1.11
2.167	1.02	8.250	2.04	14.333	2.78	20.42	1.11
2.250	1.02	8.333	2.41	14.417	2.78	20.50	1.11
2.333	1.20	8.417	2.41	14.500	2.78	20.58	1.11
2.417	1.20	8.500	2.41	14.583	2.78	20.67	1.11
2.500	1.20	8.583	2.41	14.667	2.78	20.75	1.11
2.583	1.20	8.667	2.41	14.750	2.78	20.83	1.11
2.667	1.20	8.750	2.41	14.833	2.78	20.92	1.11
2.750	1.20	8.833	2.59	14.917	2.78	21.00	1.11
2.833	1.20	8.917	2.59	15.000	2.78	21.08	1.11
2.917	1.20	9.000	2.59	15.083	2.78	21.17	1.11
3.000	1.20	9.083	2.59	15.167	2.78	21.25	1.11
3.083	1.20	9.167	2.59	15.250	2.78	21.33	1.11
3.167	1.20	9.250	2.59	15.333	2.78	21.42	1.11
3.250	1.20	9.333	2.97	15.417	2.78	21.50	1.11
3.333	1.20	9.417	2.97	15.500	2.78	21.58	1.11
3.417	1.20	9.500	2.97	15.583	2.78	21.67	1.11
3.500	1.20	9.583	2.97	15.667	2.78	21.75	1.11
3.583	1.20	9.667	2.97	15.750	2.78	21.83	1.11
3.667	1.20	9.750	2.97	15.833	2.78	21.92	1.11
3.750	1.20	9.833	3.34	15.917	2.78	22.00	1.11
3.833	1.20	9.917	3.34	16.000	2.78	22.08	1.11
3.917	1.20	10.000	3.34	16.083	2.78	22.17	1.11
4.000	1.20	10.083	3.34	16.167	2.78	22.25	1.11
4.083	1.20	10.167	3.34	16.250	2.78	22.33	1.11
4.167	1.20	10.250	3.34	16.333	1.67	22.42	1.11
4.250	1.20	10.333	4.26	16.417	1.67	22.50	1.11
4.333	1.48	10.417	4.26	16.500	1.67	22.58	1.11
4.417	1.48	10.500	4.26	16.583	1.67	22.67	1.11
4.500	1.48	10.583	4.26	16.667	1.67	22.75	1.11
4.583	1.48	10.667	4.26	16.750	1.67	22.83	1.11
4.667	1.48	10.750	4.26	16.833	1.67	22.92	1.11
4.750	1.48	10.833	5.74	16.917	1.67	23.00	1.11
4.833	1.48	10.917	5.74	17.000	1.67	23.08	1.11
4.917	1.48	11.000	5.74	17.083	1.67	23.17	1.11
5.000	1.48	11.083	5.74	17.167	1.67	23.25	1.11
5.083	1.48	11.167	5.74	17.250	1.67	23.33	1.11
5.167	1.48	11.250	5.74	17.333	1.67	23.42	1.11
5.250	1.48	11.333	8.90	17.417	1.67	23.50	1.11
5.333	1.48	11.417	8.90	17.500	1.67	23.58	1.11
5.417	1.48	11.500	8.90	17.583	1.67	23.67	1.11
5.500	1.48	11.583	8.90	17.667	1.67	23.75	1.11
5.583	1.48	11.667	8.90	17.750	1.67	23.83	1.11
5.667	1.48	11.750	8.90	17.833	1.67	23.92	1.11
5.750	1.48	11.833	27.43	17.917	1.67	24.00	1.11
5.833	1.48	11.917	27.43	18.000	1.67	24.08	1.11
5.917	1.48	12.000	27.43	18.083	1.67	24.17	1.11
6.000	1.48	12.083	113.41	18.167	1.67	24.25	1.11
6.083	1.48	12.167	113.42	18.250	1.67		

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Max.Eff.Inten.(mm/hr)=     113.42       139.84
           over (min)        5.00        10.00
Storage Coeff.  (min)=       2.66 (ii)    7.31 (ii)
Unit Hyd. Tpeak (min)=       5.00        10.00
Unit Hyd. peak  (cms)=       0.29         0.13
                                                    *TOTALS*
PEAK FLOW       (cms)=       0.19         0.26        0.448 (iii)
TIME TO PEAK    (hrs)=      12.25        12.25        12.25
RUNOFF VOLUME    (mm)=      90.66        56.48        66.49
TOTAL RAINFALL   (mm)=      92.66        92.66        92.66
RUNOFF COEFFICIENT   =       0.98         0.61         0.72

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

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

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**********************************************
** SIMULATION:J. 25yr 24hr 15min SCS Type II **
**********************************************

--------------------
|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              6ff94430-c332-4994-803a-bcaaae5f0e27\110417ef
| Ptotal=108.80 mm |    Comments: J. 25yr 24hr 15min SCS Type II
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.96	12.50	15.67	18.75	1.96
0.25	1.20	6.50	1.96	12.75	8.05	19.00	1.96
0.50	1.20	6.75	1.96	13.00	8.05	19.25	1.96
0.75	1.20	7.00	1.96	13.25	5.88	19.50	1.96
1.00	1.20	7.25	2.39	13.50	5.88	19.75	1.96
1.25	1.20	7.50	2.39	13.75	4.57	20.00	1.96
1.50	1.20	7.75	2.39	14.00	4.57	20.25	1.31
1.75	1.20	8.00	2.39	14.25	3.26	20.50	1.31
2.00	1.20	8.25	2.83	14.50	3.26	20.75	1.31
2.25	1.41	8.50	2.83	14.75	3.26	21.00	1.31
2.50	1.41	8.75	3.05	15.00	3.26	21.25	1.31
2.75	1.41	9.00	3.05	15.25	3.26	21.50	1.31
3.00	1.41	9.25	3.48	15.50	3.26	21.75	1.31
3.25	1.41	9.50	3.48	15.75	3.26	22.00	1.31
3.50	1.41	9.75	3.92	16.00	3.26	22.25	1.31
3.75	1.41	10.00	3.92	16.25	1.96	22.50	1.31
4.00	1.41	10.25	5.00	16.50	1.96	22.75	1.31
4.25	1.74	10.50	5.00	16.75	1.96	23.00	1.31
4.50	1.74	10.75	6.75	17.00	1.96	23.25	1.31
4.75	1.74	11.00	6.75	17.25	1.96	23.50	1.31
5.00	1.74	11.25	10.44	17.50	1.96	23.75	1.31
5.25	1.74	11.50	10.44	17.75	1.96	24.00	1.31
5.50	1.74	11.75	32.20	18.00	1.96		
5.75	1.74	12.00	133.17	18.25	1.96		
6.00	1.74	12.25	15.67	18.50	1.96		

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| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.74	12.250	133.17	18.33	1.96
0.167	0.00	6.250	1.74	12.333	15.68	18.42	1.96
0.250	0.00	6.333	1.96	12.417	15.67	18.50	1.96
0.333	1.20	6.417	1.96	12.500	15.67	18.58	1.96
0.417	1.20	6.500	1.96	12.583	15.67	18.67	1.96
0.500	1.20	6.583	1.96	12.667	15.67	18.75	1.96
0.583	1.20	6.667	1.96	12.750	15.67	18.83	1.96
0.667	1.20	6.750	1.96	12.833	8.05	18.92	1.96
0.750	1.20	6.833	1.96	12.917	8.05	19.00	1.96
0.833	1.20	6.917	1.96	13.000	8.05	19.08	1.96
0.917	1.20	7.000	1.96	13.083	8.05	19.17	1.96
1.000	1.20	7.083	1.96	13.167	8.05	19.25	1.96
1.083	1.20	7.167	1.96	13.250	8.05	19.33	1.96
1.167	1.20	7.250	1.96	13.333	5.88	19.42	1.96
1.250	1.20	7.333	2.39	13.417	5.88	19.50	1.96
1.333	1.20	7.417	2.39	13.500	5.88	19.58	1.96
1.417	1.20	7.500	2.39	13.583	5.88	19.67	1.96
1.500	1.20	7.583	2.39	13.667	5.88	19.75	1.96
1.583	1.20	7.667	2.39	13.750	5.88	19.83	1.96
1.667	1.20	7.750	2.39	13.833	4.57	19.92	1.96
1.750	1.20	7.833	2.39	13.917	4.57	20.00	1.96
1.833	1.20	7.917	2.39	14.000	4.57	20.08	1.96
1.917	1.20	8.000	2.39	14.083	4.57	20.17	1.96
2.000	1.20	8.083	2.39	14.167	4.57	20.25	1.96
2.083	1.20	8.167	2.39	14.250	4.57	20.33	1.31
2.167	1.20	8.250	2.39	14.333	3.26	20.42	1.31
2.250	1.20	8.333	2.83	14.417	3.26	20.50	1.31

POST-DEVELOPMENT
VO OUTPUT

2.333	1.41	8.417	2.83	14.500	3.26	20.58	1.31
2.417	1.41	8.500	2.83	14.583	3.26	20.67	1.31
2.500	1.41	8.583	2.83	14.667	3.26	20.75	1.31
2.583	1.41	8.667	2.83	14.750	3.26	20.83	1.31
2.667	1.41	8.750	2.83	14.833	3.26	20.92	1.31
2.750	1.41	8.833	3.05	14.917	3.26	21.00	1.31
2.833	1.41	8.917	3.05	15.000	3.26	21.08	1.31
2.917	1.41	9.000	3.05	15.083	3.26	21.17	1.31
3.000	1.41	9.083	3.05	15.167	3.26	21.25	1.31
3.083	1.41	9.167	3.05	15.250	3.26	21.33	1.31
3.167	1.41	9.250	3.05	15.333	3.26	21.42	1.31
3.250	1.41	9.333	3.48	15.417	3.26	21.50	1.31
3.333	1.41	9.417	3.48	15.500	3.26	21.58	1.31
3.417	1.41	9.500	3.48	15.583	3.26	21.67	1.31
3.500	1.41	9.583	3.48	15.667	3.26	21.75	1.31
3.583	1.41	9.667	3.48	15.750	3.26	21.83	1.31
3.667	1.41	9.750	3.48	15.833	3.26	21.92	1.31
3.750	1.41	9.833	3.92	15.917	3.26	22.00	1.31
3.833	1.41	9.917	3.92	16.000	3.26	22.08	1.31
3.917	1.41	10.000	3.92	16.083	3.26	22.17	1.31
4.000	1.41	10.083	3.92	16.167	3.26	22.25	1.31
4.083	1.41	10.167	3.92	16.250	3.26	22.33	1.31
4.167	1.41	10.250	3.92	16.333	1.96	22.42	1.31
4.250	1.41	10.333	5.00	16.417	1.96	22.50	1.31
4.333	1.74	10.417	5.00	16.500	1.96	22.58	1.31
4.417	1.74	10.500	5.00	16.583	1.96	22.67	1.31
4.500	1.74	10.583	5.00	16.667	1.96	22.75	1.31
4.583	1.74	10.667	5.00	16.750	1.96	22.83	1.31
4.667	1.74	10.750	5.00	16.833	1.96	22.92	1.31
4.750	1.74	10.833	6.75	16.917	1.96	23.00	1.31
4.833	1.74	10.917	6.75	17.000	1.96	23.08	1.31
4.917	1.74	11.000	6.75	17.083	1.96	23.17	1.31
5.000	1.74	11.083	6.75	17.167	1.96	23.25	1.31
5.083	1.74	11.167	6.75	17.250	1.96	23.33	1.31
5.167	1.74	11.250	6.75	17.333	1.96	23.42	1.31
5.250	1.74	11.333	10.44	17.417	1.96	23.50	1.31
5.333	1.74	11.417	10.44	17.500	1.96	23.58	1.31
5.417	1.74	11.500	10.44	17.583	1.96	23.67	1.31
5.500	1.74	11.583	10.44	17.667	1.96	23.75	1.31
5.583	1.74	11.667	10.44	17.750	1.96	23.83	1.31
5.667	1.74	11.750	10.44	17.833	1.96	23.92	1.31
5.750	1.74	11.833	32.20	17.917	1.96	24.00	1.31
5.833	1.74	11.917	32.20	18.000	1.96	24.08	1.31
5.917	1.74	12.000	32.20	18.083	1.96	24.17	1.31
6.000	1.74	12.083	133.16	18.167	1.96	24.25	1.31
6.083	1.74	12.167	133.17	18.250	1.96		

Unit Hyd Qpeak (cms)= 0.153

PEAK FLOW (cms)= 0.099 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 56.260
TOTAL RAINFALL (mm)= 108.800
RUNOFF COEFFICIENT = 0.517

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

CALIB				
NASHYD (0002)	Area (ha)= 1.29	Curve Number (CN)= 78.6		
ID= 1 DT= 5.0 min	Ia (mm)= 4.43	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 0.41			

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	0.00	6.167	1.74	12.250	133.17	18.33	1.96
0.167	0.00	6.250	1.74	12.333	15.68	18.42	1.96
0.250	0.00	6.333	1.96	12.417	15.67	18.50	1.96
0.333	1.20	6.417	1.96	12.500	15.67	18.58	1.96
0.417	1.20	6.500	1.96	12.583	15.67	18.67	1.96
0.500	1.20	6.583	1.96	12.667	15.67	18.75	1.96
0.583	1.20	6.667	1.96	12.750	15.67	18.83	1.96
0.667	1.20	6.750	1.96	12.833	8.05	18.92	1.96
0.750	1.20	6.833	1.96	12.917	8.05	19.00	1.96
0.833	1.20	6.917	1.96	13.000	8.05	19.08	1.96
0.917	1.20	7.000	1.96	13.083	8.05	19.17	1.96
1.000	1.20	7.083	1.96	13.167	8.05	19.25	1.96
1.083	1.20	7.167	1.96	13.250	8.05	19.33	1.96
1.167	1.20	7.250	1.96	13.333	5.88	19.42	1.96
1.250	1.20	7.333	2.39	13.417	5.88	19.50	1.96
1.333	1.20	7.417	2.39	13.500	5.88	19.58	1.96
1.417	1.20	7.500	2.39	13.583	5.88	19.67	1.96
1.500	1.20	7.583	2.39	13.667	5.88	19.75	1.96
1.583	1.20	7.667	2.39	13.750	5.88	19.83	1.96
1.667	1.20	7.750	2.39	13.833	4.57	19.92	1.96
1.750	1.20	7.833	2.39	13.917	4.57	20.00	1.96
1.833	1.20	7.917	2.39	14.000	4.57	20.08	1.96
1.917	1.20	8.000	2.39	14.083	4.57	20.17	1.96
2.000	1.20	8.083	2.39	14.167	4.57	20.25	1.96
2.083	1.20	8.167	2.39	14.250	4.57	20.33	1.31
2.167	1.20	8.250	2.39	14.333	3.26	20.42	1.31
2.250	1.20	8.333	2.83	14.417	3.26	20.50	1.31
2.333	1.41	8.417	2.83	14.500	3.26	20.58	1.31
2.417	1.41	8.500	2.83	14.583	3.26	20.67	1.31
2.500	1.41	8.583	2.83	14.667	3.26	20.75	1.31
2.583	1.41	8.667	2.83	14.750	3.26	20.83	1.31
2.667	1.41	8.750	2.83	14.833	3.26	20.92	1.31
2.750	1.41	8.833	3.05	14.917	3.26	21.00	1.31
2.833	1.41	8.917	3.05	15.000	3.26	21.08	1.31
2.917	1.41	9.000	3.05	15.083	3.26	21.17	1.31
3.000	1.41	9.083	3.05	15.167	3.26	21.25	1.31
3.083	1.41	9.167	3.05	15.250	3.26	21.33	1.31
3.167	1.41	9.250	3.05	15.333	3.26	21.42	1.31
3.250	1.41	9.333	3.48	15.417	3.26	21.50	1.31
3.333	1.41	9.417	3.48	15.500	3.26	21.58	1.31
3.417	1.41	9.500	3.48	15.583	3.26	21.67	1.31
3.500	1.41	9.583	3.48	15.667	3.26	21.75	1.31
3.583	1.41	9.667	3.48	15.750	3.26	21.83	1.31
3.667	1.41	9.750	3.48	15.833	3.26	21.92	1.31
3.750	1.41	9.833	3.92	15.917	3.26	22.00	1.31
3.833	1.41	9.917	3.92	16.000	3.26	22.08	1.31
3.917	1.41	10.000	3.92	16.083	3.26	22.17	1.31
4.000	1.41	10.083	3.92	16.167	3.26	22.25	1.31
4.083	1.41	10.167	3.92	16.250	3.26	22.33	1.31
4.167	1.41	10.250	3.92	16.333	1.96	22.42	1.31
4.250	1.41	10.333	5.00	16.417	1.96	22.50	1.31
4.333	1.74	10.417	5.00	16.500	1.96	22.58	1.31
4.417	1.74	10.500	5.00	16.583	1.96	22.67	1.31
4.500	1.74	10.583	5.00	16.667	1.96	22.75	1.31
4.583	1.74	10.667	5.00	16.750	1.96	22.83	1.31
4.667	1.74	10.750	5.00	16.833	1.96	22.92	1.31
4.750	1.74	10.833	6.75	16.917	1.96	23.00	1.31
4.833	1.74	10.917	6.75	17.000	1.96	23.08	1.31
4.917	1.74	11.000	6.75	17.083	1.96	23.17	1.31
5.000	1.74	11.083	6.75	17.167	1.96	23.25	1.31
5.083	1.74	11.167	6.75	17.250	1.96	23.33	1.31
5.167	1.74	11.250	6.75	17.333	1.96	23.42	1.31
5.250	1.74	11.333	10.44	17.417	1.96	23.50	1.31
5.333	1.74	11.417	10.44	17.500	1.96	23.58	1.31
5.417	1.74	11.500	10.44	17.583	1.96	23.67	1.31
5.500	1.74	11.583	10.44	17.667	1.96	23.75	1.31
5.583	1.74	11.667	10.44	17.750	1.96	23.83	1.31
5.667	1.74	11.750	10.44	17.833	1.96	23.92	1.31
5.750	1.74	11.833	32.20	17.917	1.96	24.00	1.31
5.833	1.74	11.917	32.20	18.000	1.96	24.08	1.31
5.917	1.74	12.000	32.20	18.083	1.96	24.17	1.31
6.000	1.74	12.083	133.16	18.167	1.96	24.25	1.31
6.083	1.74	12.167	133.17	18.250	1.96		

Unit Hyd Qpeak (cms)= 0.120

PEAK FLOW (cms)= 0.128 (i)
TIME TO PEAK (hrs)= 12.500
RUNOFF VOLUME (mm)= 62.768
TOTAL RAINFALL (mm)= 108.800
RUNOFF COEFFICIENT = 0.577

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

RESERVOIR(0038)	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	0.0736	0.0226
	0.0090	0.0082	0.0915	0.0263
	0.0500	0.0176	0.1064	0.0301

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	1.290	0.128	12.50	62.77
OUTFLOW: ID= 1 (0038)	1.290	0.078	13.00	62.60

POST-DEVELOPMENT
VO OUTPUT

```
                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 60.91
                    TIME SHIFT OF PEAK FLOW         (min)= 30.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0235

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--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.099    12.25    56.26
      + ID2= 2 (  0038):     1.29   0.078    13.00    62.60
        ====================================================
        ID = 3 (  0003):     1.81   0.108    12.25    60.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| CALIB           |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18         0.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     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    0.00 | 6.167    1.74 |12.250  133.17 | 18.33    1.96
               0.167    0.00 | 6.250    1.74 |12.333   15.68 | 18.42    1.96
               0.250    0.00 | 6.333    1.96 |12.417   15.67 | 18.50    1.96
               0.333    1.20 | 6.417    1.96 |12.500   15.67 | 18.58    1.96
               0.417    1.20 | 6.500    1.96 |12.583   15.67 | 18.67    1.96
               0.500    1.20 | 6.583    1.96 |12.667   15.67 | 18.75    1.96
               0.583    1.20 | 6.667    1.96 |12.750   15.67 | 18.83    1.96
               0.667    1.20 | 6.750    1.96 |12.833    8.05 | 18.92    1.96
               0.750    1.20 | 6.833    1.96 |12.917    8.05 | 19.00    1.96
               0.833    1.20 | 6.917    1.96 |13.000    8.05 | 19.08    1.96
               0.917    1.20 | 7.000    1.96 |13.083    8.05 | 19.17    1.96
               1.000    1.20 | 7.083    1.96 |13.167    8.05 | 19.25    1.96
               1.083    1.20 | 7.167    1.96 |13.250    8.05 | 19.33    1.96
               1.167    1.20 | 7.250    1.96 |13.333    5.88 | 19.42    1.96
               1.250    1.20 | 7.333    2.39 |13.417    5.88 | 19.50    1.96
               1.333    1.20 | 7.417    2.39 |13.500    5.88 | 19.58    1.96
               1.417    1.20 | 7.500    2.39 |13.583    5.88 | 19.67    1.96
               1.500    1.20 | 7.583    2.39 |13.667    5.88 | 19.75    1.96
               1.583    1.20 | 7.667    2.39 |13.750    5.88 | 19.83    1.96
               1.667    1.20 | 7.750    2.39 |13.833    4.57 | 19.92    1.96
               1.750    1.20 | 7.833    2.39 |13.917    4.57 | 20.00    1.96
               1.833    1.20 | 7.917    2.39 |14.000    4.57 | 20.08    1.96
               1.917    1.20 | 8.000    2.39 |14.083    4.57 | 20.17    1.96
               2.000    1.20 | 8.083    2.39 |14.167    4.57 | 20.25    1.96
               2.083    1.20 | 8.167    2.39 |14.250    4.57 | 20.33    1.31
               2.167    1.20 | 8.250    2.39 |14.333    3.26 | 20.42    1.31
               2.250    1.20 | 8.333    2.83 |14.417    3.26 | 20.50    1.31
               2.333    1.41 | 8.417    2.83 |14.500    3.26 | 20.58    1.31
               2.417    1.41 | 8.500    2.83 |14.583    3.26 | 20.67    1.31
               2.500    1.41 | 8.583    2.83 |14.667    3.26 | 20.75    1.31
               2.583    1.41 | 8.667    2.83 |14.750    3.26 | 20.83    1.31
               2.667    1.41 | 8.750    2.83 |14.833    3.26 | 20.92    1.31
               2.750    1.41 | 8.833    3.05 |14.917    3.26 | 21.00    1.31
               2.833    1.41 | 8.917    3.05 |15.000    3.26 | 21.08    1.31
               2.917    1.41 | 9.000    3.05 |15.083    3.26 | 21.17    1.31
               3.000    1.41 | 9.083    3.05 |15.167    3.26 | 21.25    1.31
               3.083    1.41 | 9.167    3.05 |15.250    3.26 | 21.33    1.31
               3.167    1.41 | 9.250    3.05 |15.333    3.26 | 21.42    1.31
               3.250    1.41 | 9.333    3.48 |15.417    3.26 | 21.50    1.31
               3.333    1.41 | 9.417    3.48 |15.500    3.26 | 21.58    1.31
               3.417    1.41 | 9.500    3.48 |15.583    3.26 | 21.67    1.31
               3.500    1.41 | 9.583    3.48 |15.667    3.26 | 21.75    1.31
               3.583    1.41 | 9.667    3.48 |15.750    3.26 | 21.83    1.31
               3.667    1.41 | 9.750    3.48 |15.833    3.26 | 21.92    1.31
               3.750    1.41 | 9.833    3.92 |15.917    3.26 | 22.00    1.31
               3.833    1.41 | 9.917    3.92 |16.000    3.26 | 22.08    1.31
               3.917    1.41 |10.000    3.92 |16.083    3.26 | 22.17    1.31
               4.000    1.41 |10.083    3.92 |16.167    3.26 | 22.25    1.31
               4.083    1.41 |10.167    3.92 |16.250    3.26 | 22.33    1.31
               4.167    1.41 |10.250    3.92 |16.333    1.96 | 22.42    1.31
               4.250    1.41 |10.333    5.00 |16.417    1.96 | 22.50    1.31
               4.333    1.74 |10.417    5.00 |16.500    1.96 | 22.58    1.31
               4.417    1.74 |10.500    5.00 |16.583    1.96 | 22.67    1.31
               4.500    1.74 |10.583    5.00 |16.667    1.96 | 22.75    1.31
               4.583    1.74 |10.667    5.00 |16.750    1.96 | 22.83    1.31
               4.667    1.74 |10.750    5.00 |16.833    1.96 | 22.92    1.31
               4.750    1.74 |10.833    6.75 |16.917    1.96 | 23.00    1.31
               4.833    1.74 |10.917    6.75 |17.000    1.96 | 23.08    1.31
               4.917    1.74 |11.000    6.75 |17.083    1.96 | 23.17    1.31
               5.000    1.74 |11.083    6.75 |17.167    1.96 | 23.25    1.31
               5.083    1.74 |11.167    6.75 |17.250    1.96 | 23.33    1.31
               5.167    1.74 |11.250    6.75 |17.333    1.96 | 23.42    1.31
               5.250    1.74 |11.333   10.44 |17.417    1.96 | 23.50    1.31
               5.333    1.74 |11.417   10.44 |17.500    1.96 | 23.58    1.31
               5.417    1.74 |11.500   10.44 |17.583    1.96 | 23.67    1.31
               5.500    1.74 |11.583   10.44 |17.667    1.96 | 23.75    1.31
               5.583    1.74 |11.667   10.44 |17.750    1.96 | 23.83    1.31
               5.667    1.74 |11.750   10.44 |17.833    1.96 | 23.92    1.31
               5.750    1.74 |11.833   32.20 |17.917    1.96 | 24.00    1.31
               5.833    1.74 |11.917   32.20 |18.000    1.96 | 24.08    1.31
               5.917    1.74 |12.000   32.20 |18.083    1.96 | 24.17    1.31
               6.000    1.74 |12.083  133.16 |18.167    1.96 | 24.25    1.31
               6.083    1.74 |12.167  133.17 |18.250    1.96 |

     Max.Eff.Inten.(mm/hr)=     133.17       173.69
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.49 (ii)    6.76 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.22         0.34         0.554 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25        12.25
     RUNOFF VOLUME    (mm)=     106.80        70.63        81.23
     TOTAL RAINFALL   (mm)=     108.80       108.80       108.80
     RUNOFF COEFFICIENT   =       0.98         0.65         0.75

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

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

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**********************************************
** SIMULATION:K. 50yr 24hr 15min SCS Type II **
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--------------------
|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              6ff94430-c332-4994-803a-bcaaae5f0e27\15b81333
| Ptotal=120.77 mm |    Comments: K. 50yr 24hr 15min SCS Type II
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  6.25    2.17 |  12.50   17.39 | 18.75    2.17
                0.25    1.33 |  6.50    2.17 |  12.75    8.94 | 19.00    2.17
                0.50    1.33 |  6.75    2.17 |  13.00    8.94 | 19.25    2.17
                0.75    1.33 |  7.00    2.17 |  13.25    6.52 | 19.50    2.17
                1.00    1.33 |  7.25    2.66 |  13.50    6.52 | 19.75    2.17
                1.25    1.33 |  7.50    2.66 |  13.75    5.07 | 20.00    2.17
                1.50    1.33 |  7.75    2.66 |  14.00    5.07 | 20.25    1.45
                1.75    1.33 |  8.00    2.66 |  14.25    3.62 | 20.50    1.45
                2.00    1.33 |  8.25    3.14 |  14.50    3.62 | 20.75    1.45
                2.25    1.57 |  8.50    3.14 |  14.75    3.62 | 21.00    1.45
                2.50    1.57 |  8.75    3.38 |  15.00    3.62 | 21.25    1.45
                2.75    1.57 |  9.00    3.38 |  15.25    3.62 | 21.50    1.45
                3.00    1.57 |  9.25    3.86 |  15.50    3.62 | 21.75    1.45
                3.25    1.57 |  9.50    3.86 |  15.75    3.62 | 22.00    1.45
                3.50    1.57 |  9.75    4.35 |  16.00    3.62 | 22.25    1.45
                3.75    1.57 | 10.00    4.35 |  16.25    2.17 | 22.50    1.45
                4.00    1.57 | 10.25    5.56 |  16.50    2.17 | 22.75    1.45
                4.25    1.93 | 10.50    5.56 |  16.75    2.17 | 23.00    1.45
                4.50    1.93 | 10.75    7.49 |  17.00    2.17 | 23.25    1.45
                4.75    1.93 | 11.00    7.49 |  17.25    2.17 | 23.50    1.45
                5.00    1.93 | 11.25   11.59 |  17.50    2.17 | 23.75    1.45
                5.25    1.93 | 11.50   11.59 |  17.75    2.17 | 24.00    1.45
                5.50    1.93 | 11.75   35.75 |  18.00    2.17 |
                5.75    1.93 | 12.00  147.82 |  18.25    2.17 |
                6.00    1.93 | 12.25   17.39 |  18.50    2.17 |
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POST-DEVELOPMENT
VO OUTPUT

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| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.93	12.250	147.82	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.41	18.42	2.17
0.250	0.00	6.333	2.17	12.417	17.39	18.50	2.17
0.333	1.33	6.417	2.17	12.500	17.39	18.58	2.17
0.417	1.33	6.500	2.17	12.583	17.39	18.67	2.17
0.500	1.33	6.583	2.17	12.667	17.39	18.75	2.17
0.583	1.33	6.667	2.17	12.750	17.39	18.83	2.17
0.667	1.33	6.750	2.17	12.833	8.94	18.92	2.17
0.750	1.33	6.833	2.17	12.917	8.94	19.00	2.17
0.833	1.33	6.917	2.17	13.000	8.94	19.08	2.17
0.917	1.33	7.000	2.17	13.083	8.94	19.17	2.17
1.000	1.33	7.083	2.17	13.167	8.94	19.25	2.17
1.083	1.33	7.167	2.17	13.250	8.94	19.33	2.17
1.167	1.33	7.250	2.17	13.333	6.52	19.42	2.17
1.250	1.33	7.333	2.66	13.417	6.52	19.50	2.17
1.333	1.33	7.417	2.66	13.500	6.52	19.58	2.17
1.417	1.33	7.500	2.66	13.583	6.52	19.67	2.17
1.500	1.33	7.583	2.66	13.667	6.52	19.75	2.17
1.583	1.33	7.667	2.66	13.750	6.52	19.83	2.17
1.667	1.33	7.750	2.66	13.833	5.07	19.92	2.17
1.750	1.33	7.833	2.66	13.917	5.07	20.00	2.17
1.833	1.33	7.917	2.66	14.000	5.07	20.08	2.17
1.917	1.33	8.000	2.66	14.083	5.07	20.17	2.17
2.000	1.33	8.083	2.66	14.167	5.07	20.25	2.17
2.083	1.33	8.167	2.66	14.250	5.07	20.33	1.45
2.167	1.33	8.250	2.66	14.333	3.62	20.42	1.45
2.250	1.33	8.333	3.14	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.14	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.14	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.14	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.14	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.14	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.38	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.38	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.38	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.38	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.38	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.38	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.35	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.35	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.35	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.35	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.35	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.35	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.56	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.56	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.56	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.56	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.56	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.56	16.833	2.17	22.92	1.45
4.750	1.93	10.833	7.49	16.917	2.17	23.00	1.45
4.833	1.93	10.917	7.49	17.000	2.17	23.08	1.45
4.917	1.93	11.000	7.49	17.083	2.17	23.17	1.45
5.000	1.93	11.083	7.49	17.167	2.17	23.25	1.45
5.083	1.93	11.167	7.49	17.250	2.17	23.33	1.45
5.167	1.93	11.250	7.49	17.333	2.17	23.42	1.45
5.250	1.93	11.333	11.59	17.417	2.17	23.50	1.45
5.333	1.93	11.417	11.59	17.500	2.17	23.58	1.45
5.417	1.93	11.500	11.59	17.583	2.17	23.67	1.45
5.500	1.93	11.583	11.59	17.667	2.17	23.75	1.45
5.583	1.93	11.667	11.59	17.750	2.17	23.83	1.45
5.667	1.93	11.750	11.59	17.833	2.17	23.92	1.45
5.750	1.93	11.833	35.75	17.917	2.17	24.00	1.45
5.833	1.93	11.917	35.75	18.000	2.17	24.08	1.45
5.917	1.93	12.000	35.75	18.083	2.17	24.17	1.45
6.000	1.93	12.083	147.81	18.167	2.17	24.25	1.45
6.083	1.93	12.167	147.82	18.250	2.17		

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     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.116 (i)
     TIME TO PEAK    (hrs)=  12.250
     RUNOFF VOLUME    (mm)=  65.823
     TOTAL RAINFALL   (mm)= 120.770
     RUNOFF COEFFICIENT   =   0.545

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

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| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.93	12.250	147.82	18.33	2.17
0.167	0.00	6.250	1.93	12.333	17.41	18.42	2.17
0.250	0.00	6.333	2.17	12.417	17.39	18.50	2.17
0.333	1.33	6.417	2.17	12.500	17.39	18.58	2.17
0.417	1.33	6.500	2.17	12.583	17.39	18.67	2.17
0.500	1.33	6.583	2.17	12.667	17.39	18.75	2.17
0.583	1.33	6.667	2.17	12.750	17.39	18.83	2.17
0.667	1.33	6.750	2.17	12.833	8.94	18.92	2.17
0.750	1.33	6.833	2.17	12.917	8.94	19.00	2.17
0.833	1.33	6.917	2.17	13.000	8.94	19.08	2.17
0.917	1.33	7.000	2.17	13.083	8.94	19.17	2.17
1.000	1.33	7.083	2.17	13.167	8.94	19.25	2.17
1.083	1.33	7.167	2.17	13.250	8.94	19.33	2.17
1.167	1.33	7.250	2.17	13.333	6.52	19.42	2.17
1.250	1.33	7.333	2.66	13.417	6.52	19.50	2.17
1.333	1.33	7.417	2.66	13.500	6.52	19.58	2.17
1.417	1.33	7.500	2.66	13.583	6.52	19.67	2.17
1.500	1.33	7.583	2.66	13.667	6.52	19.75	2.17
1.583	1.33	7.667	2.66	13.750	6.52	19.83	2.17
1.667	1.33	7.750	2.66	13.833	5.07	19.92	2.17
1.750	1.33	7.833	2.66	13.917	5.07	20.00	2.17
1.833	1.33	7.917	2.66	14.000	5.07	20.08	2.17
1.917	1.33	8.000	2.66	14.083	5.07	20.17	2.17
2.000	1.33	8.083	2.66	14.167	5.07	20.25	2.17
2.083	1.33	8.167	2.66	14.250	5.07	20.33	1.45
2.167	1.33	8.250	2.66	14.333	3.62	20.42	1.45
2.250	1.33	8.333	3.14	14.417	3.62	20.50	1.45
2.333	1.57	8.417	3.14	14.500	3.62	20.58	1.45
2.417	1.57	8.500	3.14	14.583	3.62	20.67	1.45
2.500	1.57	8.583	3.14	14.667	3.62	20.75	1.45
2.583	1.57	8.667	3.14	14.750	3.62	20.83	1.45
2.667	1.57	8.750	3.14	14.833	3.62	20.92	1.45
2.750	1.57	8.833	3.38	14.917	3.62	21.00	1.45
2.833	1.57	8.917	3.38	15.000	3.62	21.08	1.45
2.917	1.57	9.000	3.38	15.083	3.62	21.17	1.45
3.000	1.57	9.083	3.38	15.167	3.62	21.25	1.45
3.083	1.57	9.167	3.38	15.250	3.62	21.33	1.45
3.167	1.57	9.250	3.38	15.333	3.62	21.42	1.45
3.250	1.57	9.333	3.86	15.417	3.62	21.50	1.45
3.333	1.57	9.417	3.86	15.500	3.62	21.58	1.45
3.417	1.57	9.500	3.86	15.583	3.62	21.67	1.45
3.500	1.57	9.583	3.86	15.667	3.62	21.75	1.45
3.583	1.57	9.667	3.86	15.750	3.62	21.83	1.45
3.667	1.57	9.750	3.86	15.833	3.62	21.92	1.45
3.750	1.57	9.833	4.35	15.917	3.62	22.00	1.45
3.833	1.57	9.917	4.35	16.000	3.62	22.08	1.45
3.917	1.57	10.000	4.35	16.083	3.62	22.17	1.45
4.000	1.57	10.083	4.35	16.167	3.62	22.25	1.45
4.083	1.57	10.167	4.35	16.250	3.62	22.33	1.45
4.167	1.57	10.250	4.35	16.333	2.17	22.42	1.45
4.250	1.57	10.333	5.56	16.417	2.17	22.50	1.45
4.333	1.93	10.417	5.56	16.500	2.17	22.58	1.45
4.417	1.93	10.500	5.56	16.583	2.17	22.67	1.45
4.500	1.93	10.583	5.56	16.667	2.17	22.75	1.45
4.583	1.93	10.667	5.56	16.750	2.17	22.83	1.45
4.667	1.93	10.750	5.56	16.833	2.17	22.92	1.45

POST-DEVELOPMENT
VO OUTPUT

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                4.750    1.93 |10.833    7.49 |16.917    2.17 | 23.00    1.45
                4.833    1.93 |10.917    7.49 |17.000    2.17 | 23.08    1.45
                4.917    1.93 |11.000    7.49 |17.083    2.17 | 23.17    1.45
                5.000    1.93 |11.083    7.49 |17.167    2.17 | 23.25    1.45
                5.083    1.93 |11.167    7.49 |17.250    2.17 | 23.33    1.45
                5.167    1.93 |11.250    7.49 |17.333    2.17 | 23.42    1.45
                5.250    1.93 |11.333   11.59 |17.417    2.17 | 23.50    1.45
                5.333    1.93 |11.417   11.59 |17.500    2.17 | 23.58    1.45
                5.417    1.93 |11.500   11.59 |17.583    2.17 | 23.67    1.45
                5.500    1.93 |11.583   11.59 |17.667    2.17 | 23.75    1.45
                5.583    1.93 |11.667   11.59 |17.750    2.17 | 23.83    1.45
                5.667    1.93 |11.750   11.59 |17.833    2.17 | 23.92    1.45
                5.750    1.93 |11.833   35.75 |17.917    2.17 | 24.00    1.45
                5.833    1.93 |11.917   35.75 |18.000    2.17 | 24.08    1.45
                5.917    1.93 |12.000   35.75 |18.083    2.17 | 24.17    1.45
                6.000    1.93 |12.083  147.81 |18.167    2.17 | 24.25    1.45
                6.083    1.93 |12.167  147.82 |18.250    2.17 |

     Unit Hyd Qpeak  (cms)=   0.120

     PEAK FLOW       (cms)=   0.149 (i)
     TIME TO PEAK    (hrs)=  12.500
     RUNOFF VOLUME    (mm)=  72.958
     TOTAL RAINFALL   (mm)= 120.770
     RUNOFF COEFFICIENT   =   0.604

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

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--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                           0.0090      0.0082   |    0.0915      0.0263
                           0.0500      0.0176   |    0.1064      0.0301

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290      0.149     12.50      72.96
   OUTFLOW: ID= 1 (  0038)      1.290      0.092     13.00      72.78

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 62.12
                   TIME SHIFT OF PEAK FLOW         (min)= 30.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  0.0266

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--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.116    12.25    65.82
      + ID2= 2 (  0038):     1.29   0.092    13.00    72.78
        ===================================================
        ID = 3 (  0003):     1.81   0.132    12.25    70.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18         0.84
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.05        25.00
     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    0.00 | 6.167    1.93 |12.250  147.82 | 18.33    2.17
                 0.167    0.00 | 6.250    1.93 |12.333   17.41 | 18.42    2.17
                 0.250    0.00 | 6.333    2.17 |12.417   17.39 | 18.50    2.17
                 0.333    1.33 | 6.417    2.17 |12.500   17.39 | 18.58    2.17
                 0.417    1.33 | 6.500    2.17 |12.583   17.39 | 18.67    2.17
                 0.500    1.33 | 6.583    2.17 |12.667   17.39 | 18.75    2.17
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                 0.583    1.33 | 6.667    2.17 |12.750   17.39 | 18.83    2.17
                 0.667    1.33 | 6.750    2.17 |12.833    8.94 | 18.92    2.17
                 0.750    1.33 | 6.833    2.17 |12.917    8.94 | 19.00    2.17
                 0.833    1.33 | 6.917    2.17 |13.000    8.94 | 19.08    2.17
                 0.917    1.33 | 7.000    2.17 |13.083    8.94 | 19.17    2.17
                 1.000    1.33 | 7.083    2.17 |13.167    8.94 | 19.25    2.17
                 1.083    1.33 | 7.167    2.17 |13.250    8.94 | 19.33    2.17
                 1.167    1.33 | 7.250    2.17 |13.333    6.52 | 19.42    2.17
                 1.250    1.33 | 7.333    2.66 |13.417    6.52 | 19.50    2.17
                 1.333    1.33 | 7.417    2.66 |13.500    6.52 | 19.58    2.17
                 1.417    1.33 | 7.500    2.66 |13.583    6.52 | 19.67    2.17
                 1.500    1.33 | 7.583    2.66 |13.667    6.52 | 19.75    2.17
                 1.583    1.33 | 7.667    2.66 |13.750    6.52 | 19.83    2.17
                 1.667    1.33 | 7.750    2.66 |13.833    5.07 | 19.92    2.17
                 1.750    1.33 | 7.833    2.66 |13.917    5.07 | 20.00    2.17
                 1.833    1.33 | 7.917    2.66 |14.000    5.07 | 20.08    2.17
                 1.917    1.33 | 8.000    2.66 |14.083    5.07 | 20.17    2.17
                 2.000    1.33 | 8.083    2.66 |14.167    5.07 | 20.25    2.17
                 2.083    1.33 | 8.167    2.66 |14.250    5.07 | 20.33    1.45
                 2.167    1.33 | 8.250    2.66 |14.333    3.62 | 20.42    1.45
                 2.250    1.33 | 8.333    3.14 |14.417    3.62 | 20.50    1.45
                 2.333    1.57 | 8.417    3.14 |14.500    3.62 | 20.58    1.45
                 2.417    1.57 | 8.500    3.14 |14.583    3.62 | 20.67    1.45
                 2.500    1.57 | 8.583    3.14 |14.667    3.62 | 20.75    1.45
                 2.583    1.57 | 8.667    3.14 |14.750    3.62 | 20.83    1.45
                 2.667    1.57 | 8.750    3.14 |14.833    3.62 | 20.92    1.45
                 2.750    1.57 | 8.833    3.38 |14.917    3.62 | 21.00    1.45
                 2.833    1.57 | 8.917    3.38 |15.000    3.62 | 21.08    1.45
                 2.917    1.57 | 9.000    3.38 |15.083    3.62 | 21.17    1.45
                 3.000    1.57 | 9.083    3.38 |15.167    3.62 | 21.25    1.45
                 3.083    1.57 | 9.167    3.38 |15.250    3.62 | 21.33    1.45
                 3.167    1.57 | 9.250    3.38 |15.333    3.62 | 21.42    1.45
                 3.250    1.57 | 9.333    3.86 |15.417    3.62 | 21.50    1.45
                 3.333    1.57 | 9.417    3.86 |15.500    3.62 | 21.58    1.45
                 3.417    1.57 | 9.500    3.86 |15.583    3.62 | 21.67    1.45
                 3.500    1.57 | 9.583    3.86 |15.667    3.62 | 21.75    1.45
                 3.583    1.57 | 9.667    3.86 |15.750    3.62 | 21.83    1.45
                 3.667    1.57 | 9.750    3.86 |15.833    3.62 | 21.92    1.45
                 3.750    1.57 | 9.833    4.35 |15.917    3.62 | 22.00    1.45
                 3.833    1.57 | 9.917    4.35 |16.000    3.62 | 22.08    1.45
                 3.917    1.57 |10.000    4.35 |16.083    3.62 | 22.17    1.45
                 4.000    1.57 |10.083    4.35 |16.167    3.62 | 22.25    1.45
                 4.083    1.57 |10.167    4.35 |16.250    3.62 | 22.33    1.45
                 4.167    1.57 |10.250    4.35 |16.333    2.17 | 22.42    1.45
                 4.250    1.57 |10.333    5.56 |16.417    2.17 | 22.50    1.45
                 4.333    1.93 |10.417    5.56 |16.500    2.17 | 22.58    1.45
                 4.417    1.93 |10.500    5.56 |16.583    2.17 | 22.67    1.45
                 4.500    1.93 |10.583    5.56 |16.667    2.17 | 22.75    1.45
                 4.583    1.93 |10.667    5.56 |16.750    2.17 | 22.83    1.45
                 4.667    1.93 |10.750    5.56 |16.833    2.17 | 22.92    1.45
                 4.750    1.93 |10.833    7.49 |16.917    2.17 | 23.00    1.45
                 4.833    1.93 |10.917    7.49 |17.000    2.17 | 23.08    1.45
                 4.917    1.93 |11.000    7.49 |17.083    2.17 | 23.17    1.45
                 5.000    1.93 |11.083    7.49 |17.167    2.17 | 23.25    1.45
                 5.083    1.93 |11.167    7.49 |17.250    2.17 | 23.33    1.45
                 5.167    1.93 |11.250    7.49 |17.333    2.17 | 23.42    1.45
                 5.250    1.93 |11.333   11.59 |17.417    2.17 | 23.50    1.45
                 5.333    1.93 |11.417   11.59 |17.500    2.17 | 23.58    1.45
                 5.417    1.93 |11.500   11.59 |17.583    2.17 | 23.67    1.45
                 5.500    1.93 |11.583   11.59 |17.667    2.17 | 23.75    1.45
                 5.583    1.93 |11.667   11.59 |17.750    2.17 | 23.83    1.45
                 5.667    1.93 |11.750   11.59 |17.833    2.17 | 23.92    1.45
                 5.750    1.93 |11.833   35.75 |17.917    2.17 | 24.00    1.45
                 5.833    1.93 |11.917   35.75 |18.000    2.17 | 24.08    1.45
                 5.917    1.93 |12.000   35.75 |18.083    2.17 | 24.17    1.45
                 6.000    1.93 |12.083  147.81 |18.167    2.17 | 24.25    1.45
                 6.083    1.93 |12.167  147.82 |18.250    2.17 |

     Max.Eff.Inten.(mm/hr)=     147.82       199.10
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.39 (ii)    6.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.24         0.39        0.634 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25        12.25
     RUNOFF VOLUME    (mm)=     118.77        81.37        92.33
     TOTAL RAINFALL   (mm)=     120.77       120.77       120.77
     RUNOFF COEFFICIENT   =       0.98         0.67         0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
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POST-DEVELOPMENT
VO OUTPUT

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      (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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**************************************************
** SIMULATION:L. 100yr 24hr 15min SCS Type II **
**************************************************

--------------------
|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              6ff94430-c332-4994-803a-bcaaae5f0e27\15758074
| Ptotal=132.74 mm |    Comments: L. 100yr 24hr 15min SCS Type II
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  6.25    2.39 | 12.50   19.11 | 18.75    2.39
                0.25    1.46 |  6.50    2.39 | 12.75    9.82 | 19.00    2.39
                0.50    1.46 |  6.75    2.39 | 13.00    9.82 | 19.25    2.39
                0.75    1.46 |  7.00    2.39 | 13.25    7.17 | 19.50    2.39
                1.00    1.46 |  7.25    2.92 | 13.50    7.17 | 19.75    2.39
                1.25    1.46 |  7.50    2.92 | 13.75    5.58 | 20.00    2.39
                1.50    1.46 |  7.75    2.92 | 14.00    5.58 | 20.25    1.59
                1.75    1.46 |  8.00    2.92 | 14.25    3.98 | 20.50    1.59
                2.00    1.46 |  8.25    3.45 | 14.50    3.98 | 20.75    1.59
                2.25    1.73 |  8.50    3.45 | 14.75    3.98 | 21.00    1.59
                2.50    1.73 |  8.75    3.72 | 15.00    3.98 | 21.25    1.59
                2.75    1.73 |  9.00    3.72 | 15.25    3.98 | 21.50    1.59
                3.00    1.73 |  9.25    4.25 | 15.50    3.98 | 21.75    1.59
                3.25    1.73 |  9.50    4.25 | 15.75    3.98 | 22.00    1.59
                3.50    1.73 |  9.75    4.78 | 16.00    3.98 | 22.25    1.59
                3.75    1.73 | 10.00    4.78 | 16.25    2.39 | 22.50    1.59
                4.00    1.73 | 10.25    6.11 | 16.50    2.39 | 22.75    1.59
                4.25    2.12 | 10.50    6.11 | 16.75    2.39 | 23.00    1.59
                4.50    2.12 | 10.75    8.23 | 17.00    2.39 | 23.25    1.59
                4.75    2.12 | 11.00    8.23 | 17.25    2.39 | 23.50    1.59
                5.00    2.12 | 11.25   12.74 | 17.50    2.39 | 23.75    1.59
                5.25    2.12 | 11.50   12.74 | 17.75    2.39 | 24.00    1.59
                5.50    2.12 | 11.75   39.29 | 18.00    2.39 |
                5.75    2.12 | 12.00  162.47 | 18.25    2.39 |
                6.00    2.12 | 12.25   19.11 | 18.50    2.39 |

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| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   0.52   Curve Number   (CN)= 74.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.92   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

         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    0.00 | 6.167    2.12 |12.250  162.47 | 18.33    2.39
               0.167    0.00 | 6.250    2.12 |12.333   19.13 | 18.42    2.39
               0.250    0.00 | 6.333    2.39 |12.417   19.11 | 18.50    2.39
               0.333    1.46 | 6.417    2.39 |12.500   19.11 | 18.58    2.39
               0.417    1.46 | 6.500    2.39 |12.583   19.11 | 18.67    2.39
               0.500    1.46 | 6.583    2.39 |12.667   19.11 | 18.75    2.39
               0.583    1.46 | 6.667    2.39 |12.750   19.11 | 18.83    2.39
               0.667    1.46 | 6.750    2.39 |12.833    9.82 | 18.92    2.39
               0.750    1.46 | 6.833    2.39 |12.917    9.82 | 19.00    2.39
               0.833    1.46 | 6.917    2.39 |13.000    9.82 | 19.08    2.39
               0.917    1.46 | 7.000    2.39 |13.083    9.82 | 19.17    2.39
               1.000    1.46 | 7.083    2.39 |13.167    9.82 | 19.25    2.39
               1.083    1.46 | 7.167    2.39 |13.250    9.82 | 19.33    2.39
               1.167    1.46 | 7.250    2.39 |13.333    7.17 | 19.42    2.39
               1.250    1.46 | 7.333    2.92 |13.417    7.17 | 19.50    2.39
               1.333    1.46 | 7.417    2.92 |13.500    7.17 | 19.58    2.39
               1.417    1.46 | 7.500    2.92 |13.583    7.17 | 19.67    2.39
               1.500    1.46 | 7.583    2.92 |13.667    7.17 | 19.75    2.39
               1.583    1.46 | 7.667    2.92 |13.750    7.17 | 19.83    2.39
               1.667    1.46 | 7.750    2.92 |13.833    5.58 | 19.92    2.39
               1.750    1.46 | 7.833    2.92 |13.917    5.58 | 20.00    2.39
               1.833    1.46 | 7.917    2.92 |14.000    5.58 | 20.08    2.39
               1.917    1.46 | 8.000    2.92 |14.083    5.58 | 20.17    2.39
               2.000    1.46 | 8.083    2.92 |14.167    5.58 | 20.25    2.39
               2.083    1.46 | 8.167    2.92 |14.250    5.58 | 20.33    1.59
               2.167    1.46 | 8.250    2.92 |14.333    3.98 | 20.42    1.59
               2.250    1.46 | 8.333    3.45 |14.417    3.98 | 20.50    1.59
               2.333    1.73 | 8.417    3.45 |14.500    3.98 | 20.58    1.59
               2.417    1.73 | 8.500    3.45 |14.583    3.98 | 20.67    1.59
               2.500    1.73 | 8.583    3.45 |14.667    3.98 | 20.75    1.59
               2.583    1.73 | 8.667    3.45 |14.750    3.98 | 20.83    1.59
               2.667    1.73 | 8.750    3.45 |14.833    3.98 | 20.92    1.59
               2.750    1.73 | 8.833    3.72 |14.917    3.98 | 21.00    1.59
               2.833    1.73 | 8.917    3.72 |15.000    3.98 | 21.08    1.59
               2.917    1.73 | 9.000    3.72 |15.083    3.98 | 21.17    1.59
               3.000    1.73 | 9.083    3.72 |15.167    3.98 | 21.25    1.59
               3.083    1.73 | 9.167    3.72 |15.250    3.98 | 21.33    1.59
               3.167    1.73 | 9.250    3.72 |15.333    3.98 | 21.42    1.59
               3.250    1.73 | 9.333    4.25 |15.417    3.98 | 21.50    1.59
               3.333    1.73 | 9.417    4.25 |15.500    3.98 | 21.58    1.59
               3.417    1.73 | 9.500    4.25 |15.583    3.98 | 21.67    1.59
               3.500    1.73 | 9.583    4.25 |15.667    3.98 | 21.75    1.59
               3.583    1.73 | 9.667    4.25 |15.750    3.98 | 21.83    1.59
               3.667    1.73 | 9.750    4.25 |15.833    3.98 | 21.92    1.59
               3.750    1.73 | 9.833    4.78 |15.917    3.98 | 22.00    1.59
               3.833    1.73 | 9.917    4.78 |16.000    3.98 | 22.08    1.59
               3.917    1.73 |10.000    4.78 |16.083    3.98 | 22.17    1.59
               4.000    1.73 |10.083    4.78 |16.167    3.98 | 22.25    1.59
               4.083    1.73 |10.167    4.78 |16.250    3.98 | 22.33    1.59
               4.167    1.73 |10.250    4.78 |16.333    2.39 | 22.42    1.59
               4.250    1.73 |10.333    6.11 |16.417    2.39 | 22.50    1.59
               4.333    2.12 |10.417    6.11 |16.500    2.39 | 22.58    1.59
               4.417    2.12 |10.500    6.11 |16.583    2.39 | 22.67    1.59
               4.500    2.12 |10.583    6.11 |16.667    2.39 | 22.75    1.59
               4.583    2.12 |10.667    6.11 |16.750    2.39 | 22.83    1.59
               4.667    2.12 |10.750    6.11 |16.833    2.39 | 22.92    1.59
               4.750    2.12 |10.833    8.23 |16.917    2.39 | 23.00    1.59
               4.833    2.12 |10.917    8.23 |17.000    2.39 | 23.08    1.59
               4.917    2.12 |11.000    8.23 |17.083    2.39 | 23.17    1.59
               5.000    2.12 |11.083    8.23 |17.167    2.39 | 23.25    1.59
               5.083    2.12 |11.167    8.23 |17.250    2.39 | 23.33    1.59
               5.167    2.12 |11.250    8.23 |17.333    2.39 | 23.42    1.59
               5.250    2.12 |11.333   12.74 |17.417    2.39 | 23.50    1.59
               5.333    2.12 |11.417   12.74 |17.500    2.39 | 23.58    1.59
               5.417    2.12 |11.500   12.74 |17.583    2.39 | 23.67    1.59
               5.500    2.12 |11.583   12.74 |17.667    2.39 | 23.75    1.59
               5.583    2.12 |11.667   12.74 |17.750    2.39 | 23.83    1.59
               5.667    2.12 |11.750   12.74 |17.833    2.39 | 23.92    1.59
               5.750    2.12 |11.833   39.29 |17.917    2.39 | 24.00    1.59
               5.833    2.12 |11.917   39.29 |18.000    2.39 | 24.08    1.59
               5.917    2.12 |12.000   39.29 |18.083    2.39 | 24.17    1.59
               6.000    2.12 |12.083  162.46 |18.167    2.39 | 24.25    1.59
               6.083    2.12 |12.167  162.47 |18.250    2.39 |

     Unit Hyd Qpeak  (cms)=   0.153

     PEAK FLOW       (cms)=   0.133 (i)
     TIME TO PEAK    (hrs)=  12.250
     RUNOFF VOLUME    (mm)=  75.643
     TOTAL RAINFALL   (mm)= 132.740
     RUNOFF COEFFICIENT   =   0.570

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

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| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   1.29   Curve Number   (CN)= 78.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.43   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

         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    0.00 | 6.167    2.12 |12.250  162.47 | 18.33    2.39
               0.167    0.00 | 6.250    2.12 |12.333   19.13 | 18.42    2.39
               0.250    0.00 | 6.333    2.39 |12.417   19.11 | 18.50    2.39
               0.333    1.46 | 6.417    2.39 |12.500   19.11 | 18.58    2.39
               0.417    1.46 | 6.500    2.39 |12.583   19.11 | 18.67    2.39
               0.500    1.46 | 6.583    2.39 |12.667   19.11 | 18.75    2.39
               0.583    1.46 | 6.667    2.39 |12.750   19.11 | 18.83    2.39
               0.667    1.46 | 6.750    2.39 |12.833    9.82 | 18.92    2.39
               0.750    1.46 | 6.833    2.39 |12.917    9.82 | 19.00    2.39
               0.833    1.46 | 6.917    2.39 |13.000    9.82 | 19.08    2.39
               0.917    1.46 | 7.000    2.39 |13.083    9.82 | 19.17    2.39
               1.000    1.46 | 7.083    2.39 |13.167    9.82 | 19.25    2.39
               1.083    1.46 | 7.167    2.39 |13.250    9.82 | 19.33    2.39
               1.167    1.46 | 7.250    2.39 |13.333    7.17 | 19.42    2.39
```

POST-DEVELOPMENT VO OUTPUT

1.250	1.46	7.333	2.92	13.417	7.17	19.50	2.39
1.333	1.46	7.417	2.92	13.500	7.17	19.58	2.39
1.417	1.46	7.500	2.92	13.583	7.17	19.67	2.39
1.500	1.46	7.583	2.92	13.667	7.17	19.75	2.39
1.583	1.46	7.667	2.92	13.750	7.17	19.83	2.39
1.667	1.46	7.750	2.92	13.833	5.58	19.92	2.39
1.750	1.46	7.833	2.92	13.917	5.58	20.00	2.39
1.833	1.46	7.917	2.92	14.000	5.58	20.08	2.39
1.917	1.46	8.000	2.92	14.083	5.58	20.17	2.39
2.000	1.46	8.083	2.92	14.167	5.58	20.25	2.39
2.083	1.46	8.167	2.92	14.250	5.58	20.33	1.59
2.167	1.46	8.250	2.92	14.333	3.98	20.42	1.59
2.250	1.46	8.333	3.45	14.417	3.98	20.50	1.59
2.333	1.73	8.417	3.45	14.500	3.98	20.58	1.59
2.417	1.73	8.500	3.45	14.583	3.98	20.67	1.59
2.500	1.73	8.583	3.45	14.667	3.98	20.75	1.59
2.583	1.73	8.667	3.45	14.750	3.98	20.83	1.59
2.667	1.73	8.750	3.45	14.833	3.98	20.92	1.59
2.750	1.73	8.833	3.72	14.917	3.98	21.00	1.59
2.833	1.73	8.917	3.72	15.000	3.98	21.08	1.59
2.917	1.73	9.000	3.72	15.083	3.98	21.17	1.59
3.000	1.73	9.083	3.72	15.167	3.98	21.25	1.59
3.083	1.73	9.167	3.72	15.250	3.98	21.33	1.59
3.167	1.73	9.250	3.72	15.333	3.98	21.42	1.59
3.250	1.73	9.333	4.25	15.417	3.98	21.50	1.59
3.333	1.73	9.417	4.25	15.500	3.98	21.58	1.59
3.417	1.73	9.500	4.25	15.583	3.98	21.67	1.59
3.500	1.73	9.583	4.25	15.667	3.98	21.75	1.59
3.583	1.73	9.667	4.25	15.750	3.98	21.83	1.59
3.667	1.73	9.750	4.25	15.833	3.98	21.92	1.59
3.750	1.73	9.833	4.78	15.917	3.98	22.00	1.59
3.833	1.73	9.917	4.78	16.000	3.98	22.08	1.59
3.917	1.73	10.000	4.78	16.083	3.98	22.17	1.59
4.000	1.73	10.083	4.78	16.167	3.98	22.25	1.59
4.083	1.73	10.167	4.78	16.250	3.98	22.33	1.59
4.167	1.73	10.250	4.78	16.333	2.39	22.42	1.59
4.250	1.73	10.333	6.11	16.417	2.39	22.50	1.59
4.333	2.12	10.417	6.11	16.500	2.39	22.58	1.59
4.417	2.12	10.500	6.11	16.583	2.39	22.67	1.59
4.500	2.12	10.583	6.11	16.667	2.39	22.75	1.59
4.583	2.12	10.667	6.11	16.750	2.39	22.83	1.59
4.667	2.12	10.750	6.11	16.833	2.39	22.92	1.59
4.750	2.12	10.833	8.23	16.917	2.39	23.00	1.59
4.833	2.12	10.917	8.23	17.000	2.39	23.08	1.59
4.917	2.12	11.000	8.23	17.083	2.39	23.17	1.59
5.000	2.12	11.083	8.23	17.167	2.39	23.25	1.59
5.083	2.12	11.167	8.23	17.250	2.39	23.33	1.59
5.167	2.12	11.250	8.23	17.333	2.39	23.42	1.59
5.250	2.12	11.333	12.74	17.417	2.39	23.50	1.59
5.333	2.12	11.417	12.74	17.500	2.39	23.58	1.59
5.417	2.12	11.500	12.74	17.583	2.39	23.67	1.59
5.500	2.12	11.583	12.74	17.667	2.39	23.75	1.59
5.583	2.12	11.667	12.74	17.750	2.39	23.83	1.59
5.667	2.12	11.750	12.74	17.833	2.39	23.92	1.59
5.750	2.12	11.833	39.29	17.917	2.39	24.00	1.59
5.833	2.12	11.917	39.29	18.000	2.39	24.08	1.59
5.917	2.12	12.000	39.29	18.083	2.39	24.17	1.59
6.000	2.12	12.083	162.46	18.167	2.39	24.25	1.59
6.083	2.12	12.167	162.47	18.250	2.39		

```
Unit Hyd Qpeak  (cms)=   0.120

PEAK FLOW       (cms)=   0.170 (i)
TIME TO PEAK    (hrs)=  12.500
RUNOFF VOLUME    (mm)=  83.365
TOTAL RAINFALL   (mm)= 132.740
RUNOFF COEFFICIENT   =   0.628

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0038)|     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   |    0.0736      0.0226
                          0.0090      0.0082   |    0.0915      0.0263
                          0.0500      0.0176   |    0.1064      0.0301

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      1.290      0.170     12.50      83.36
   OUTFLOW: ID= 1 (  0038)      1.290      0.105     13.00      83.19

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 61.85
                    TIME SHIFT OF PEAK FLOW         (min)= 30.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0299

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     0.52   0.133    12.25    75.64
      + ID2= 2 (  0038):     1.29   0.105    13.00    83.19
        ===================================================
        ID = 3 (  0003):     1.81   0.156    12.25    81.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.02
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.20   Dir. Conn.(%)=  29.30
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.18          0.84
     Dep. Storage     (mm)=       2.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     116.05         25.00
     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	0.00	6.167	2.12	12.250	162.47	18.33	2.39
0.167	0.00	6.250	2.12	12.333	19.13	18.42	2.39
0.250	0.00	6.333	2.39	12.417	19.11	18.50	2.39
0.333	1.46	6.417	2.39	12.500	19.11	18.58	2.39
0.417	1.46	6.500	2.39	12.583	19.11	18.67	2.39
0.500	1.46	6.583	2.39	12.667	19.11	18.75	2.39
0.583	1.46	6.667	2.39	12.750	19.11	18.83	2.39
0.667	1.46	6.750	2.39	12.833	9.82	18.92	2.39
0.750	1.46	6.833	2.39	12.917	9.82	19.00	2.39
0.833	1.46	6.917	2.39	13.000	9.82	19.08	2.39
0.917	1.46	7.000	2.39	13.083	9.82	19.17	2.39
1.000	1.46	7.083	2.39	13.167	9.82	19.25	2.39
1.083	1.46	7.167	2.39	13.250	9.82	19.33	2.39
1.167	1.46	7.250	2.39	13.333	7.17	19.42	2.39
1.250	1.46	7.333	2.92	13.417	7.17	19.50	2.39
1.333	1.46	7.417	2.92	13.500	7.17	19.58	2.39
1.417	1.46	7.500	2.92	13.583	7.17	19.67	2.39
1.500	1.46	7.583	2.92	13.667	7.17	19.75	2.39
1.583	1.46	7.667	2.92	13.750	7.17	19.83	2.39
1.667	1.46	7.750	2.92	13.833	5.58	19.92	2.39
1.750	1.46	7.833	2.92	13.917	5.58	20.00	2.39
1.833	1.46	7.917	2.92	14.000	5.58	20.08	2.39
1.917	1.46	8.000	2.92	14.083	5.58	20.17	2.39
2.000	1.46	8.083	2.92	14.167	5.58	20.25	2.39
2.083	1.46	8.167	2.92	14.250	5.58	20.33	1.59
2.167	1.46	8.250	2.92	14.333	3.98	20.42	1.59
2.250	1.46	8.333	3.45	14.417	3.98	20.50	1.59
2.333	1.73	8.417	3.45	14.500	3.98	20.58	1.59
2.417	1.73	8.500	3.45	14.583	3.98	20.67	1.59
2.500	1.73	8.583	3.45	14.667	3.98	20.75	1.59
2.583	1.73	8.667	3.45	14.750	3.98	20.83	1.59
2.667	1.73	8.750	3.45	14.833	3.98	20.92	1.59
2.750	1.73	8.833	3.72	14.917	3.98	21.00	1.59
2.833	1.73	8.917	3.72	15.000	3.98	21.08	1.59
2.917	1.73	9.000	3.72	15.083	3.98	21.17	1.59
3.000	1.73	9.083	3.72	15.167	3.98	21.25	1.59
3.083	1.73	9.167	3.72	15.250	3.98	21.33	1.59
3.167	1.73	9.250	3.72	15.333	3.98	21.42	1.59
3.250	1.73	9.333	4.25	15.417	3.98	21.50	1.59
3.333	1.73	9.417	4.25	15.500	3.98	21.58	1.59
3.417	1.73	9.500	4.25	15.583	3.98	21.67	1.59
3.500	1.73	9.583	4.25	15.667	3.98	21.75	1.59
3.583	1.73	9.667	4.25	15.750	3.98	21.83	1.59
3.667	1.73	9.750	4.25	15.833	3.98	21.92	1.59
3.750	1.73	9.833	4.78	15.917	3.98	22.00	1.59
3.833	1.73	9.917	4.78	16.000	3.98	22.08	1.59
3.917	1.73	10.000	4.78	16.083	3.98	22.17	1.59
4.000	1.73	10.083	4.78	16.167	3.98	22.25	1.59

POST-DEVELOPMENT
VO OUTPUT

```
                4.083    1.73 |10.167    4.78 |16.250    3.98 | 22.33    1.59
                4.167    1.73 |10.250    4.78 |16.333    2.39 | 22.42    1.59
                4.250    1.73 |10.333    6.11 |16.417    2.39 | 22.50    1.59
                4.333    2.12 |10.417    6.11 |16.500    2.39 | 22.58    1.59
                4.417    2.12 |10.500    6.11 |16.583    2.39 | 22.67    1.59
                4.500    2.12 |10.583    6.11 |16.667    2.39 | 22.75    1.59
                4.583    2.12 |10.667    6.11 |16.750    2.39 | 22.83    1.59
                4.667    2.12 |10.750    6.11 |16.833    2.39 | 22.92    1.59
                4.750    2.12 |10.833    8.23 |16.917    2.39 | 23.00    1.59
                4.833    2.12 |10.917    8.23 |17.000    2.39 | 23.08    1.59
                4.917    2.12 |11.000    8.23 |17.083    2.39 | 23.17    1.59
                5.000    2.12 |11.083    8.23 |17.167    2.39 | 23.25    1.59
                5.083    2.12 |11.167    8.23 |17.250    2.39 | 23.33    1.59
                5.167    2.12 |11.250    8.23 |17.333    2.39 | 23.42    1.59
                5.250    2.12 |11.333   12.74 |17.417    2.39 | 23.50    1.59
                5.333    2.12 |11.417   12.74 |17.500    2.39 | 23.58    1.59
                5.417    2.12 |11.500   12.74 |17.583    2.39 | 23.67    1.59
                5.500    2.12 |11.583   12.74 |17.667    2.39 | 23.75    1.59
                5.583    2.12 |11.667   12.74 |17.750    2.39 | 23.83    1.59
                5.667    2.12 |11.750   12.74 |17.833    2.39 | 23.92    1.59
                5.750    2.12 |11.833   39.29 |17.917    2.39 | 24.00    1.59
                5.833    2.12 |11.917   39.29 |18.000    2.39 | 24.08    1.59
                5.917    2.12 |12.000   39.29 |18.083    2.39 | 24.17    1.59
                6.000    2.12 |12.083  162.46 |18.167    2.39 | 24.25    1.59
                6.083    2.12 |12.167  162.47 |18.250    2.39 |

     Max.Eff.Inten.(mm/hr)=     162.47       224.67
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.30 (ii)    6.15 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.27         0.45          0.716 (iii)
     TIME TO PEAK    (hrs)=      12.25        12.25          12.25
     RUNOFF VOLUME    (mm)=     130.74        92.27         103.54
     TOTAL RAINFALL   (mm)=     132.74       132.74         132.74
     RUNOFF COEFFICIENT   =       0.98         0.70           0.78

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

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

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Project:	Glenelg School Block
Project No.:	2243-7223
File:	Pond Storage Contributions
Design by:	CB
Date:	2025.06.19

Permanent Pool Volume Contribution Calculation

Untreated Drainage from Development Direct to Pond		
Catchment Area	2.02	ha
Impervious Area	117.16	ha
Percent Impervious	58.0	%
Water Quality Storage Requirement (extrapolated from table 3.2, MOE 2003)	198	m^3/ha
Extended Detention Requirement	40.0	m^3/ha
Permanent Pool Storage Requirement	158	m^3/ha
Permanent Pool Volume Contribution	**318**	**m^3**

Extended Detention Volume Contribution Calculation

From 25mm Storm Event		
Runoff Volume	11.32	mm
Area	2.02	ha
Extended Detention Volume (Area x runoff from 25mm event) (cu.m)	**229**	**m^3**
From MOE 2003		
Extended Detention Requirement	40.0	m^3/ha
Site Area	2.02	ha
Extended Detention Volume (MOE 2003)	**81**	**m^3**
Largest Extended Detention	**229**	**m^3**

APPENDIX E

Storage Tank Sizing

CROZIER

Project: Glenelg School Block
Project No.: 2243-7223
File: Stage Storage Discharge
Design by: AW/CB/KS
Date: 2025-06-05

Glenelg Phase 3 - School Block Storage Tank SSD

Pond Stage - Storage - Discharge Calculations

Bottom of Stone Layer	521.21	m
E.D. Orifice Diameter:	0.250	m
E.D. Orifice Invert Elevation:	521.44	m

Elev. (m)	Storage Volume (cu.m)	Depth Above E.D. Invert (m)	ED Orifice Discharge (cu.m/s)	Total Discharge (cu.m/s)	Storage (ha-m)
521.24	6	0.00	0.0000	0.0000	0.001
521.26	12	0.00	0.0000	0.0000	0.001
521.29	19	0.00	0.0000	0.0000	0.002
521.31	25	0.00	0.0000	0.0000	0.002
521.34	31	0.00	0.0000	0.0000	0.003
521.36	37	0.00	0.0000	0.0000	0.004
521.39	44	0.00	0.0000	0.0000	0.004
521.41	50	0.00	0.0000	0.0000	0.005
521.44	56	0.00	0.0000	0.0000	0.006
521.46	69	0.02	0.0044	0.0044	0.007
521.49	82	0.05	0.0091	0.0091	0.008
521.51	95	0.07	0.0138	0.0138	0.009
521.54	107	0.10	0.0185	0.0185	0.011
521.59	131	0.15	0.0224	0.0224	0.013
521.62	143	0.18	0.0315	0.0315	0.014
521.64	155	0.20	0.0386	0.0386	0.015
521.67	166	0.23	0.0445	0.0445	0.017
521.69	176	0.25	0.0497	0.0497	0.018
521.72	186	0.28	0.0544	0.0544	0.019
521.74	196	0.30	0.0588	0.0588	0.020
521.77	205	0.33	0.0628	0.0628	0.020
521.79	212	0.35	0.0666	0.0666	0.021
521.82	219	0.38	0.0702	0.0702	0.022
521.85	226	0.40	0.0736	0.0736	0.023
521.87	232	0.43	0.0769	0.0769	0.023
521.90	238	0.46	0.0800	0.0800	0.024
521.92	244	0.48	0.0831	0.0831	0.024
521.95	251	0.51	0.0860	0.0860	0.025
521.97	257	0.53	0.0888	0.0888	0.026
522.00	263	0.56	0.0915	0.0915	0.026
522.02	269	0.58	0.0942	0.0942	0.027
522.05	276	0.61	0.0967	0.0967	0.028
522.07	282	0.63	0.0992	0.0992	0.028
522.10	288	0.66	0.1017	0.1017	0.029
522.12	294	0.68	0.1041	0.1041	0.029
522.15	301	0.71	0.1064	0.1064	0.030

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH INSTALLATION INSTRUCTIONS VISIT OUR APP

SCHOOLBLOCK_APRIL2024

SOUTHGATE, ON, CANADA

SC-310 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-310.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE OR POLYETHYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2922 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-310 SYSTEM

1. STORMTECH SC-310 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 80 mm (3") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

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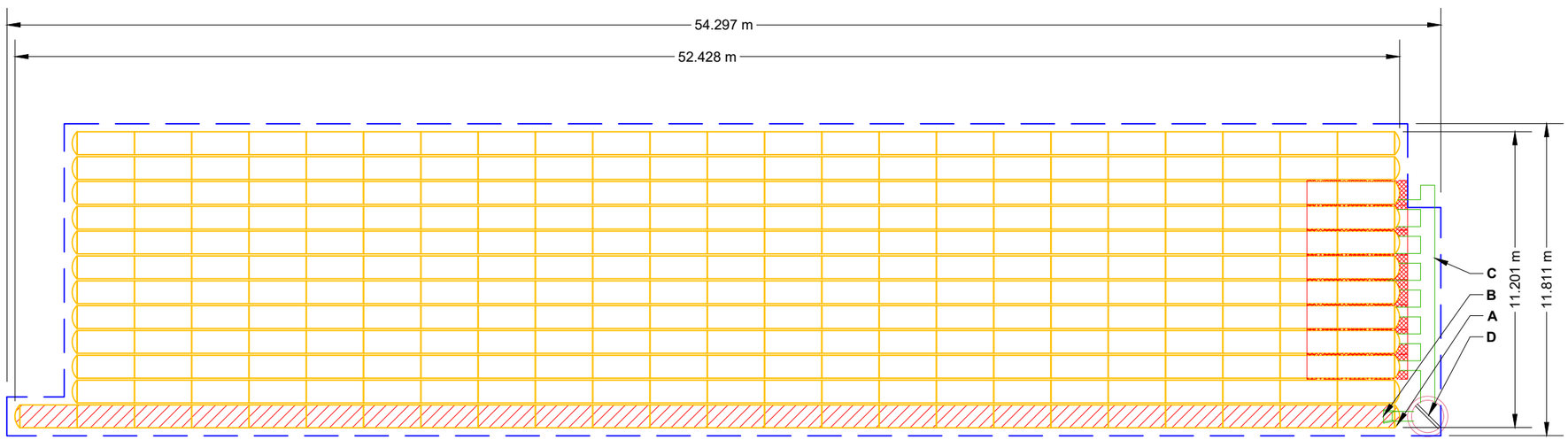
PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS	
277	STORMTECH SC-310 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	3.074
24	STORMTECH SC-310 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1.194
305	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1.042
229	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1.042
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.042
300.6	INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	0.941
		TOP OF SC-310 CHAMBER:	0.636
		450 mm x 300 mm BOTTOM MANIFOLD INVERT (300 mm PIPE):	0.252
		300 mm ISOLATOR ROW PLUS INVERT:	0.252
614.9	SYSTEM AREA (m²)	BOTTOM OF SC-310 CHAMBER:	0.229
132.2	SYSTEM PERIMETER (m)	450 mm x 300 mm BOTTOM MANIFOLD INVERT (450 mm PIPE):	0.102
		BOTTOM OF STONE:	0.000

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED EZ END CAP	A	300 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC310ECEZ / TYP OF ALL 300 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	23 mm	
FLAMP	B	INSTALL FLAMP ON 300 mm ACCESS PIPE / PART#: SC31012RAMP		
MANIFOLD	C	450 mm x 300 mm ADS N-12 (450 mm PIPE) 450 mm x 300 mm ADS N-12 (300 mm PIPE)	-128 mm 23 mm	
CONCRETE STRUCTURE W/WEIR	D	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		369 L/s IN



ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 3.810 m OF ADSPLUS625 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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SOUTHGATE, ON, CANADA

DATE: 04/28/2025 | DRAWN: KS

PROJECT #: | CHECKED: N/A

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ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
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SCALE = 1 : 200

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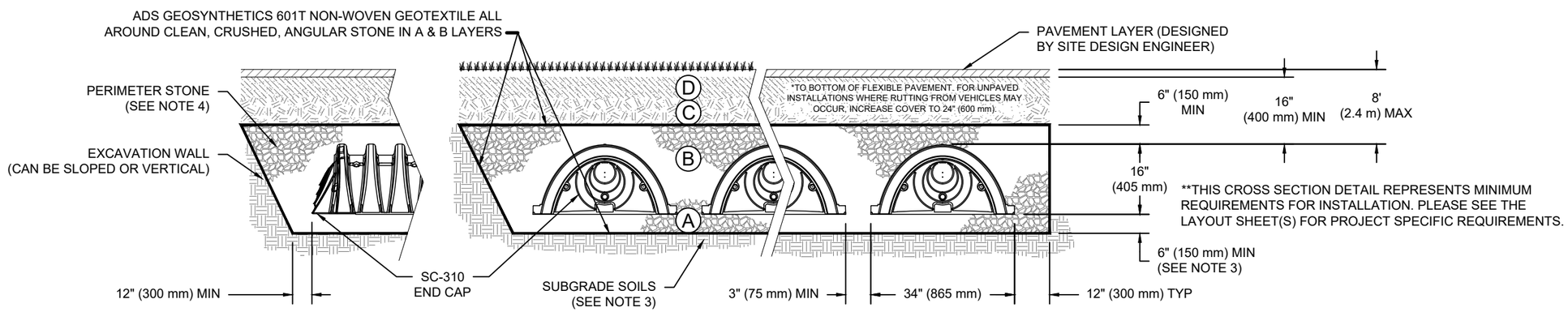
ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 16" (400 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE5	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE5	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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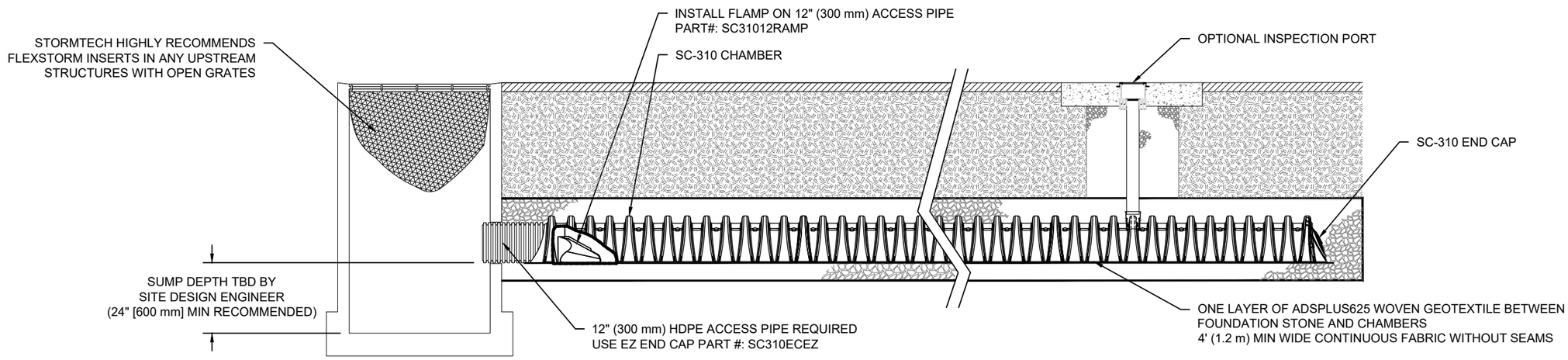

SC-310 ISOLATOR ROW PLUS DETAIL

NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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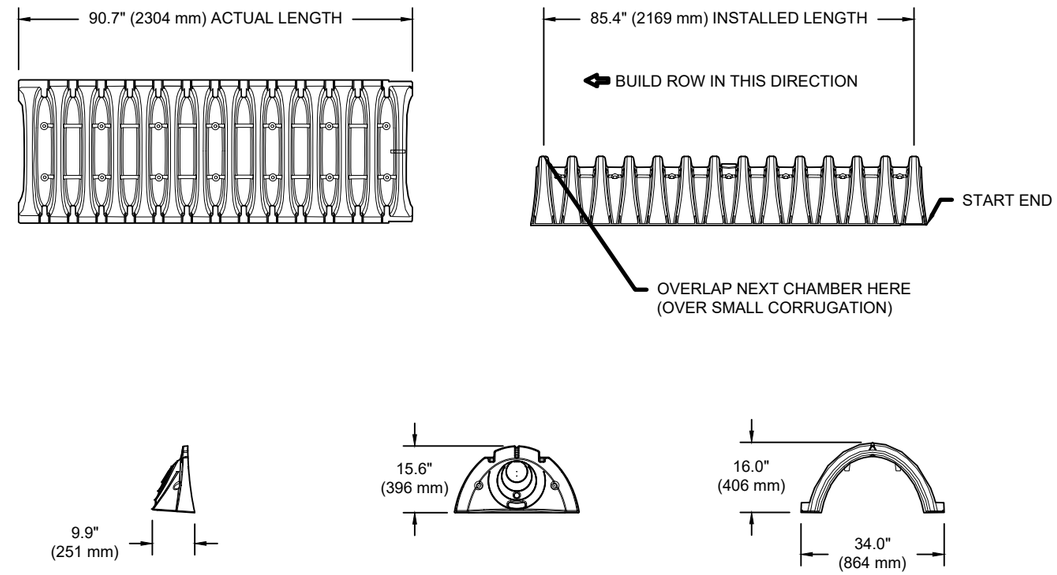
SC-310 TECHNICAL SPECIFICATION

NTS

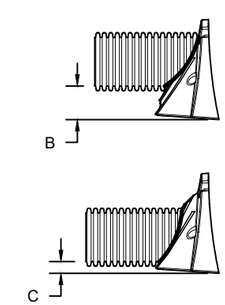


NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	34.0" X 16.0" X 85.4"	(864 mm X 406 mm X 2169 mm)
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	29.3 CUBIC FEET	(0.83 m³)
WEIGHT	35.0 lbs.	(16.8 kg)

*ASSUMES 6" (152 mm) ABOVE, BELOW, AND 3" (75 mm) BETWEEN CHAMBERS

PART #	STUB	B	C
SC310EPE06TPC	6" (150 mm)	5.8" (147 mm)	---
SC310EPE06BPC		---	0.5" (13 mm)
SC310EPE08TPC	8" (200 mm)	3.5" (89 mm)	---
SC310EPE08BPC		---	0.6" (15 mm)
SC310EPE10TPC	10" (250 mm)	1.4" (36 mm)	---
SC310EPE10BPC		---	0.7" (18 mm)
SC310ECEZ*	12" (300 mm)	---	0.9" (23 mm)



ALL STUBS, EXCEPT FOR THE SC310ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC310ECEZ THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL; PRE-CORED END CAPS END WITH "PC"

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APPENDIX F

Infiltration Trench Sizing

Project: BWDSB School Block
Project No: 2243-7223
Modelled By: AW
Date: 2025.01.07

Mitigation Sizing - Bioretention in School Block
Project Name: BWDSB School Block
Water Balance/Water Budget Assessment

Total Contributing Drainage Area:	3053	m^2
Design Runoff/Infiltration Volume:	42.0	m^3

Maximum Depth of Cell

$$d_{cmax} = i*(t_s-d_p/i)/V_r$$

Where:
$d_{c\,max}$ = Maximum cell depth (mm)
i = Infiltration rate for native soils (mm/hr)
V_r = Void space ratio for filter bed and gravel storage layer (assume 0.4)
t_s = Time to drain
d_p = Maximum surface ponding depth (mm)

Assumptions

i^1 =	8.56	mm/hr
V_r =	0.4	
t_s =	48	hr
d_p =	0.15	mm
$d_{c\,max}$ =	1.027	m

Hydraulic Conducivity Based on Site Geometric Mean

Hydraulic Conductivity:	5.70E-08	m/s
Infiltration Rate:	21	mm/hr
Safety Factor:	2.5	
Design Infiltration Rate:	8.56	mm/hr

Length of Bioretention:	35	m
Width of Bioretention:	6	m
Number of LIDs:	1	
Storage Depth:	0.500	m
Drawdown Time:	23.364	hr
Total Volume Retained:	42	m^3

Groundwater Depth Based on COMPARE GW to GRAD Figure:

Depth to Groundwater:	2.5	m
Storage Depth:	0.500	m
Clearance from Groundwater:	2.000	m

Therefore, the proposed system will drain within 48 hours and will provide a retention volume that exceeds the volume for mitigation.

Project: BWDSB School Block
Project No: 2243-7223
Modelled By: AW
Date: 2025.01.07

Mitigation Sizing - Bioretention in School Block
Project Name: BWDSB School Block
Water Balance/Water Budget Assessment

Total Contributing Drainage Area:	4213	m^2
Design Runoff/Infiltration Volume:	57.9	m^3

Maximum Depth of Cell

$$d_{cmax} = i*(t_s-d_p/i)/V_r$$

Where:
$d_{c\,max}$ = Maximum cell depth (mm)
i = Infiltration rate for native soils (mm/hr)
V_r = Void space ratio for filter bed and gravel storage layer (assume 0.4)
t_s = Time to drain
d_p = Maximum surface ponding depth (mm)

Assumptions

i^1 =	8.56	mm/hr
V_r =	0.4	
t_s =	48	hr
d_p =	0.15	mm
$d_{c\,max}$ =	1.027	m

Hydraulic Conducivity Based on Site Geometric Mean

Hydraulic Conductivity:	5.70E-08	m/s
Infiltration Rate:	21	mm/hr
Safety Factor:	2.5	
Design Infiltration Rate:	8.56	mm/hr

Length of Bioretention:	54	m
Width of Bioretention:	6	m
Number of LIDs:	1	
Storage Depth:	0.500	m
Drawdown Time:	23.364	hr
Total Volume Retained:	64.8	m^3

Groundwater Depth Based on COMPARE GW to GRAD Figure:

Depth to Groundwater:	2.5	m
Storage Depth:	0.500	m
Clearance from Groundwater:	2.000	m

Therefore, the proposed system will drain within 48 hours and will provide a retention volume that exceeds the volume for mitigation.

APPENDIX G

Water Balance

Project Name: BWDSB School Block
Project No: 2243-7223
Modelled By: CB
Checked By:
Date: 2025.01.24

Climatic Water Budget - Thornthwaite Method
Project Name: BWDSB School Block
PROTON STATION - Climate Normals 1981-2010 Station Data

	Degrees	Minutes	Seconds	
Insert Latitude:	44	10	9.29	*Only Applicable Between Latitudes 40° - 50°

Month	Mean Temperature (◦C)	Heat index	" a "	PET - Potential Evapotranspiration (mm)	Daily Correction Value	Adjusted PET - Potential Evapotranspiration (mm)	Total Precipitation (mm)	Surplus (mm)	Deficit (mm)
January	-8.3	0.0	0.49	0.0	0.76	0.0	107.8	107.8	0.0
February	-7.4	0.0	0.49	0.0	0.87	0.0	84.3	84.3	0.0
March	-3.4	0.0	0.49	0.0	0.99	0.0	79.2	79.2	0.0
April	4.5	0.9	0.51	24.5	1.12	27.4	72.1	44.7	0.0
May	10.8	3.2	0.55	56.9	1.23	70.2	89.8	19.6	0.0
June	15.5	5.5	0.59	80.6	1.30	104.4	93.5	0.0	10.9
July	17.8	6.8	0.61	92.0	1.27	117.0	77.9	0.0	39.1
August	17.1	6.4	0.60	88.5	1.18	104.0	91.9	0.0	12.1
September	12.9	4.2	0.57	67.5	1.05	70.8	104.4	33.6	0.0
October	7.1	1.7	0.52	38.0	0.92	34.9	92.3	57.4	0.0
November	0.9	0.1	0.49	5.2	0.80	4.2	110.9	106.7	0.0
December	-5.0	0.0	0.49	0.0	0.74	0.0	102.1	102.1	0.0
Totals		**28.9**	**0.96**			**532.9**	**1106.2**	**635.4**	**62.2**

TOTAL WATER DEFICIT = **62.2 mm**
TOTAL WATER SURPLUS (SURPLUS - DEFICIT) = **573.3 mm**
Precipitation Adjustment Factor : **none**

NOTES:
1. Water budget adjusted for latitude and daylight.
2. (◦C) - Represents calculated mean of daily temperatures for the month.
3. Precipitation and Temperature data from the PROTON STATION (Station No.6116750) Environment Canada Station Data
4. Total Water Surplus (Thornthwaite, 1948) is calculated as total precipitation minus adjusted potential evapostranspiration.

Project Name: BWDSB School Block
Project No: 2243-7223
Modelled By: CB
Checked By:
Date: 2025.01.24

Water Budget - Pre-Development
Project Name: BWDSB School Block
Water Balance/Water Budget Assessment

Pre-development area available for infiltration (landscaped/lawn area considered to infiltrate)
Pre-development area not available for infiltration (total site area less landscaped area noted above)
Remaining Impervious area (e.g. parking asphalt area)

Note: site land use areas consistent with Pre-Development SWM hydrologic modeling & calculation:

Catchment Designation	School Block	Totals
Area (m^2)	33100	33100
Pervious Area (m^2)	33100	33100
Impervious Area (m^2)	0	0
Infiltration Factors		
Topography Infiltration Factor	0.25	
Soil Infiltration Factor	0.2	
Land Cover Infiltration Factor	0.1	
MOE Infiltration Factor	0.55	
Actual Infiltration Factor	0.55	
Run-off Coefficient	0.25	
Runoff from Impervious Surfaces *	0	
Inputs (per Unit Area)		
Precipitation (mm/yr)	1106	1106
Run-On (mm/yr)	0	0
Other Inputs (mm/yr)	0	0
Total Inputs (mm/yr)	**1106**	**1106**
Outputs (per Unit Area)		
Precipitation Surplus (mm/yr)	573	573
Net Surplus (mm/yr)	573	573
Green Roof Evapotranspiration (mm/yr)	0	0
Wetland Cell Evapotranspiration (mm/yr)	0	0
Evapotranspiration (mm/yr) *	533	533
Total Evapotranspiration (mm/yr)	533	533
Infiltration (mm/yr)	315	315
Soakaway Pit Infiltration (mm/yr)	0	0
Bioretention Infiltration(mmyr)	0	0
Total Infiltration (mm/yr)	315	315
Runoff Pervious Areas (mm/yr)	258	258
Runoff Impervious Areas (mm/yr)	0	0
Total Runoff (mm/yr)	258	258
Total Outputs (mm/yr)	**1106**	**1106**
Difference (Inputs- Outputs)	**0**	**0**
Inputs (Volumes)		
Precipitation (m^3/yr)	36615	36615
Run-On (m^3/yr)	0	0
Other Inputs (m^3/yr)	0	0
Total Inputs (m^3/yr)	**36615**	**36615**
Outputs (Volumes)		
Precipitation Surplus (m^3/yr)	18976	18976
Net Surplus (m^3/yr)	18976	18976
Green Roof Evapotranspiration (m^3/yr)	0	0
Wetland Cell Evapotranspiration (m^3/yr)	0	0
Evapotranspiration (m^3/yr) *	17639	17639
Total Evapotranspiration (m^3/yr)	17639	17639
Infiltration (m^3/yr)	10437	10437
Soakaway Pit Infiltration (m^3/yr)	0	0
Bioretention Infiltration(m^3/yr)	0	0
Total Infiltration (m^3/yr)	10437	10437
Runoff Pervious Areas (m^3/yr)	8539	8539
Runoff Impervious Areas (m^3/yr)	0	0
Total Runoff (m^3/yr)	8539	8539
Total Outputs (m^3/yr)	**36615**	**36615**
Difference (Inputs- Outputs)	**0**	**0**

NOTES:
* Evaporation from impervious areas was assumed to be 20% of precipitation.

Project Name: BWDSB School Block
Project No: 2243-7223
Modelled By: CB
Checked By:
Date: 2025.01.24

Water Budget - Post-Development *Without Mitigation*
Project Name: BWDSB School Block
Water Balance/Water Budget Assessment

Post-development area available for infiltration (landscaped/lawn area considered to infiltrate)
Post-development area not available for infiltration (total site area less landscaped area noted above)
Remaining Impervious area (e.g. parking asphalt area, building/rooftop area)

Note: site land use areas consistent with Post-Development SWM hydrologic modeling & calculations

Catchment Designation	School Block			
	Pervious Area	Impervious Block Area	Impervious Road Area	Totals
Area (m^2)	18880	8950	5270	33100
Pervious Area (m^2)	18880	0	0	18880
Impervious Area (m^2)	0	8950	5270	14220
Infiltration Factors				
Topography Infiltration Factor	0.25	0	0	
Soil Infiltration Factor	0.2	0	0	
Land Cover Infiltration Factor	0.1	0	0	
MOE Infiltration Factor	0.55	0	0	
Actual Infiltration Factor	0.55	0	0	
Run-off Coefficient	0.25	0.95	0.95	
Runoff from Impervious Surfaces *	0	0.8	0.8	
Inputs (per Unit Area)				
Precipitation (mm/yr)	1106	1106	1106	1106
Run-On (mm/yr)	0	0	0	0
Other Inputs (mm/yr)	0	0	0	0
Total Inputs (mm/yr)	**1106**	**1106**	**1106**	**1106**
Outputs (per Unit Area)				
Precipitation Surplus (mm/yr)	573	885	885	707
Net Surplus (mm/yr)	573	885	885	707
Green Roof Evapotranspiration (mm/yr)	0	0	0	0
Wetland Cell Evapotranspiration (mm/yr)	0	0	0	0
Evapotranspiration (mm/yr) *	533	221	221	399
Total Evapotranspiration (mm/yr)	533	221	221	399
Infiltration (mm/yr)	315	0	0	180
Soakaway Pit Infiltration (mm/yr)	0	0	0	0
Bioretention Infiltration(mmyr)	0	0	0	0
Total Infiltration (mm/yr)	315	0	0	180
Runoff Pervious Areas (mm/yr)	258	0	0	147
Runoff Impervious Areas (mm/yr)	0	885	885	380
Total Runoff (mm/yr)	258	885	885	527
Total Outputs (mm/yr)	**1106**	**1106**	**1106**	**1106**
Difference (Inputs- Outputs)	**0**	**0**	**0**	**0**

Project Name: BWDSB School Block
Project No: 2243-7223
Modelled By: CB
Checked By:
Date: 2025.01.24

Water Budget - Post-Development *Without Mitigation*
Project Name: BWDSB School Block
Water Balance/Water Budget Assessment

Inputs (Volumes)				
Precipitation (m^3/yr)	20885	9900	5830	36615
Run-On (m^3/yr)	0	0	0	0
Other Inputs (m^3/yr)	0	0	0	0
Total Inputs (m^3/yr)	**20885**	**9900**	**5830**	**36615**
Outputs (Volumes)				
Precipitation Surplus (m^3/yr)	10824	7920	4664	23408
Net Surplus (m^3/yr)	10824	7920	4664	23408
Green Roof Evapotranspiration (m^3/yr)	0	0	0	0
Wetland Cell Evapotranspiration (m^3/yr)	0	0	0	0
Evapotranspiration (m^3/yr) *	10061	1980	1166	13207
Total Evapotranspiration (m^3/yr)	10061	1980	1166	13207
Infiltration (m^3/yr)	5953	0	0	5953
Soakaway Pit Infiltration (m^3/yr)	0	0	0	0
Bioretention Infiltration(m^3/yr)	0	0	0	0
Total Infiltration (m^3/yr)	5953	0	0	5953
Runoff Pervious Areas (m^3/yr)	4871	0	0	4871
Runoff Impervious Areas (m^3/yr)	0	7920	4664	12584
Total Runoff (m^3/yr)	4871	7920	4664	17455
Total Outputs (m^3/yr)	**20885**	**9900**	**5830**	**36615**
Difference (Inputs- Outputs)	**0**	**0**	**0**	**0**

Pre-Development Total Infiltration:
10437 m^3/yr

NOTES:
* Evaporation from impervious areas was assumed to be 20% of precipitation.

Project Name: BWDSB School Block
Project No: 2243-7223
Modelled By: CB
Checked By:
Date: 2025.01.24

Water Budget - Post-Development *with Mitigation*
Project Name: BWDSB School Block
Water Balance/Water Budget Assessment

Post-development area available for infiltration (lawn/landscaped area considered to infiltrate).

Post-development area not available for infiltration (total site area less landscaped area noted above)
Remaining Impervious area (e.g. parking asphalt area, building/rooftop area)

Catchment Designation	School Block						
	Pervious School Block Not Contributing to Infiltration Trench	Impervious School Block Not Contributing to Infiltration Trench	Pervious Area Contributing to West Infiltration Trench	Impervious Area Contributing to West Infiltration Trench	Pervious Area Contributing to East Infiltration Trench	Impervious Area Contributing to East Infiltration Trench	Totals
Area (m^2)	15610	10224	1374	1679	1896	2317	33100
Pervious Area (m^2)	15610	0	1374	0	1896	0	18880
Impervious Area (m^2)	0	10224	0	1679	0	2317	14220
Infiltration Factors							
Topography Infiltration Factor	0.25	0	0.25	0	0.25	0	
Soil Infiltration Factor	0.2	0	0.2	0	0.2	0	
Land Cover Infiltration Factor	0.1	0	0.1	0	0.1	0	
MOE Infiltration Factor	0.55	0	0.55	0	0.55	0	
Actual Infiltration Factor	0.55	0	0.55	0	0.55	0	
Run-off Coefficient	0.25	0.95	0.25	0.95	0.25	0.95	
Runoff from Impervious Surfaces *	0	0.8	0	0.8	0	0.8	
Inputs (per Unit Area)							
Precipitation (mm/yr)	1106	1106	1106	1106	1106	1106	1106
Run-On (mm/yr)	0	0	0	0	0	0	0
Other Inputs (mm/yr)	0	0	0	0	0	0	0
Total Inputs (mm/yr)	**1106**	**1106**	**1106**	**1106**	**1106**	**1106**	1106
Outputs (per Unit Area)							
Precipitation Surplus (mm/yr)	573	885	573	885	573	885	707
Net Surplus (mm/yr)	573	885	573	885	573	885	707
Evapotranspiration (mm/yr) *	533	221	533	221	533	221	399
Total Evapotranspiration (mm/yr)	533	221	533	221	533	221	399
Infiltration (mm/yr)	315	0	315	0	315	0	180
Infiltration Trench Infiltration(mm/yr)	0	0	116	498	116	498	72
Total Infiltration (mm/yr)	315	0	431	498	431	498	251
Runoff Pervious Areas (mm/yr)	258	0	0	0	0	0	122
Runoff Impervious Areas (mm/yr)	0	885	142	387	142	387	334
Total Runoff (mm/yr)	258	885	142	387	142	387	456
Total Outputs (mm/yr)	**1106**	**1106**	**1106**	**1106**	**1106**	**1106**	**1106**
Difference (Inputs- Outputs)	**0**	**0**	**0**	**0**	**0**	**0**	0

Pre-Development Total Infiltration:
315 mm/yr

Project Name: BWDSB School Block
Project No: 2243-7223
Modelled By: CB
Checked By:
Date: 2025.01.24

Water Budget - Post-Development *with Mitigation*
Project Name: BWDSB School Block
Water Balance/Water Budget Assessment

Inputs (Volumes)							
Precipitation (m^3/yr)	17268	11310	1520	1857	2097	2563	36615
Run-On (m^3/yr)	0	0	0	0	0	0	0
Other Inputs (m^3/yr)	0	0	0	0	0	0	0
Total Inputs (m^3/yr)	**17268**	**11310**	**1520**	**1857**	**2097**	**2563**	**36615**
Outputs (Volumes)							
Precipitation Surplus (m^3/yr)	8949	9048	788	1486	1087	2050	23408
Net Surplus (m^3/yr)	8949	9048	788	1486	1087	2050	23408
Green Roof Evapotranspiration (m^3/yr) *	0	0	0	0	0	0	0
Wetland Cell Evapotranspiration (m^3/yr)	0	0	0	0	0	0	0
Evapotranspiration (m^3/yr) *	8319	2262	732	371	1010	513	13207
Total Evapotranspiration (m^3/yr)	8319	2262	732	371	1010	513	13207
Infiltration (m^3/yr)	4922	0	433	0	598	0	5953
Infiltration Trench Infiltration(m^3/yr)	0	0	160	836	220	1153	2369
Total Infiltration (m^3/yr)	4922	0	593	836	818	1153	8322
Runoff Pervious Areas (m^3/yr)	4027	0	0	0	0	0	4027
Runoff Impervious Areas (m^3/yr)	0	9048	195	650	269	897	11059
Total Runoff (m^3/yr)	4027	9048	195	650	269	897	15086
Total Outputs (m^3/yr)	**17268**	**11310**	**1520**	**1857**	**2097**	**2563**	**36615**
Difference (Inputs- Outputs)	**0**	**0**	**0**	**0**	**0**	**0**	0

NOTES:
* Evaporation from impervious areas was assumed to be 20% of precipitation.
* Evaporation from green roof is 84% of precipitation per Green Roof specification.
* Runoff Reduction for infiltration trench facilities assumed to be 45% based on Low Impact Development Stormwater Managemen Planning and Design Guide by CVC and TRCA (2010).

Project: BWDSB School Block
Project No: 2243-7223
Modelled By: CB
Checked By:
Date: 2025.01.24

CROZIER CONSULTING ENGINEERS

Water Budget Summary
Project Name: BWDSB School Block
Water Balance/Water Budget Assessment

Characteristic	Site				
	Pre-Development	Post-Development	Post-Development *with Mitigation*	Change (Pre to Post)	Change (Pre to Post) *with Mititgation*
Inputs (Volumes)					
Precipitation (m^3/yr)	36615	36615	36615	0%	0%
Run-On (m^3/yr)	0	0	0	0%	0%
Other inputs (m^3/yr)	0	0	0	0%	0%
Total Inputs (m^3/yr)	**36615**	**36615**	**36615**	**0**	**0**
Outputs (Volumes)					
Precipitation Surplus (m^3/yr)	18976	23408	23408	23%	23%
Net Surplus (m^3/yr)	18976	23408	23408	23%	23%
Green Roof Evapotranspiration (m^3/yr)	0	0	0	-	**0 m3/yr**
Wetland Cell Evapotranspiration (m^3/yr)	0	0	0	-	**0 m3/yr**
Evapotranspiration (m^3/yr)	17639	13207	13207	-25%	-25%
Total Evapotranspiration (m^3/yr)	17639	13207	13207	-25%	-25%
Infiltration (m^3/yr)	10437	5953	5953	-43%	-43%
Infiltration Trench Infiltration (m^3/yr)	0	0	2369	-	**2369 m3/yr**
Total Infiltration (m^3/yr)	**10437**	**5953**	**8322**	-43%	-20%
Runoff Pervious Areas (m^3/yr)	8539	4871	4027	-43%	-53%
Runoff Impervious Areas (m^3/yr)	0	12584	11059	-	-
Total Runoff (m^3/yr)	8539	17455	15086	104%	77%
Total Outputs (m^3/yr)	**36615**	**36615**	**36615**	0%	0%

FIGURES & DRAWINGS

Figure 1: Site Location Plan
Figure 2: Glenelg Phase 3 Draft Plan
Figure 3: School Block Site Plan
Figure 4: Pre-Development Drainage Plan
Figure 5: Post-Development Drainage Plan
Figure 6: Glenelg Phase 3 Pre-Development Drainage Plan
Figure 7: Glenelg Phase 3 Post-Development Drainage Plan
Drawing C101: General Site Servicing Plan
Drawing C102: Preliminary Site Grading Plan
Drawing C103: Stormwater Management Concept Plan
Drawing C104: Sanitary Drainage Plan
Drawing C105: Storm Drainage Plan
Drawing C106: Erosion and Sediment Control Plan

Legend

= SUBJECT LANDS

Project

TOWN OF DUNDALK

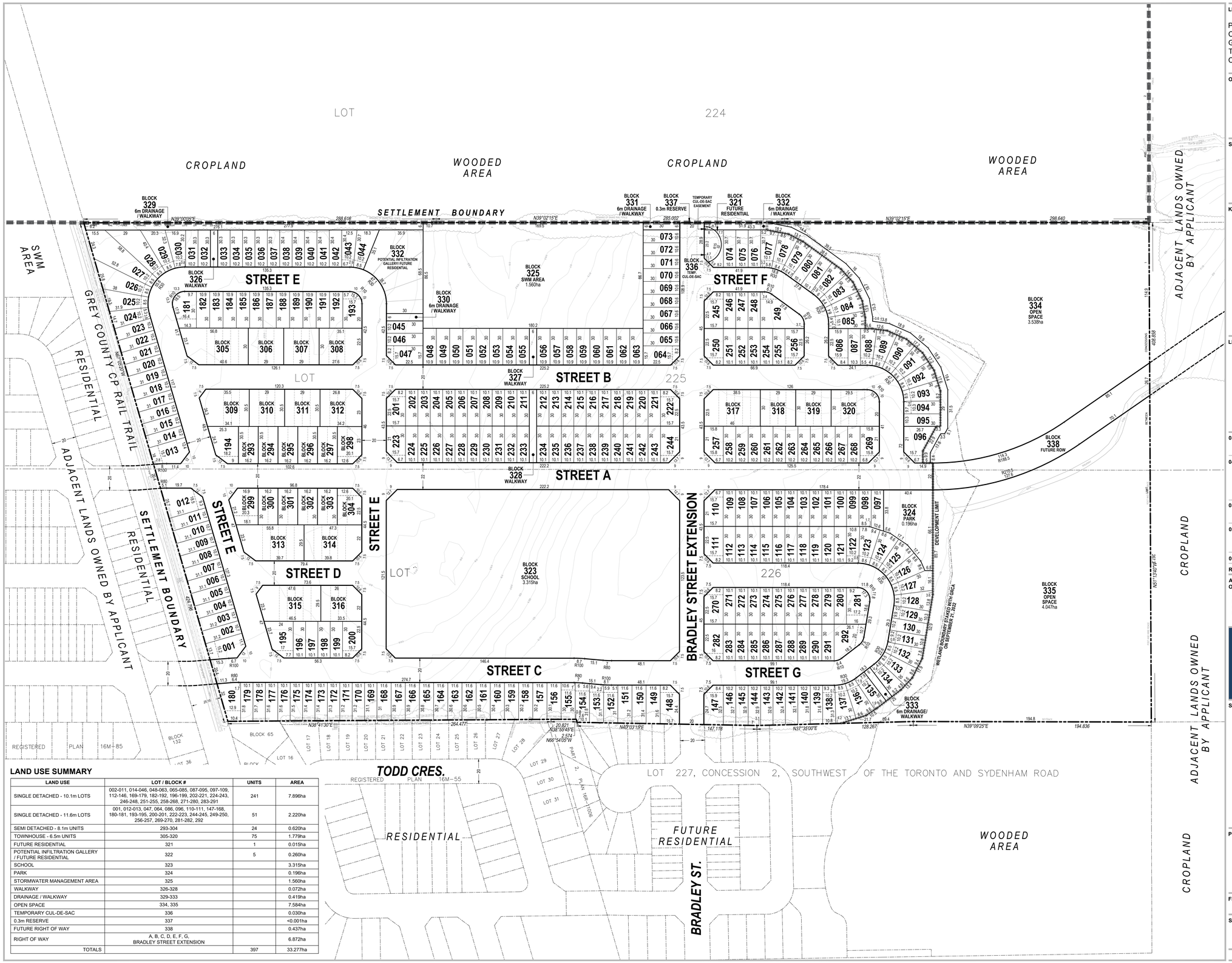
Drawing

GLENELG EXPANSION LANDS

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
COLLINGWOOD, ON, L9Y 1A1
705-446-3510 T
705-446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project
D.K.	R.M.	1060–6220

Scale	Date	Check By	Drawing
N.T.S.	05/26/2023	R.M.	FIG. 1



LAND USE SUMMARY

LAND USE	LOT / BLOCK #	UNITS	AREA
SINGLE DETACHED - 10.1m LOTS	002-011, 014-046, 048-063, 065-085, 087-095, 097-109, 112-146, 169-179, 182-192, 196-199, 202-221, 224-243, 246-248, 251-255, 258-268, 271-280, 283-291	241	7.896ha
SINGLE DETACHED - 11.6m LOTS	001, 012-013, 047, 064, 086, 096, 110-111, 147-168, 180-181, 193-195, 200-201, 222-223, 244-245, 249-250, 256-257, 269-270, 281-282, 292	51	2.220ha
SEMI DETACHED - 8.1m UNITS	293-304	24	0.620ha
TOWNHOUSE - 6.5m UNITS	305-320	75	1.779ha
FUTURE RESIDENTIAL	321	1	0.015ha
POTENTIAL INFILTRATION GALLERY / FUTURE RESIDENTIAL	322	5	0.260ha
SCHOOL	323		3.315ha
PARK	324		0.196ha
STORMWATER MANAGEMENT AREA	325		1.560ha
WALKWAY	326-328		0.072ha
DRAINAGE / WALKWAY	329-333		0.419ha
OPEN SPACE	334, 335		7.584ha
TEMPORARY CUL-DE-SAC	336		0.030ha
0.3m RESERVE	337		<0.001ha
FUTURE RIGHT OF WAY	338		0.437ha
RIGHT OF WAY	A, B, C, D, E, F, G, BRADLEY STREET EXTENSION		6.872ha
TOTALS		397	33.277ha

LEGAL DESCRIPTION

PART OF LOTS 225 AND 226
CONCESSION 2, SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
GEOGRAPHIC TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

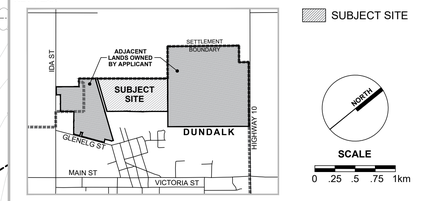
DATE: _____ _____
SHAKIR REHMATULLAH - PRESIDENT
DUNDALK VILLAGE TWO INC.

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____ _____
DAN DZALDOV - O.L.S.
SCHAEFFER DZALDOV BENNETT LTD.

KEY PLAN



LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- BLOCK LINE
- LOT LINE
- PARCEL FABRIC

REV. No.	DATE	ISSUED / REVISION	BY
03	MAR. 27, 2024	CONVERT 5 SINGLES TO A POTENTIAL INFILTRATION GALLERY / FUTURE RESIDENTIAL BLOCK, WIDEN WALKWAY BLOCK, REVISE LOTTING	M.M.
04	DEC. 12, 2023	INCREASE DAYLIGHT TRIANGLES ON SKEWED CORNERS; REMOVE GHOSTED ROAD THROUGH SCHOOL BLOCK; INCREASE BLOCK 336 WIDTH TO 6m AND LABEL AS DRAINAGE / WALKWAY; ADD TEMPORARY CUL-DE-SAC EASEMENT TO BLOCK 339; REVISED FUTURE ROW ALIGNMENT; ADD 11.6m SINGLE DETACHED LOTS	M.M.
03	OCT. 5, 2023	ADD WETLAND BOUNDARY AND TEMPORARY CUL-DE-SAC; REVISE PARK, AND LOT LAYOUTS; WIDEN STREET 'A' TO 22m ROW	R.K. / M.M.
02	JUN. 28, 2023	ADD SCHOOL, WALKWAYS, DRAINAGE BLOCKS; REMOVE STREET; CREATE CRESCENT STREET G AND STREET F; REVISE PARK, SWM AREA, AND LOT LAYOUTS	M.M.
01	AUG. 18, 2022	1st SUBMISSION	M.M.

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED

A. AS SHOWN
B. AS SHOWN
C. AS SHOWN
D. 298 SINGLES, 24 SEMIS, & 75 TOWNHOUSES
E. AS SHOWN
F. AS SHOWN
G. AS SHOWN
H. MUNICIPAL WATER SUPPLY
I. LOAM/SILT LOAM
J. AS SHOWN
K. ALL SERVICES AS REQUIRED (WATER, SANITARY, STORMWATER, HYDRO)
L. AS SHOWN

113 COLLIER STREET
BARRIE, ON. L4M 1H2
P: 705 728 0045 F: 705 728 2010
WWW.MHBCPLAN.CON
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE
MHBC PLANNING

STAMP

DATE	AUG. 18, 2022
FILE No.	15184AT
SCALE	1:1,400 (ARCH D)
DRAWN BY	M.M.
CHECKED BY	K.C.
OTHER	

PROJECT

GLENELG PHASE 3

DUNDALK VILLAGE TWO INC.
3621 HIGHWAY 7 EAST, SUITE 503
MARKHAM, ON L3R 0G6
P:(905) 479-9292 F:(905) 429-9165
WWW.FLATOGROUP.COM

NORTH

FILE NAME DRAFT PLAN OF SUBDIVISION

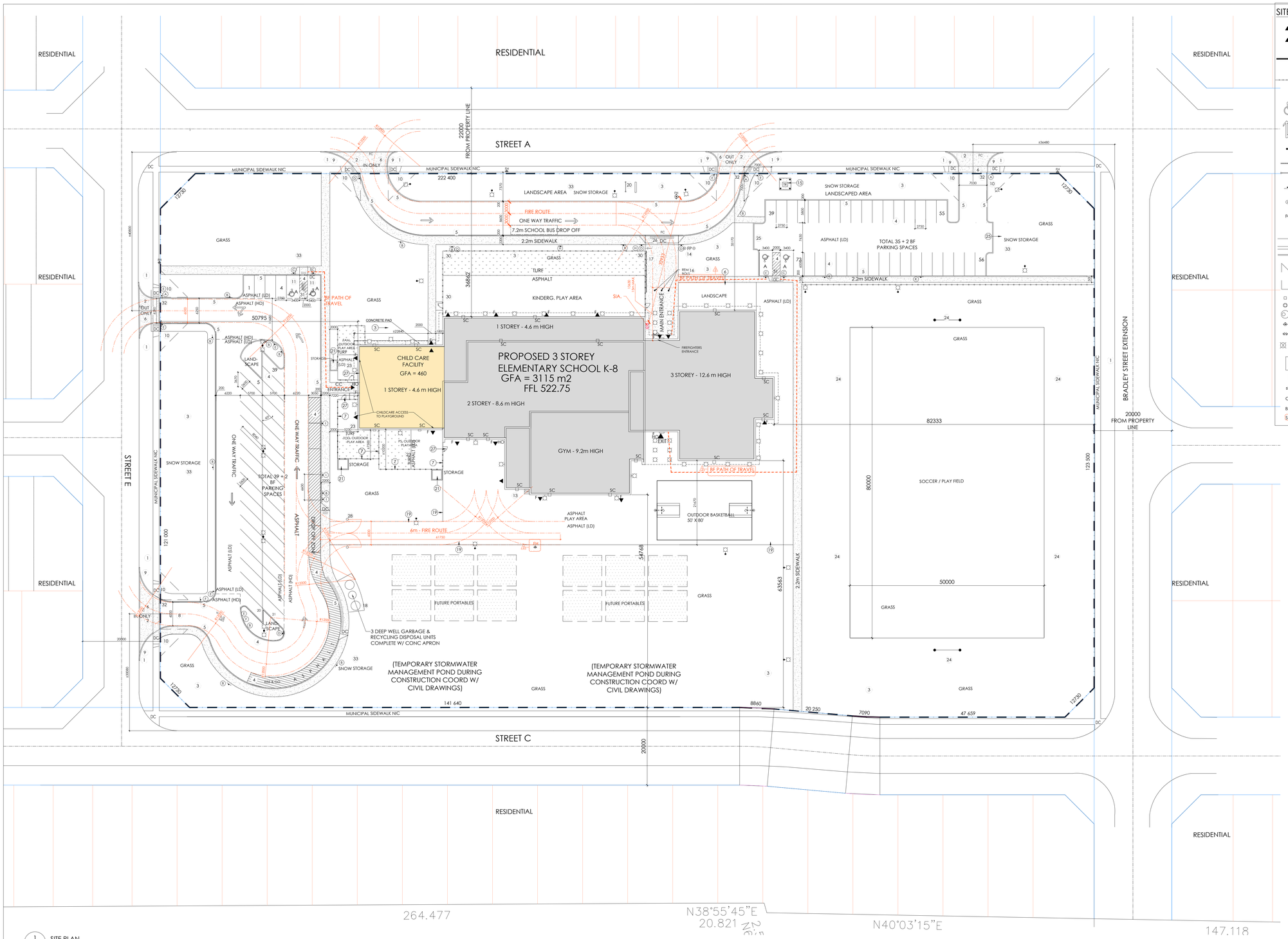
DWG No. 1 of 1

SCALE BAR

0 7 14 21 28 35 52.5 70 105 140m

MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

N:\Southgate\15184AT\Drawings\Draft Plan\CAD\



1 / A1.1 SITE PLAN
0 4 8 20m

HATCH ID MARKER LEGEND

- NEW PTD. ROAD MARKINGS
- NEW AREA CONC. SIDEWALK / PAD
- NEW BUILDING (ELEM. SCHOOL)
- NEW BUILDING (CHILDCARE)
- ARTIFICIAL TURF - SEE SPECS.

NOTE:
COORD. W/ EX. SITE SURVEY DWG. FOR THEIR LEGEND & OBJECT DEPICTION NOTATIONS PROVIDED FOR REFERENCE ONLY.

BEFORE STARTING WORK

- THE CONTRACTOR SHALL NOTIFY THE TOWNSHIP, ARCHITECT & CONSULTANTS AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
- THE POSITION OF THE POLE LINES, CONDUITS, WATER MAINS, SEWERS, AND OTHER UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. CONTRACTOR TO VERIFY EXISTING CONDITIONS.
- ALL EXISTING UNDERGROUND UTILITIES WITHIN THE LIMITS OF CONSTRUCTION SHALL BE LOCATED, MARKED AND PROTECTED. ANY UTILITIES DAMAGED OR DISTURBED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE ENGINEER, AT THE CONTRACTOR'S EXPENSE.
- PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, ALL BENCHMARKS, ELEVATIONS, DIMENSIONS, AND GRADES MUST BE CHECKED BY THE CONTRACTOR AND ANY DISCREPANCIES REPORTED TO THE ENGINEER.
- AT LEAST TWO DIFFERENT BENCHMARKS MUST BE REFERRED TO AT ALL TIMES.

REFERENCED NOTES:

GENERAL CONTRACTOR TO COORDINATE ALL WORK WITHIN THE BOULEVARD SHALL BE DONE UNDER THIS CONTRACT INCLUDING DRIVEWAY ACCESSES, SIDEWALK & RELATED WORK.

1 GENERAL CONTRACTOR TO EXECUTE WORK TO DRIVEWAY ENTRANCE TO STANDARDS OF THE TOWNSHIP . REFER TO ENTRANCE PERMIT REQUIREMENTS. INSTALLATION OF NEW SITE ACCESS VEHICLE ENTRANCE TO BE AS PER TOWNSHIP REQUIREMENTS

3 COORD. WITH LANDSCAPE DRAWINGS FOR ALL PLANTING BEDS, TREE PLANTINGS, LANDSCAPE FEATURES & SODDED AREAS

4 PROVIDE PAINTED PARKING MARKINGS - PARKING STALLS100mm WIDE WHITE, HANDICAP SYMBOLS, CROSS HATCHING & TRAFFIC ARROWS MARKINGS ON TOP OF FINISHED ASPHALT LAYER. ALL PAVEMENT MARKINGS TO BE AS PER THE STANDARDS OF ONTARIO TRAFFIC MANUAL.

5 CONCRETE BARRIER CURBS UNLESS OTHERWISE NOTED (COORD. W/ **OPSD-600.080, OPSD 310.020** & MUNICIPAL STANDARD DETAILS)
NEW MUNICIPAL CONCRETE WALKWAY C/W REINF. CONC. ACROSS VEHICLE ENTRANCES TO BE OF **200mm THICK CONCRETE.**

7 1525 BLK. CLF TYP. AROUND CHILDCARE PLAYGROUND AREA

8 PROPOSED LOCATION OF CONSTRUCTION ACCESS C/W MUD MAT. REFER TO DWG A1.2.

9 PROVIDE MIN. 150mm TOPSOIL & SOD IN ALL AREAS OF EXISTING ROAD BOULEVARD WHERE DISTURBED BY NEW WORK.

10 A 7m X 7m VISIBILITY TRIANGLE MUST BE MAINTAINED (REMAIN CLEAR) AT BOTH SIDES OF ALL INTERSECTION OF VEHICULAR TRAFFIC ACCESS ROADS / DRIVEWAYS. THE MAX. HEIGHT OF ANY OBJECT OR MATURE VEGETATION WITHIN THE VISIBILITY TRIANGLE IS NOT TO EXCEED 0.6m ABOVE THE CENTRELINE OF THE CORRESPONDING ADJACENT STREET. REFER SOUTHGATE CURRENT BY-LAWS AND STANDARDS

11 1800 HIGH PERIMETER CHAIN LINK FENCE. REFER TO **OPSD 972.130**

12 ACCESSIBLE AISLE WITH MIN. WIDTH OF 1.5 SHARED BY ACCESSIBLE PARKING SPACES AS PER MUNICIPAL BY-LAW

13 GAS METER ENCLOSURE - REFER TO DETAIL 13/A1.2

14 PROVIDE TWO FLAG POLES - SEE DETAIL ON DWG A1.2

15 TRANSFORMER ON CONC. PAD TO SUIT C/W 4 BOLLARDS

16 REMOVABLE BOLLARD - REFER TO DETAILS ON DWG A1.2.

17 BICYCLE RACKS (TOTAL CAPACITY OF 60 BIKES) BIKE RACK MODEL EXPO 7510 MANUFACTURED BY CORA.

18 3 -DEEP WELL GARBAGE AND RECYCLING BINS ON CONCRETE PAD - 24 X 5 CUBIC METRE -1 X 915mm DIA. SIZE BINS - REFER TO SPECS

19 ASPHALT /TURF DETAIL - SEE DETAIL ON DWG A1.2

20 PROPOSED LOCATION FOR PROJECT SIGN. FOUNDATION, DATA AND ELECTRICITY FOR ILLUMINATED SCHOOL SIGN APPROXIMATELY 1.8m HIGH x 2.4m LONG INCLUDED IN PROJECT CONTRACT. SIGN PERMIT TO BE BY SIGN CONTRACTOR. REFER TO WCDSB STANDARD AND DETAIL 15/A1.2

21 PROVIDE 3m X 3m x 100mm REINFORCED CONCRETE SLAB ON COMPACTED GRANULAR BASE. FOR CHILDCARE SHED,WHICH IS NIC. FINAL LOCATION TO BE CONFIRMED PRIOR TO PLACEMENT OF SLAB.

22 ASPHALT SPEED BUMP. REFER TO DETAIL ON DWG A1.2

23 PLAYGROUND EQUIPMENT (INCLUDING DESIGN AND SPECS) NOT IN CONTRACT. COORD. WITH LANDSCAPE DWGS FOR GROUND SURFACING IN FENCED PLAY AREAS.

24 2 REGULATION & 4 MINI SOCCER GOAL POSTS - REFER TO DETAIL ON DWG A1.2

25 CONCRETE 5EMI MOUNTABLE CURB W/ **OPSD-600.090, 600.100, 600.0)**

26 NEW SLOPED BARRIER-FREE ACCESS COORD W/ DETAILS ON DWGS A1.2 AND A1.3) PROVIDE TACKTILE WARNING SURFACES

27 1220mm WIDTH CHAIN LINK GATE - GALV. STEEL. PROVIDE CHILD LOCK ONLY AT GATES LOCATED IN PRESCHOOL, TODDLER AND INFANT PLAY AREA.

28 SECURITY GATE: PROVIDE 7000mm MIN WIDTH SECURITY GATE - GALV. STEEL LOCKABLE. C/W 1 REMOVABLE BOLLARD. (COORD. W/ DWG A1.2)

29 OUTDOOR BASKETBALL STANDARD & KEY - REFER TO DWG A1.2.

30 1600 HIGH BLACK METAL FENCE. SEE DETAIL ON A1.2

31 BARRIER-FREE PARKING SPACES AND ACCESS AISLE FLUSH WITH CURB.

32 PAINTED STOP BAR ACROSS ENTIRE WIDTH OF ACCESS. PAINTED 60CM WIDE IN COLOUR WHITE .

33 SNOW STORAGE

GENERAL NOTES -MUNICIPAL

- ALL WORK INVOLVED IN THE CONSTRUCTION, RELOCATION, REPAIR OF MUNICIPAL SERVICES FOR THE PROPOSED DEVELOPMENT SHALL BE TO THE SATISFACTION OF THE TOWNSHIP.
- STREET EXCAVATION PERMITS ARE REQUIRED FOR ANY WORK IN MUNICIPAL RIGHT OF WAY BY ANY CONTRACTOR.
- CONTRACTOR IS RESPONSIBLE FOR ALL SERVICING, UTILITIES, AND COSTS.
- STORM WATER DRAINAGE MUST NOT HAVE A NEGATIVE IMPACT ON ADJACENT PROPERTIES.
- FIRE ROUTE SIGNS AND 3-WAY FIRE HYDRANTS SHALL BE ESTABLISHED TO THE SATISFACTION OF THE FIRE DEPARTMENT AND AT THE EXPENSE OF THE CONTRACTOR.
- ALL DRIVEWAYS FROM PROPERTY LINES FOR THE FIRST 7.5 M SHALL BE WITHIN 5% MAXIMUM GRADE. THEREAFTER, ALL DRIVEWAYS SHALL BE WITHIN 10% MAXIMUM GRADES.
- PAVEMENT MARKINGS AND SIGNAGE ARE TO BE IMPLEMENTED AS PER THE PAVEMENT MARKING AND SIGNAGE / TRAFFIC CONTROL PLAN BY GHD.
- UNLESS OTHERWISE NOTED VEHICULAR ASPHALT AREAS TO BE DEFINED WITH 0.15M HIGH POURED CONCRETE CURBING
- THE MUNICIPAL APPROVAL OF THIS SITE PLAN DOES NOT EXEMPT THE CONTRACTOR FROM THE REQUIREMENTS TO OBTAIN THE VARIOUS PERMITS/APPROVALS NORMALLY REQUIRED TO COMPLETE A CONSTRUCTION PROJECT, SUCH AS, BUT NOT LIMITED TO THE FOLLOWING:

- ROAD CUT PERMITS
- SEWER AND WATER PERMITS
- AGREEMENTS
- RELOCATION OF SERVICES
- APPROACH APPROVAL PERMITS

SITE SIGNAGE LEGEND:

- (A) STOP SIGN
- (B) ONE WAY
- (C) BARRIER-FREE PARKING
- (D) FIRE ROUTE STATING 'FIRE ROUTE TO BE POSTED AND DESIGNATED UNDER MUNICIPAL BY-LAW'
- (E) DO NOT ENTER
- (F) NO LEFT TURN
- (G) DO NOT ENTER - LEFT TURN ONLY
- (H) SCHOOL BUS LOADING ZONE
- (I) NO PARKING - DROP OFF AREA ONLY
- (J) RESERVED
- (K) VISITOR PARKING

NOTE:
1. CONFIRM LOCATIONS & CONTENT OF ALL SIGNAGE W/ THE OWNER & TOWNSHIP PRIOR TO FABRICATION & ERECTION. PROPOSED SITE SIGNAGE TO COMPLY W/ SIGNAGE BY-LAWS.
2. ALL SIGNS TO BE LOCATED NOT TO CREATE A HAZARD ON WALKWAYS AND BE CENTERED ON POSTS TYP.

DEVELOPMENT DETAILS:

PROPERTY DISCRIPTION:	PART OF LOTS 225 AND 226 - CONCESSION 2, SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD GEOGRAPHIC TOWNSHIP OF PROTON, TOWNSHIP OF SOUTHGATE, COUNTY OF GREY.
SPA THE SCHOOL SITE APPROVED UNDER CONSENT APPLICATION NO. B8-24.	

TOWNSHIP OF SOUTHGATE ZONING BY-LAW 19-2002 AS AMENDED		PROVIDED
MIN. LOT AREA	550 m2	33,100 m2
MAX. LOT COVERAGE	35% MAX.	10 %
MIN. FRONT YARD	12 m	36.6 m
MIN. INTERIOR SIDE YARD	9 m	50.7 m
MIN. EXTERIOR SIDE YARD	9 m	82 m
MIN. REAR YARD	12 m	54.6 m
BUILDING HEIGHT	12.6 m	12.6 m
OBC BUILDING AREA	FIRST FLOOR AREA LEVEL 2 FLOOR AREA LEVEL 3 FLOOR AREA	3,606 sq m = 11% 2,043 sq m 1,093 sq m
GROSS BUILDING AREA	TOTAL BUILDING AREA	6,742 sq m
HARD SURFACE AREA (ASPHALT+ CONCRETE)	=	10,768 m2 =32.5%
LANDSCAPE AREA	=	18,727 m2 = 56.6%
TOTAL SITE AREA		33,100 m2

TYPE OF DEVELOPMENT	
BUILDING CLASSIFICATION	GROUP A, DIV. 2 OBC CLASSIFICATION - 3.2.2.24 UP TO 6 STOREYS, ANY AREA SPRINKLERED

PARKING REQUIREMENTS

MIN. SIZE OF PARKING STALLS	PER BYLAW	
PERPENDICULAR	2.75 X 5.75m	2.75 x 5.75m
OFF STREET PARKING REQUIREMENTS	***ELEM. SCHOOL:*** *1.5 SPACE PER CLASSROOM AND 1 PER 6 M2 OF ASSEMBLY AREA + 12 PORTABLES OR FUTURE ADDITION*	31 CLASSROOMS X 1.5 = 46.5 =47 *(OR 234.3 m2/ 6 = 43)* + 12 PORTABLES = 12X1.5=18 ***REQUIRED 47 + 18 = 65***
	CHILD CARE: *3 PER CLASSROOM* *OR* *1 PER 60 m2 OF GFA*	***3 X 3 = 9 SPACES***
ACCESSIBLE PARKING SPACES	*4.4 X 6m* 1 SPACE FOR THE FIRST 20 SPACES + 1 FOR EACH ADDITIONAL 100 SPACES ***REQUIRED =2***	***3.4 X 6m AS PER AODA STANDARDS*** ***REQUIRED = 2*** ***PROVIDED = 4***
		TOTAL REQ'D. = **74 (3 BF)** ***TOTAL PROVIDED = 78 (4 BF)***

SITE PLAN LEGEND:

- F — ENTRANCE / EXIT @ GRADE FLUSH W/ INT. FIN. FLOOR
- HO — ENTRANCE / EXIT - W/ BARRIER FREE DOOR OPERATOR (COORD. W/ ELEC. DWG.'S)
- PROPERTY LINES / BOUNDARY
- CHAIN LINK FENCE (CLF) TYP. 1800mm HIGH UNLESS NOTED OTHERWISE (COORD. W/ OPSD DETAILS OPSD-972.132, 972.130, 972.102, 972.101) NOTE: WHERE EX. FENCES ARE SHOWN THEY SHALL REMAIN ON ADJACENT LANDS UNLESS OTHERWISE NOTED
- PTD. WHEELCHAIR SIGN ON ASPHALT
- DENOTES EX. PAINTED DIRECTIONAL ARROWS ON ASPHALT PAVEMENT
- BOL. — BOLLARD - REFER TO SITE ON DWG A1.2
- BICYCLE RACK - REFER TO SPECS
- PROPOSED PROJECT SIGN W/ DETAILS ON DWG A1.2)
- TRAFFIC SIGNAGE (COORD. W/ SIGNAGE SCH.)
- FP — FLAG POLE (COORD. W/ DETAILS ON DWG A1.2)
- FC — FLUSH CURB - CONCRETE SIDEWALK TO BE FLUSH WITH ASPHALT - COORD W/ OPSD-310.030) SEE DETAILS ON DWG A1.3 ASPHALT WITHIN THE BARRIER FREE PARKING SPACES SHOULD BE RAMPED FLUSH WITH THE ADJACENT CURB
- DC — DROPPED CURB (COORD. W/ OPSD-310.030) SEE DETAILS ON DWG A1.3
- A 4.5m X 4.5m VISIBILITY TRIANGLE MUST BE MAINTAINED (REMAIN CLEAR) AT BOTH SIDES OF ALL INTERSECTION OF VEHICULAR TRAFFIC ACCESS ROADS / DRIVEWAYS. THE MAX. HEIGHT OF ANY OBJECT OR MATURE VEGETATION WITHIN THE VISIBILITY TRIANGLE IS NOT TO EXCEED 0.6m ABOVE THE CENTRELINE OF THE CORRESPONDING ADJACENT STREET.
- CB — CATCH BASIN
- CB/MH — CATCH BASIN - MAN HOLE
- MH — MAN HOLE
- FH — NEW FIRE HYDRANT/EX. LOCATION
- SIA. — PROPOSED SIAMESE /FIRE DEPARTMENT CONNECTION
- LIGHT STD. (COORD. W/ ELEC. SITE PLAN)
- TR — HYDRO VAULT/TRANSFORMER ON CONC. PAD (COORD. W/ ELEC. SITE PLAN)
- GM — GAS METER LOCATION REFER TO DWG A1.2 FOR ENCLOSURE DETAIL
- ASPHALT SPEED BUMP REFER TO DETAIL ON DWG A1.2
- CLF — GALV. CHAIN LINK FENCE
- BLK CLF — GALV. BLACK VINYL COATED CHAIN LINK FENCE
- SC — ROOF SCUPPER LOCATION

GENERAL NOTES:

- THE "LIMITS OF CONSTRUCTION" SHALL BE ASSUMED TO BE THE PROPERTY LINE UNLESS OTHERWISE NOTED
- FIRE ACCESS ROUTE TO BE POSTED AND DESIGNATED UNDER MUNICIPAL BY-LAW. (FIRE ACCESS ROUTE TO BE MIN. 6 m WIDE WITH A MIN. 12 m CENTRELINE TURNING RADIUS AND MAX. 6% SLOPE)
- COORD. W/ CIVIL, MECH. & ELEC. SITE PLANS FOR ALL EXISTING & NEW LOCATIONS OF SERVICES & ENTRY OF SERVICES INTO THE BUILDING ENVELOPE. (ALL CIVIL MECH., ELECT. & LANDSCAPE INFO INDICATED ON ARCHITECTURAL SITE DWG. A1.1 IS FOR GENERAL REFERENCE & COORD. ONLY)
- REFER TO AND COORD. W/ SITE GRADING PLAN FOR PROPOSED FINAL FINISH GRADE ELEV.'S & DRAINAGE SLOPES
- TYP. DRIVEWAY & PARKING LOT CONC. CURBS AS INDICATED ON DRAWING. COORD. W/ CIVIL DRAWINGS, OPSD DETAILS & SPEC'S. FOR TYPICAL CURB TYPES. SITE DIMENSIONS ARE TYPICALLY DIMENSIONED TO FACE OF CURB
- THE SUB-GRADE SOILS EXPOSED AFTER EXCAVATION SHALL BE INSPECTED AND CERTIFIED BY A QUALIFIED REGISTERED PROFESSIONAL SOILS ENGINEER AND A COPY OF THE REPORT SHALL BE FORWARDED TO THE TOWNSHIP
- ALL FILL PLACED ON THE SITE SHALL BE COMPACTED TO A MINIMUM OF 98-100% STANDARD PROCTOR DENSITY ,A SUFFICIENT NUMBER OF TESTS SHALL BE TAKEN AT VARIOUS LEVELS SATISFACTORY TO THE DIRECTOR OF ENGINEERING. TEST RESULTS SHALL BE SENT TO THE TOWNSHIP WITH A LETTER, SIGNED AND STAMPED BY THE SOILS ENGINEER, STATING THAT A SUFFICIENT NUMBER OF TESTS HAVE BEEN TAKEN AND THE MINIMUM DEGREE OF COMPACTION HAS BEEN REACHED
- APPROVAL OF THIS DRAWING IS FOR MATERIAL ACCEPTABILITY AND COMPLIANCE WITH MUNICIPAL AND PROVINCIAL SPECIFICATIONS AND STANDARDS ONLY. APPROVAL AND INSPECTION BY THE TOWNSHIP OF THE WORKS DOES NOT CERTIFY THE LINE AND GRADE OF THE WORKS AND IT IS THE OWNER'S RESPONSIBILITY TO HAVE THEIR ENGINEER CERTIFY THIS ACCORDINGLY
- SILTATION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO WORKS COMMENCING ON THE SITE AND SHALL BE MAINTAINED FOR THE DURATION OF CONSTRUCTION, TO THE SATISFACTION OF THE TOWNSHIP OF SOUTHGATE. (COORD. W/ OPSD DETAILS)
- PROJECT SIGN TO BE ERECTED @ BEGINNING OF PROJECT. LOCATION TO BE COORDINATED WITH ARCHITECT ON SITE. (DETAILS 2, 3 & 4 ON A1.2)
- PROVIDE ASPHALT AS INDICATED IN THE GEOTECHNICAL REPORT FOR PAVEMENT STRUCTURE RECOMMENDATION
- CONTRACTOR IS RESPONSIBLE FOR PLANTINGS, SOD, WATERING, FERTILIZING & MAINTENANCE UNTIL SUBSTANTIAL PERFORMANCE IS ACHIEVED. THE WARRANITY PERIOD WILL COMMENCE UPON SUBSTANTIAL PERFORMANCE OF THIS WORK.
- REMOVE ANY EXISTING CURB CUTS & DRIVEWAY ACCESS & REINSTATE BARRIER CURB & NEW TOPSOIL & SOD.

REVISIONS

NO.	DATE	PARTICULAR
1	2024.12.13	ISSUED FOR MINOR VARIANCE APP.
2	2025.02.06	ISSUED FOR SPA SUBMISSION
3	2025.02.07	ISSUED FOR CLASS B ESTIMATE - 80% PROGRESS SET
4	2025.03.19	ISSUED FOR BUILDING PERMIT
5	2025.05.09	BUILDING PERMIT 1ST COMMENTS RESUBMISSION
6	2025.05.29	BUILDING PERMIT 2ND COMMENTS RESUBMISSION

NOTES:

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

All dimensions and measurements must be checked and verified by the General Contractor

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KEY PLAN:

SITE DESCRIPTION:

BLOCK 323 OF DRAFT PLAN OF SUBDIVISION

PART OF LOTS 225 & 226
CONCESSION 2
SOUTHWEST OF TORONTO & SYDENHAM RD.
GEOGRAPHIC TOWNSHIP OF PROTON
COUNTY OF GREY

CLIENT:

BLUEWATER DISTRICT SCHOOL BOARD

PROJECT:
22431

DUNDALK ES AND CHILDCARE

ADDRESS TO BE DETERMINED -
DUNDALK, ON.

ORIGINAL PAGE SIZE ARCH E1 - 30" x 42"

KEY TO DETAIL LOCATION:
(A) A - DETAIL NO.
(B) B - DETAIL NO. ORIGIN

+VG ARCHITECTS
THE VENTIN GROUP LTD

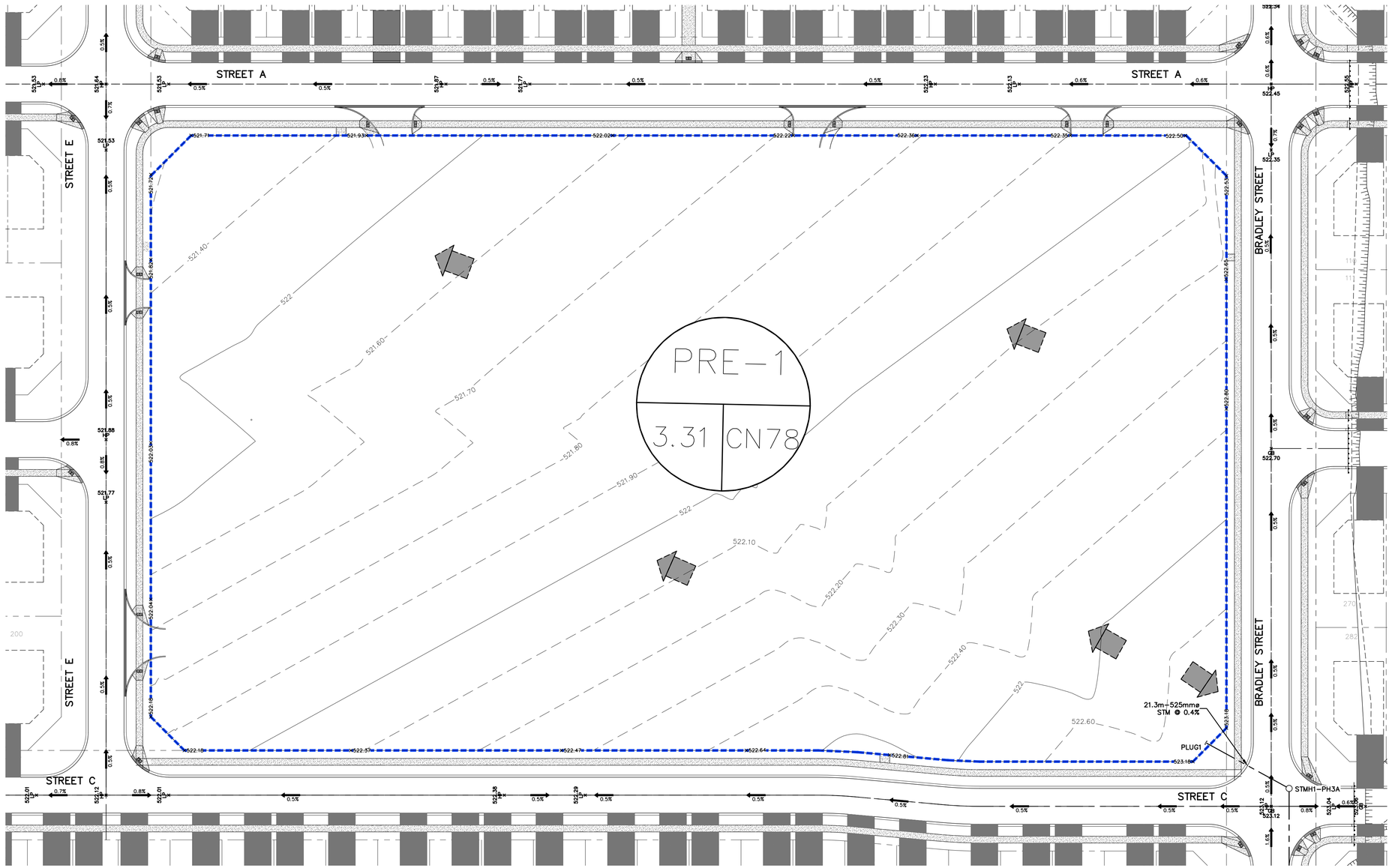
CN N

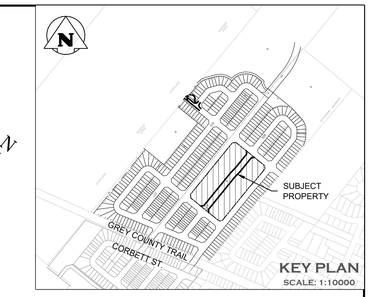
SITE PLAN

A1.1

Plot Date: Jul 02, 2025 - 3:06pm By: amontisano
Filename: K:\TVG-Brantford\Dundalk ES and Childcare-22431\Drawings\WG-Current\A1.1.dwg

DRAWN BY : EB/AM
CHECKED BY : PS





LEGEND

- OVERLAND FLOW DIRECTION
- CATCHMENT AREAS
- PROPERTY LINE
- PRE-X — DRAINAGE ID; XX — % IMPERVIOUS OR CN COEFFICIENT; XX — AREA (ha.)

SCALE: 1:500

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2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

BENCHMARKS

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY BENCHMARK No. 00820048005 HAVING A PUBLISHED ELEVATION OF 525.163 METRES

Town

No.	ISSUE	DATE: YYYY/MM/DD
1	ISSUED FOR 1st SUBMISSION	2025/JAN/30
2	ISSUED FOR 2nd SUBMISSION	2025/JUL/07

Engineer

LICENSED PROFESSIONAL ENGINEER
A. L. WEST
100190189
July 9, 2025
PROVINCE OF ONTARIO

Engineer

Project

BWDSB NEW SCHOOL
TOWNSHIP OF SOUTHGATE

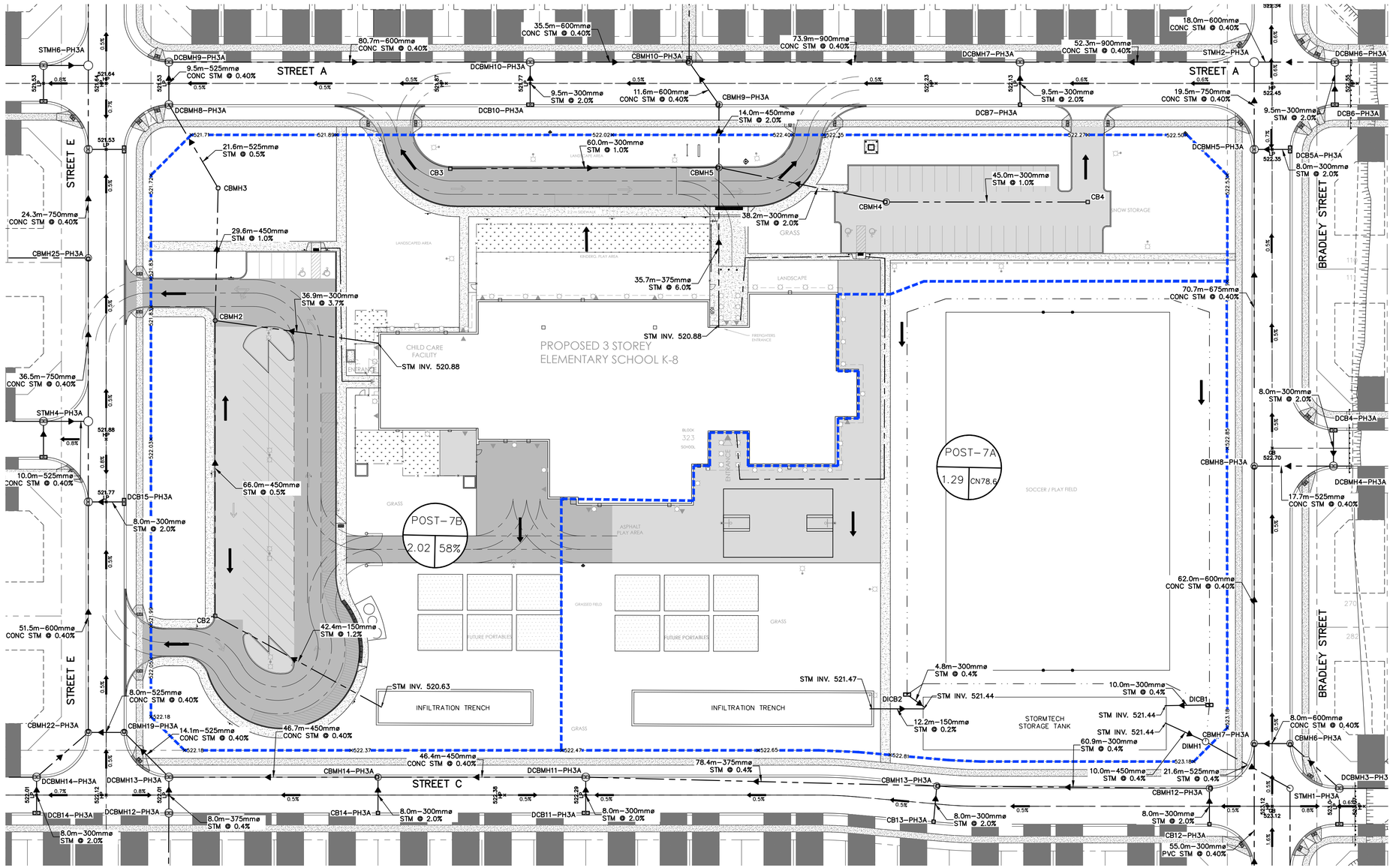
Drawing

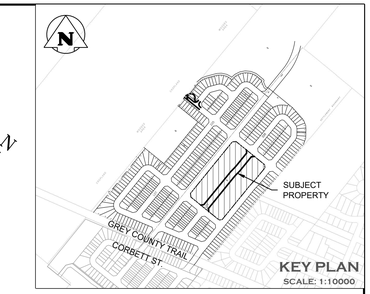
PRE DEVELOPMENT DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
V.P.	V.P./A.W.	2243-7223
Check By	Check By	Drawing
A.W.	A.W./R.W.	FIG4

C:\Users\ppronyk\DC\ACCDocs\Crozier Consulting Engineers\2243-7223 - Southgate - BWDSB New School\Project Files\Civil_Sheets\FIGs\7223_FIG4.dwg, 2025-07-07 4:15:33 PM





LEGEND

- x 521.30 — PROPOSED GRADES
- DRAINAGE ARROWS
- CATCHMENT AREAS
- PROPERTY LINE
- X — CATCHMENT ID; X.XX R/U — R = CURVE NUMBER (NASHYD), U = % TOTAL IMPERVIOUS (STANHYD); CATCHMENT AREA (ha)

10 0m 10 20 30 40
SCALE: 1:500

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6. DO NOT SCALE DRAWINGS.

BENCHMARKS

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY BENCHMARK No. 00820048005 HAVING A PUBLISHED ELEVATION OF 525.163 METRES

Town

No.	ISSUE	DATE: YYYY/MM/DD
1	ISSUED FOR 1st SUBMISSION	2025/JAN/30
2	ISSUED FOR BUILDING PERMIT	2025/MAY/01
3	ISSUED FOR 2nd SUBMISSION	2025/JUL/07

Engineer: LICENSED PROFESSIONAL ENGINEER A. L. WEST 100190189 July 9, 2025 PROVINCE OF ONTARIO

Engineer: LICENSED PROFESSIONAL ENGINEER J.Y. WANG 100178087 07/07/2025 PROVINCE OF ONTARIO

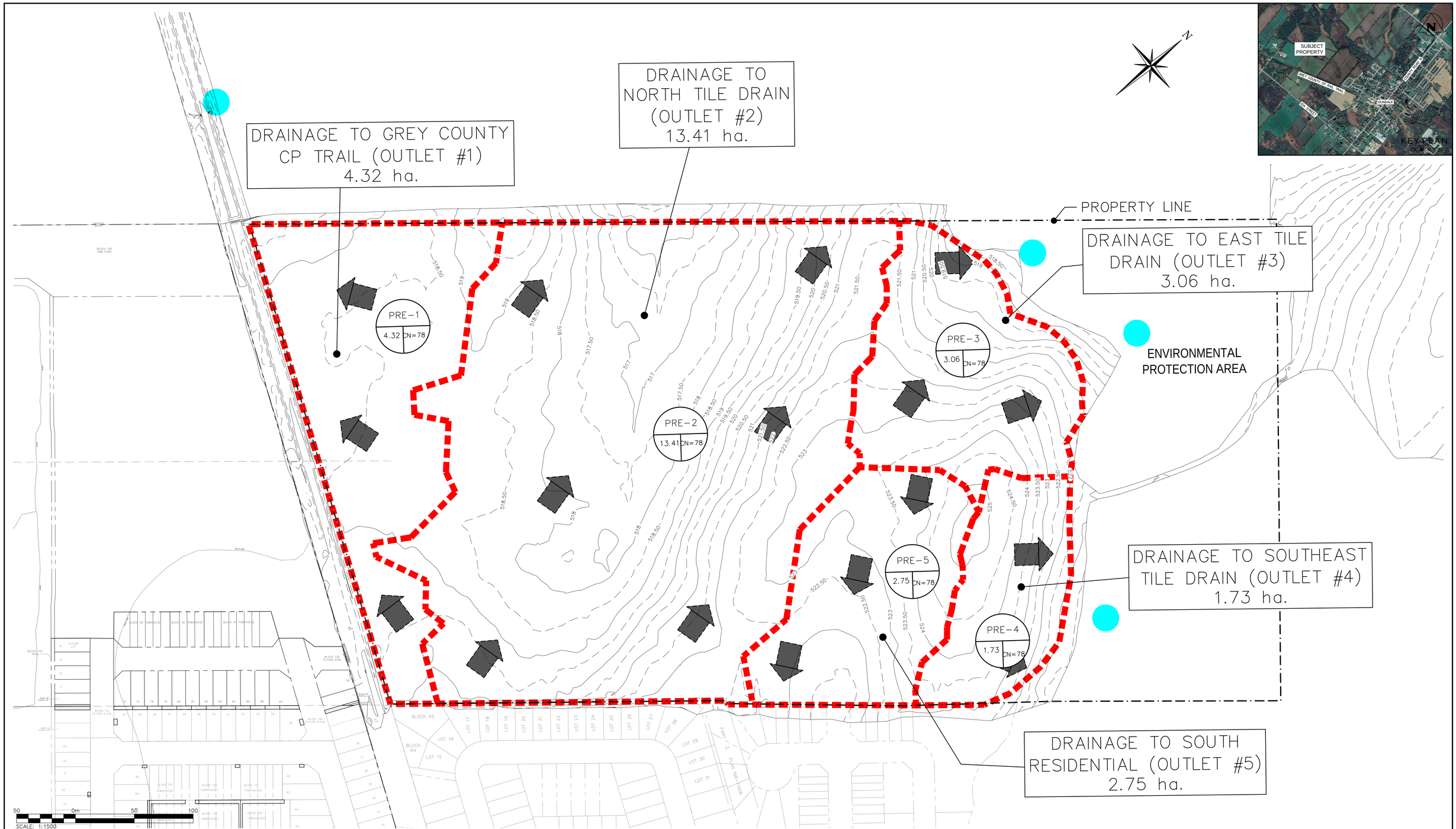
Project: BWDSB NEW SCHOOL TOWNSHIP OF SOUTHGATE

Drawing: POST DEVELOPMENT DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
V.P.	V.P./A.W./R.W.	2243–7223
Check By	Check By	Drawing
A.W./R.W.	A.W./R.W.	FIG5

C:\Users\vpornyak\DC\ACCDocs\Crozier Consulting Engineers\2243-7223 - Southgate - BWDSB New School\Project Files\Civil_Streets\FIGs\7223_FIG5.dwg, 2025-07-07 4:14:26 PM



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LEGEND

- OVERLAND FLOW DIRECTION
- CATCHMENT AREAS
- PROPERTY LINE
- PRE-X / XX.XX | XX — DRAINAGE ID / AREA (ha.) | CN COEFFICIENT
- APPROXIMATE TILE DRAIN LOCATION

Town

No.	ISSUE	DATE: MMM/DD/YYYY
1	ISSUED FOR 1st SUBMISSION	AUG/26/2022
2	ISSUED FOR 2nd SUBMISSION	MAY/26/2023
3	ISSUED FOR 3rd SUBMISSION	AUG/14/2023
4	ISSUED FOR 4th SUBMISSION	OCT/05/2023
5	ISSUED FOR 5th SUBMISSION	JAN/19/2024

Engineer

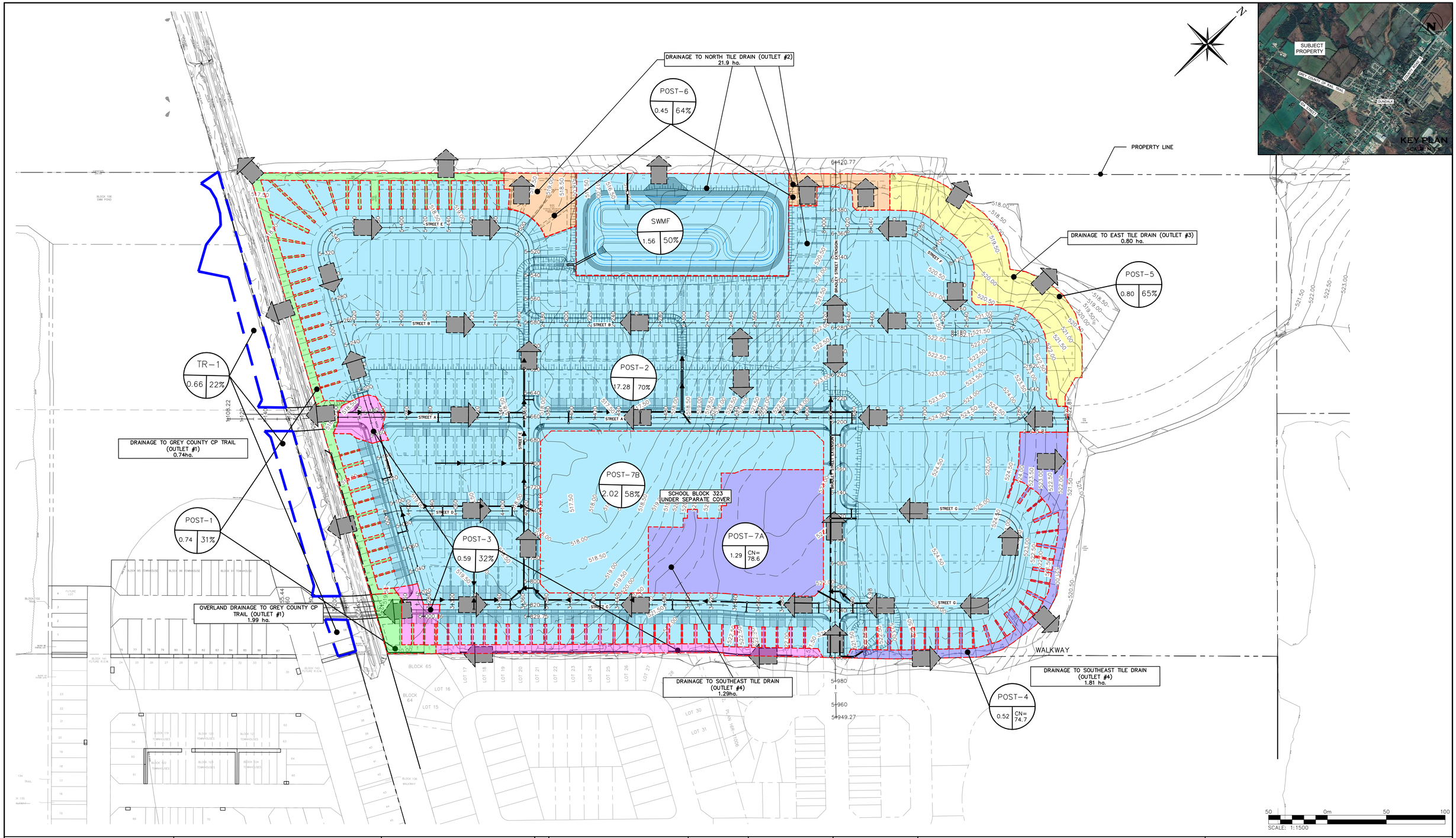
Engineer

Project: GLENELG EXPANSION LANDS TOWNSHIP OF SOUTHGATE

Drawing: PRE-DEVELOPMENT DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS
Admiral Building
1 First Street, Suite 200
Collingwood, ON, L9Y 1A1
705 446-3510 T
705 446-3520 F
www.cfcrozier.ca
info@cfcrozier.ca

Drawn By	Design By	Project	
V.P.	V.P./A.W./R.W.	1060-6220	
Check By	Check By	Scale	Drawing
A.W./R.W.	A.W./R.W.	1:1500	FIG 6



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LEGEND

- OVERLAND FLOW DIRECTION
- CATCHMENT AREAS
- PROPERTY LINE
- POST-X — DRAINAGE ID
- X.XX | XX — AREA (ha.) | % IMPERVIOUS OR CN COEFFICIENT
- OVERLAND DRAINAGE AREA TO OUTLET #1
- DRAINAGE AREA TO OUTLET #2
- DRAINAGE AREA TO OUTLET #1
- DRAINAGE AREA TO OUTLET #2
- DRAINAGE AREA TO OUTLET #2
- DRAINAGE AREA TO OUTLET #3
- DRAINAGE AREA TO OUTLET #4

Town

No.	ISSUE	DATE: MMM/DD/YYYY
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4	ISSUED FOR 4th SUBMISSION	OCT/05/2023
5	ISSUED FOR 5th SUBMISSION	JAN/19/2024

Engineer

Engineer

Project

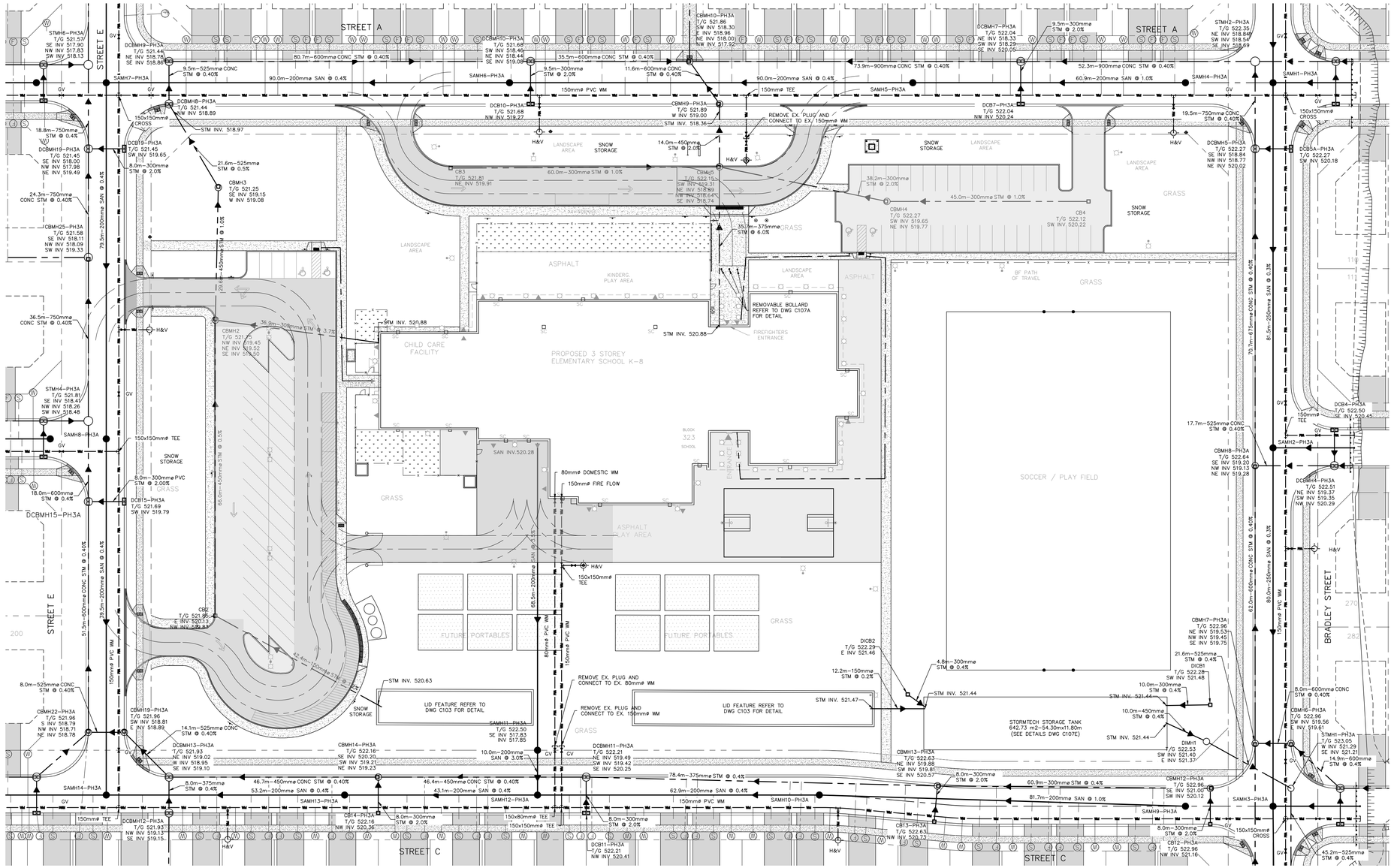
GLENELG EXPANSION LANDS
TOWNSHIP OF SOUTHGATE

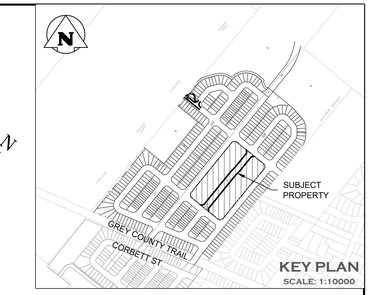
Drawing

POST DEVELOPMENT DRAINAGE PLAN
ULTIMATE CONDITION

CROZIER CONSULTING ENGINEERS
ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
COLLINGWOOD, ON, L9Y 1A1
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project	
V.P.	V.P. /A.W. /R.W.	1060-6220	
Check By	**Check By**	**Scale**	**Drawing**
A.W. /R.W.	A.W. /R.W.	1:1500	FIG 7





LEGEND

SC ROOF OVERFLOW (SCUPPER)

10 0m 10 20 30 40
SCALE: 1:500

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BENCHMARKS

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Town

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Engineer: LICENSED PROFESSIONAL ENGINEER J.Y. WANG 100178087 07/07/2025 PROVINCE OF ONTARIO

Project: BWDSB NEW SCHOOL
TOWNSHIP OF SOUTHGATE

Drawing: GENERAL SITE SERVICING PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
V.P.	V.P./A.W./R.W.	2243-7223
Check By	**Check By**	**Drawing**
A.W./R.W.	A.W./R.W.	C101

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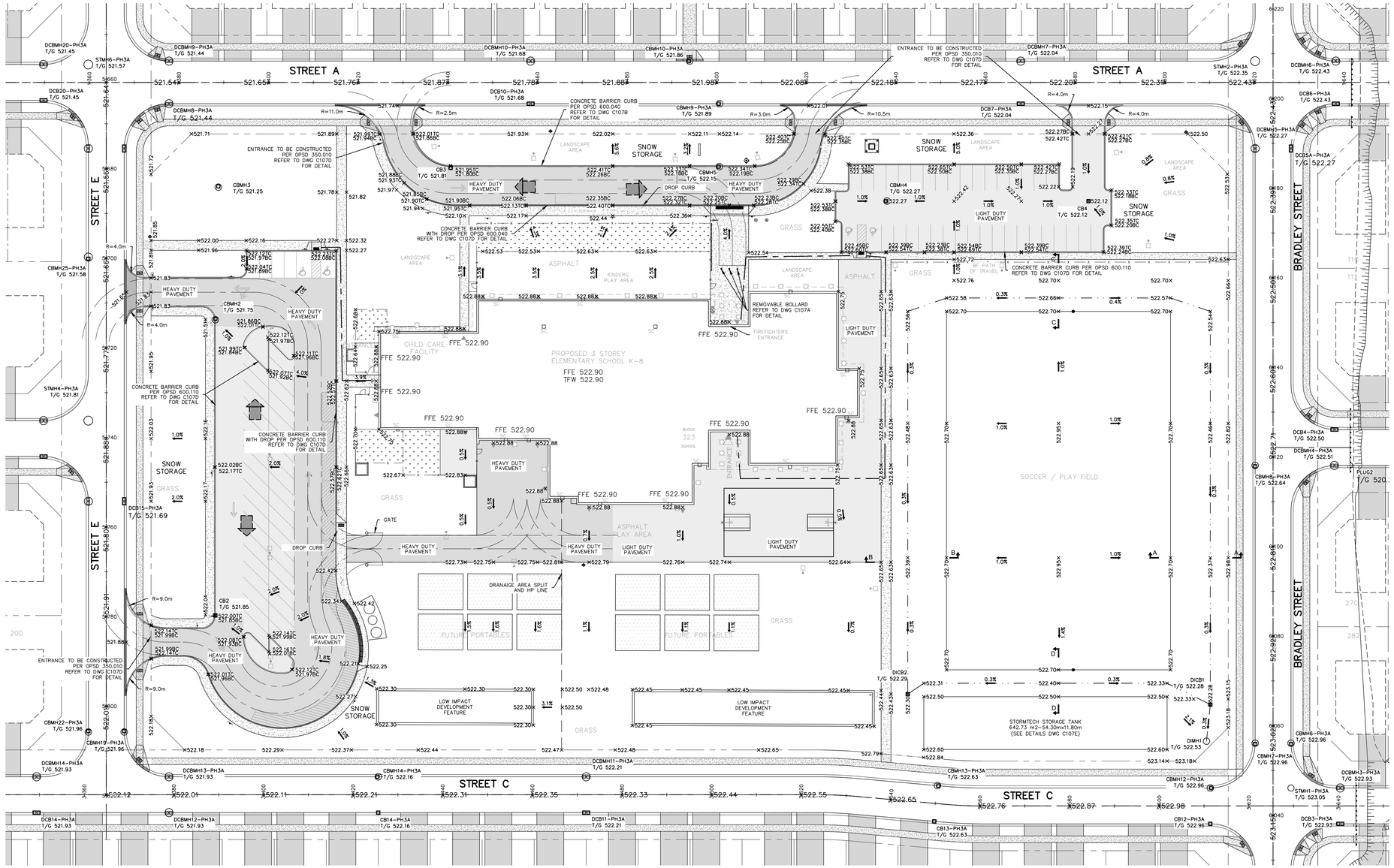
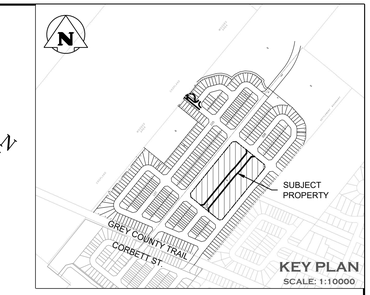
HEAVY DUTY PAVEMENT STRUCTURE:
- 40mm HL3 SURFACE ASPHALT
- 50mm HL4 BASE ASPHALT
- 150mm GRANULAR 'A'
- 450mm GRANULAR 'B'

LIGHT DUTY PAVEMENT STRUCTURE:
- 75mm HL3 ASPHALT
- 200mm GRANULAR 'A'
- COMPACTED SUBGRADE

REFER TO DETAIL ON DWG C107A

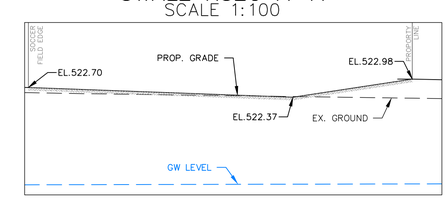




LEGEND

SC ROOF OVERFLOW (SCUPPER)

SWALE XSEC A–A
SCALE 1:100



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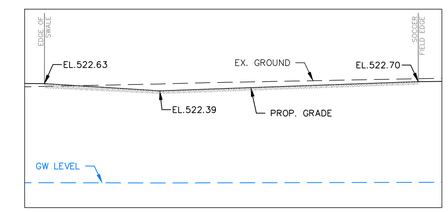
SCALE 1:100



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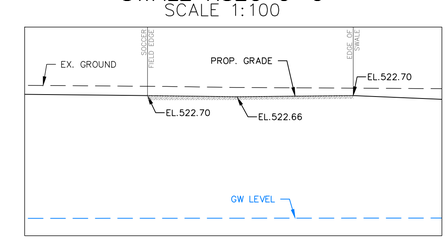
SCALE 1:100



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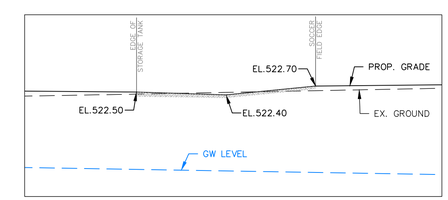
SCALE 1:100



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BENCHMARKS

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Engineer: LICENSED PROFESSIONAL ENGINEER A.L. WEST 100190189 July 9, 2025 PROVINCE OF ONTARIO

Engineer: LICENSED PROFESSIONAL ENGINEER J.Y. WANG 100178087 07/07/2025 PROVINCE OF ONTARIO

Project: BWDSB NEW SCHOOL TOWNSHIP OF SOUTHGATE

Drawing: PRELIMINARY SITE GRADING PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
V.P.	V.P./A.W./R.W.	2243–7223
Check By	Check By	Drawing
A.W./R.W.	A.W./R.W.	C102

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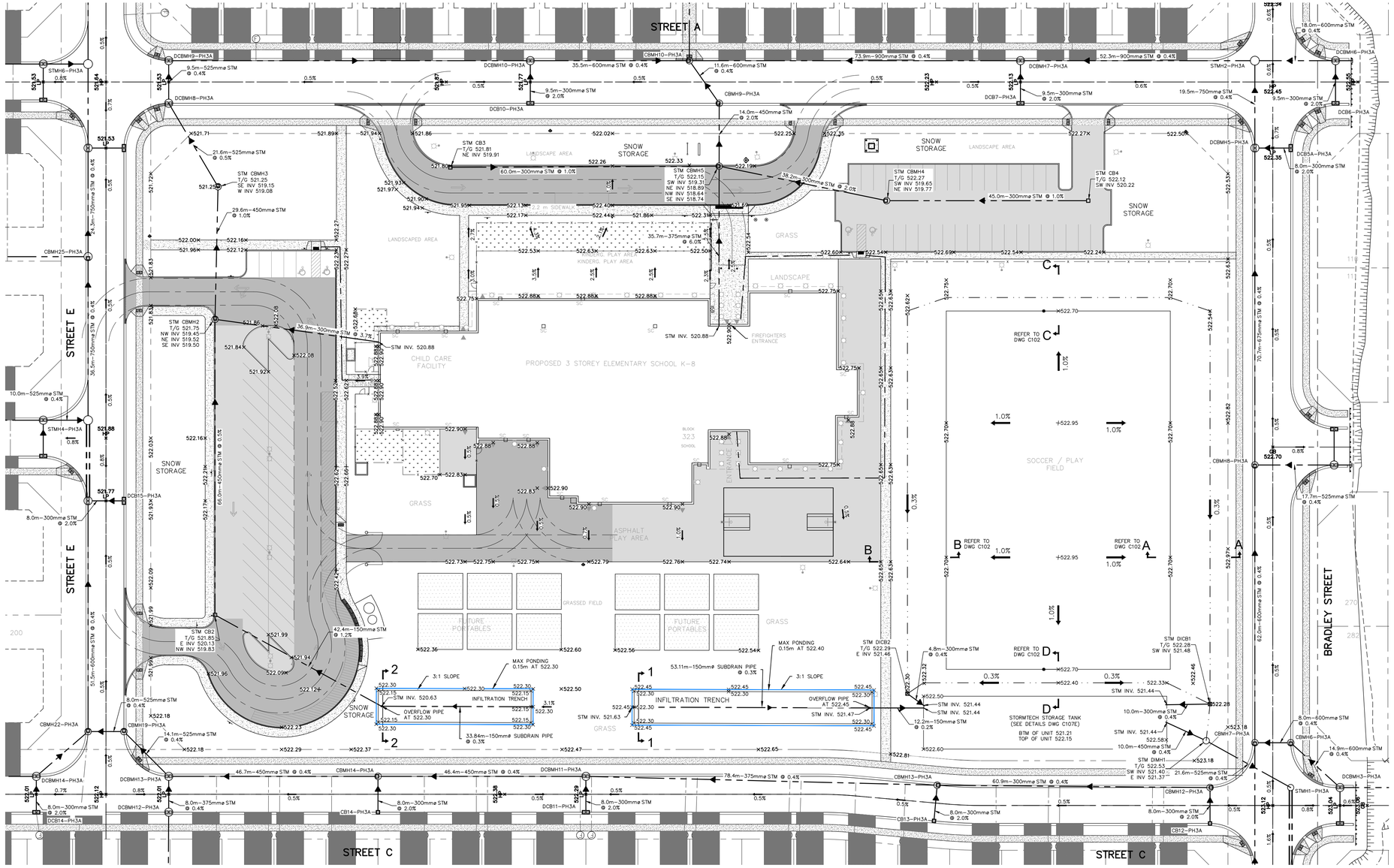
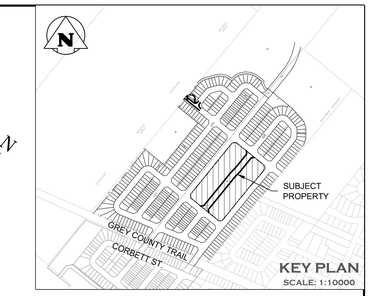


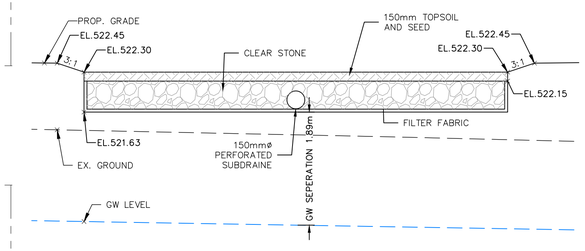


LEGEND

SC ROOF OVERFLOW (SCUPPER)

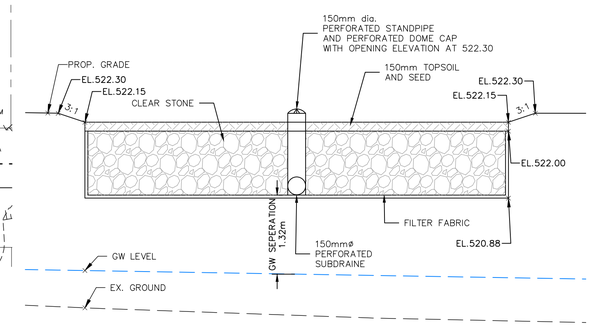
CROSS SECTION 1–1

SCALE 1:50



CROSS SECTION 2–2

SCALE 1:50



10 0m 10 20 30 40

SCALE: 1:500

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Town

No.	ISSUE	DATE: YYYY/MM/DD
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Engineer

LICENSED PROFESSIONAL ENGINEER
A. L. WEST
100190189
July 9, 2025
PROVINCE OF ONTARIO

Engineer

Project

BWDSB NEW SCHOOL
TOWNSHIP OF SOUTHGATE

Drawing

STORMWATER MANAGEMENT CONCEPT PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
V.P.	V.P./A.W.	2243–7223
Check By	Check By	Drawing
A.W.	A.W./R.W.	C103

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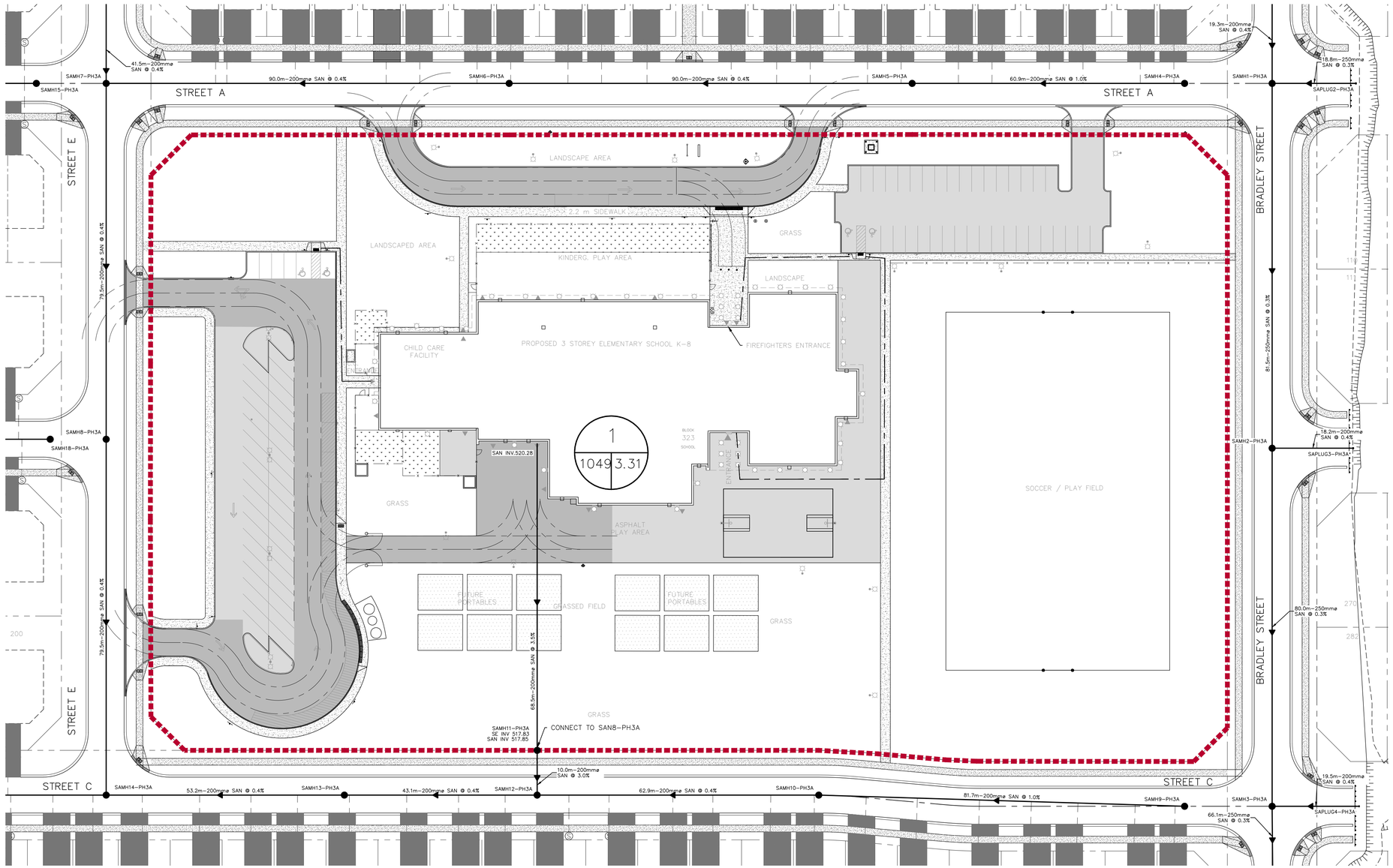

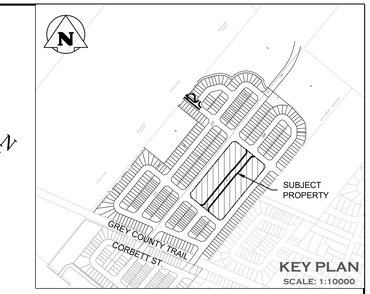

LEGEND

- PR. SANITARY SEWER & MANHOLE
- PR. SANITARY CATCHMENT
- X — SANITARY CATCHMENT AREA ID
- XX — SANITARY CATCHMENT AREA (ha)
- X.XX — SANITARY CATCHMENT POPULATION

10 0m 10 20 30 40
SCALE: 1:500

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Engineer: LICENSED PROFESSIONAL ENGINEER J.Y. WANG 100178087 07/07/2025 PROVINCE OF ONTARIO

Project: BWDSB NEW SCHOOL TOWNSHIP OF SOUTHGATE

Drawing: SANITARY DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
V.P.	V.P./A.W./R.W.	2243-7223
Check By	Check By	Drawing
A.W./R.W.	A.W./R.W.	C104

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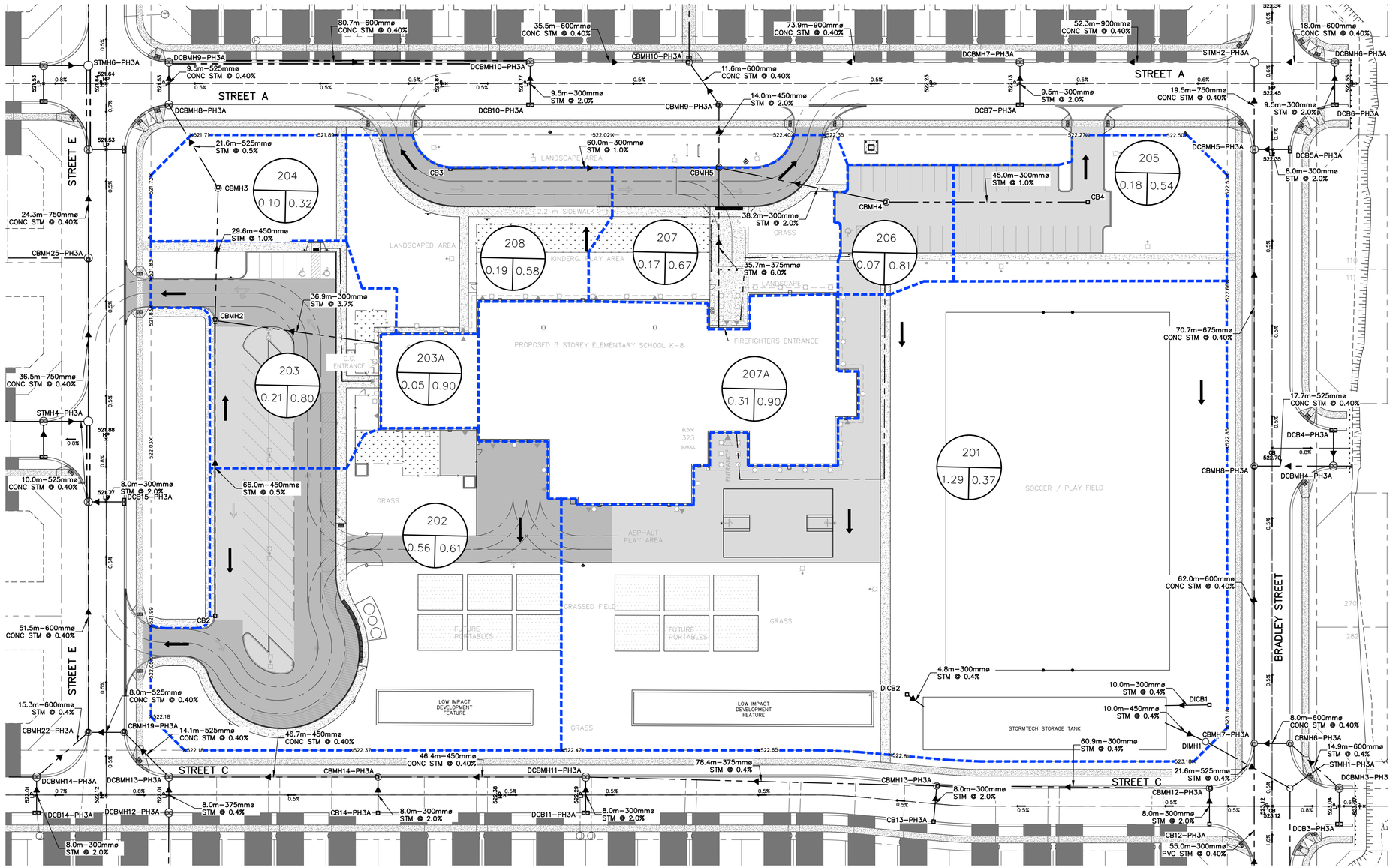

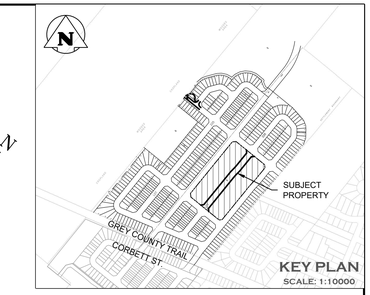

LEGEND

x 521.30	PROPOSED GRADES
	DRAINAGE ARROWS
	CATCHMENT AREAS
	PROPERTY LINE
201 / 0.47 / 0.35	DRAINAGE ID; % IMPERVIOUS OR CN COEFFICIENT; AREA (ha.)

10 0m 10 20 30 40
SCALE: 1:500

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BENCHMARKS

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY BENCHMARK No. 00820048005 HAVING A PUBLISHED ELEVATION OF 525.163 METRES

Town

No.	ISSUE	DATE: YYYY/MM/DD
1	ISSUED FOR 1st SUBMISSION	2025/JAN/30
2	ISSUED FOR BUILDING PERMIT	2025/MAY/01
3	ISSUED FOR 2nd SUBMISSION	2025/JUL/07

Engineer: LICENSED PROFESSIONAL ENGINEER A. L. WEST 100190189 July 9, 2025 PROVINCE OF ONTARIO

Engineer: LICENSED PROFESSIONAL ENGINEER J.Y. WANG 100178087 07/07/2025 PROVINCE OF ONTARIO

Project: BWDSB NEW SCHOOL
TOWNSHIP OF SOUTHGATE

Drawing: STORM DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
V.P.	V.P./A.W./R.W.	2243–7223
Check By	Check By	Drawing
A.W./R.W.	A.W./R.W.	C105

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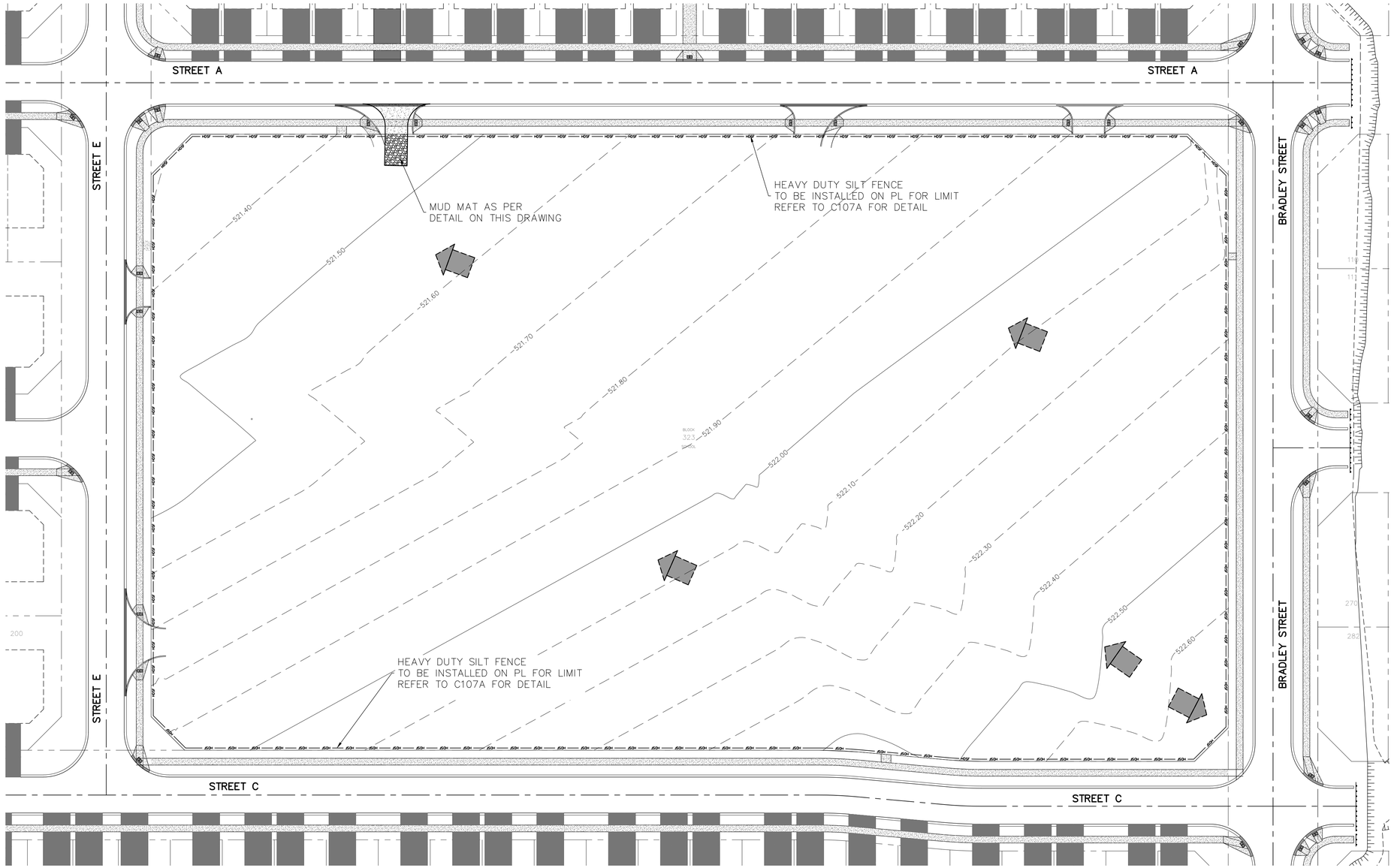
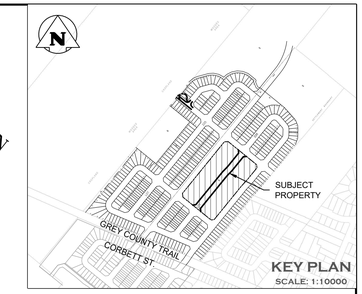




LEGEND

- PROPERTY LINE LIMITS
- EXISTING CONTOURS
- HEAVY DUTY SINGLE ROW SILT FENCE AS PER OPSD 219.130
- MAJOR OVERLAND FLOW

GENERAL NOTES:

1. ALL WORKS SHALL BE COMPLETED IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT. THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE "CONSTRUCTOR" AS DEFINED IN THE ACT.
2. ALL SEDIMENT AND EROSION CONTROL FACILITIES AND WORKS ARE TO BE CONSTRUCTED AND IN PLACE TO THE APPROVAL OF THE SITE ENGINEER PRIOR TO ANY GRADING OPERATIONS COMMENCING. TYPICAL WORKS INCLUDE SILT FENCES, INTERCEPTOR SWALES, STRAW BALE CHECK DAMS AND SEDIMENT TRAPS.
3. ALL TEMPORARY TOPSOIL STOCKPILES ARE TO BE PROVIDED WITH THE NECESSARY SEDIMENT AND EROSION CONTROL FEATURES.
4. ALL INTERCEPTOR SWALES ARE TO BE SEEDED TO STABILIZE THEIR BANKS IMMEDIATELY FOLLOWING CONSTRUCTION.
5. REFER TO APPLICATION FORM FOR GRUBBING OF TREES WITHIN LIMITS OF FILL AREA.
6. NO GRADING OF LANDS WILL OCCUR WITHIN SPECIFIED BUFFERS ALONG PROPERTY LINES AND INTERNAL TO SITE.
7. THE LOCATION OF ALL UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE LOCATION OF SUCH UTILITIES AND STRUCTURES 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.

MAINTENANCE & OPERATIONS OF SEDIMENT CONTROLS

SILT FENCE

1. SILT FENCE MUST BE INSPECTED WEEKLY FOR RIPS OR TEARS, BROKEN STAKES, BLOW-OUTS AND ACCUMULATION OF SEDIMENT.
2. SILT FENCE MUST BE INSPECTED FOLLOWING ALL 15mm OR GREATER RAIN STORM EVENTS OR AS DIRECTED BY SITE ENGINEER.
3. SEDIMENT MUST BE REMOVED FROM SILT FENCE WHEN ACCUMULATION REACHES 50% OF THE HEIGHT OF THE FENCE.
4. ALL SILT FENCES MUST BE REMOVED ONLY WHEN THE ENTIRE SITE IS STABILIZED AND AS DIRECTED BY THE SITE ENGINEER.

MUD MAT MAINTENANCE

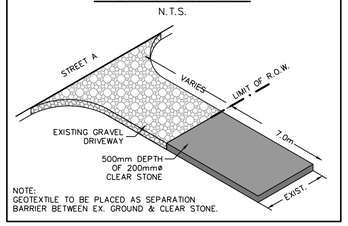
1. INSPECT MUD MAT WEEKLY TO ASSESS CONDITION AND ENSURE OPERATION EFFICIENCY.
2. SUPPLY AND PLACE ADDITIONAL CLEAR STONE AS DIRECTED BY SITE ENGINEER.
3. MAT TO REMAIN IN PLACE UNTIL SITE IS STABILIZED OR AS DIRECTED BY SITE ENGINEER.

DECOMMISSIONING / RESTORATION

1. FOLLOWING COMPLETION OF CONSTRUCTION AND AS DIRECTED BY SITE ENGINEER, ALL EROSION AND SEDIMENT CONTROL WORKS ARE TO BE REMOVED INCLUDING ANY ACCUMULATED SEDIMENT.
2. ALL WORKS LOCATED ON LANDS OUTSIDE THE PROPOSED DEVELOPMENT AREA ARE TO BE GRADED TO MATCH EXISTING SURROUNDING GROUND AND HYDROSEEDED.
3. ALL SEDIMENT BUILD-UP TO BE REMOVED FROM SEDIMENT BASINS. DISTURBED AREAS AND SEDIMENT BASINS TO BE TREATED WITH 25mm OF TOPSOIL AND HYDROSEEDED AS DIRECTED BY SITE ENGINEER.

MUD MAT DETAIL

N.T.S.



NOTE:
GEOTEXTILE TO BE PLACED AS SEPARATION BARRIER BETWEEN EX. GROUND & CLEAR STONE.

10 0m 10 20 30 40
SCALE: 1:500

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.

3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

BENCHMARKS

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Project: BWDSB NEW SCHOOL
TOWNSHIP OF SOUTHGATE

Drawing: EROSION AND SEDIMENT CONTROL PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
V.P.	V.P./A.W./R.W.	2243-7223
Check By	**Check By**	**Drawing**
A.W./R.W.	A.W./R.W.	C106

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