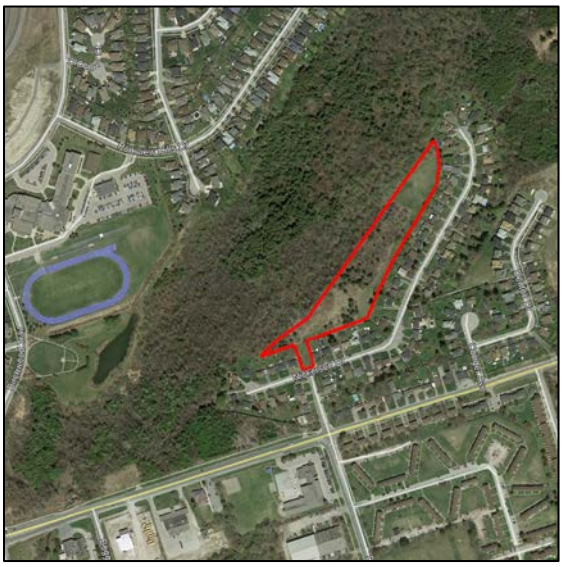
Stormwater Management Report

Nickerson Woods

D'Arcy Street, Parts of Blocks A & B
Plan 27 Parts 5-8 Plan 39R-8760
Cobourg, ON

D.M. Wills Project Number 10-10122



D.M. Wills Associates Limited
Partners in Engineering
Peterborough

June 2020

Prepared for:
Leblanc Enterprises

Summary of Revisions

Revision No.	Revision Title	Date of Release	Summary of Revisions
1	Stormwater Management Report	July 2019	1st Submission to Town of Cobourg
2	Stormwater Management Report	January 2020	2nd Submission to Town of Cobourg
3	Stormwater Management Report	June 2020	3rd Submission to Town of Cobourg

This report has been formatted considering the requirements of the Accessibility for Ontarians with Disabilities Act.

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1.0 Purpose

D.M. Wills Associates Limited (Wills) has been retained by Leblanc Enterprises to prepare a detailed Stormwater Management Report for the development of D'Arcy Street, Parts of Blocks A & B Plan 27 Parts 5-8 Plan 39R-8760 in the Town of Cobourg.

The purpose of this report is to evaluate the existing drainage characteristics of the site and to advance an integrated plan for stormwater management that will permit the development to proceed with no adverse impacts to the receiving drainage system. This report has been prepared to address the requirements of the Town of Cobourg as well as Ganaraska Conservation (GRCA).

2.0 Site Description

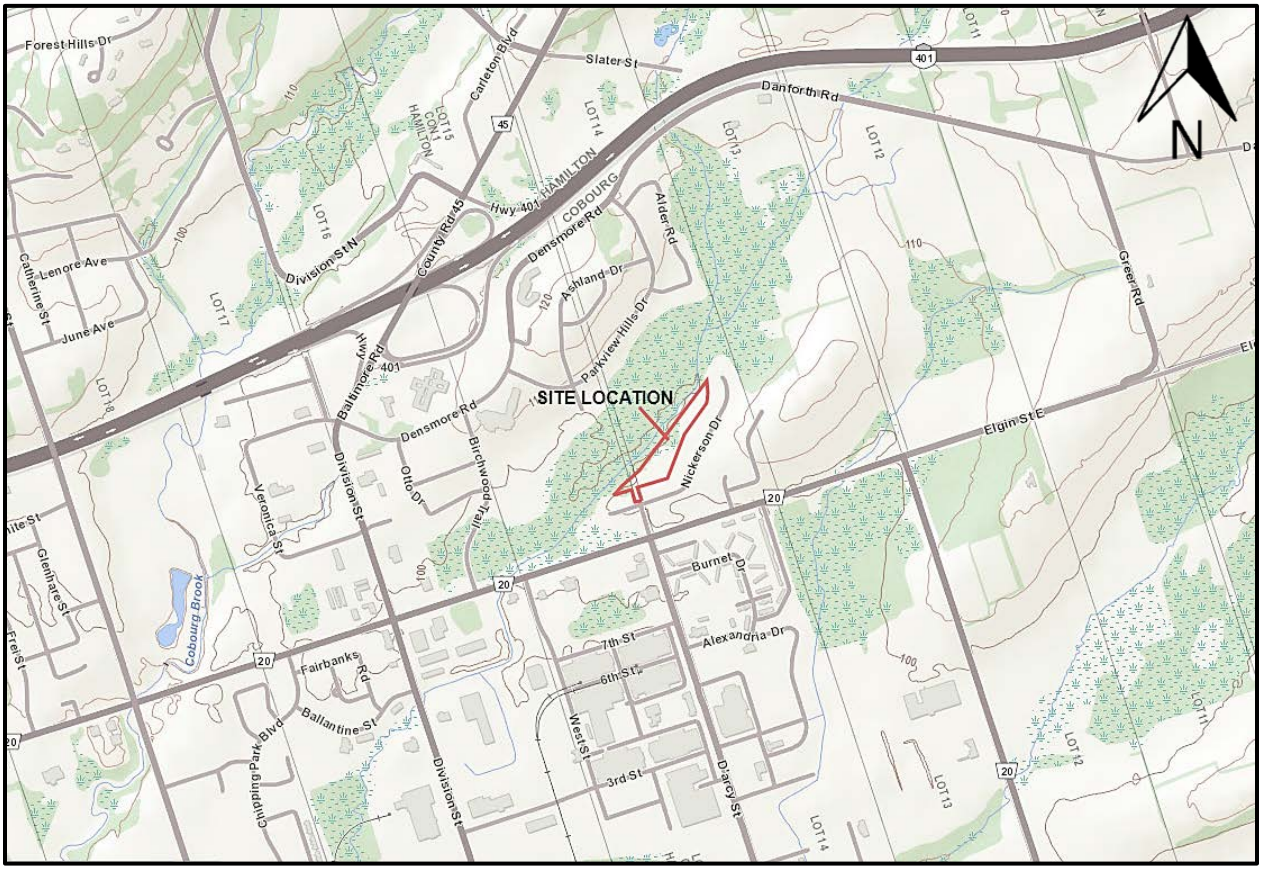
The location of the site is shown on **Figure 1** and is legally described as, Parts 5, 6, 7 & 8 Plan 39R-8760, Part of Blocks A & B, Registered Plan 27, Town of Cobourg, County of Northumberland. The surrounding properties include residential lands to the east and south, forested lands to the west and north.

The existing site is comprised of grass and wooded areas and gradually slopes east to west. During storm events, runoff will drain as sheet flow and ultimately outlet into Midtown Creek. The proposed development is to include the construction of a new Plan of Condominium which will comprise of impervious areas such as building, paved roadway and paved parking areas. This development will also include impervious areas such as parkland, manicured grass and landscaping features.

The original topographic survey of the site was completed by IBW Surveyors in 2013 and supplementary data was collected by Wills in 2018 and 2019. This data was used to determine elevations and locations of existing site features, determine on-site drainage patterns and establish the proposed grades.

A Subsurface Investigation Report was prepared by Geo-logic on May 25, 2015. The report presents the findings of groundwater observations and sols conditions within three (3) test pits across the site. A copy of the Subsurface Investigation Report can be found in **Appendix F**.

Figure 1 – Site Location



3.0 Methodology

The present hierarchy of watershed planning in Ontario can be described by the following in descending order: Watershed Plans, Sub-watershed Plans and Individual Stormwater Management Plans. The subject site is located within the Midtown Creek Sub-Watershed boundary that has established the Flood Control Criteria to be used for developments within sub-watershed. Furthermore, a preliminary stormwater management report was prepared by Greenland Engineering in November 2017 to support the Draft Plan of Condominium phase of this development. As such, this stormwater management report has been prepared considering the design criteria and recommendations established in these previous studies.

3.1 Site Specific Stormwater Design Criteria

Based on the requirements of the Town of Cobourg, Ganaraska Conservation, the Midtown Creek Flood Control Criteria and the Greenland Engineering Preliminary Stormwater Management Report, the following design criteria have been established for the site:

- Provide stormwater quantity controls to reduce the post-development peak flow rates directed to Midtown Creek to 50% of the pre-development peak flow rate, during a 2-year storm event.
- Provide stormwater quantity controls to reduce the post-development peak flow rates directed to Midtown Creek to 70% of the pre-development peak flow rates, during the 5 to 100-year storm events.
- Provide stormwater quality controls to achieve Ministry of the Environment "Enhanced" (Level 1) protection.
- Provide Low Impact Development features to maintain pre-development runoff volumes on an average annual basis.
- Ensure adequate conveyance of external drainage directed onto the property.

3.2 Catchment Characterization

The existing condition of the site has been analyzed as one (1) internal catchment and four (4) external catchments that drain onto the subject property. The pre-development catchment boundaries are shown on **Figure 2** and described in detail below.

- Catchment **EX-100** represents the internal boundary of the site and is comprised of wooded and grassed areas. The catchment slopes from east to west draining as sheet flow to Midtown Creek (**OUT-1**).
- Catchments **EXT-201, EXT-202, EXT-203** and **EXT-204** represent the external catchments that drain onto the site. Each catchment includes rear yard drainage from the adjacent subdivision and is comprised of impervious and grassed areas. Runoff is conveyed as sheet flow onto the site and eventually discharges to Midtown Creek (**OUT-1**).

The proposed condition has been analyzed as five (5) internal catchments and four (4) external catchments as shown on **Figure 3** and are described in detail below:

- Catchment **PR-101** represents the southwestern portion of the development and is comprised of buildings, roadway and landscaped areas. Runoff will be directed through an internal sewer to a stormwater facility along the northwestern site boundary (Chamber System 2) and outlet to Midtown Creek (**OUT-1**).
- Catchment **PR-102** represents the southeastern portion of the development and is comprised of buildings, roadway and landscaped areas. Runoff will be directed to an underground storage facility (Chamber System 1) located in the park block. Outflows from Chamber System 1 will then drain through an internal sewer to Chamber System 2 before discharging to Midtown Creek (**OUT-1**).
- Catchment **PR-103** represents the rear yards along the northwest property boundary and is comprised of buildings and landscaped areas. Runoff is conveyed by a rear yard swale to Chamber System 2, before discharging to Midtown Creek (**OUT-2**).

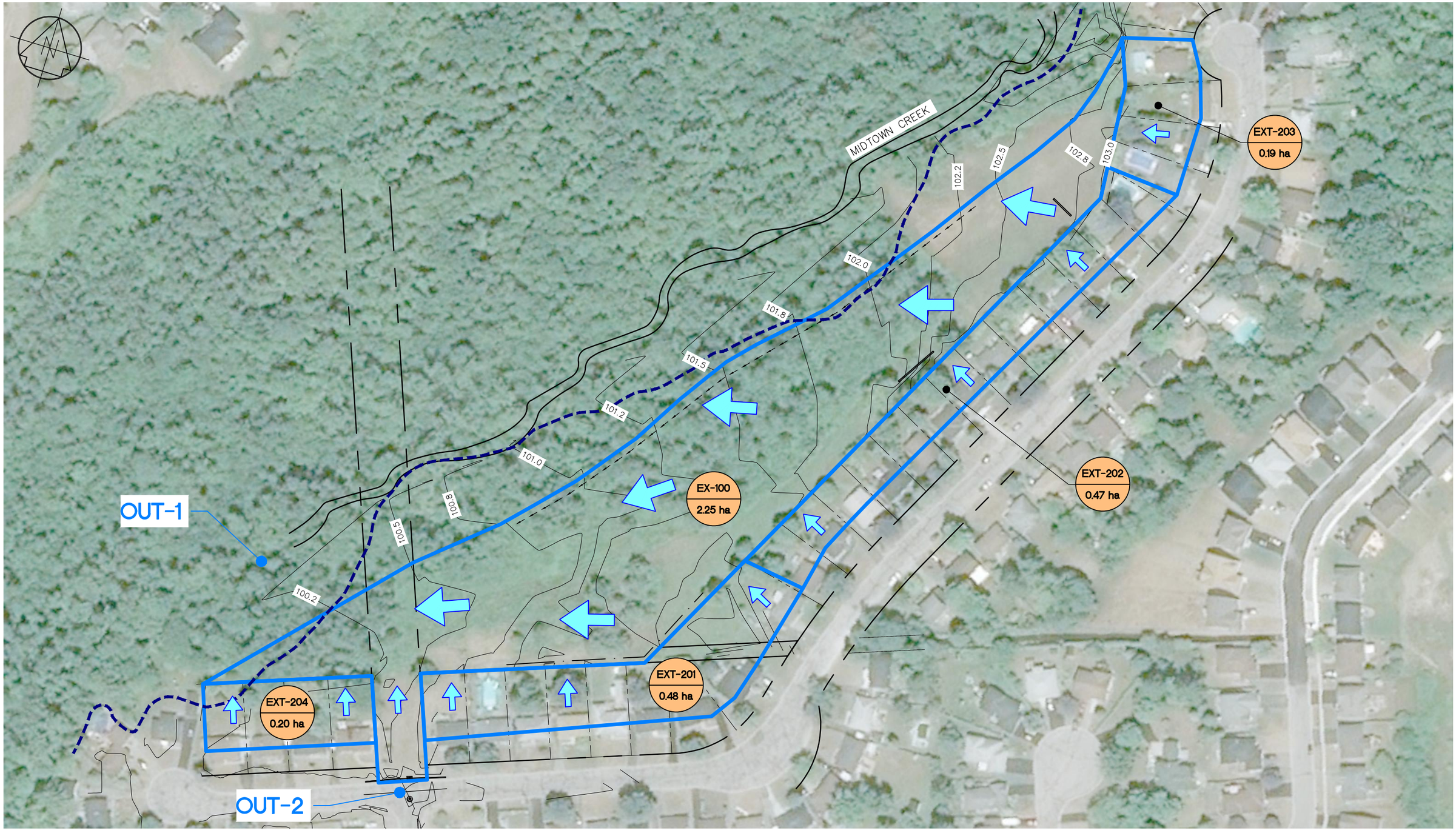
- Catchment **PR-104** represents the southwest corner of the development as well as the portion of the rear yards along the northwest property boundary that will drain uncontrolled. The catchment is comprised of buildings and landscaped areas and will drain as sheet flow to Midtown Creek (**OUT-1**)
- Catchment **PR-300** represents a small portion of roadway that will direct runoff south to an existing storm sewer on D'Arcy Street (**OUT-2**).
- Catchment **EXT-201** will be unchanged from the existing condition. Runoff will be conveyed as sheet flow to catchment PR-101.
- Catchment **EXT-202** will be unchanged from the existing condition. Runoff will be conveyed as sheet flow to catchment PR-102.
- Catchment **EXT-203** will be unchanged from the existing condition. Runoff will be conveyed as sheet flow to catchment PR-103.
- Catchment **EXT-204** will be unchanged from the existing condition. Runoff will be conveyed as sheet flow to catchment PR-104.

The existing and proposed runoff characteristics were analyzed using individual sub-catchments. Hydrologic parameters such as soil infiltration properties, land use and runoff response were determined based on literature review. Topographic mapping and AutoCAD Civil 3D software were used to establish sub-watershed areas, land use and slope. On-site soils were assessed as Tecumseth Sandy Loam with a Hydrologic Soil Group of AB. The hydrologic parameters for each catchment have been summarized in **Figure 3** and documented in **Appendix A**.

Table 1 – Existing and Proposed Hydrologic Parameters

Catchment ID	Command Line[1]	Area (ha)	Impervious %	CN*[2]	Ia[3]	Tp[4] (hrs)
EX-100	NasHyd	2.26	0	46.4	6.7	0.64
PR-101	StandHyd	0.70	40	47.8	5.0	-
PR-102	StandHyd	0.71	27	47.8	5.0	-
PR-103	StandHyd	0.44	30	47.8	5.0	-
PR-104	StandHyd	0.34	29	47.8	5.0	-
EXT-201	StandHyd	0.47	30	47.8	5.0	-
EXT-202	StandHyd	0.47	30	47.8	5.0	-
EXT-203	StandHyd	0.19	30	47.8	5.0	-
EXT-204	StandHyd	0.20	30	47.8	5.0	-

Notes:
1. Command Line refers to the unit hydrograph used in the VO3 hydrologic model for the respective catchment area.
2. CN* refers to the modified CN number adjusted to Antecedent Moisture Conditions II. Excludes Impervious Area for Standhyd.
3. Ia refers to Initial Abstraction. Excludes Impervious Area for Standhyd.
4. Tp refers to Time of Peak.



EX-1 / 0.22 — SUB-WATERSHED / AREA (IN HECTARES)

SUBWATERSHED BOUNDARY

OVERLAND FLOW DIRECTION

STORM SEWER FLOW DIRECTION

TEST PIT LOCATION

OUT — OUTLET LOCATION

MIDTOWN CREEK EXISTING REGULATORY FLOOD LINE (2008)

MIDTOWN CREEK PROPOSED REGULATORY FLOOD LINE

WILLS

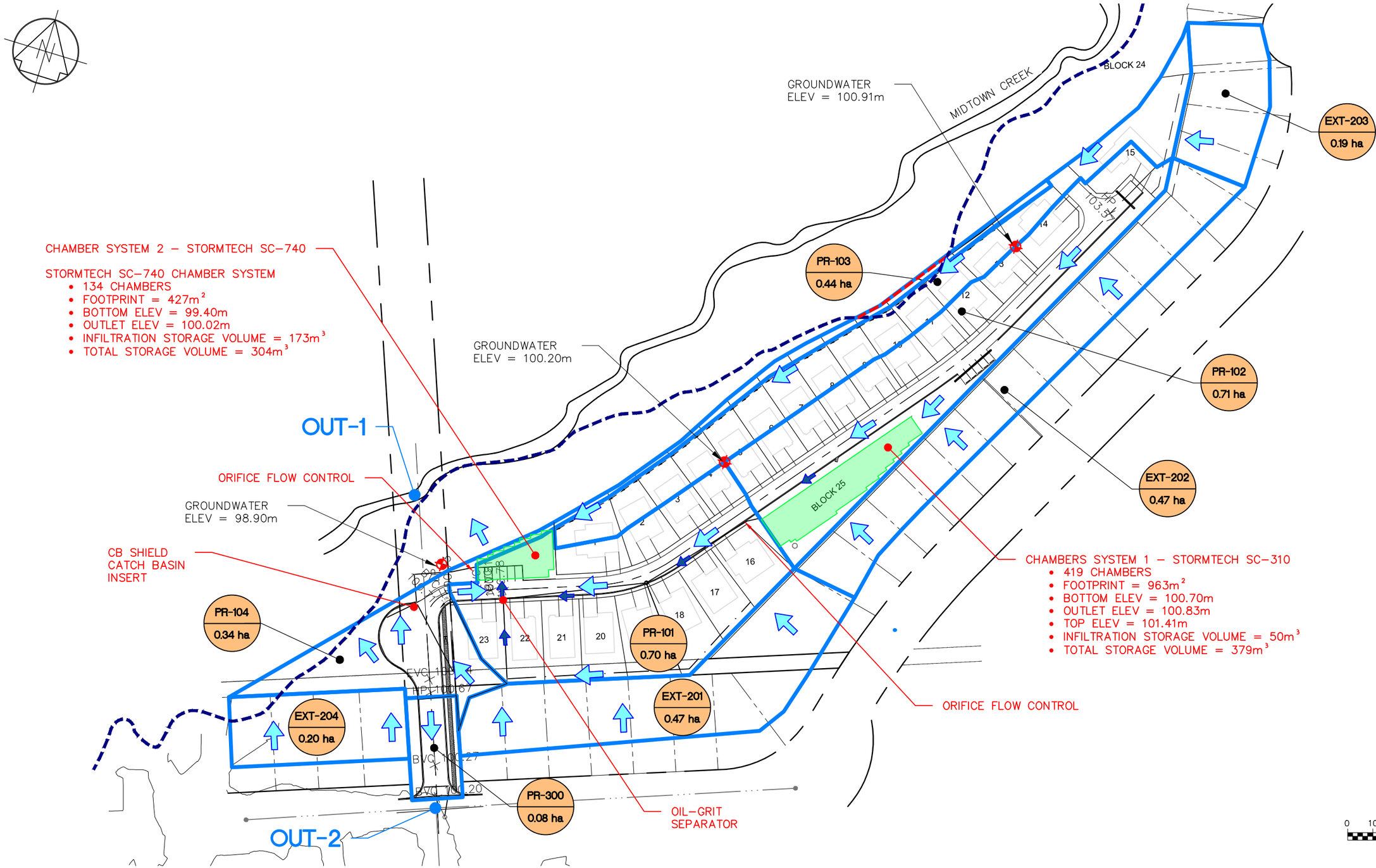
D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario
Canada K9J 0B9

P. 705.742.2297
F. 705.741.3568
E. wills@dmwills.com

Sketch No.

NICKERSON WOODS
FIGURE 2 – PRE-DEVELOPMENT DRAINAGE AREA PLAN

Drawn By: CS	Scale: 1:1500
Designed By: CS	Plot Date: JULY 2019
Checked By: CPB	Project No.: 10122
Engineer: CPB	Drawing File No.: FIGURE 2



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MIDTOWN CREEK PROPOSED REGULATORY FLOOD LINE

D.M. Wills Associates Limited
150 Jameson Drive
Peterborough, Ontario
Canada K9J 0B9

P. 705.742.2297
F. 705.741.3568
E. wills@dmwills.com

Sketch No.

NICKERSON WOODS
FIGURE 3 – POST-DEVELOPMENT DRAINAGE AREA PLAN

Drawn By: CS	Scale: 1:1500
Designed By: CS/RC	Plot Date: MAY 2020
Checked By: CPB	Project No.: 10122
Engineer: CPB/RC	Drawing File No.: 10122-DP

4.0 Stormwater Management

4.1 Stormwater Quantity Control

The development of the existing site will result in increased peak flow rates and runoff volumes of stormwater leaving the site. In order to ensure that the receiving drainage system will not be adversely affected, stormwater management facilities are typically required to reduce post-development peak flows to existing (or lower) levels.

4.1.1 Existing Flow Analysis

The existing condition peak flow rates were calculated using the Visual Otthymo Version 3.0 (VO3) hydrologic model. Ganaraska Conservation requires that a range of storm events and distributions be considered in the analysis. As such, peak flow rates were calculated for the 2, 5, 10, 25, 50 and 100-year design storms for each of the 4-hour Chicago, 6-hour SCS, 12-hour SCS and 24-hour SCS distributions. It is noted that a ShiftHyd was used to account for the travel time required for the external catchments to drain through the internal site and reach the outlet. The model schematic and detailed results have been included in **Appendix B**, peak flow rates are summarized in **Table 2** below.

Table 2 – Existing Peak Flow Summary

Return Period	Peak Flow (m^3/s)							
	4 Hour Chicago		6 Hour SCS		12 Hour SCS		24 Hour SCS	
	INT[1]	EX[2]	INT[1]	EX[2]	INT[1]	EX[2]	INT[1]	EX[2]
2-Year	0.006	0.064	0.005	0.041	0.004	0.035	0.003	0.029
5-Year	0.012	0.087	0.010	0.066	0.009	0.058	0.008	0.047
10-Year	0.016	0.104	0.014	0.081	0.013	0.071	0.011	0.060
25-Year	0.032	0.161	0.028	0.142	0.026	0.119	0.022	0.099
50-Year	0.043	0.181	0.042	0.191	0.038	0.169	0.033	0.143
100-Year	0.056	0.209	0.056	0.245	0.052	0.219	0.045	0.186

Notes: 1. INT refers to the existing condition peak flow rates for the internal boundary of the site (VO3 NHYD = 1100).

2. EX refers to total existing condition peak flow rates directed to Midtown Creek including the external catchments (VO3 NHYD = 1001).

A review of **Table 2** shows that the existing peak flow rates are similar for each storm distribution, with the highest 100-year peak flow rate provided by the 6-hour SCS Storm. It is also noted that the existing site generates only a small portion of the runoff directed to Midtown Creek. Preliminary analyses determined that the 6-hour SCS Storm also produced the largest storage volume requirements, and has been used to establish the target flow rates for the development.

4.1.2 Target Flow Rates

In accordance with the Midtown Creek Flood Control Criteria, the proposed development is required to control the runoff generated by the site to 50% of the pre-development peak flow rate for the 2-year storm and 70% of the pre-development peak flow rate for the 5 to 100-year storms. Quantity controls are not required for external catchments that drain onto the property as they are beyond the development limits and will be unchanged from the existing condition.

Ideally, external catchments would be directed around the development to keep external runoff separate from the proposed stormwater design. However, as the external catchments border the entire southeastern boundary of the site this was not deemed a feasible option for the proposed development. As such, special considerations were required to establish target flow rates for the development.

Target flow rates were determined using the VO3 model for a 6-hour SCS storm. A DivertHyd command was used to split existing flows generated by the site in accordance with the Midtown Creek Flood Control Criteria. The resulting hydrograph was then added to the external hydrograph to calculate the peak flows that would be directed to Midtown Creek if the existing site was controlled to the Midtown Creek Flood Control Criteria. The calculated target flow rates are summarized in **Table 3** and the detailed model results have been included in **Appendix B**.

Table 3 – Target Flow Rate Summary (6-hour SCS)

Return Period	Peak Flow Rates (m^3/s)			
	OUT-1			
	INT[1]	EXT[2]	EX[3]	TGT[4]
2-Year	0.005	0.036	0.041	0.038
5-Year	0.010	0.056	0.066	0.063
10-Year	0.014	0.067	0.081	0.077
25-Year	0.028	0.113	0.142	0.134
50-Year	0.042	0.150	0.191	0.178
100-Year	0.056	0.188	0.245	0.228

Notes:
1. INT refers to the existing condition peak flow rates for the internal boundary of the site (VO3 NHYD = 1100).
2. EXT refers to the existing condition peak flow rates for the external drainage directed onto the site (VO3 NHYD = 20).
3. EX refers to total existing condition peak flow rates directed to Midtown Creek including the external catchments (VO3 NHYD = 1001).
4. TGT refers to the target flow rates for the proposed development and external catchments in accordance with the Midtown Creek Flood Control Criteria (VO3 NHYD = 1000).

4.1.3 Proposed Quantity Controls

Quantity controls will be required to ensure that proposed flows will not exceed the target flow rates. Based on the site constraints, storage volume requirements and outlet location, it was not possible to provide quantity controls within a single stormwater facility. As such, two (2) stormwater management facilities are proposed within the development with controlled flows from the upstream facility directed to the downstream facility. Details of each facility are discussed in the following sections.

4.1.3.1 Chamber System 1

Chamber System 1 is centrally located within the site and controls runoff from catchments PR-102 and EXT-202. The facility consists of underground storage provided by Stormtech SC-310 chambers. Flows controlled by an orifice plate located in the downstream structure and the outlet is raised above the base of the chambers to promote infiltration during frequent storm events. The stage-storage-discharge relationship for the facility is shown in **Table 4** and detailed calculations are provided in **Appendix C**.

Table 4 – Chamber System 1 Storage Summary

Elev. (m)	Storage Depth (m)	Peak Flows (m^3/s)	Storage Volume (m^3)	Remarks
100.70	0.00	0.0000	0	Bottom of Underground Storage
100.83	0.13	0.0000	50	75 mm Orifice Plate
100.88	0.18	0.0013	80	2 Year (74 m^3)
100.92	0.22	0.0027	111	5 Year (104 m^3)
100.94	0.24	0.0032	127	10 Year (123 m^3)
101.03	0.33	0.0047	192	25 Year (191 m^3)
101.12	0.42	0.0059	252	50 Year (249 m^3)
101.24	0.54	0.0072	313	100 Year (311 m^3)
101.41	0.71	0.009	379	Top of Underground Storage

Notes: 1. Storage volumes used for each return period are based on VO3 model results for the 6-hour SCS Storm Distribution.

4.1.3.2 Chamber System 2

Chamber System 2 is located within the southwestern corner of the site and controls runoff from catchments PR-101, PR-103, EXT-201, EXT-203 and outflows from Chamber System 1. The facility consists of underground storage provided by Stormtech SC-740 chambers. Flows are controlled by an orifice plate located in the downstream structure and the outlet is raised above the base of the chambers to promote infiltration during frequent storm events. The stage-storage-discharge relationship for the facility is shown in and detailed calculations are provided in **Appendix C**.

Table 5 – Chamber System 2 Storage Summary

Elev. (m)	Storage Depth (m)	Peak Flows (m^3/s)	Storage Volume (m^3)	Remarks
99.40	0.00	0.000	0	Bottom of Underground Storage
100.02	0.62	0.000	173	2 Year (170 m^3), 390 mm Orifice Plate
100.09	0.69	0.007	195	5 Year (194 m^3)
100.12	0.72	0.014	204	10 Year (204 m^3)
100.24	0.84	0.061	239	25 Year (239 m^3)
100.38	0.98	0.130	272	50 Year (271 m^3)
100.57	1.17	0.189	304	100 Year (303 m^3), Top of Underground Storage

Notes: 1. Storage volumes used for each return period are based on VO3 model results for the 6-hour SCS Storm Distribution

4.1.4 Proposed Peak Flow Rates

The proposed peak flow rates, accounting for the controls provided in the stormwater facilities, are summarized in **Table 6** and detailed model output is provide in **Appendix B**.

Table 6 – Proposed Peak Flow Summary (6-hour SCS)

Peak Flow Rates (m^3/s)		
EX[1]	TGT[2]	PR[3]
0.041	0.038	0.013
0.066	0.063	0.022
0.081	0.077	0.027
0.142	0.134	0.078
0.191	0.178	0.160
0.245	0.228	0.228

Notes: 1. EX refers to total existing condition peak flow rates directed to Midtown Creek including the external catchments (VO3 NHYD = 1001).

2. TGT refers to the target flow rates for the proposed development and external catchments in accordance with the Midtown Creek Flood Control Criteria (VO3 NHYD = 1000).

3. PR refers to total proposed condition peak flow rates directed to Midtown Creek including the external catchments (VO3 NHYD = 2000).

A review of **Table 6** demonstrates that the proposed peak flow rates will not exceed the target flow rates for all storm events. As such, the Midtown Creek Flood Control Criteria have been achieved.

The proposed peak flow rates have also been calculated for each storm distribution. The results are summarized in **Table 7** and detailed model output is provided in **Appendix B**.

Table 7 – Proposed Peak Flow Summary

Return Period	Peak Flow (m^3/s)							
	4 Hour Chicago		6 Hour SCS		12 Hour SCS		24 Hour SCS	
	OUT-1	OUT-2	OUT-1	OUT-2	OUT-1	OUT-2	OUT-1	OUT-2
2-Year	0.028	0.011	0.022	0.007	0.020	0.006	0.017	0.005
5-Year	0.058	0.014	0.059	0.009	0.052	0.008	0.043	0.007
10-Year	0.077	0.016	0.077	0.011	0.070	0.009	0.059	0.008
25-Year	0.126	0.021	0.132	0.015	0.119	0.013	0.103	0.011
50-Year	0.148	0.021	0.168	0.019	0.154	0.016	0.135	0.014
100-Year	0.172	0.023	0.207	0.022	0.188	0.019	0.165	0.016

Notes:
1. OUT-1 refers to total proposed condition peak flow rates directed to Midtown Creek including the external catchments (VO3 NHYD = 2000).
2. OUT-2 refers to total proposed condition peak flow rates directed to the D'Arcy Street Storm Sewer (VO3 NHYD = 2300).

4.2 Stormwater Quality Control

The proposed development may cause additional pollutants to be conveyed off-site; as such, water quality controls have been provided. The selection and sizing of the water quality measures have been based on the procedures set out in the *Stormwater Management Planning and Design Manual* (MOE, March 2003) for Enhanced (Level 1) protection. This level of protection requires 80% total suspended solids (TSS) removal and treatment of 90% of the annual runoff volume.

The goal of stormwater management is to preserve the natural hydrologic cycle and mitigation measures should be assessed in the following order:

- Stormwater lot level controls.
- Stormwater conveyance controls.
- End-of-pipe stormwater management facilities.

Stormwater lot level controls represent measures that are implemented on an individual lot basis such as soak away pits, flatter grading and reduction of the impervious footprint. For the proposed development, lot level controls such as reduced grading will be used to supplement the proposed SWM strategy; however, these are not intended to become the primary means for stormwater quality control.

Stormwater conveyance controls represent the conveyance systems used to transport stormwater runoff from the lots to the receiving waters such as pervious pipes, catchbasin treatment and grassed swales. The proposed SWM strategy will include some conveyance controls to pretreat runoff; however, they are not meant to be the primary means of water quality treatment for the development.

End-of-pipe stormwater management facilities represent the common urban stormwater management measures used to service numerous lots or whole subdivisions. These facilities include Wet Ponds, Wetlands, Dry Ponds, Infiltration Basins, Infiltration Trenches, Filter Strips, Sand Filters and Oil-Grit Separators. End-of-pipe SWM facilities will be considered for this development.

Based on the development area, site configuration and maintenance requirements, the proposed water quality controls will include pretreatment in the form of grassed swales and an oil-grit separator and primary treatment provided by infiltration layers included in each chamber system.

For infiltration facilities, a minimum separation of 1.0 m is recommended from the bottom of feature to the seasonally high groundwater level. The Soils Investigation Report estimated the groundwater elevations of 100.20 m within the vicinity of Chamber System 1 and 98.90 m within the vicinity of Chamber System 2 and infiltration rates from 50 to 75 mm/hr. As the groundwater level is very shallow across the site, best practices have been used to provide as much groundwater separation as possible, while still achieving the quantity control requirements. A minimum separation of 0.50 m has been provided, which is consistent with the preliminary stormwater management report.

4.2.1 Chamber System 1

The outlet elevation from Chamber System 1 has been raised to promote infiltration of runoff during frequent storm events. According to Table 3.2 of the *Stormwater Management Planning and Design Manual* an infiltration storage volume of 25 m^3/ha is required (at an impervious level of 35%) to achieve Enhanced (Level 1) treatment. Based on the contributing area, a total infiltration storage volume of 29.5 m^3 is required. As shown in **Table 4**, 50 m^3 of runoff is required to activate the outlet; therefore, the water quality requirements are achieved. Supporting calculations are provided in **Appendix D**.

Pretreatment of runoff prior to entering Chamber System 1 will be provided by a grassed swale located within catchment PR-102. The grassed swale will provide some sediment removal to reduce the risk of clogging within the underground chamber system and reduce the overall maintenance requirements. Supporting calculations are provided in **Appendix D**.

4.2.2 Chamber System 2

The outlet elevation from Chamber System 2 has been raised to promote infiltration of runoff during frequent storm events. According to Table 3.2 of the *Stormwater*

Management Planning and Design Manual an infiltration storage volume of 25 m^3/ha is required (at an impervious level of 35%) to achieve Enhanced (Level 1) treatment. Based on the contributing area, a total infiltration storage volume of 45 m^3 is required. As shown in **Table 5,** 176 m^3 of runoff is required to activate the outlet; therefore, the water quality requirements are achieved. Supporting calculations are provided in **Appendix D**.

Pretreatment of runoff prior to entering Chamber System 2 will be provided by an oil-grit separator located within catchment PR-101 and a grassed swale in catchment PR-103. The oil-grit separator will treat flows entering Chamber System 2 from the storm sewer system, while the grassed swale will treat flows from the rear yards along the northwest property boundary. PCSWMM for Stormceptor recommends the Stormceptor EF-4 oil-grit separator and will achieve 75% TSS removal and treat >90% of the annual runoff volume. The oil-grit separator and grassed swale will provide some sediment removal to reduce the risk of clogging within the underground chamber system and reduce the overall maintenance requirements. Supporting calculations are provided in **Appendix D**.

4.2.3 Uncontrolled Catchment Areas

Catchments **PR-104** and **EXT-204** will drain as sheet flow towards Midtown Creek. These catchments cannot be directed to either Chamber System due to grading constraints. The majority of these catchments consists of rooftop and landscaped areas, which are considered clean sources of runoff. Roadway runoff will be directed to catch basin near the western property boundary. The catch basin will be equipped with a 600 mm sump as well as a CB Shield catch basin insert, which is anticipated to provide 57% TSS removal based on the contributing area. CB Shield design details are included in **Appendix D**.

Catchment **PR-300** includes a small portion of roadway that is directed to the D'Arcy Street storm sewer. Based on the small catchment area and constrained outlet location, no quantity controls are proposed for this catchment.

5.0 Water Balance Analysis

A water balance analysis has been completed to ensure that the average annual runoff volume directed to Midtown Creek will not be increased as a result of the proposed development.

The water balance analysis has been completed in accordance with the method described in the Conservation Authority Guidelines for Hydrogeological Assessments (June 2013). Water budget calculations were completed using the Thornthwaite Equation using Canadian Climate Normals from the Cobourg Sewage Treatment Plant from 1981 to 2010. The study area was divided into catchments to determine infiltration factors and the impact of the proposed infiltration features. For existing conditions, the study area was divided into internal and external catchments. For proposed

conditions, the study area was divided based on drainage directed Chamber System 1, Chamber System 2 and the Uncontrolled areas.

In order to account for the infiltration provided within each chamber system, a daily water balance analysis was completed. The daily water balance analysis assumes all runoff generated within a particular day is directed to the infiltration storage layer associated with each chamber system. If there is storage available in the infiltration layer, the volume is deducted from the runoff volume and added to the infiltration volume for each catchment. Precipitation and temperature data were used from the Cobourg Sewage Treatment Plant from 1981 to 2006 (26 years). This date range was selected because it contains the most recent data available for the gauge station and did not have a significant quantity of missing data.

A summary of the infiltration volume results is shown in **Table 8** with detailed water balance calculations provided in **Appendix E**

Table 8 – Annual Water Balance Summary

Infiltration Catchment ID	Contributing Drainage Catchments	Contributing Area (ha)	Infiltration Storage Volume (m^3)	Runoff Volume (m^3/year)		
				No Mitigation	Infiltration Features	With Mitigation
Internal	EX-100	2.26	-	2495	-	-
External	EXT-201, EXT-202, EXT-203, EXT-204	1.34	-	4123	-	-
Total Existing		**3.60**	**-**	**6617**		
Chamber 1	PR-102, EXT-202,	1.18	50	3374	2061	1313
Chamber 2	PR-101, PR-103, EXT-201, EXT-203	1.80	173	5837	4660	1177
Uncontrolled	PR-104, PR-300, EXT-204	0.62	-	1990	-	1990
Total Proposed		**3.60**	**101**	**11201**	**6721**	**4480**

Notes: 1. No infiltration has been calculated for LID features during months with a negative average temperature.

A review of **Table 8** shows that without mitigation, the off-site average annual runoff volume will increase as a result of the proposed development. However, when accounting for additional infiltration provided by the stormwater facilities the proposed off-site runoff volume will be less than existing conditions.

6.0 Hydraulic Elements

Internal Storm Sewer System

A storm sewer design sheet has been completed to ensure that the internal sewer network is sufficiently sized for a 5-year storm event, in accordance with the standard guidelines, peak flow rates were calculated using the rational method without flow controls. The storm sewer design sheet is included in **Appendix F**.

Overland Conveyance Swales and Ditches

Two rear yard swales are proposed in catchment areas **PR-103** and **PR-102** to convey runoff to Chamber 2. These swales have been sufficiently sized to convey the 100-year peak flow rate; however, they have a very shallow slope due to the graining constraints. As such, both swales include underdrains and the PR-103 slope includes a gravel trench. Swale sizing calculations are included in **Appendix F.**

Culvert Crossings

A 300 mm CSP crossing is proposed in the catchment area **PR-102** to convey the runoff from the roadside ditch to the Chamber System 1, underneath the proposed permeable parking lot. The hydraulic performance of the culvert was analyzed using HY-8 and the results confirm that the culvert can convey up to 50-year storm event without overtopping, which is an appropriate level of service for the development. Culvert sizing calculations are included in **Appendix F.**

Emergency Spill Ditch

An emergency spill ditch is proposed at the location west of CB10, connecting CB10 to CB9. The design intent was to provide a defined spillway for the runoff of generated in catchment areas **PR-101** and **EXT-201**, under the conditions when the CB10 is clogged or surge charged during extreme events. This ditch is 0.3 m deep and runs at two (2) percent longitudinal slope for 21 m with sufficient capacity to handle the 100-year storm event. Ditch sizing calculations are included in **Appendix F.**

Emergency Spillway Weir

The Concrete walkway adjacent to CB9 will act as the emergency spillway weir for the diverted runoff from the CB10 via the emergency spill ditch. The concrete walkway adjacent to CB9 will act as the emergency spillway weir for the diverted runoff from CB10 via the emergency spill ditch. The weir has been sized to convey the 100-year flow and the maximum ponding depth will not exceed 0.30 m. Flows from the weir will be conveyed to CBMH18. Weir sizing calculations are included in **Appendix F."**

This will ultimately pool at the roadway CBMH18 and bypass towards the outlet ditch. Weir sizing calculations are included in **Appendix F.**

7.0 Operation and Maintenance Considerations

The stormwater management facilities will require periodic maintenance to function properly. The following maintenance program is recommended:

- During construction, sediment should be kept away from the underground chambers in both facilities. They should not be used as temporary sediment control during construction. A final inspection, post construction, should be conducted prior to putting it into service.
- Inspect the facility every month for the first year to identify whether any trash or debris has accumulated on the surface.
- Grass clippings and leaves should be prevented from entering the underground chambers. During the Fall it is advised that leaves are removed from the surface to prevent clogging.
- Each facility has been designed such that ponded water should not be retained for longer than 24 hours. If this is the case, it is likely that the outlet structure or connecting pipe are clogged and may require maintenance.

Furthermore, the oil-grit separator unit will require periodic maintenance to function properly. The following maintenance program is recommended:

- Units should be inspected post construction, prior to being put into service.
- Inspect each unit every three (3) months for the first year to determine the oil and sediment accumulation rates.
- Cleaning is required annually or once the sediment depth reaches 15% of the storage capacity.
- Inspect the units immediately after an oil, fuel or chemical spill.
- A licensed waste management company should remove oil and sediment and dispose of it according to current regulations.
- At the time of maintenance, inspect the internal storm sewer system and remove accumulated sediment to ensure proper maintenance of the entire drainage system.

A standalone Operation and Maintenance Manual has been provided with details on the operation, inspection and maintenance requirements of the development, including the stormwater management features. Additional maintenance requirements and recommendations may also be provided by the Manufacturer at the time of purchase/installation.

8.0 Regulatory Flood Impacts

A small portion of the Midtown Creek Regulatory Flood Line encroaches into the proposed development as shown on **Figure 3**. The proposed site grading will result in approximately 30 m^3 of fill to be placed within the regulated area. This volume of fill is not significant and will not impact existing flood elevations within the creek.

9.0 Erosion and Sediment Control

When soils are exposed during construction, there is a potential for transport of relatively large amounts of sediment off-site to downstream areas. A standalone Erosion and Sediment Control Plan detailing the operation, inspection and maintenance requirements of the erosion control measures to be implemented during construction of the development is required. A brief overview of the erosion and sediment control features is provided below.

In order to minimize the impacts associated with sediment transfer, the following measures will be completed in the order listed:

- Install silt barrier along the property limits as shown on Detailed Design Drawings and maintain as required.
- Install a mud mat at the proposed construction entrances.
- Remove temporary erosion and sediment control devices/measures and clean out once vegetation is established.

When feasible, topsoil stripping should be limited to areas where development is to proceed in the near future. Topsoil stockpiles on sloped areas should be stabilized by hydro seeding. Where development is to be delayed, areas stripped of topsoil should also be hydro-seeded to minimize sediment runoff.

Regular inspection and maintenance of the silt fence will ensure continued protection to the downstream areas for the duration of the construction period. Additional information on the proposed erosion and sediment control measures are listed below:

Silt Fencing

Heavy duty silt fencing will be as per OPSD 219.130 (modified). The proposed silt fence shall be inspected after every rainfall to identify failed sections. Any failures shall be repaired immediately. When sediment accumulates to half the height of the geotextile, it is to be removed and disposed of in a controlled area. A supply of extra silt fence is to be kept on site to provide for quick repairs or the installation of additional fence, if required.

Mud Mat

The location of the proposed mud mat at the construction entrances is shown on the detailed design drawings. The mud mat is to be 400 mm thick and consist of 200 mm angular stone. The mud mat is to be underlain with geotextile or a graded aggregate filter.

The granular material will require periodic replacement as it becomes contaminated by vehicle traffic. Sediment shall be cleaned from public roads at the end of each day by shoveling or sweeping and disposed of properly in a controlled sediment disposal area.

10.0 Conclusion

The proposed development is located at D'Arcy Street in the Town of Cobourg. This development will alter the existing runoff characteristics of the site and adjacent properties; therefore, stormwater quantity and quality control measures have been provided to ensure that the receiving drainage system will not be adversely affected.

Water quantity control will be provided by two (2) underground storage chambers. They have been design to meet the Midtown Creek Flood Control Criteria and will reduce proposed peak flow rates to the target flow rates for the 2 to 100-year storm events.

Water quality treatment will be provided by an infiltration layer located within each chamber system. The infiltration layer is sufficiently sized to meet Ministry of Environment Level 1 (Enhanced) water quality treatment. Site soil characteristics have been considered to ensure drawdown within an acceptable period and emergency overflow considerations have been provided in event of clogging.

A water balance analysis has been completed demonstrating that the proposed development, with the proposed infiltration features, will not increase runoff volumes to Midtown Creek, on an average annual basis.

Erosion and sediment control measures have been prepared to ensure that off-site transport of sediment is minimized through temporary measures. These include the installation of silt barriers and a mud mat.

The proper installation and ongoing maintenance of the erosion and sediment control measures outlined in this report will ensure that the development can proceed without adversely affecting downstream drainage conditions. The maintenance of the proposed measures will be carried out by the property owner.

Respectfully submitted,

Chris Proctor-Bennett, P.Eng.
Water Resources Engineer

Raja Subramaniam Raja Chockalingam, P.Eng.
Water Resources Engineer

CPB/CS/RC/mh/kr

Statement of Limitations

This report has been prepared by D.M. Wills Associates Limited on behalf of Leblanc Enterprise to address the requirements of the Town of Cobourg and Ganaraska Conservation.

The conclusions and recommendations in this report are based on available background documentation and discussions with applicable agencies at the time of preparation.

The report is intended to demonstrate the means whereby stormwater runoff originating from the site will be managed with respect to both quantity and quality control. The report is applicable only to the project described in the text, constructed substantially in accordance with the plans and details accompanying this report.

Any use which a third party makes of this report other than a stormwater management report for the proposed development is the responsibility of such third parties. D.M. Wills Associates Limited accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or action taken based on using this report for purposes other than a stormwater management report for the Nickerson Woods, Cobourg development.

D.M. Wills Associates Limited is not responsible for any changes made to the stormwater management measures which are not in accordance with the design drawings. Any person(s) relying on the "as-constructed" stormwater measures should confirm that the field conditions are in accordance with the design drawings.

Appendix A

Rainfall Data and Hydrology Parameters

Hydrologic Parameters for EX-100

Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 5-Mar-19

Land Use

Agriculture	0.00	ha
Range	0.00	ha
Grass	1.51	ha
Woods	0.75	ha
Wetland	0.00	ha
Gravel	0.00	ha
Impervious	0.00	ha
SUM	**2.26**	

Hydrologic Soil Group[1]	AB
Soil Type	Tecumseth Sandy Loam
C	0.07
CN (Nashyd)	48.0

Rainfall Data

Gauging Station = Clariington IDF Coefficients (GRCA 2014 Guidelines)
12 hr, 100 Yr Rainfall = 89.6 mm

Drainage Area	**2.26**	ha
Impervious Area	**0.00**	ha
Percent Impervious	**0.0%**	

Pervious		
Length	275	m
US Elev	103.0	m
DS Elev	100.5	m
Slope	0.9	%
	Flat	

Parameter	Soil Group	Land Use							Weighted Value	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient[2], C	**AB**	0.22	0.12	0.07	0.07	0.05	0.67	0.90	0.07	n.a.
SCS Curve No.[3], CN	**AB**	70	51	50	44	50	81	98	48.0	48.0
Initial Abstraction[5], mm		6.0	8.0	5.0	10.0	10.0	2.5	2.0	6.7	6.7

Time of Concentration[6]

Pervious Length	275	m	
Slope	0.9	%	
Airport	**57.7**	min.	Flat: 0-2% Slopes Rolling: 2-6% Slopes Hilly: >6% Slopes
Bransby - Williams	14.7	min.	
Applicable Minimum[7]	10.0	min.	
Time to Peak	38.7	min.	
	0.64	**hr.**	

Composite Parameters

Drainage Area	2.26 ha	
Runoff Coefficient	0.07	
SCS Curve No.	48.0	48.0
Modified Curve No.[4], CN*	**46.4**	46.4
Initial Abstraction.	**6.7**	6.7

Notes:

1. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2. Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, Hydrologic Analysis and Design, McCuen 2004 and New Jersey Technical Manual for Stream Encroachment, 1984.
3. SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4. The modified curve number is adjusted as per Paul Wisner & Associates (1982) and represents anticedent moisture conditions Type II
5. Initial Abstraction values taken from the Environmental and Engineering Services Department, The Corporation of the City of London, Dec 2005
6. Based on the results of the Uplands Method
7. Minimum Time of Concentration for use in the Rational Method and Hydrologic Model has been set to 10 minutes

Hydrologic Parameters for EXT-201

Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 5-Mar-19

Land Use

Agriculture	0.00	ha
Range	0.00	ha
Grass	0.33	ha
Woods	0.00	ha
Wetland	0.00	ha
Gravel	0.00	ha
Impervious	0.14	ha
SUM	**0.47**	

Hydrologic Soil Group[1]	AB
Soil Type	Tecumseth Sandy Loam
C	0.35
CN (Nashyd)	64.4

Rainfall Data

Gauging Station = Clariington IDF Coefficients (GRCA 2014 Guidelines)
12 hr, 100 Yr Rainfall = 89.6 mm

Drainage Area	**0.47**	ha
Impervious Area	**0.14**	ha
Percent Impervious	**30.0%**	

Pervious		
Length	25	m
US Elev	101.2	m
DS Elev	100.3	m
Slope	3.6	%
	Rolling	

Parameter	Soil Group	Land Use							Weighted Value	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient[2], C	**AB**	0.26	0.19	0.12	0.10	0.05	0.67	0.90	0.35	n.a.
SCS Curve No.[3], CN	**AB**	70	51	50	44	50	81	98	64.4	50.0
Initial Abstraction[5], mm		6.0	8.0	5.0	10.0	10.0	2.5	2.0	4.1	5.0

Time of Concentration[6]

Pervious Length	25	m	
Slope	3.6	%	
Airport	8.0	min.	
Bransby - Williams	1.2	min.	Flat: 0-2% Slopes Rolling: 2-6% Slopes Hilly: >6% Slopes
Applicable Minimum[7]	**10.0**	min.	
Time to Peak	6.7	min.	
	0.11	**hr.**	

Composite Parameters

Drainage Area	0.47 ha	
Runoff Coefficient	0.35	
SCS Curve No.	64.4	50.0
Modified Curve No.[4], CN*	64.2	**47.8**
Initial Abstraction.	4.1	**5.0**

Notes:

1. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2. Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, Hydrologic Analysis and Design, McCuen 2004 and New Jersey Technical Manual for Stream Encroachment, 1984.
3. SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4. The modified curve number is adjusted as per Paul Wisner & Associates (1982) and represents anticedent moisture conditions Type II
5. Initial Abstraction values taken from the Environmental and Engineering Services Department, The Corporation of the City of London, Dec 2005
6. Based on the results of the Uplands Method
7. Minimum Time of Concentration for use in the Rational Method and Hydrologic Model has been set to 10 minutes

Hydrologic Parameters for EXT-202

Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 5-Mar-19

Land Use

Agriculture	0.00	ha
Range	0.00	ha
Grass	0.33	ha
Woods	0.00	ha
Wetland	0.00	ha
Gravel	0.00	ha
Impervious	0.14	ha
SUM	**0.47**	

Hydrologic Soil Group[1]	AB
Soil Type	Tecumseth Sandy Loam
C	0.35
CN (Nashyd)	64.4

Rainfall Data

Gauging Station = Clariington IDF Coefficients (GRCA 2014 Guidelines)
12 hr, 100 Yr Rainfall = 89.6 mm

Drainage Area	**0.47**	ha
Impervious Area	**0.14**	ha
Percent Impervious	**30.0%**	

Pervious		
Length	25	m
US Elev	101.2	m
DS Elev	100.3	m
Slope	3.6	%
	Rolling	

Parameter	Soil Group	Land Use							Weighted Value	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient[2], C	**AB**	0.26	0.19	0.12	0.10	0.05	0.67	0.90	0.35	n.a.
SCS Curve No.[3], CN	**AB**	70	51	50	44	50	81	98	64.4	50.0
Initial Abstraction[5], mm		6.0	8.0	5.0	10.0	10.0	2.5	2.0	4.1	5.0

Time of Concentration[6]

Pervious Length	25	m	
Slope	3.6	%	
Airport	8.0	min.	
Bransby - Williams	1.2	min.	Flat: 0-2% Slopes Rolling: 2-6% Slopes Hilly: >6% Slopes
Applicable Minimum[7]	**10.0**	min.	
Time to Peak	6.7	min.	
	0.11	**hr.**	

Composite Parameters

Drainage Area	0.47 ha	
Runoff Coefficient	0.35	
SCS Curve No.	64.4	50.0
Modified Curve No.[4], CN*	64.2	**47.8**
Initial Abstraction.	4.1	**5.0**

Notes:

1. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2. Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, Hydrologic Analysis and Design, McCuen 2004 and New Jersey Technical Manual for Stream Encroachment, 1984.
3. SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4. The modified curve number is adjusted as per Paul Wisner & Associates (1982) and represents anticedent moisture conditions Type II
5. Initial Abstraction values taken from the Environmental and Engineering Services Department, The Corporation of the City of London, Dec 2005
6. Based on the results of the Uplands Method
7. Minimum Time of Concentration for use in the Rational Method and Hydrologic Model has been set to 10 minutes

Hydrologic Parameters for EXT-203

Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 5-Mar-19

Land Use

Agriculture	0.00	ha
Range	0.00	ha
Grass	0.13	ha
Woods	0.00	ha
Wetland	0.00	ha
Gravel	0.00	ha
Impervious	0.06	ha
SUM	**0.19**	

Hydrologic Soil Group[1]	AB
Soil Type	Tecumseth Sandy Loam
C	0.35
CN (Nashyd)	64.4

Rainfall Data

Gauging Station = Clariington IDF Coefficients (GRCA 2014 Guidelines)
12 hr, 100 Yr Rainfall = 89.6 mm

Drainage Area	**0.19**	ha
Impervious Area	**0.06**	ha
Percent Impervious	**30.0%**	

Pervious		
Length	25	m
US Elev	101.2	m
DS Elev	100.3	m
Slope	3.6	%
	Rolling	

Parameter	Soil Group	Land Use							Weighted Value	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient[2], C	**AB**	0.26	0.19	0.12	0.10	0.05	0.67	0.90	0.35	n.a.
SCS Curve No.[3], CN	**AB**	70	51	50	44	50	81	98	64.4	50.0
Initial Abstraction[5], mm		6.0	8.0	5.0	10.0	10.0	2.5	2.0	4.1	5.0

Time of Concentration[6]

Pervious Length	25	m	
Slope	3.6	%	
Airport	8.0	min.	
Bransby - Williams	1.3	min.	Flat: 0-2% Slopes Rolling: 2-6% Slopes Hilly: >6% Slopes
Applicable Minimum[7]	**10.0**	min.	
Time to Peak	6.7	min.	
	0.11	**hr.**	

Composite Parameters

Drainage Area	0.19 ha	
Runoff Coefficient	0.35	
SCS Curve No.	64.4	50.0
Modified Curve No.[4], CN*	64.2	**47.8**
Initial Abstraction.	4.1	**5.0**

Notes:

1. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2. Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, Hydrologic Analysis and Design, McCuen 2004 and New Jersey Technical Manual for Stream Encroachment, 1984.
3. SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4. The modified curve number is adjusted as per Paul Wisner & Associates (1982) and represents anticedent moisture conditions Type II
5. Initial Abstraction values taken from the Environmental and Engineering Services Department, The Corporation of the City of London, Dec 2005
6. Based on the results of the Uplands Method
7. Minimum Time of Concentration for use in the Rational Method and Hydrologic Model has been set to 10 minutes

Hydrologic Parameters for EXT-204

Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 5-Mar-19

Land Use

Agriculture	0.00	ha
Range	0.00	ha
Grass	0.14	ha
Woods	0.00	ha
Wetland	0.00	ha
Gravel	0.00	ha
Impervious	0.06	ha
SUM	**0.20**	

Hydrologic Soil Group[1]	AB
Soil Type	Tecumseth Sandy Loam
C	0.35
CN (Nashyd)	64.4

Rainfall Data

Gauging Station = Clariington IDF Coefficients (GRCA 2014 Guidelines)
12 hr, 100 Yr Rainfall = 89.6 mm

Drainage Area	**0.20**	ha
Impervious Area	**0.06**	ha
Percent Impervious	**30.0%**	

Pervious		
Length	25	m
US Elev	101.2	m
DS Elev	100.3	m
Slope	3.6	%
	Rolling	

Parameter	Soil Group	Land Use							Weighted Value	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient[2], C	**AB**	0.26	0.19	0.12	0.10	0.05	0.67	0.90	0.35	n.a.
SCS Curve No.[3], CN	**AB**	70	51	50	44	50	81	98	64.4	50.0
Initial Abstraction[5], mm		6.0	8.0	5.0	10.0	10.0	2.5	2.0	4.1	5.0

Time of Concentration[6]

Pervious Length	25	m	
Slope	3.6	%	
Airport	8.0	min.	
Bransby - Williams	1.3	min.	Flat: 0-2% Slopes Rolling: 2-6% Slopes Hilly: >6% Slopes
Applicable Minimum[7]	**10.0**	min.	
Time to Peak	6.7	min.	
	0.11	**hr.**	

Composite Parameters

Drainage Area	0.20 ha	
Runoff Coefficient	0.35	
SCS Curve No.	64.4	50.0
Modified Curve No.[4], CN*	64.2	**47.8**
Initial Abstraction.	4.1	**5.0**

Notes:

1. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2. Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, Hydrologic Analysis and Design, McCuen 2004 and New Jersey Technical Manual for Stream Encroachment, 1984.
3. SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4. The modified curve number is adjusted as per Paul Wisner & Associates (1982) and represents anticedent moisture conditions Type II
5. Initial Abstraction values taken from the Environmental and Engineering Services Department, The Corporation of the City of London, Dec 2005
6. Based on the results of the Uplands Method
7. Minimum Time of Concentration for use in the Rational Method and Hydrologic Model has been set to 10 minutes

Hydrologic Parameters for PR-101

Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 5-Mar-19

Land Use

Agriculture	0.00	ha
Range	0.00	ha
Grass	0.42	ha
Woods	0.00	ha
Wetland	0.00	ha
Gravel	0.00	ha
Impervious	0.28	ha
SUM	**0.70**	

Hydrologic Soil Group[1]	AB
Soil Type	Tecumseth Sandy Loam
C	0.43
CN (Nashyd)	69.2

Rainfall Data

Gauging Station = Clariington IDF Coefficients (GRCA 2014 Guidelines)
12 hr, 100 Yr Rainfall = 89.6 mm

Drainage Area	**0.70**	ha
Impervious Area	**0.28**	ha
Percent Impervious	**40.0%**	

	Pervious	Impervious	
Length	10	130	m
US Elev	100.5	101.8	m
DS Elev	100.3	100.5	m
Slope	2.0	1.0	%
	Rolling	Flat	

Parameter	Soil Group	Land Use							Weighted Value	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient[2], C	**AB**	0.26	0.19	0.12	0.10	0.05	0.67	0.90	0.43	n.a.
SCS Curve No.[3], CN	**AB**	70	51	50	44	50	81	98	69.2	50.0
Initial Abstraction[5], mm		6.0	8.0	5.0	10.0	10.0	2.5	2.0	3.8	5.0

Time of Concentration[6]

Total Length	140	m	
Average Slope	1.1	%	
Airport	25.3	min.	Flat: 0-2% Slopes Rolling: 2-6% Slopes Hilly: >6% Slopes
Bransby - Williams	8.2	min.	
Applicable Minimum[7]	**10.0**	min.	
Time to Peak	6.7	min.	
	0.11	**hr.**	

Composite Parameters

Drainage Area	0.70 ha	
Runoff Coefficient	0.43	
SCS Curve No.	69.2	50.0
Modified Curve No.[4], CN*	69.6	**47.8**
Initial Abstraction.	3.8	**5.0**

Notes:

1. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2. Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, Hydrologic Analysis and Design, McCuen 2004 and New Jersey Technical Manual for Stream Encroachment, 1984.
3. SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4. The modified curve number is adjusted as per Paul Wisner & Associates (1982) and represents anticedent moisture conditions Type II
5. Initial Abstraction values taken from the Environmental and Engineering Services Department, The Corporation of the City of London, Dec 2005
6. Based on the results of the Uplands Method
7. Minimum Time of Concentration for use in the Rational Method and Hydrologic Model has been set to 10 minutes

Hydrologic Parameters for PR-102

Sheet 1 of 1

WILLS

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 5-Mar-19

Land Use

Agriculture	0.00	ha
Range	0.00	ha
Grass	0.52	ha
Woods	0.00	ha
Wetland	0.00	ha
Gravel	0.00	ha
Impervious	0.19	ha
SUM	**0.71**	

Hydrologic Soil Group[1]	AB
Soil Type	Tecumseth Sandy Loam
C	0.33
CN (Nashyd)	63.0

Rainfall Data

Gauging Station = Clariington IDF Coefficients (GRCA 2014 Guidelines)
12 hr, 100 Yr Rainfall = 89.6 mm

Drainage Area	**0.71**	ha
Impervious Area	**0.19**	ha
Percent Impervious	**27.0%**	

	Pervious	Impervious	
Length	10	200	m
US Elev	102.0	103.0	m
DS Elev	101.8	101.8	m
Slope	2.0	0.6	%
	Rolling	Flat	

Parameter	Soil Group	Land Use							Weighted Value	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient[2], C	**AB**	0.26	0.19	0.12	0.10	0.05	0.67	0.90	0.33	n.a.
SCS Curve No.[3], CN	**AB**	70	51	50	44	50	81	98	63.0	50.0
Initial Abstraction[5], mm		6.0	8.0	5.0	10.0	10.0	2.5	2.0	4.2	5.0

Time of Concentration[6]

Total Length	210	m	
Average Slope	0.7	%	
Airport	**41.7**	min.	Flat: 0-2% Slopes Rolling: 2-6% Slopes Hilly: >6% Slopes
Bransby - Williams	13.4	min.	
Applicable Minimum[7]	10.0	min.	
Time to Peak	28.0	min.	
	0.47	**hr.**	

Composite Parameters

Drainage Area	0.71 ha	
Runoff Coefficient	0.33	
SCS Curve No.	63.0	50.0
Modified Curve No.[4], CN*	62.6	**47.8**
Initial Abstraction.	4.2	**5.0**

Notes:

1. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2. Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, Hydrologic Analysis and Design, McCuen 2004 and New Jersey Technical Manual for Stream Encroachment, 1984.
3. SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4. The modified curve number is adjusted as per Paul Wisner & Associates (1982) and represents anticedent moisture conditions Type II
5. Initial Abstraction values taken from the Environmental and Engineering Services Department, The Corporation of the City of London, Dec 2005
6. Based on the results of the Uplands Method
7. Minimum Time of Concentration for use in the Rational Method and Hydrologic Model has been set to 10 minutes

Hydrologic Parameters for PR-103

Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 5-Mar-19

Land Use

Agriculture	0.00	ha
Range	0.00	ha
Grass	0.31	ha
Woods	0.00	ha
Wetland	0.00	ha
Gravel	0.00	ha
Impervious	0.13	ha
SUM	**0.44**	

Hydrologic Soil Group[1]	AB
Soil Type	Tecumseth Sandy Loam
C	0.35
CN (Nashyd)	64.4

Rainfall Data

Gauging Station = Clariington IDF Coefficients (GRCA 2014 Guidelines)
12 hr, 100 Yr Rainfall = 89.6 mm

Drainage Area	**0.44**	ha
Impervious Area	**0.13**	ha
Percent Impervious	**30.0%**	

	Pervious	Impervious	
Length	10	10	m
US Elev	102.0	102.2	m
DS Elev	101.8	102.0	m
Slope	2.0	2.0	%
	Rolling	Rolling	

Parameter	Soil Group	Land Use							Weighted Value	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient[2]**, C**	**AB**	0.26	0.19	0.12	0.10	0.05	0.67	0.90	0.35	n.a.
SCS Curve No.[3]**, CN**	**AB**	70	51	50	44	50	81	98	64.4	50.0
Initial Abstraction[5]**, mm**		6.0	8.0	5.0	10.0	10.0	2.5	2.0	4.1	5.0

Time of Concentration[6]

Total Length	20	m	
Average Slope	2.0	%	
Airport	8.7	min.	Flat: 0-2% Slopes Rolling: 2-6% Slopes Hilly: >6% Slopes
Bransby - Williams	1.1	min.	
Applicable Minimum[7]	**10.0**	min.	
Time to Peak	6.7	min.	
	0.11	**hr.**	

Composite Parameters

Drainage Area	0.44 ha	
Runoff Coefficient	0.35	
SCS Curve No.	64.4	50.0
Modified Curve No.[4]**, CN***	64.2	**47.8**
Initial Abstraction.	4.1	**5.0**

Notes:

1. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2. Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, Hydrologic Analysis and Design, McCuen 2004 and New Jersey Technical Manual for Stream Encroachment, 1984.
3. SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4. The modified curve number is adjusted as per Paul Wisner & Associates (1982) and represents anticedent moisture conditions Type II
5. Initial Abstraction values taken from the Environmental and Engineering Services Department, The Corporation of the City of London, Dec 2005
6. Based on the results of the Uplands Method
7. Minimum Time of Concentration for use in the Rational Method and Hydrologic Model has been set to 10 minutes

Hydrologic Parameters for PR-104

Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 5-Mar-19

Land Use

Agriculture	0.00	ha
Range	0.00	ha
Grass	0.24	ha
Woods	0.00	ha
Wetland	0.00	ha
Gravel	0.00	ha
Impervious	0.10	ha
SUM	**0.34**	

Hydrologic Soil Group[1]	AB
Soil Type	Tecumseth Sandy Loam
C	0.35
CN (Nashyd)	64.1

Rainfall Data

Gauging Station = Clariington IDF Coefficients (GRCA 2014 Guidelines)
12 hr, 100 Yr Rainfall = 89.6 mm

Drainage Area	**0.34**	ha
Impervious Area	**0.10**	ha
Percent Impervious	**29.4%**	

	Pervious	Impervious	
Length	10	30	m
US Elev	100.5	101.2	m
DS Elev	100.3	100.6	m
Slope	2.0	2.0	%
	Rolling	Rolling	

Parameter	Soil Group	Land Use							Weighted Value	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient[2], C	**AB**	0.26	0.19	0.12	0.10	0.05	0.67	0.90	0.35	n.a.
SCS Curve No.[3], CN	**AB**	70	51	50	44	50	81	98	64.1	50.0
Initial Abstraction[5], mm		6.0	8.0	5.0	10.0	10.0	2.5	2.0	4.1	5.0

Time of Concentration[6]

Impervious Length	30	m	
Slope	2.0	%	
Airport	**10.7**	min.	Flat: 0-2% Slopes Rolling: 2-6% Slopes Hilly: >6% Slopes
Bransby - Williams	1.7	min.	
Applicable Minimum[7]	10.0	min.	
Time to Peak	7.2	min.	
	0.12	**hr.**	

Composite Parameters

Drainage Area	0.34 ha	
Runoff Coefficient	0.35	
SCS Curve No.	64.1	50.0
Modified Curve No.[4], CN*	63.9	**47.8**
Initial Abstraction.	4.1	**5.0**

Notes:

1. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2. Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, Hydrologic Analysis and Design, McCuen 2004 and New Jersey Technical Manual for Stream Encroachment, 1984.
3. SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4. The modified curve number is adjusted as per Paul Wisner & Associates (1982) and represents anticedent moisture conditions Type II
5. Initial Abstraction values taken from the Environmental and Engineering Services Department, The Corporation of the City of London, Dec 2005
6. Based on the results of the Uplands Method
7. Minimum Time of Concentration for use in the Rational Method and Hydrologic Model has been set to 10 minutes

Hydrologic Parameters for PR-300

Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 5-Mar-19

Land Use

Agriculture	0.00	ha
Range	0.00	ha
Grass	0.03	ha
Woods	0.00	ha
Wetland	0.00	ha
Gravel	0.00	ha
Impervious	0.05	ha
SUM	**0.08**	

Hydrologic Soil Group[1]	AB
Soil Type	Tecumseth Sandy Loam
C	0.59
CN (Nashyd)	80.0

Rainfall Data

Gauging Station =	Clariington IDF Coefficients (GRCA 2014 Guidelines)	
12 hr, 100 Yr Rainfall =	89.6	mm

Drainage Area	**0.08**	ha
Impervious Area	**0.05**	ha
Percent Impervious	**62.5%**	

	Pervious	**Impervious**	
Length	5	40	m
US Elev	100.0	100.6	m
DS Elev	99.9	100.2	m
Slope	2.0	1.0	%
	Flat	Flat	

Parameter	**Soil Group**	**Land Use**							**Weighted Value**	
		Agriculture	**Range**	**Grass**	**Woods**	**Wetland**	**Gravel**	**Imperv.**	**Incl. Imperv. Nashyd**	**Not Incl. Imperv. Standhyd**
Runoff Coefficient[2]**, C**	**AB**	0.22	0.12	0.07	0.07	0.05	0.67	0.90	0.59	n.a.
SCS Curve No.[3]**, CN**	**AB**	70	51	50	44	50	81	98	80.0	50.0
Initial Abstraction[5]**, mm**		6.0	8.0	5.0	10.0	10.0	2.5	2.0	3.1	5.0

Time of Concentration[6]

Impervious Length	40	m	
Slope	1.0	%	
Airport	10.6	min.	
Bransby - Williams	2.9	min.	Flat: 0-2% Slopes Rolling: 2-6% Slopes Hilly: >6% Slopes
Applicable Minimum[7]	**10.0**	min.	
Time to Peak	6.7	min.	
	0.11	**hr.**	

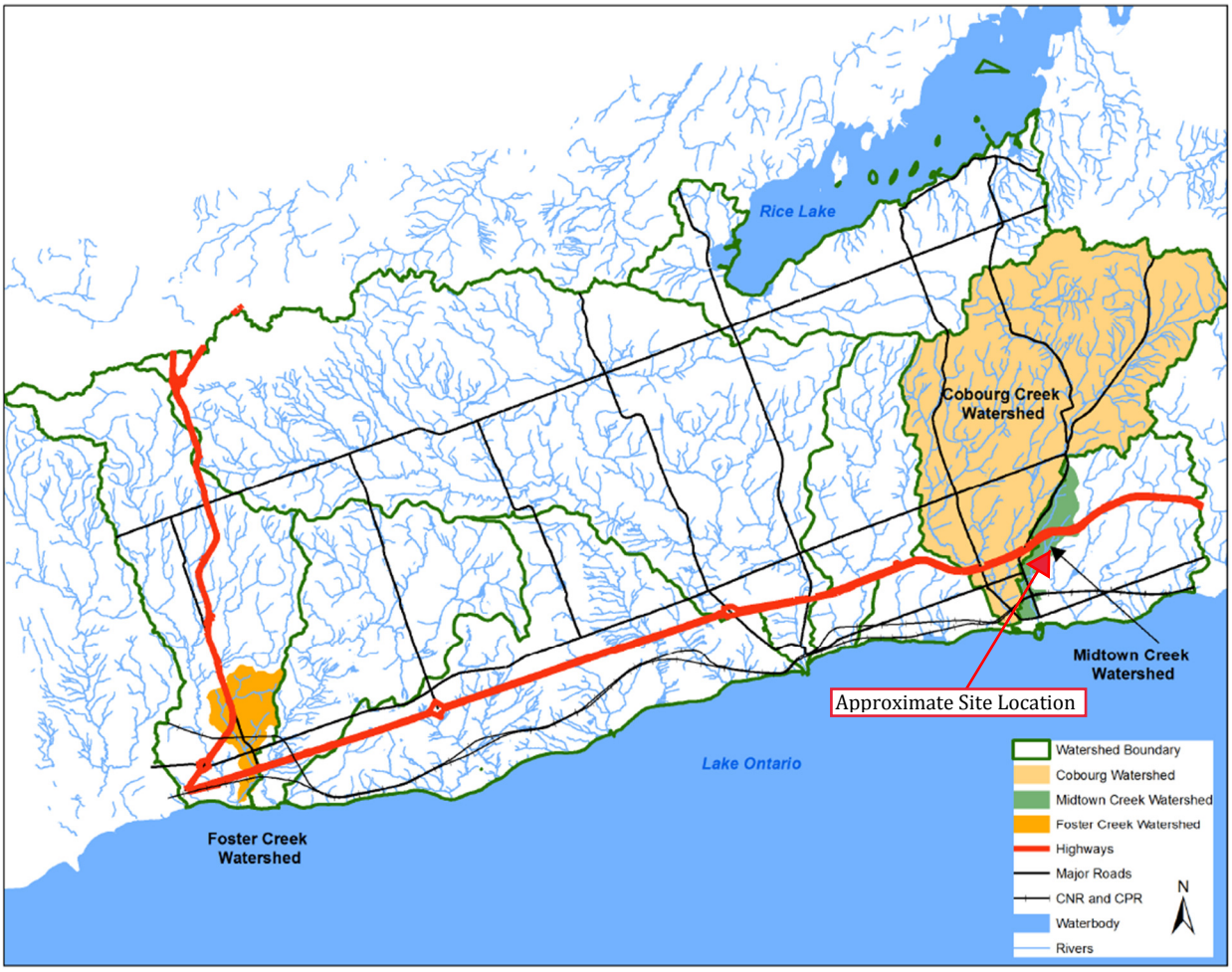
Composite Parameters

Drainage Area	0.08 ha	
Runoff Coefficient	0.59	
SCS Curve No.	80.0	50.0
Modified Curve No.[4]**, CN***	80.0	**47.8**
Initial Abstraction.	3.1	**5.0**

Notes:

1. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2. Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, Hydrologic Analysis and Design, McCuen 2004 and New Jersey Technical Manual for Stream Encroachment, 1984.
3. SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4. The modified curve number is adjusted as per Paul Wisner & Associates (1982) and represents anticedent moisture conditions Type II
5. Initial Abstraction values taken from the Environmental and Engineering Services Department, The Corporation of the City of London, Dec 2005
6. Based on the results of the Uplands Method
7. Minimum Time of Concentration for use in the Rational Method and Hydrologic Model has been set to 10 minutes

Watershed Boundary



Clarington Intensity Formulas

IDF Equation	I =a/(b+Td)		Td --- Time in hour I -- Intensity in mm/Hr				Conservative a i = --------- (td + b)^c
Return Period Parameters	2 year	5 year	10 year	25 year	50 year	100 year	100year
a	1778	2464	2819	3886	4750	5588	1770
b	13	16	16	18	24	28	4
							0.82

Rainfall Intensity Formulas (beyond Clarington)

Yarnell Equation

	I =a/(b+Td)		Td --- Time in hour I -- Intensity in mm/Hr			
Return Period Parameters	2 year	5 year	10 year	25 year	50 year	100 year
a	1778	2464	2819	3886	4750	5588
b	13	16	16	18	24	28

Design Chart 1.05: SCS Type II Distribution

6 hour			12 hour			24 hour		
Time end'g, hour	F_{inc} (%)	F_{cum} (%)	Time end'g, hour	F_{inc} (%)	F_{cum} (%)	Time end'g, hour	F_{inc} (%)	F_{cum} (%)
0	0	0	0	0	0	0	0	0
0.5	2	2	2	5	5	2	2.2	2.2
1	3	5	3	3	8	4	2.6	4.8
1.5	3	8	3.5	2	10	6	3.2	8.0
2	5	13	4	2	12	7	-	-
2.5	6	19	4.5	3	15	8	4.0	12.0
2.75	15	34	5	4	19	8.5	-	-
3	39	73	5.5	6	25	9	2.7	14.7
3.5	11	84	5.75	12	37	9.5	1.6	16.3
4	5	89	6	33	70	9.75	-	-
4.5	4	93	6.5	9	79	10	1.8	18.1
5	3	96	7	4	83	10.5	2.3	20.4
6	4	100	7.5	3	86	11	3.1	23.5
			8	3	89	11.5	4.8	28.3
			10	7	96	11.75	10.4	38.7
			12	4	100	12	27.6	66.3
						12.5	7.2	73.5
						13	3.7	77.2
						13.5	0.7	77.9
						14	4.1	82.0
						16	6.0	88.0
						20	7.2	95.2
						24	4.8	100

Source: Ministry of Natural Resources - MNR (1986)

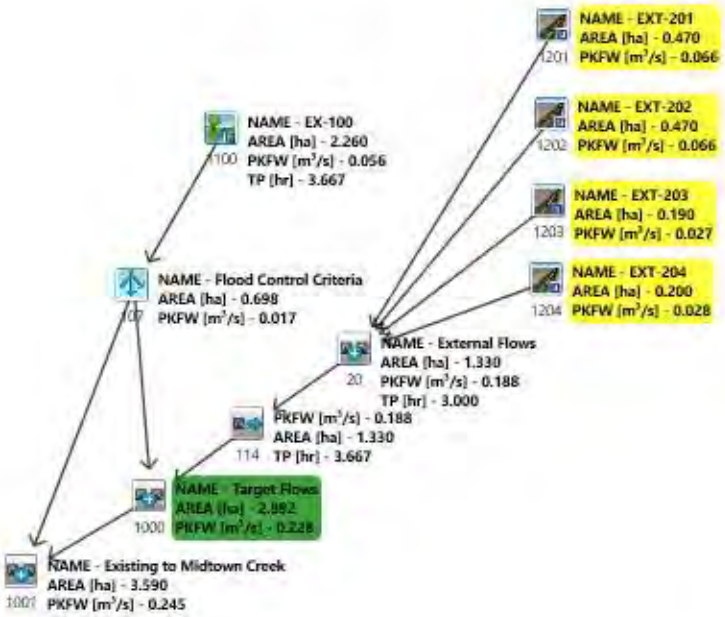
Appendix B

Hydrologic Modelling

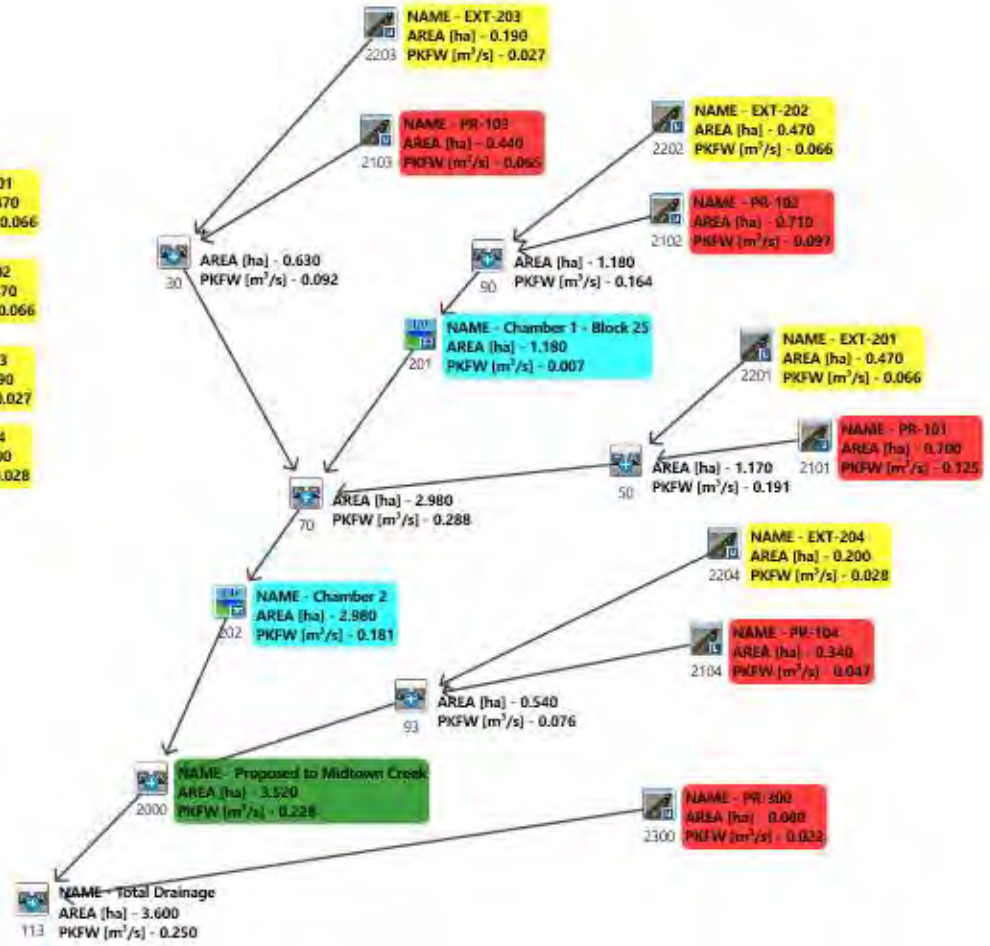
Detailed Output - 6 hour SCS Storm
Existing and Proposed Condition

VO3 Model Schematic
Target Flow Rates (6 hour SCS)

Existing Conditions



Proposed Conditions



DIVERTHYD Input Parameters
Midtown Creek Flood Control Criteria

Diversion Editor

Down Stream: Q1 Q2 Q3 Q4 Q5

Diversions: 1000 - Target | 1001 - Existir

Flow Table:

	QID 1 [m³/s]	QID 2 [m³/s]	QID 3 [m³/s]	QID 4 [m³/s]	QID 5 [m³/s]	Total
1	0	0	0	0	0	0
2	0.0025	0.0025	0	0	0	0.0050
3	0.007	0.003	0	0	0	0.010
4	0.010	0.004	0	0	0	0.014
5	0.020	0.008	0	0	0	0.028
6	0.029	0.013	0	0	0	0.042
7	0.039	0.017	0	0	0	0.056
8	0.07	0.03	0	0	0	0.10
9						

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

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\VO Suite 3.0\VO2\voin.dat


  Output  filename: C:\Users\cproctorbennett\AppData\Local\Temp\750011ff-e3b9-41bb-9e57-167e83c22650\Scenario.
out

  Summary filename: C:\Users\cproctorbennett\AppData\Local\Temp\750011ff-e3b9-41bb-9e57-167e83c22650\Scenario.
sum


DATE: 05-11-2020                          TIME: 08:17:12

USER:


COMMENTS: _____________________________________________________


----------------------------------------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: C:\Users\cproctorbennett\AppD
|                  |              ata\Local\Temp\
|                  |              750011ff-e3b9-41bb-9e57-167e83c22650\9a624bb6
| Ptotal= 28.55 mm |    Comments: 2-Year, 6 hour SCS Type II Storm Distrib
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    1.10 |  1.75    2.90 |  3.25    6.30 |  4.75    1.70
                0.50    1.10 |  2.00    2.90 |  3.50    6.30 |  5.00    1.70
                0.75    1.70 |  2.25    3.40 |  3.75    2.90 |  5.25    1.10
                1.00    1.70 |  2.50    3.40 |  4.00    2.90 |  5.50    1.10
                1.25    1.70 |  2.75   17.20 |  4.25    2.30 |  5.75    1.10
                1.50    1.70 |  3.00   44.60 |  4.50    2.30 |  6.00    1.10

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

--------------------
| CALIB            |
| NASHYD    (1100) |   Area    (ha)=   2.26   Curve Number   (CN)= 46.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.64
```


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	1.10	1.583	2.90	3.083	6.30	4.58	1.70
0.167	1.10	1.667	2.90	3.167	6.30	4.67	1.70
0.250	1.10	1.750	2.90	3.250	6.30	4.75	1.70
0.333	1.10	1.833	2.90	3.333	6.30	4.83	1.70
0.417	1.10	1.917	2.90	3.417	6.30	4.92	1.70
0.500	1.10	2.000	2.90	3.500	6.30	5.00	1.70
0.583	1.70	2.083	3.40	3.583	2.90	5.08	1.10
0.667	1.70	2.167	3.40	3.667	2.90	5.17	1.10
0.750	1.70	2.250	3.40	3.750	2.90	5.25	1.10
0.833	1.70	2.333	3.40	3.833	2.90	5.33	1.10
0.917	1.70	2.417	3.40	3.917	2.90	5.42	1.10
1.000	1.70	2.500	3.40	4.000	2.90	5.50	1.10
1.083	1.70	2.583	17.20	4.083	2.30	5.58	1.10
1.167	1.70	2.667	17.20	4.167	2.30	5.67	1.10
1.250	1.70	2.750	17.20	4.250	2.30	5.75	1.10
1.333	1.70	2.833	44.60	4.333	2.30	5.83	1.10
1.417	1.70	2.917	44.60	4.417	2.30	5.92	1.10
1.500	1.70	3.000	44.60	4.500	2.30	6.00	1.10

Unit Hyd Qpeak (cms)= 0.135

PEAK FLOW (cms)= 0.005 (i)
TIME TO PEAK (hrs)= 3.750
RUNOFF VOLUME (mm)= 1.514
TOTAL RAINFALL (mm)= 28.550
RUNOFF COEFFICIENT = 0.053

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

```
--------------------
| DIVERT HYD (0107)|
| IN= 1   # OUT= 5 |
--------------------
```

Outflow / Inflow Relationships

Flow 1 (cms)	+ Flow 2 (cms)	+ Flow 3 (cms)	+ Flow 4 (cms)	+ Flow 5 (cms)	= Total (cms)
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.00	0.00	0.00	0.00	0.01
0.01	0.00	0.00	0.00	0.00	0.01
0.02	0.01	0.00	0.00	0.00	0.03
0.03	0.01	0.00	0.00	0.00	0.04
0.04	0.02	0.00	0.00	0.00	0.06
0.07	0.03	0.00	0.00	0.00	0.10

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	2.26	0.00	3.75	1.51
ID= 2 (2) :	1.13	0.00	3.75	1.51
ID= 3 (2) :	1.13	0.00	3.75	1.51
ID= 4 (2) :	0.00	0.00	0.00	0.00
ID= 5 (2) :	0.00	0.00	0.00	0.00
ID= 6 (2) :	0.00	0.00	0.00	0.00

```
--------------------
| CALIB            |
| STANDHYD  (1203) |   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
```

	IMPERVIOUS	PERVIOUS (i)

```
     Surface Area     (ha)=       0.06         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      35.59        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      44.60         3.42
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       1.90 (ii)   19.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.32         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.00       0.005 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.25       3.00
     RUNOFF VOLUME    (mm)=      27.55         2.19       7.20
     TOTAL RAINFALL   (mm)=      28.55        28.55      28.55
     RUNOFF COEFFICIENT   =       0.96         0.08       0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (1202) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      44.60         3.42
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       2.49 (ii)   19.70 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.29         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00       0.013 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.25       3.00
     RUNOFF VOLUME    (mm)=      27.55         2.19       7.24
     TOTAL RAINFALL   (mm)=      28.55        28.55      28.55
     RUNOFF COEFFICIENT   =       0.96         0.08       0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (1201) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
-------------------
```



```
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      44.60         3.42
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       2.49 (ii)   19.70 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.29         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00       0.013 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.25       3.00
     RUNOFF VOLUME    (mm)=      27.55         2.19       7.24
     TOTAL RAINFALL   (mm)=      28.55        28.55      28.55
     RUNOFF COEFFICIENT   =       0.96         0.08       0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (1204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      36.51        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      44.60         3.42
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       1.93 (ii)   19.14 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.31         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.00       0.005 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.25       3.00
     RUNOFF VOLUME    (mm)=      27.55         2.19       7.20
     TOTAL RAINFALL   (mm)=      28.55        28.55      28.55
     RUNOFF COEFFICIENT   =       0.96         0.08       0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
```

```
--------------------          (ha)     (cms)     (hrs)      (mm)
          ID1= 1 (1201):      0.47     0.013     3.00      7.24
        + ID2= 2 (1202):      0.47     0.013     3.00      7.24
          ================================================
          ID = 3 (0020):      0.94     0.025     3.00      7.24

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

```
--------------------
| ADD HYD   (0020) |
|   3 +  2 =  1    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
          ID1= 3 (0020):      0.94     0.025     3.00      7.24
        + ID2= 2 (1203):      0.19     0.005     3.00      7.20
          ================================================
          ID = 1 (0020):      1.13     0.031     3.00      7.23

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

```
--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
          ID1= 1 (0020):      1.13     0.031     3.00      7.23
        + ID2= 2 (1204):      0.20     0.005     3.00      7.20
          ================================================
          ID = 3 (0020):      1.33     0.036     3.00      7.22

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

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--------------------
| SHIFT HYD (0114) |
| IN= 2---> OUT= 1 |
| SHIFT= 40.0 min  |       AREA      QPEAK      TPEAK       R.V.
--------------------       (ha)      (cms)      (hrs)       (mm)
          ID= 2 (0020):     1.33      0.04       3.00       7.22
    SHIFT ID= 1 (0114):     1.33      0.04       3.67       7.22
```

```
--------------------
| ADD HYD   (1000) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
          ID1= 1 (0107):      1.13     0.002     3.75      1.51
        + ID2= 2 (0114):      1.33     0.036     3.67      7.22
          ================================================
          ID = 3 (1000):      2.46     0.038     3.67      4.60

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

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--------------------
| ADD HYD   (1001) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
          ID1= 1 (1000):      2.46     0.038     3.67      4.60
        + ID2= 2 (0107):      1.13     0.002     3.75      1.51
          ================================================
          ID = 3 (1001):      3.59     0.041     3.67      3.63

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

```
--------------------
| CALIB            |
| STANDHYD  (2101) |   Area    (ha)=   0.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       0.28          0.42
     Dep. Storage      (mm)=       1.00          5.00
     Average Slope      (%)=       1.00          2.00
     Length             (m)=      68.31         10.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      44.60          4.47
                   over (min)       5.00         15.00
     Storage Coeff.  (min)=       2.81 (ii)    13.45 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.28          0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.03          0.00       0.028 (iii)
     TIME TO PEAK    (hrs)=       3.00          3.17       3.00
     RUNOFF VOLUME    (mm)=      27.55          2.25       9.82
     TOTAL RAINFALL   (mm)=      28.55         28.55      28.55
     RUNOFF COEFFICIENT   =       0.96          0.08       0.34

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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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--------------------
| CALIB            |
| STANDHYD  (2201) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       0.14          0.33
     Dep. Storage      (mm)=       1.00          5.00
     Average Slope      (%)=       1.00          3.60
     Length             (m)=      55.98         25.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      44.60          3.42
                   over (min)       5.00         20.00
     Storage Coeff.  (min)=       2.49 (ii)    19.70 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=       0.29          0.06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.00       0.013 (iii)
     TIME TO PEAK    (hrs)=       3.00          3.25       3.00
     RUNOFF VOLUME    (mm)=      27.55          2.19       7.24
     TOTAL RAINFALL   (mm)=      28.55         28.55      28.55
     RUNOFF COEFFICIENT   =       0.96          0.08       0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

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--------------------
| ADD HYD   (0050) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (2101):     0.70   0.028     3.00     9.82
        + ID2= 2 (2201):     0.47   0.013     3.00     7.24
          ================================================
          ID = 3 (0050):     1.17   0.041     3.00     8.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2102) |   Area    (ha)=   0.71
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  18.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.19          0.52
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       0.60          2.00
     Length            (m)=      68.80         10.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      44.60          4.10
                   over (min)       5.00         15.00
     Storage Coeff.  (min)=       3.29 (ii)    14.31 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.27          0.08
                                                          *TOTALS*
     PEAK FLOW        (cms)=      0.02          0.00          0.018 (iii)
     TIME TO PEAK     (hrs)=      3.00          3.17          3.00
     RUNOFF VOLUME     (mm)=     27.55          2.14          6.70
     TOTAL RAINFALL    (mm)=     28.55          28.55         28.55
     RUNOFF COEFFICIENT   =       0.96          0.08          0.23

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2202) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14          0.33
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          3.60
     Length            (m)=      55.98         25.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      44.60          3.42
                   over (min)       5.00         20.00
     Storage Coeff.  (min)=       2.49 (ii)    19.70 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=       0.29          0.06
                                                          *TOTALS*
     PEAK FLOW        (cms)=      0.01          0.00          0.013 (iii)
     TIME TO PEAK     (hrs)=      3.00          3.25          3.00
     RUNOFF VOLUME     (mm)=     27.55          2.19          7.24
```



```
     TOTAL RAINFALL   (mm)=      28.55         28.55          28.55
     RUNOFF COEFFICIENT   =       0.96          0.08           0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
--------------------
| ADD HYD   (0090) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (2102):     0.71   0.018     3.00     6.70
        + ID2= 2 (2202):     0.47   0.013     3.00     7.24
          ================================================
          ID = 3 (0090):     1.18   0.031     3.00     6.92

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0201) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0052     0.0213
                          0.0001     0.0050   |   0.0060     0.0258
                          0.0003     0.0058   |   0.0068     0.0296
                          0.0009     0.0073   |   0.0074     0.0325
                          0.0021     0.0096   |   0.0081     0.0352
                          0.0034     0.0134   |   0.0086     0.0379
                          0.0039     0.0157   |   0.0000     0.0000

                                AREA     QPEAK     TPEAK        R.V.
                                (ha)     (cms)     (hrs)        (mm)
     INFLOW : ID= 2 (0090)      1.180      0.031      3.00        6.92
     OUTFLOW: ID= 1 (0201)      1.180      0.001      6.00        2.16

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.99
                    TIME SHIFT OF PEAK FLOW          (min)=180.00
                    MAXIMUM  STORAGE   USED        (ha.m.)=  0.0074

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2103) |   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.13          0.31
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=      54.16         10.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      44.60          4.26
                   over (min)       5.00         15.00
     Storage Coeff.  (min)=       1.98 (ii)    12.83 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.31          0.08
                                                          *TOTALS*
     PEAK FLOW        (cms)=      0.01          0.00          0.013 (iii)
```

```
     TIME TO PEAK    (hrs)=       3.00         3.17          3.00
     RUNOFF VOLUME    (mm)=      27.55         2.19          7.24
     TOTAL RAINFALL   (mm)=      28.55        28.55         28.55
     RUNOFF COEFFICIENT   =       0.96         0.08          0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2203) |   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      35.59        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      44.60         3.42
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       1.90 (ii)   19.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.32         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.00          0.005 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.25          3.00
     RUNOFF VOLUME    (mm)=      27.55        28.55         28.55
     TOTAL RAINFALL   (mm)=      28.55        28.55         28.55
     RUNOFF COEFFICIENT   =       0.96         0.08          0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0030) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (2103):     0.44   0.013     3.00     7.24
       + ID2= 2 (2203):     0.19   0.005     3.00     7.20
         ====================================================
         ID = 3 (0030):     0.63   0.018     3.00     7.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0070) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```



```
         ID1= 1 (0201):     1.18   0.001     6.00     2.16
       + ID2= 2 (0030):     0.63   0.018     3.00     7.23
         ====================================================
         ID = 3 (0070):     1.81   0.018     3.00     3.92

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0070) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0070):     1.81   0.018     3.00     3.92
       + ID2= 2 (0050):     1.17   0.041     3.00     8.78
         ====================================================
         ID = 1 (0070):     2.98   0.059     3.00     5.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0202) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0430     0.0228
                          0.0001     0.0173   |   0.0913     0.0255
                          0.0006     0.0179   |   0.1374     0.0275
                          0.0094     0.0198   |   0.1695     0.0292
                          0.0236     0.0214   |   0.1892     0.0304

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0070)     2.980     0.059      3.00       5.83
     OUTFLOW: ID= 1 (0202)     2.980     0.000     15.92       0.14

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.17
                TIME SHIFT OF PEAK FLOW          (min)=775.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.0170

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2104) |   Area    (ha)=   0.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  15.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.10         0.24
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      47.61        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      44.60         5.49
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       1.84 (ii)   11.64 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.32         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.008 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.17          3.00
     RUNOFF VOLUME    (mm)=      27.55         2.32          6.09
     TOTAL RAINFALL   (mm)=      28.55        28.55         28.55
     RUNOFF COEFFICIENT   =       0.96         0.08          0.21

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.
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       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06          0.14
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          3.60
     Length            (m)=      36.51         25.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      44.60          3.42
               over (min)        5.00         20.00
     Storage Coeff.  (min)=       1.93 (ii)    19.14 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=       0.31          0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00          0.00          0.005 (iii)
     TIME TO PEAK    (hrs)=       3.00          3.25          3.00
     RUNOFF VOLUME    (mm)=      27.55          2.19          7.20
     TOTAL RAINFALL   (mm)=      28.55         28.55         28.55
     RUNOFF COEFFICIENT   =       0.96          0.08          0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0093) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2104):     0.34   0.008     3.00     6.09
        + ID2= 2 (2204):     0.20   0.005     3.00     7.20
          ================================================
          ID = 3 (0093):     0.54   0.013     3.00     6.50

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (2000) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0202):     2.98   0.000    15.92     0.14
        + ID2= 2 (0093):     0.54   0.013     3.00     6.50
          ================================================
          ID = 3 (2000):     3.52   0.013     3.00     1.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (2300) |   Area    (ha)=   0.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  63.00   Dir. Conn.(%)=  63.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05          0.03
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      23.09          5.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      44.60          3.65
               over (min)        5.00          5.00
     Storage Coeff.  (min)=       1.46 (ii)     3.73 (ii)
     Unit Hyd. Tpeak (min)=       5.00          5.00
     Unit Hyd. peak  (cms)=       0.33          0.25
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.00          0.007 (iii)
     TIME TO PEAK    (hrs)=       3.00          3.00          3.00
     RUNOFF VOLUME    (mm)=      27.55          1.84         18.03
     TOTAL RAINFALL   (mm)=      28.55         28.55         28.55
     RUNOFF COEFFICIENT   =       0.96          0.06          0.63

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0113) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2000):     3.52   0.013     3.00     1.12
        + ID2= 2 (2300):     0.08   0.007     3.00    18.03
          ================================================
          ID = 3 (0113):     3.60   0.020     3.00     1.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************


--------------------
|    READ STORM    |    Filename: C:\Users\cproctorbennett\AppD
|                  |              ata\Local\Temp\
|                  |              750011ff-e3b9-41bb-9e57-167e83c22650\3113dc0e
| Ptotal= 39.33 mm |    Comments: 5-Year, 6 hour SCS Type II Storm Distrib
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.25     1.60 |  1.75     3.90 |  3.25     8.60 |  4.75     2.40
                0.50     1.60 |  2.00     3.90 |  3.50     8.60 |  5.00     2.40
                0.75     2.40 |  2.25     4.70 |  3.75     3.90 |  5.25     1.60
                1.00     2.40 |  2.50     4.70 |  4.00     3.90 |  5.50     1.60
                1.25     2.40 |  2.75    23.60 |  4.25     3.10 |  5.75     1.60
                1.50     2.40 |  3.00    61.30 |  4.50     3.10 |  6.00     1.60

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CALIB					
NASHYD (1100)	Area (ha)= 2.26	Curve Number (CN)= 46.4			
ID= 1 DT= 5.0 min	Ia (mm)= 6.70	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.64				

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	1.60	1.583	3.90	3.083	8.60	4.58	2.40
0.167	1.60	1.667	3.90	3.167	8.60	4.67	2.40
0.250	1.60	1.750	3.90	3.250	8.60	4.75	2.40
0.333	1.60	1.833	3.90	3.333	8.60	4.83	2.40
0.417	1.60	1.917	3.90	3.417	8.60	4.92	2.40
0.500	1.60	2.000	3.90	3.500	8.60	5.00	2.40
0.583	2.40	2.083	4.70	3.583	3.90	5.08	1.60
0.667	2.40	2.167	4.70	3.667	3.90	5.17	1.60
0.750	2.40	2.250	4.70	3.750	3.90	5.25	1.60
0.833	2.40	2.333	4.70	3.833	3.90	5.33	1.60
0.917	2.40	2.417	4.70	3.917	3.90	5.42	1.60
1.000	2.40	2.500	4.70	4.000	3.90	5.50	1.60
1.083	2.40	2.583	23.60	4.083	3.10	5.58	1.60
1.167	2.40	2.667	23.60	4.167	3.10	5.67	1.60
1.250	2.40	2.750	23.60	4.250	3.10	5.75	1.60
1.333	2.40	2.833	61.30	4.333	3.10	5.83	1.60
1.417	2.40	2.917	61.30	4.417	3.10	5.92	1.60
1.500	2.40	3.000	61.30	4.500	3.10	6.00	1.60

Unit Hyd Qpeak (cms)= 0.135

PEAK FLOW (cms)= 0.010 (i)
TIME TO PEAK (hrs)= 3.667
RUNOFF VOLUME (mm)= 3.264
TOTAL RAINFALL (mm)= 39.325
RUNOFF COEFFICIENT = 0.083

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

DIVERT HYD (0107)		
IN= 1	# OUT= 5	

Outflow / Inflow Relationships

Flow 1 (cms)	+ Flow 2 (cms)	+ Flow 3 (cms)	+ Flow 4 (cms)	+ Flow 5 (cms)	= Total (cms)
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.00	0.00	0.00	0.00	0.01
0.01	0.00	0.00	0.00	0.00	0.01
0.02	0.01	0.00	0.00	0.00	0.03
0.03	0.01	0.00	0.00	0.00	0.04
0.04	0.02	0.00	0.00	0.00	0.06
0.07	0.03	0.00	0.00	0.00	0.10

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	2.26	0.01	3.67	3.26
ID= 2 (2) :	1.36	0.01	3.67	3.26
ID= 3 (2) :	0.90	0.00	3.67	3.26
ID= 4 (2) :	0.00	0.00	0.00	0.00
ID= 5 (2) :	0.00	0.00	0.00	0.00
ID= 6 (2) :	0.00	0.00	0.00	0.00

CALIB					
STANDHYD (1203)	Area (ha)= 0.19				
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.06	0.13	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	3.60	
Length	(m)=	35.59	25.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		61.30	8.67	
over (min)		5.00	15.00	
Storage Coeff. (min)=		1.67 (ii)	13.54 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.32	0.08	
				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.008 (iii)
TIME TO PEAK	(hrs)=	3.00	3.17	3.00
RUNOFF VOLUME	(mm)=	38.32	4.40	11.14
TOTAL RAINFALL	(mm)=	39.33	39.33	39.33
RUNOFF COEFFICIENT	=	0.97	0.11	0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 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.

CALIB					
STANDHYD (1202)	Area (ha)= 0.47				
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.14	0.33	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	3.60	
Length	(m)=	55.98	25.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		61.30	8.67	
over (min)		5.00	15.00	
Storage Coeff. (min)=		2.19 (ii)	14.06 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.31	0.08	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.00	0.020 (iii)
TIME TO PEAK	(hrs)=	3.00	3.17	3.00
RUNOFF VOLUME	(mm)=	38.32	4.40	11.17
TOTAL RAINFALL	(mm)=	39.33	39.33	39.33
RUNOFF COEFFICIENT	=	0.97	0.11	0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 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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--------------------
| CALIB            |
| STANDHYD  (1201) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      61.30         8.67
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.19 (ii)   14.06 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.31         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.020 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.17          3.00
     RUNOFF VOLUME    (mm)=      38.32         4.40         11.17
     TOTAL RAINFALL   (mm)=      39.33        39.33         39.33
     RUNOFF COEFFICIENT   =       0.97         0.11          0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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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--------------------
| CALIB            |
| STANDHYD  (1204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      36.51        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      61.30         8.67
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       1.70 (ii)   13.57 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.32         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.008 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.17          3.00
     RUNOFF VOLUME    (mm)=      38.32         4.40         11.14
     TOTAL RAINFALL   (mm)=      39.33        39.33         39.33
     RUNOFF COEFFICIENT   =       0.97         0.11          0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (1201):     0.47   0.020     3.00    11.17
        + ID2= 2 (1202):     0.47   0.020     3.00    11.17
          ================================================
          ID = 3 (0020):     0.94   0.040     3.00    11.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0020) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0020):     0.94   0.040     3.00    11.17
        + ID2= 2 (1203):     0.19   0.008     3.00    11.14
          ================================================
          ID = 1 (0020):     1.13   0.048     3.00    11.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0020):     1.13   0.048     3.00    11.16
        + ID2= 2 (1204):     0.20   0.008     3.00    11.14
          ================================================
          ID = 3 (0020):     1.33   0.056     3.00    11.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| SHIFT HYD (0114) |
| IN= 2---> OUT= 1 |
| SHIFT= 40.0 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------       (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0020):    1.33     0.06      3.00     11.16
    SHIFT ID= 1 (0114):    1.33     0.06      3.67     11.16

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--------------------
| ADD HYD   (1000) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0107):     1.36   0.007     3.67     3.26
        + ID2= 2 (0114):     1.33   0.056     3.67    11.16
          ================================================
          ID = 3 (1000):     2.69   0.063     3.67     7.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (1001) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (1000):     2.69   0.063     3.67     7.17
        + ID2= 2 (0107):     0.90   0.003     3.67     3.26
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          ================================================
          ID = 3 (1001):     3.59   0.066     3.67     6.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (2101) |   Area    (ha)=   0.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      68.31        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      61.30        10.33
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.47 (ii)    7.40 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.01          0.044 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08           3.00
     RUNOFF VOLUME    (mm)=      38.32         4.50          14.64
     TOTAL RAINFALL   (mm)=      39.33        39.33          39.33
     RUNOFF COEFFICIENT   =       0.97         0.11           0.37

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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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--------------------
| CALIB            |
| STANDHYD  (2201) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      61.30         8.67
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.19 (ii)   14.06 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.31         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.020 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.17           3.00
     RUNOFF VOLUME    (mm)=      38.32         4.40          11.17
     TOTAL RAINFALL   (mm)=      39.33        39.33          39.33
     RUNOFF COEFFICIENT   =       0.97         0.11           0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
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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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| ADD HYD   (0050) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2101):     0.70   0.044     3.00    14.64
        + ID2= 2 (2201):     0.47   0.020     3.00    11.17
          ================================================
          ID = 3 (0050):     1.17   0.064     3.00    13.25

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2102) |   Area    (ha)=   0.71
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  18.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.19         0.52
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       0.60         2.00
     Length            (m)=      68.80        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      61.30         9.54
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.89 (ii)   10.76 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.28         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.01          0.028 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08           3.00
     RUNOFF VOLUME    (mm)=      38.32        39.33          10.43
     TOTAL RAINFALL   (mm)=      39.33        39.33          39.33
     RUNOFF COEFFICIENT   =       0.97         0.11           0.27

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2202) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      61.30         8.67
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.19 (ii)   14.06 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
```

```
     Unit Hyd. peak  (cms)=       0.31         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.020 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.17          3.00
     RUNOFF VOLUME    (mm)=      38.32         4.40         11.17
     TOTAL RAINFALL   (mm)=      39.33        39.33         39.33
     RUNOFF COEFFICIENT   =       0.97         0.11          0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------
| ADD HYD   (0090) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2102):     0.71   0.028     3.00    10.43
        + ID2= 2 (2202):     0.47   0.020     3.00    11.17
          ================================================
          ID = 3 (0090):     1.18   0.048     3.00    10.72

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

```
--------------------
| RESERVOIR (0201) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0052     0.0213
                          0.0001     0.0050   |   0.0060     0.0258
                          0.0003     0.0058   |   0.0068     0.0296
                          0.0009     0.0073   |   0.0074     0.0325
                          0.0021     0.0096   |   0.0081     0.0352
                          0.0034     0.0134   |   0.0086     0.0379
                          0.0039     0.0157   |   0.0000     0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0090)      1.180     0.048      3.00      10.72
     OUTFLOW: ID= 1 (0201)      1.180     0.002      5.17       5.97

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.91
                    TIME SHIFT OF PEAK FLOW          (min)=130.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0104
```

```
--------------------
| CALIB            |
| STANDHYD  (2103) |   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.13         0.31
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      54.16        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      61.30         9.89
               over (min)         5.00        10.00
```



```
     Storage Coeff.  (min)=       1.75 (ii)    9.50 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01          0.020 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08          3.00
     RUNOFF VOLUME    (mm)=      38.32         4.40         11.17
     TOTAL RAINFALL   (mm)=      39.33        39.33         39.33
     RUNOFF COEFFICIENT   =       0.97         0.11          0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8     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.
```

```
--------------------
| CALIB            |
| STANDHYD  (2203) |   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      35.59        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      61.30         8.67
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       1.67 (ii)   13.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.32         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.008 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.17          3.00
     RUNOFF VOLUME    (mm)=      38.32         4.40         11.14
     TOTAL RAINFALL   (mm)=      39.33        39.33         39.33
     RUNOFF COEFFICIENT   =       0.97         0.11          0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------
| ADD HYD   (0030) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2103):     0.44   0.020     3.00    11.17
        + ID2= 2 (2203):     0.19   0.008     3.00    11.14
          ================================================
          ID = 3 (0030):     0.63   0.029     3.00    11.16

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

```
--------------------
| ADD HYD   (0070) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (0201):      1.18   0.002     5.17     5.97
       + ID2= 2 (0030):      0.63   0.029     3.00    11.16
         ================================================
         ID = 3 (0070):      1.81   0.029     3.00     7.78

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

```
--------------------
| ADD HYD   (0070) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 3 (0070):      1.81   0.029     3.00     7.78
       + ID2= 2 (0050):      1.17   0.064     3.00    13.25
         ================================================
         ID = 1 (0070):      2.98   0.093     3.00     9.93

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

```
--------------------
| RESERVOIR (0202) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0430      0.0228
                         0.0001     0.0173   |   0.0913      0.0255
                         0.0006     0.0179   |   0.1374      0.0275
                         0.0094     0.0198   |   0.1695      0.0292
                         0.0236     0.0214   |   0.1892      0.0304

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0070)    2.980     0.093     3.00       9.93
     OUTFLOW: ID= 1 (0202)    2.980     0.008     4.67       4.06

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.22
                    TIME SHIFT OF PEAK FLOW         (min)=100.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0194
```

```
--------------------
| CALIB            |
| STANDHYD  (2104) |   Area    (ha)=   0.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  15.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.10          0.24
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=      47.61         10.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      61.30         10.90
                over (min)        5.00         10.00
     Storage Coeff.  (min)=       1.62 (ii)     9.07 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.32          0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.01       0.014 (iii)
     TIME TO PEAK    (hrs)=       3.00          3.08       3.00
     RUNOFF VOLUME    (mm)=      38.32         4.63        9.67
     TOTAL RAINFALL   (mm)=      39.33        39.33       39.33
```



```
     RUNOFF COEFFICIENT   =       0.97          0.12          0.25

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.
```

```
--------------------
| CALIB            |
| STANDHYD  (2204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06          0.14
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          3.60
     Length            (m)=      36.51         25.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      61.30          8.67
                over (min)        5.00         15.00
     Storage Coeff.  (min)=       1.70 (ii)    13.57 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.32          0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.00       0.008 (iii)
     TIME TO PEAK    (hrs)=       3.00          3.17       3.00
     RUNOFF VOLUME    (mm)=      38.32         4.40        11.14
     TOTAL RAINFALL   (mm)=      39.33        39.33       39.33
     RUNOFF COEFFICIENT   =       0.97          0.11          0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------
| ADD HYD   (0093) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (2104):      0.34   0.014     3.00     9.67
       + ID2= 2 (2204):      0.20   0.008     3.00    11.14
         ================================================
         ID = 3 (0093):      0.54   0.022     3.00    10.21

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

```
--------------------
| ADD HYD   (2000) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (0202):      2.98   0.008     4.67     4.06
       + ID2= 2 (0093):      0.54   0.022     3.00    10.21
         ================================================
```

```
          ID = 3 (2000):     3.52   0.022     3.00     5.00

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2300) |   Area     (ha)=   0.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  63.00   Dir. Conn.(%)=  63.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       0.05          0.03
     Dep. Storage      (mm)=       1.00          5.00
     Average Slope      (%)=       1.00          2.00
     Length             (m)=      23.09          5.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      61.30          7.45
                   over (min)        5.00          5.00
     Storage Coeff.  (min)=       1.29 (ii)     3.28 (ii)
     Unit Hyd. Tpeak (min)=       5.00          5.00
     Unit Hyd. peak  (cms)=       0.33          0.27
                                                      *TOTALS*
     PEAK FLOW         (cms)=       0.01          0.00          0.009 (iii)
     TIME TO PEAK      (hrs)=       3.00          3.00           3.00
     RUNOFF VOLUME      (mm)=      38.33          3.78          25.54
     TOTAL RAINFALL     (mm)=      39.33         39.33          39.33
     RUNOFF COEFFICIENT    =       0.97          0.10           0.65

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD   (0113) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (2000):     3.52   0.022     3.00     5.00
        + ID2= 2 (2300):     0.08   0.009     3.00    25.54
          ================================================
          ID = 3 (0113):     3.60   0.031     3.00     5.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************


--------------------
|    READ STORM    |    Filename: C:\Users\cproctorbennett\AppD
|                  |              ata\Local\Temp\
|                  |              750011ff-e3b9-41bb-9e57-167e83c22650\2a628570
| Ptotal= 45.00 mm |   Comments: 10-Year, 6 hour SCS Type II Storm Distri
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    1.80 |  1.75    4.50 |  3.25    9.90 |  4.75    2.70
                0.50    1.80 |  2.00    4.50 |  3.50    9.90 |  5.00    2.70
                0.75    2.70 |  2.25    5.40 |  3.75    4.50 |  5.25    1.80
                1.00    2.70 |  2.50    5.40 |  4.00    4.50 |  5.50    1.80
                1.25    2.70 |  2.75   27.00 |  4.25    3.60 |  5.75    1.80
```



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                1.50    2.70 |  3.00   70.20 |  4.50    3.60 |  6.00    1.80

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

--------------------
| CALIB            |
| NASHYD    (1100) |   Area     (ha)=   2.26   Curve Number    (CN)= 46.4
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.64

         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    1.80 | 1.583    4.50 | 3.083    9.90 |  4.58    2.70
               0.167    1.80 | 1.667    4.50 | 3.167    9.90 |  4.67    2.70
               0.250    1.80 | 1.750    4.50 | 3.250    9.90 |  4.75    2.70
               0.333    1.80 | 1.833    4.50 | 3.333    9.90 |  4.83    2.70
               0.417    1.80 | 1.917    4.50 | 3.417    9.90 |  4.92    2.70
               0.500    1.80 | 2.000    4.50 | 3.500    9.90 |  5.00    2.70
               0.583    2.70 | 2.083    5.40 | 3.583    4.50 |  5.08    1.80
               0.667    2.70 | 2.167    5.40 | 3.667    4.50 |  5.17    1.80
               0.750    2.70 | 2.250    5.40 | 3.750    4.50 |  5.25    1.80
               0.833    2.70 | 2.333    5.40 | 3.833    4.50 |  5.33    1.80
               0.917    2.70 | 2.417    5.40 | 3.917    4.50 |  5.42    1.80
               1.000    2.70 | 2.500    5.40 | 4.000    4.50 |  5.50    1.80
               1.083    2.70 | 2.583   27.00 | 4.083    3.60 |  5.58    1.80
               1.167    2.70 | 2.667   27.00 | 4.167    3.60 |  5.67    1.80
               1.250    2.70 | 2.750   27.00 | 4.250    3.60 |  5.75    1.80
               1.333    2.70 | 2.833   70.20 | 4.333    3.60 |  5.83    1.80
               1.417    2.70 | 2.917   70.20 | 4.417    3.60 |  5.92    1.80
               1.500    2.70 | 3.000   70.20 | 4.500    3.60 |  6.00    1.80

     Unit Hyd Qpeak  (cms)=   0.135

     PEAK FLOW        (cms)=   0.014 (i)
     TIME TO PEAK     (hrs)=   3.667
     RUNOFF VOLUME     (mm)=   4.422
     TOTAL RAINFALL    (mm)=  45.000
     RUNOFF COEFFICIENT   =   0.098

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

--------------------------------------------------------------------------------
--------------------
| DIVERT HYD (0107)|
| IN= 1   # OUT= 5 |
--------------------
     Outflow / Inflow  Relationships

      Flow 1 + Flow 2 + Flow 3 + Flow 4 + Flow 5 = Total
       (cms)    (cms)    (cms)    (cms)    (cms)    (cms)
        0.00     0.00     0.00     0.00     0.00     0.00
        0.00     0.00     0.00     0.00     0.00     0.00
        0.01     0.00     0.00     0.00     0.00     0.01
        0.01     0.00     0.00     0.00     0.00     0.01
        0.02     0.01     0.00     0.00     0.00     0.03
        0.03     0.01     0.00     0.00     0.00     0.04
        0.04     0.02     0.00     0.00     0.00     0.06
        0.07     0.03     0.00     0.00     0.00     0.10

                            AREA     QPEAK     TPEAK     R.V.
                            (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):    2.26      0.01      3.67     4.42
     ================================================
     ID= 2  (   2)    :    1.44      0.01      3.67     4.42
     ID= 3  (   2)    :    0.82      0.00      3.67     4.42
```

```
     ID= 4  (   2)    :   0.00      0.00      0.00    0.00
     ID= 5  (   2)    :   0.00      0.00      0.00    0.00
     ID= 6  (   2)    :   0.00      0.00      0.00    0.00
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (1203) |   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      35.59        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      70.20        11.52
                 over (min)        5.00        15.00
     Storage Coeff.  (min)=       1.58 (ii)   12.18 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.33         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.010 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08          3.00
     RUNOFF VOLUME    (mm)=      44.00         5.82         13.43
     TOTAL RAINFALL   (mm)=      45.00        45.00         45.00
     RUNOFF COEFFICIENT   =       0.98         0.13          0.30

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (1202) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      70.20        11.52
                 over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.08 (ii)   12.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.31         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.01          0.024 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.17          3.00
     RUNOFF VOLUME    (mm)=      44.00         5.82         13.44
     TOTAL RAINFALL   (mm)=      45.00        45.00         45.00
     RUNOFF COEFFICIENT   =       0.98         0.13          0.30

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
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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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--------------------
| CALIB            |
| STANDHYD  (1201) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      70.20        11.52
                 over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.08 (ii)   12.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.31         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.01          0.024 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.17          3.00
     RUNOFF VOLUME    (mm)=      44.00         5.82         13.44
     TOTAL RAINFALL   (mm)=      45.00        45.00         45.00
     RUNOFF COEFFICIENT   =       0.98         0.13          0.30

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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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--------------------
| CALIB            |
| STANDHYD  (1204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      36.51        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      70.20        11.52
                 over (min)        5.00        15.00
     Storage Coeff.  (min)=       1.61 (ii)   12.20 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.32         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.010 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08          3.00
     RUNOFF VOLUME    (mm)=      44.00         5.82         13.43
     TOTAL RAINFALL   (mm)=      45.00        45.00         45.00
     RUNOFF COEFFICIENT   =       0.98         0.13          0.30

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
```

```
          CN*  =  47.8    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (1201):     0.47   0.024     3.00    13.44
        + ID2= 2 (1202):     0.47   0.024     3.00    13.44
          ================================================
          ID = 3 (0020):     0.94   0.047     3.00    13.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0020) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0020):     0.94   0.047     3.00    13.44
        + ID2= 2 (1203):     0.19   0.010     3.00    13.43
          ================================================
          ID = 1 (0020):     1.13   0.057     3.00    13.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0020):     1.13   0.057     3.00    13.44
        + ID2= 2 (1204):     0.20   0.010     3.00    13.43
          ================================================
          ID = 3 (0020):     1.33   0.067     3.00    13.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| SHIFT HYD (0114) |
| IN= 2---> OUT= 1 |
| SHIFT= 40.0 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0020):    1.33      0.07      3.00     13.44
    SHIFT ID= 1 (0114):    1.33      0.07      3.67     13.44

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--------------------
| ADD HYD   (1000) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0107):     1.44   0.010     3.67     4.42
        + ID2= 2 (0114):     1.33   0.067     3.67    13.44
          ================================================
          ID = 3 (1000):     2.77   0.077     3.67     8.75

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (1001) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (1000):     2.77   0.077     3.67     8.75
        + ID2= 2 (0107):     0.82   0.004     3.67     4.42
          ================================================
          ID = 3 (1001):     3.59   0.081     3.67     7.76

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (2101) |   Area     (ha)=   0.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
--------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=          0.28          0.42
     Dep. Storage     (mm)=          1.00          5.00
     Average Slope     (%)=          1.00          2.00
     Length            (m)=         68.31         10.00
     Mannings n          =          0.013         0.250

     Max.Eff.Inten.(mm/hr)=         70.20         13.63
               over (min)           5.00         10.00
     Storage Coeff.  (min)=          2.34 (ii)     7.01 (ii)
     Unit Hyd. Tpeak (min)=          5.00         10.00
     Unit Hyd. peak  (cms)=          0.30          0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=          0.04          0.01          0.053 (iii)
     TIME TO PEAK    (hrs)=          3.00          3.00          3.00
     RUNOFF VOLUME    (mm)=         44.00          5.95         17.36
     TOTAL RAINFALL   (mm)=         45.00         45.00         45.00
     RUNOFF COEFFICIENT   =          0.98          0.13          0.39

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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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--------------------
| CALIB            |
| STANDHYD  (2201) |   Area     (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=          0.14          0.33
     Dep. Storage     (mm)=          1.00          5.00
     Average Slope     (%)=          1.00          3.60
     Length            (m)=         55.98         25.00
     Mannings n          =          0.013         0.250

     Max.Eff.Inten.(mm/hr)=         70.20         11.52
               over (min)           5.00         15.00
     Storage Coeff.  (min)=          2.08 (ii)    12.67 (ii)
     Unit Hyd. Tpeak (min)=          5.00         15.00
     Unit Hyd. peak  (cms)=          0.31          0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=          0.02          0.01          0.024 (iii)
     TIME TO PEAK    (hrs)=          3.00          3.17          3.00
     RUNOFF VOLUME    (mm)=         44.00          5.82         13.44
     TOTAL RAINFALL   (mm)=         45.00         45.00         45.00
     RUNOFF COEFFICIENT   =          0.98          0.13          0.30

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
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***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  47.8     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0050) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2101):     0.70   0.053     3.00    17.36
        + ID2= 2 (2201):     0.47   0.024     3.00    13.44
          ================================================
          ID = 3 (0050):     1.17   0.076     3.00    15.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (2102) |   Area    (ha)=   0.71
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  18.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.19         0.52
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       0.60         2.00
     Length            (m)=      68.80        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      70.20        12.61
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.74 (ii)    9.77 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.11
                                                      *TOTALS*
     PEAK FLOW        (cms)=       0.02         0.01          0.037 (iii)
     TIME TO PEAK     (hrs)=       3.00         3.08          3.00
     RUNOFF VOLUME     (mm)=      44.00         5.72         12.60
     TOTAL RAINFALL    (mm)=      45.00        45.00         45.00
     RUNOFF COEFFICIENT   =       0.98         0.13          0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  47.8     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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--------------------
| CALIB            |
| STANDHYD  (2202) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n           =      0.013        0.250
```



```
     Max.Eff.Inten.(mm/hr)=      70.20        11.52
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.08 (ii)   12.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.31         0.08
                                                      *TOTALS*
     PEAK FLOW        (cms)=       0.02         0.01          0.024 (iii)
     TIME TO PEAK     (hrs)=       3.00         3.17          3.00
     RUNOFF VOLUME     (mm)=      44.00         5.82         13.44
     TOTAL RAINFALL    (mm)=      45.00        45.00         45.00
     RUNOFF COEFFICIENT   =       0.98         0.13          0.30

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  47.8     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0090) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2102):     0.71   0.037     3.00    12.60
        + ID2= 2 (2202):     0.47   0.024     3.00    13.44
          ================================================
          ID = 3 (0090):     1.18   0.060     3.00    12.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0201) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0052     0.0213
                         0.0001     0.0050   |   0.0060     0.0258
                         0.0003     0.0058   |   0.0068     0.0296
                         0.0009     0.0073   |   0.0074     0.0325
                         0.0021     0.0096   |   0.0081     0.0352
                         0.0034     0.0134   |   0.0086     0.0379
                         0.0039     0.0157   |   0.0000     0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0090)       1.180     0.060      3.00      12.94
     OUTFLOW: ID= 1 (0201)       1.180     0.003      5.08       8.18

               PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.01
               TIME SHIFT OF PEAK FLOW          (min)=125.00
               MAXIMUM  STORAGE   USED       (ha.m.)=  0.0123

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--------------------
| CALIB            |
| STANDHYD  (2103) |   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.13         0.31
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
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     Length            (m)=      54.16        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      70.20        13.07
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      1.65 (ii)    8.59 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.32         0.12
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.02         0.01     0.025 (iii)
     TIME TO PEAK    (hrs)=      3.00         3.08      3.00
     RUNOFF VOLUME    (mm)=     44.00         5.82     13.45
     TOTAL RAINFALL   (mm)=     45.00        45.00     45.00
     RUNOFF COEFFICIENT   =      0.98         0.13      0.30

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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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--------------------
| CALIB            |
| STANDHYD  (2203) |   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.06         0.13
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      1.00         3.60
     Length            (m)=     35.59        25.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     70.20        11.52
               over (min)        5.00        15.00
     Storage Coeff.  (min)=      1.58 (ii)   12.18 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=      0.33         0.09
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.01         0.00      0.010 (iii)
     TIME TO PEAK    (hrs)=      3.00         3.08      3.00
     RUNOFF VOLUME    (mm)=     44.00         5.82     13.43
     TOTAL RAINFALL   (mm)=     45.00        45.00     45.00
     RUNOFF COEFFICIENT   =      0.98         0.13      0.30

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0030) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2103):     0.44   0.025     3.00    13.45
        + ID2= 2 (2203):     0.19   0.010     3.00    13.43
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          ID = 3 (0030):     0.63   0.034     3.00    13.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0070) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0201):     1.18   0.003     5.08     8.18
        + ID2= 2 (0030):     0.63   0.034     3.00    13.44
          ================================================
          ID = 3 (0070):     1.81   0.035     3.00    10.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0070) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0070):     1.81   0.035     3.00    10.01
        + ID2= 2 (0050):     1.17   0.076     3.00    15.79
          ================================================
          ID = 1 (0070):     2.98   0.112     3.00    12.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0202) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0430     0.0228
                          0.0001     0.0173   |   0.0913     0.0255
                          0.0006     0.0179   |   0.1374     0.0275
                          0.0094     0.0198   |   0.1695     0.0292
                          0.0236     0.0214   |   0.1892     0.0304

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0070)     2.980     0.112     3.00       12.28
     OUTFLOW: ID= 1 (0202)     2.980     0.014     3.75        6.42

               PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.98
               TIME SHIFT OF PEAK FLOW          (min)= 45.00
               MAXIMUM  STORAGE   USED       (ha.m.)=  0.0204

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| CALIB            |
| STANDHYD  (2104) |   Area    (ha)=   0.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  15.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.10         0.24
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         2.00
     Length            (m)=     47.61        10.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     70.20        14.36
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      1.53 (ii)    8.21 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.33         0.13
```

				TOTALS
PEAK FLOW	(cms)=	0.01	0.01	0.017 (iii)
TIME TO PEAK	(hrs)=	3.00	3.08	3.00
RUNOFF VOLUME	(mm)=	44.00	6.12	11.78
TOTAL RAINFALL	(mm)=	45.00	45.00	45.00
RUNOFF COEFFICIENT	=	0.98	0.14	0.26

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 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.

CALIB	
STANDHYD (2204)	Area (ha)= 0.20
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.14
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	3.60
Length	(m)=	36.51	25.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.	(mm/hr)=	70.20	11.52
over	(min)	5.00	15.00
Storage Coeff.	(min)=	1.61 (ii)	12.20 (ii)
Unit Hyd. Tpeak	(min)=	5.00	15.00
Unit Hyd. peak	(cms)=	0.32	0.09

				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.010 (iii)
TIME TO PEAK	(hrs)=	3.00	3.08	3.00
RUNOFF VOLUME	(mm)=	44.00	5.82	13.43
TOTAL RAINFALL	(mm)=	45.00	45.00	45.00
RUNOFF COEFFICIENT	=	0.98	0.13	0.30

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0093)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2104):		0.34	0.017	3.00	11.78
+ ID2= 2 (2204):		0.20	0.010	3.00	13.43
ID = 3 (0093):		0.54	0.027	3.00	12.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2000)

1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0202):		2.98	0.014	3.75	6.42
+ ID2= 2 (0093):		0.54	0.027	3.00	12.39
ID = 3 (2000):		3.52	0.027	3.00	7.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (2300)	Area (ha)= 0.08
ID= 1 DT= 5.0 min	Total Imp(%)= 63.00 Dir. Conn.(%)= 63.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.05	0.03
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	23.09	5.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.	(mm/hr)=	70.20	9.92
over	(min)	5.00	5.00
Storage Coeff.	(min)=	1.22 (ii)	3.11 (ii)
Unit Hyd. Tpeak	(min)=	5.00	5.00
Unit Hyd. peak	(cms)=	0.33	0.27

				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.011 (iii)
TIME TO PEAK	(hrs)=	3.00	3.00	3.00
RUNOFF VOLUME	(mm)=	44.00	5.04	29.58
TOTAL RAINFALL	(mm)=	45.00	45.00	45.00
RUNOFF COEFFICIENT	=	0.98	0.11	0.66

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0113)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2000):		3.52	0.027	3.00	7.33
+ ID2= 2 (2300):		0.08	0.011	3.00	29.58
ID = 3 (0113):		3.60	0.038	3.00	7.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 4 **
****

READ STORM	Filename: C:\Users\cproctorbennett\AppData\Local\Temp\750011ff-e3b9-41bb-9e57-167e83c22650\9cef4af0
Ptotal= 61.77 mm	Comments: 25-Year, 6 hour SCS Type II Storm Distri

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

0.25	2.50	1.75	6.20	3.25	13.60	4.75	3.70
0.50	2.50	2.00	6.20	3.50	13.60	5.00	3.70
0.75	3.70	2.25	7.40	3.75	6.20	5.25	2.50
1.00	3.70	2.50	7.40	4.00	6.20	5.50	2.50
1.25	3.70	2.75	37.00	4.25	4.90	5.75	2.50
1.50	3.70	3.00	96.30	4.50	4.90	6.00	2.50

CALIB	
NASHYD (1100)	Area (ha)= 2.26 Curve Number (CN)= 46.4
ID= 1 DT= 5.0 min	Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.64

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.50	1.583	6.20	3.083	13.60	4.58	3.70
0.167	2.50	1.667	6.20	3.167	13.60	4.67	3.70
0.250	2.50	1.750	6.20	3.250	13.60	4.75	3.70
0.333	2.50	1.833	6.20	3.333	13.60	4.83	3.70
0.417	2.50	1.917	6.20	3.417	13.60	4.92	3.70
0.500	2.50	2.000	6.20	3.500	13.60	5.00	3.70
0.583	3.70	2.083	7.40	3.583	6.20	5.08	2.50
0.667	3.70	2.167	7.40	3.667	6.20	5.17	2.50
0.750	3.70	2.250	7.40	3.750	6.20	5.25	2.50
0.833	3.70	2.333	7.40	3.833	6.20	5.33	2.50
0.917	3.70	2.417	7.40	3.917	6.20	5.42	2.50
1.000	3.70	2.500	7.40	4.000	6.20	5.50	2.50
1.083	3.70	2.583	37.00	4.083	4.90	5.58	2.50
1.167	3.70	2.667	37.00	4.167	4.90	5.67	2.50
1.250	3.70	2.750	37.00	4.250	4.90	5.75	2.50
1.333	3.70	2.833	96.30	4.333	4.90	5.83	2.50
1.417	3.70	2.917	96.30	4.417	4.90	5.92	2.50
1.500	3.70	3.000	96.30	4.500	4.90	6.00	2.50

Unit Hyd Qpeak (cms)= 0.135

PEAK FLOW (cms)= 0.028 (i)
TIME TO PEAK (hrs)= 3.667
RUNOFF VOLUME (mm)= 8.703
TOTAL RAINFALL (mm)= 61.775
RUNOFF COEFFICIENT = 0.141

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

DIVERT HYD (0107)
IN= 1 # OUT= 5

Outflow / Inflow Relationships

Flow 1 (cms)	+ Flow 2 (cms)	+ Flow 3 (cms)	+ Flow 4 (cms)	+ Flow 5 (cms)	= Total (cms)
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.00	0.00	0.00	0.00	0.01
0.01	0.00	0.00	0.00	0.00	0.01
0.02	0.01	0.00	0.00	0.00	0.03
0.03	0.01	0.00	0.00	0.00	0.04
0.04	0.02	0.00	0.00	0.00	0.06
0.07	0.03	0.00	0.00	0.00	0.10

AREA QPEAK TPEAK R.V.

	(ha)	(cms)	(hrs)	(mm)
TOTAL HYD.(ID= 1):	2.26	0.03	3.67	8.70
ID= 2 (2) :	1.54	0.02	3.67	8.70
ID= 3 (2) :	0.72	0.01	3.67	8.70
ID= 4 (2) :	0.00	0.00	0.00	0.00
ID= 5 (2) :	0.00	0.00	0.00	0.00
ID= 6 (2) :	0.00	0.00	0.00	0.00

CALIB	
STANDHYD (1203)	Area (ha)= 0.19
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.06	0.13	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	3.60	
Length	(m)=	35.59	25.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.	(mm/hr)=	96.30	24.50	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	1.40 (ii)	9.23 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.33	0.12	
				TOTALS
PEAK FLOW	(cms)=	0.01	0.01	0.016 (iii)
TIME TO PEAK	(hrs)=	3.00	3.08	3.00
RUNOFF VOLUME	(mm)=	60.77	10.98	20.92
TOTAL RAINFALL	(mm)=	61.78	61.78	61.78
RUNOFF COEFFICIENT	=	0.98	0.18	0.34

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 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.

CALIB	
STANDHYD (1202)	Area (ha)= 0.47
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00 Dir. Conn.(%)= 20.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.14	0.33	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	3.60	
Length	(m)=	55.98	25.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.	(mm/hr)=	96.30	24.50	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	1.83 (ii)	9.67 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.32	0.11	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.02	0.040 (iii)
TIME TO PEAK	(hrs)=	3.00	3.08	3.00
RUNOFF VOLUME	(mm)=	60.78	10.98	20.92
TOTAL RAINFALL	(mm)=	61.78	61.78	61.78
RUNOFF COEFFICIENT	=	0.98	0.18	0.34

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

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***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8     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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--------------------
| CALIB            |
| STANDHYD  (1201) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      96.30        24.50
                   over (min)       5.00        10.00
     Storage Coeff.  (min)=       1.83 (ii)    9.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.11
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.02          0.040 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08           3.00
     RUNOFF VOLUME    (mm)=      60.78        10.98          20.92
     TOTAL RAINFALL   (mm)=      61.78        61.78          61.78
     RUNOFF COEFFICIENT   =       0.98         0.18           0.34

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8     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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--------------------
| CALIB            |
| STANDHYD  (1204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      36.51        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      96.30        24.50
                   over (min)       5.00        10.00
     Storage Coeff.  (min)=       1.42 (ii)    9.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01          0.017 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08           3.00
     RUNOFF VOLUME    (mm)=      60.77        10.98          20.92
     TOTAL RAINFALL   (mm)=      61.78        61.78          61.78
     RUNOFF COEFFICIENT   =       0.98         0.18           0.34
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***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (1201):     0.47   0.040     3.00    20.92
        + ID2= 2 (1202):     0.47   0.040     3.00    20.92
          ================================================
          ID = 3 (0020):     0.94   0.080     3.00    20.92

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0020) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0020):     0.94   0.080     3.00    20.92
        + ID2= 2 (1203):     0.19   0.016     3.00    20.92
          ================================================
          ID = 1 (0020):     1.13   0.096     3.00    20.92

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0020):     1.13   0.096     3.00    20.92
        + ID2= 2 (1204):     0.20   0.017     3.00    20.92
          ================================================
          ID = 3 (0020):     1.33   0.113     3.00    20.92

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| SHIFT HYD (0114) |
| IN= 2---> OUT= 1 |
| SHIFT= 40.0 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0020):    1.33     0.11      3.00     20.92
    SHIFT ID= 1 (0114):    1.33     0.11      3.67     20.92

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--------------------
| ADD HYD   (1000) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0107):     1.54   0.020     3.67     8.70
        + ID2= 2 (0114):     1.33   0.113     3.67    20.92
          ================================================
          ID = 3 (1000):     2.87   0.134     3.67    14.36
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (1001)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (1000):		2.87	0.134	3.67	14.36
+ ID2= 2 (0107):		0.72	0.008	3.67	8.70
ID = 3 (1001):		3.59	0.142	3.67	13.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (2101)	Area (ha)= 0.70				
ID= 1 DT= 5.0 min	Total Imp(%)= 40.00	Dir. Conn.(%)= 30.00			
		IMPERVIOUS	PERVIOUS (i)		
Surface Area	(ha)=	0.28	0.42		
Dep. Storage	(mm)=	1.00	5.00		
Average Slope	(%)=	1.00	2.00		
Length	(m)=	68.31	10.00		
Mannings n	=	0.013	0.250		
Max.Eff.Inten.	(mm/hr)=	96.30	25.49		
over	(min)	5.00	10.00		
Storage Coeff.	(min)=	2.06 (ii)	6.18 (ii)		
Unit Hyd. Tpeak	(min)=	5.00	10.00		
Unit Hyd. peak	(cms)=	0.31	0.15		
				TOTALS	
PEAK FLOW	(cms)=	0.06	0.02	0.080 (iii)	
TIME TO PEAK	(hrs)=	3.00	3.00	3.00	
RUNOFF VOLUME	(mm)=	60.77	11.19	26.06	
TOTAL RAINFALL	(mm)=	61.78	61.78	61.78	
RUNOFF COEFFICIENT	=	0.98	0.18	0.42	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 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.

CALIB					
STANDHYD (2201)	Area (ha)= 0.47				
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00			
		IMPERVIOUS	PERVIOUS (i)		
Surface Area	(ha)=	0.14	0.33		
Dep. Storage	(mm)=	1.00	5.00		
Average Slope	(%)=	1.00	3.60		
Length	(m)=	55.98	25.00		
Mannings n	=	0.013	0.250		
Max.Eff.Inten.	(mm/hr)=	96.30	24.50		
over	(min)	5.00	10.00		
Storage Coeff.	(min)=	1.83 (ii)	9.67 (ii)		
Unit Hyd. Tpeak	(min)=	5.00	10.00		
Unit Hyd. peak	(cms)=	0.32	0.11		
				TOTALS	
PEAK FLOW	(cms)=	0.03	0.02	0.040 (iii)	
TIME TO PEAK	(hrs)=	3.00	3.08	3.00	

RUNOFF VOLUME	(mm)=	60.78	10.98	20.92
TOTAL RAINFALL	(mm)=	61.78	61.78	61.78
RUNOFF COEFFICIENT	=	0.98	0.18	0.34

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0050)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2101):		0.70	0.080	3.00	26.06
+ ID2= 2 (2201):		0.47	0.040	3.00	20.92
ID = 3 (0050):		1.17	0.120	3.00	24.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (2102)	Area (ha)= 0.71				
ID= 1 DT= 5.0 min	Total Imp(%)= 27.00	Dir. Conn.(%)= 18.00			
		IMPERVIOUS	PERVIOUS (i)		
Surface Area	(ha)=	0.19	0.52		
Dep. Storage	(mm)=	1.00	5.00		
Average Slope	(%)=	0.60	2.00		
Length	(m)=	68.80	10.00		
Mannings n	=	0.013	0.250		
Max.Eff.Inten.	(mm/hr)=	96.30	23.69		
over	(min)	5.00	10.00		
Storage Coeff.	(min)=	2.42 (ii)	7.88 (ii)		
Unit Hyd. Tpeak	(min)=	5.00	10.00		
Unit Hyd. peak	(cms)=	0.30	0.13		
				TOTALS	
PEAK FLOW	(cms)=	0.03	0.02	0.059 (iii)	
TIME TO PEAK	(hrs)=	3.00	3.08	3.00	
RUNOFF VOLUME	(mm)=	60.77	10.80	19.79	
TOTAL RAINFALL	(mm)=	61.78	61.78	61.78	
RUNOFF COEFFICIENT	=	0.98	0.17	0.32	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 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.

CALIB					
STANDHYD (2202)	Area (ha)= 0.47				
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00			
		IMPERVIOUS	PERVIOUS (i)		

```
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      96.30        24.50
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.83 (ii)    9.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.11
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.02          0.040 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08           3.00
     RUNOFF VOLUME    (mm)=      60.78        10.98          20.92
     TOTAL RAINFALL   (mm)=      61.78        61.78          61.78
     RUNOFF COEFFICIENT   =       0.98         0.18           0.34

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0090) |
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2102):    0.71   0.059     3.00    19.79
         + ID2= 2 (2202):    0.47   0.040     3.00    20.92
           ================================================
          ID = 3 (0090):     1.18   0.099     3.00    20.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0201) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0052     0.0213
                          0.0001     0.0050   |   0.0060     0.0258
                          0.0003     0.0058   |   0.0068     0.0296
                          0.0009     0.0073   |   0.0074     0.0325
                          0.0021     0.0096   |   0.0081     0.0352
                          0.0034     0.0134   |   0.0086     0.0379
                          0.0039     0.0157   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0090)     1.180     0.099      3.00      20.24
     OUTFLOW: ID= 1 (0201)     1.180     0.005      5.08      15.49

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.74
                    TIME SHIFT OF PEAK FLOW         (min)=125.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0191

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2103) |   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
```



```
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.13         0.31
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      54.16        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      96.30        24.50
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.46 (ii)    6.85 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.02          0.039 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00           3.00
     RUNOFF VOLUME    (mm)=      60.77        10.98          20.93
     TOTAL RAINFALL   (mm)=      61.78        61.78          61.78
     RUNOFF COEFFICIENT   =       0.98         0.18           0.34

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2203) |   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      35.59        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      96.30        24.50
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.40 (ii)    9.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01          0.016 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08           3.00
     RUNOFF VOLUME    (mm)=      60.77        10.98          20.92
     TOTAL RAINFALL   (mm)=      61.78        61.78          61.78
     RUNOFF COEFFICIENT   =       0.98         0.18           0.34

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0030) |
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|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
          ID1= 1 (2103):      0.44   0.039     3.00     20.93
        + ID2= 2 (2203):      0.19   0.016     3.00     20.92
          ================================================
          ID = 3 (0030):      0.63   0.056     3.00     20.92

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD   (0070) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
          ID1= 1 (0201):      1.18   0.005     5.08     15.49
        + ID2= 2 (0030):      0.63   0.056     3.00     20.92
          ================================================
          ID = 3 (0070):      1.81   0.058     3.00     17.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD   (0070) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
          ID1= 3 (0070):      1.81   0.058     3.00     17.38
        + ID2= 2 (0050):      1.17   0.120     3.00     24.00
          ================================================
          ID = 1 (0070):      2.98   0.178     3.00     19.98

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

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--------------------
| RESERVOIR (0202) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0430      0.0228
                          0.0001     0.0173   |   0.0913      0.0255
                          0.0006     0.0179   |   0.1374      0.0275
                          0.0094     0.0198   |   0.1695      0.0292
                          0.0236     0.0214   |   0.1892      0.0304

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0070)     2.980     0.178      3.00      19.98
     OUTFLOW: ID= 1 (0202)     2.980     0.061      3.17      14.11

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 34.45
                    TIME SHIFT OF PEAK FLOW          (min)= 10.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0239
```

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--------------------
| CALIB            |
| STANDHYD  (2104) |   Area    (ha)=   0.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  15.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.10         0.24
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      47.61        10.00
     Mannings n           =      0.013        0.250
```



```
     Max.Eff.Inten.(mm/hr)=      96.30        26.79
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.35 (ii)    6.55 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01      0.028 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00       3.00
     RUNOFF VOLUME    (mm)=      60.78        11.47      18.85
     TOTAL RAINFALL   (mm)=      61.78        61.78      61.78
     RUNOFF COEFFICIENT   =       0.98         0.19       0.31

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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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--------------------
| CALIB            |
| STANDHYD  (2204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      36.51        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      96.30        24.50
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.42 (ii)    9.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01      0.017 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08       3.00
     RUNOFF VOLUME    (mm)=      60.77        10.98      20.92
     TOTAL RAINFALL   (mm)=      61.78        61.78      61.78
     RUNOFF COEFFICIENT   =       0.98         0.18       0.34

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

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--------------------
| ADD HYD   (0093) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
          ID1= 1 (2104):      0.34   0.028     3.00     18.85
        + ID2= 2 (2204):      0.20   0.017     3.00     20.92
          ================================================
          ID = 3 (0093):      0.54   0.045     3.00     19.62

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

ADD HYD (2000)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0202):	2.98	0.061	3.17	14.11
	+ ID2= 2 (0093):	0.54	0.045	3.00	19.62
	ID = 3 (2000):	3.52	0.078	3.08	14.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (2300)	Area (ha)= 0.08		
ID= 1 DT= 5.0 min	Total Imp(%)= 63.00	Dir. Conn.(%)= 63.00	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.05	0.03	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	23.09	5.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)	=	96.30	18.86	
over (min)		5.00	5.00	
Storage Coeff. (min)	=	1.08 (ii)	2.74 (ii)	
Unit Hyd. Tpeak (min)	=	5.00	5.00	
Unit Hyd. peak (cms)	=	0.34	0.29	
				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.015 (iii)
TIME TO PEAK	(hrs)=	3.00	3.00	3.00
RUNOFF VOLUME	(mm)=	60.77	9.65	41.85
TOTAL RAINFALL	(mm)=	61.78	61.78	61.78
RUNOFF COEFFICIENT	=	0.98	0.16	0.68

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0113)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (2000):	3.52	0.078	3.08	14.96
	+ ID2= 2 (2300):	0.08	0.015	3.00	41.85
	ID = 3 (0113):	3.60	0.080	3.08	15.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 5 **
****

READ STORM	Filename: C:\Users\cproctorbennett\AppData\Local\Temp\	750011ff-e3b9-41bb-9e57-167e83c22650\9ac8a4c3
Ptotal= 74.28 mm	Comments: 50-Year, 6 hour SCS Type II Storm Distri	

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	3.00	1.75	7.40	3.25	16.30	4.75	4.50
0.50	3.00	2.00	7.40	3.50	16.30	5.00	4.50
0.75	4.50	2.25	8.90	3.75	7.40	5.25	3.00
1.00	4.50	2.50	8.90	4.00	7.40	5.50	3.00
1.25	4.50	2.75	44.50	4.25	5.90	5.75	3.00
1.50	4.50	3.00	115.80	4.50	5.90	6.00	3.00

CALIB			
NASHYD (1100)	Area (ha)= 2.26	Curve Number (CN)= 46.4	
ID= 1 DT= 5.0 min	Ia (mm)= 6.70	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.64		

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	3.00	1.583	7.40	3.083	16.30	4.58	4.50
0.167	3.00	1.667	7.40	3.167	16.30	4.67	4.50
0.250	3.00	1.750	7.40	3.250	16.30	4.75	4.50
0.333	3.00	1.833	7.40	3.333	16.30	4.83	4.50
0.417	3.00	1.917	7.40	3.417	16.30	4.92	4.50
0.500	3.00	2.000	7.40	3.500	16.30	5.00	4.50
0.583	4.50	2.083	8.90	3.583	7.40	5.08	3.00
0.667	4.50	2.167	8.90	3.667	7.40	5.17	3.00
0.750	4.50	2.250	8.90	3.750	7.40	5.25	3.00
0.833	4.50	2.333	8.90	3.833	7.40	5.33	3.00
0.917	4.50	2.417	8.90	3.917	7.40	5.42	3.00
1.000	4.50	2.500	8.90	4.000	7.40	5.50	3.00
1.083	4.50	2.583	44.50	4.083	5.90	5.58	3.00
1.167	4.50	2.667	44.50	4.167	5.90	5.67	3.00
1.250	4.50	2.750	44.50	4.250	5.90	5.75	3.00
1.333	4.50	2.833	115.80	4.333	5.90	5.83	3.00
1.417	4.50	2.917	115.80	4.417	5.90	5.92	3.00
1.500	4.50	3.000	115.80	4.500	5.90	6.00	3.00

Unit Hyd Qpeak (cms)= 0.135

PEAK FLOW (cms)= 0.042 (i)
TIME TO PEAK (hrs)= 3.667
RUNOFF VOLUME (mm)= 12.649
TOTAL RAINFALL (mm)= 74.275
RUNOFF COEFFICIENT = 0.170

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

DIVERT HYD (0107)	
IN= 1	# OUT= 5

Outflow / Inflow Relationships

Flow 1 (cms)	+ Flow 2 (cms)	+ Flow 3 (cms)	+ Flow 4 (cms)	+ Flow 5 (cms)	= Total (cms)
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.00	0.00	0.00	0.00	0.01
0.01	0.00	0.00	0.00	0.00	0.01
0.02	0.01	0.00	0.00	0.00	0.03

```
       0.03     0.01     0.00     0.00     0.00     0.04
       0.04     0.02     0.00     0.00     0.00     0.06
       0.07     0.03     0.00     0.00     0.00     0.10

                          AREA     QPEAK     TPEAK     R.V.
                          (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):   2.26      0.04      3.67    12.65
     ========================================================
     ID= 2  (   2)    :   1.55      0.03      3.67    12.65
     ID= 3  (   2)    :   0.71      0.01      3.67    12.65
     ID= 4  (   2)    :   0.00      0.00      0.00     0.00
     ID= 5  (   2)    :   0.00      0.00      0.00     0.00
     ID= 6  (   2)    :   0.00      0.00      0.00     0.00
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (1203) |   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      35.59        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        34.83
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.30 (ii)    8.10 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.13
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01          0.021 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00          3.00
     RUNOFF VOLUME    (mm)=      73.27        15.63         27.14
     TOTAL RAINFALL   (mm)=      74.28        74.28         74.28
     RUNOFF COEFFICIENT   =       0.99         0.21          0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (1202) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        34.83
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.70 (ii)    8.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.02          0.053 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08          3.00
```



```
     RUNOFF VOLUME    (mm)=      73.28        15.63         27.15
     TOTAL RAINFALL   (mm)=      74.28        74.28         74.28
     RUNOFF COEFFICIENT   =       0.99         0.21          0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (1201) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        34.83
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.70 (ii)    8.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.02          0.053 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08          3.00
     RUNOFF VOLUME    (mm)=      73.28        15.63         27.15
     TOTAL RAINFALL   (mm)=      74.28        74.28         74.28
     RUNOFF COEFFICIENT   =       0.99         0.21          0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (1204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      36.51        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        34.83
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.32 (ii)    8.12 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.13
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01          0.023 (iii)
```

```
     TIME TO PEAK     (hrs)=       3.00         3.00          3.00
     RUNOFF VOLUME     (mm)=      73.28        15.63         27.14
     TOTAL RAINFALL    (mm)=      74.28        74.28         74.28
     RUNOFF COEFFICIENT    =       0.99         0.21          0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (1201):     0.47   0.053     3.00    27.15
        + ID2= 2 (1202):     0.47   0.053     3.00    27.15
          ================================================
          ID = 3 (0020):     0.94   0.105     3.00    27.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0020) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0020):     0.94   0.105     3.00    27.15
        + ID2= 2 (1203):     0.19   0.021     3.00    27.14
          ================================================
          ID = 1 (0020):     1.13   0.127     3.00    27.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0020):     1.13   0.127     3.00    27.14
        + ID2= 2 (1204):     0.20   0.023     3.00    27.14
          ================================================
          ID = 3 (0020):     1.33   0.150     3.00    27.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| SHIFT HYD (0114) |
| IN= 2---> OUT= 1 |
| SHIFT= 40.0 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0020):    1.33     0.15      3.00     27.14
     SHIFT ID= 1 (0114):   1.33     0.15      3.67     27.14

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--------------------
| ADD HYD   (1000) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```



```
          ID1= 1 (0107):     1.55   0.029     3.67    12.65
        + ID2= 2 (0114):     1.33   0.150     3.67    27.14
          ================================================
          ID = 3 (1000):     2.88   0.178     3.67    19.33

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (1001) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (1000):     2.88   0.178     3.67    19.33
        + ID2= 2 (0107):     0.71   0.013     3.67    12.65
          ================================================
          ID = 3 (1001):     3.59   0.191     3.67    18.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2101) |   Area     (ha)=   0.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       0.28          0.42
     Dep. Storage      (mm)=       1.00          5.00
     Average Slope      (%)=       1.00          2.00
     Length             (m)=      68.31         10.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     115.80         36.20
               over (min)         5.00         10.00
     Storage Coeff.  (min)=       1.92 (ii)     5.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.31          0.15
                                                          *TOTALS*
     PEAK FLOW         (cms)=     0.07          0.03        0.102 (iii)
     TIME TO PEAK      (hrs)=     3.00          3.00         3.00
     RUNOFF VOLUME      (mm)=    73.28         15.92        33.12
     TOTAL RAINFALL     (mm)=    74.28         74.28        74.28
     RUNOFF COEFFICIENT    =     0.99          0.21         0.45

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    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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--------------------
| CALIB            |
| STANDHYD  (2201) |   Area     (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       0.14          0.33
     Dep. Storage      (mm)=       1.00          5.00
     Average Slope      (%)=       1.00          3.60
     Length             (m)=      55.98         25.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     115.80         34.83
               over (min)         5.00         10.00
     Storage Coeff.  (min)=       1.70 (ii)     8.51 (ii)
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     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.02         0.053 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08          3.00
     RUNOFF VOLUME    (mm)=      73.28        15.63         27.15
     TOTAL RAINFALL   (mm)=      74.28        74.28         74.28
     RUNOFF COEFFICIENT   =       0.99         0.21          0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0050) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (2101):     0.70   0.102     3.00    33.12
       + ID2= 2 (2201):     0.47   0.053     3.00    27.15
         ================================================
         ID = 3 (0050):     1.17   0.154     3.00    30.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (2102) |   Area    (ha)=   0.71
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  18.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.19         0.52
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       0.60         2.00
     Length            (m)=      68.80        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        33.71
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.24 (ii)    6.99 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.04         0.078 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00          3.00
     RUNOFF VOLUME    (mm)=      73.28        15.39         25.80
     TOTAL RAINFALL   (mm)=      74.28        74.28         74.28
     RUNOFF COEFFICIENT   =       0.99         0.21          0.35

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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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--------------------
| CALIB            |
| STANDHYD  (2202) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        34.83
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.70 (ii)    8.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.02         0.053 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.08          3.00
     RUNOFF VOLUME    (mm)=      73.28        15.63         27.15
     TOTAL RAINFALL   (mm)=      74.28        74.28         74.28
     RUNOFF COEFFICIENT   =       0.99         0.21          0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0090) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (2102):     0.71   0.078     3.00    25.80
       + ID2= 2 (2202):     0.47   0.053     3.00    27.15
         ================================================
         ID = 3 (0090):     1.18   0.131     3.00    26.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0201) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0052      0.0213
                         0.0001     0.0050    |   0.0060      0.0258
                         0.0003     0.0058    |   0.0068      0.0296
                         0.0009     0.0073    |   0.0074      0.0325
                         0.0021     0.0096    |   0.0081      0.0352
                         0.0034     0.0134    |   0.0086      0.0379
                         0.0039     0.0157    |   0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0090)    1.180     0.131      3.00      26.34
     OUTFLOW: ID= 1 (0201)    1.180     0.006      5.17      21.58

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.47
                TIME SHIFT OF PEAK FLOW          (min)=130.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.0249
```

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--------------------
| CALIB            |
| STANDHYD  (2103) |   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.13         0.31
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      54.16        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        34.83
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.35 (ii)    6.14 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.02          0.052 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00           3.00
     RUNOFF VOLUME    (mm)=      73.27        15.63          27.15
     TOTAL RAINFALL   (mm)=      74.28        74.28          74.28
     RUNOFF COEFFICIENT   =       0.99         0.21           0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2203) |   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      35.59        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        34.83
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.30 (ii)    8.10 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01          0.021 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00           3.00
     RUNOFF VOLUME    (mm)=      73.27        15.63          27.14
     TOTAL RAINFALL   (mm)=      74.28        74.28          74.28
     RUNOFF COEFFICIENT   =       0.99         0.21           0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```



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--------------------
| ADD HYD   (0030) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (2103):      0.44   0.052     3.00    27.15
       + ID2= 2 (2203):      0.19   0.021     3.00    27.14
         ================================================
         ID = 3 (0030):      0.63   0.073     3.00    27.15

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0070) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0201):      1.18   0.006     5.17    21.58
       + ID2= 2 (0030):      0.63   0.073     3.00    27.15
         ================================================
         ID = 3 (0070):      1.81   0.077     3.00    23.52

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0070) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0070):      1.81   0.077     3.00    23.52
       + ID2= 2 (0050):      1.17   0.154     3.00    30.72
         ================================================
         ID = 1 (0070):      2.98   0.231     3.00    26.35

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0202) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0430     0.0228
                          0.0001     0.0173   |   0.0913     0.0255
                          0.0006     0.0179   |   0.1374     0.0275
                          0.0094     0.0198   |   0.1695     0.0292
                          0.0236     0.0214   |   0.1892     0.0304

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0070)     2.980     0.231      3.00      26.35
     OUTFLOW: ID= 1 (0202)     2.980     0.126      3.08      20.48

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 54.45
                TIME SHIFT OF PEAK FLOW          (min)=  5.00
                MAXIMUM  STORAGE   USED        (ha.m.)=  0.0271

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2104) |   Area    (ha)=   0.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  15.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.10         0.24
```

```
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      47.61        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        37.98
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.25 (ii)    5.78 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.02          0.037 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00          3.00
     RUNOFF VOLUME    (mm)=      73.28        16.28         24.82
     TOTAL RAINFALL   (mm)=      74.28        74.28         74.28
     RUNOFF COEFFICIENT   =       0.99         0.22          0.33

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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.

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD  (2204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      36.51        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        34.83
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.32 (ii)    8.12 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01          0.023 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00          3.00
     RUNOFF VOLUME    (mm)=      73.28        15.63         27.14
     TOTAL RAINFALL   (mm)=      74.28        74.28         74.28
     RUNOFF COEFFICIENT   =       0.99         0.21          0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (0093) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2104):     0.34   0.037     3.00    24.82
```



```
        + ID2= 2 (2204):     0.20   0.023     3.00    27.14
          ================================================
          ID = 3 (0093):     0.54   0.060     3.00    25.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (2000) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0202):     2.98   0.126     3.08    20.48
        + ID2= 2 (0093):     0.54   0.060     3.00    25.68
          ================================================
          ID = 3 (2000):     3.52   0.160     3.08    21.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD  (2300) |   Area    (ha)=   0.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  63.00   Dir. Conn.(%)=  63.00
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.03
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      23.09         5.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     115.80        27.03
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.00 (ii)    2.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.29
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.019 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00          3.00
     RUNOFF VOLUME    (mm)=      73.27        13.84         51.28
     TOTAL RAINFALL   (mm)=      74.28        74.28         74.28
     RUNOFF COEFFICIENT   =       0.99         0.19          0.69

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD   (0113) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2000):     3.52   0.160     3.08    21.28
        + ID2= 2 (2300):     0.08   0.019     3.00    51.28
          ================================================
          ID = 3 (0113):     3.60   0.163     3.08    21.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   6 **
  ****************************
```

```
--------------------
|    READ STORM    |    Filename: C:\Users\cproctorbennett\AppD
|                  |              ata\Local\Temp\
|                  |              750011ff-e3b9-41bb-9e57-167e83c22650\fbaa91b3
| Ptotal= 86.45 mm |    Comments: 100-Year, 6 hour SCS Type II Storm Distr
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    3.50 |  1.75    8.60 |  3.25   19.00 |  4.75    5.20
                0.50    3.50 |  2.00    8.60 |  3.50   19.00 |  5.00    5.20
                0.75    5.20 |  2.25   10.40 |  3.75    8.60 |  5.25    3.50
                1.00    5.20 |  2.50   10.40 |  4.00    8.60 |  5.50    3.50
                1.25    5.20 |  2.75   51.80 |  4.25    6.90 |  5.75    3.50
                1.50    5.20 |  3.00  134.80 |  4.50    6.90 |  6.00    3.50

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--------------------
| CALIB            |
| NASHYD    (1100) |   Area    (ha)=   2.26   Curve Number   (CN)= 46.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.64

         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    3.50 | 1.583    8.60 | 3.083   19.00 |  4.58    5.20
               0.167    3.50 | 1.667    8.60 | 3.167   19.00 |  4.67    5.20
               0.250    3.50 | 1.750    8.60 | 3.250   19.00 |  4.75    5.20
               0.333    3.50 | 1.833    8.60 | 3.333   19.00 |  4.83    5.20
               0.417    3.50 | 1.917    8.60 | 3.417   19.00 |  4.92    5.20
               0.500    3.50 | 2.000    8.60 | 3.500   19.00 |  5.00    5.20
               0.583    5.20 | 2.083   10.40 | 3.583    8.60 |  5.08    3.50
               0.667    5.20 | 2.167   10.40 | 3.667    8.60 |  5.17    3.50
               0.750    5.20 | 2.250   10.40 | 3.750    8.60 |  5.25    3.50
               0.833    5.20 | 2.333   10.40 | 3.833    8.60 |  5.33    3.50
               0.917    5.20 | 2.417   10.40 | 3.917    8.60 |  5.42    3.50
               1.000    5.20 | 2.500   10.40 | 4.000    8.60 |  5.50    3.50
               1.083    5.20 | 2.583   51.80 | 4.083    6.90 |  5.58    3.50
               1.167    5.20 | 2.667   51.80 | 4.167    6.90 |  5.67    3.50
               1.250    5.20 | 2.750   51.80 | 4.250    6.90 |  5.75    3.50
               1.333    5.20 | 2.833  134.80 | 4.333    6.90 |  5.83    3.50
               1.417    5.20 | 2.917  134.80 | 4.417    6.90 |  5.92    3.50
               1.500    5.20 | 3.000  134.80 | 4.500    6.90 |  6.00    3.50

     Unit Hyd Qpeak  (cms)=   0.135

     PEAK FLOW       (cms)=   0.056 (i)
     TIME TO PEAK    (hrs)=   3.667
     RUNOFF VOLUME    (mm)=  17.043
     TOTAL RAINFALL   (mm)=  86.450
     RUNOFF COEFFICIENT   =   0.197

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

--------------------------------------------------------------------------------
--------------------
| DIVERT HYD (0107)|
| IN= 1   # OUT= 5 |
--------------------
     Outflow / Inflow  Relationships

      Flow 1 + Flow 2 + Flow 3 + Flow 4 + Flow 5 = Total
       (cms)    (cms)    (cms)    (cms)    (cms)    (cms)
```



```
        0.00     0.00     0.00     0.00     0.00     0.00
        0.00     0.00     0.00     0.00     0.00     0.00
        0.01     0.00     0.00     0.00     0.00     0.01
        0.01     0.00     0.00     0.00     0.00     0.01
        0.02     0.01     0.00     0.00     0.00     0.03
        0.03     0.01     0.00     0.00     0.00     0.04
        0.04     0.02     0.00     0.00     0.00     0.06
        0.07     0.03     0.00     0.00     0.00     0.10

                              AREA     QPEAK     TPEAK     R.V.
                              (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):      2.26      0.06      3.67    17.04
     ================================================
     ID= 2  (   2)    :      1.56      0.04      3.67    17.04
     ID= 3  (   2)    :      0.70      0.02      3.67    17.04
     ID= 4  (   2)    :      0.00      0.00      0.00     0.00
     ID= 5  (   2)    :      0.00      0.00      0.00     0.00
     ID= 6  (   2)    :      0.00      0.00      0.00     0.00
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (1203) |   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06          0.13
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          3.60
     Length            (m)=      35.59         25.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     134.80         46.14
               over (min)          5.00         10.00
     Storage Coeff.  (min)=       1.22 (ii)     7.30 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.33          0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.01          0.027 (iii)
     TIME TO PEAK    (hrs)=       3.00          3.00           3.00
     RUNOFF VOLUME    (mm)=      85.45         20.74          33.66
     TOTAL RAINFALL   (mm)=      86.45         86.45          86.45
     RUNOFF COEFFICIENT   =       0.99          0.24           0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (1202) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14          0.33
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          3.60
     Length            (m)=      55.98         25.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     134.80         46.14
               over (min)          5.00         10.00
     Storage Coeff.  (min)=       1.60 (ii)     7.68 (ii)
```

```
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.03         0.066 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00          3.00
     RUNOFF VOLUME    (mm)=      85.45        20.74         33.67
     TOTAL RAINFALL   (mm)=      86.45        86.45         86.45
     RUNOFF COEFFICIENT   =       0.99         0.24          0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (1201) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     134.80        46.14
                  over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.60 (ii)    7.68 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.03         0.066 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00          3.00
     RUNOFF VOLUME    (mm)=      85.45        20.74         33.67
     TOTAL RAINFALL   (mm)=      86.45        86.45         86.45
     RUNOFF COEFFICIENT   =       0.99         0.24          0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (1204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      36.51        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     134.80        46.14
                  over (min)        5.00        10.00
```



```
     Storage Coeff.  (min)=       1.24 (ii)    7.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01         0.028 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00          3.00
     RUNOFF VOLUME    (mm)=      85.45        20.74         33.66
     TOTAL RAINFALL   (mm)=      86.45        86.45         86.45
     RUNOFF COEFFICIENT   =       0.99         0.24          0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (1201):     0.47   0.066     3.00    33.67
        + ID2= 2 (1202):     0.47   0.066     3.00    33.67
          ================================================
          ID = 3 (0020):     0.94   0.133     3.00    33.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0020) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0020):     0.94   0.133     3.00    33.67
        + ID2= 2 (1203):     0.19   0.027     3.00    33.66
          ================================================
          ID = 1 (0020):     1.13   0.160     3.00    33.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0020):     1.13   0.160     3.00    33.67
        + ID2= 2 (1204):     0.20   0.028     3.00    33.66
          ================================================
          ID = 3 (0020):     1.33   0.188     3.00    33.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0114) |
| IN= 2---> OUT= 1 |
| SHIFT= 40.0 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0020):    1.33     0.19      3.00     33.67
    SHIFT ID= 1 (0114):    1.33     0.19      3.67     33.67

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```

```
--------------------
| ADD HYD   (1000) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (0107):      1.56   0.039     3.67     17.04
       + ID2= 2 (0114):      1.33   0.188     3.67     33.67
         ================================================
         ID = 3 (1000):      2.89   0.228     3.67     24.69

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (1001) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (1000):      2.89   0.228     3.67     24.69
       + ID2= 2 (0107):      0.70   0.017     3.67     17.04
         ================================================
         ID = 3 (1001):      3.59   0.245     3.67     23.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2101) |   Area    (ha)=   0.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      68.31        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     134.80        47.91
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.80 (ii)    5.40 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.16
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.08         0.05          0.125 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00           3.00
     RUNOFF VOLUME    (mm)=      85.45        21.10          40.40
     TOTAL RAINFALL   (mm)=      86.45        86.45          86.45
     RUNOFF COEFFICIENT   =       0.99         0.24           0.47

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2201) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
```



```
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     134.80        46.14
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.60 (ii)    7.68 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.13
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.03          0.066 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00           3.00
     RUNOFF VOLUME    (mm)=      85.45        20.74          33.67
     TOTAL RAINFALL   (mm)=      86.45        86.45          86.45
     RUNOFF COEFFICIENT   =       0.99         0.24           0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD   (0050) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (2101):      0.70   0.125     3.00    40.40
       + ID2= 2 (2201):      0.47   0.066     3.00    33.67
         ================================================
         ID = 3 (0050):      1.17   0.191     3.00    37.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2102) |   Area    (ha)=   0.71
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  18.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.19         0.52
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       0.60         2.00
     Length            (m)=      68.80        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     134.80     ********
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.11 (ii)    6.88 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.14
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.05          0.097 (iii)
     TIME TO PEAK    (hrs)=       3.00         3.00           3.00
     RUNOFF VOLUME    (mm)=      85.45        20.44          32.14
     TOTAL RAINFALL   (mm)=      86.45        86.45          86.45
     RUNOFF COEFFICIENT   =       0.99         0.24           0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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.

CALIB			
STANDHYD (2202)	Area (ha)= 0.47		
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.14	0.33	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	3.60	
Length	(m)=	55.98	25.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.	(mm/hr)=	134.80	46.14	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	1.60 (ii)	7.68 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.32	0.13	
				TOTALS
PEAK FLOW	(cms)=	0.04	0.03	0.066 (iii)
TIME TO PEAK	(hrs)=	3.00	3.00	3.00
RUNOFF VOLUME	(mm)=	85.45	20.74	33.67
TOTAL RAINFALL	(mm)=	86.45	86.45	86.45
RUNOFF COEFFICIENT	=	0.99	0.24	0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0090)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (2102):	0.71	0.097	3.00	32.14
+	ID2= 2 (2202):	0.47	0.066	3.00	33.67
	ID = 3 (0090):	1.18	0.164	3.00	32.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0201)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
	0.0000	0.0000	0.0052	0.0213
	0.0001	0.0050	0.0060	0.0258
	0.0003	0.0058	0.0068	0.0296
	0.0009	0.0073	0.0074	0.0325
	0.0021	0.0096	0.0081	0.0352
	0.0034	0.0134	0.0086	0.0379
	0.0039	0.0157	0.0000	0.0000

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0090)	1.180	0.164	3.00	32.75
OUTFLOW: ID= 1 (0201)	1.180	0.007	5.17	27.99

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.34
TIME SHIFT OF PEAK FLOW (min)=130.00
MAXIMUM STORAGE USED (ha.m.)= 0.0311

CALIB			
STANDHYD (2103)	Area (ha)= 0.44		
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.13	0.31	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	54.16	10.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.	(mm/hr)=	134.80	46.14	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	1.27 (ii)	5.77 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.33	0.15	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.03	0.065 (iii)
TIME TO PEAK	(hrs)=	3.00	3.00	3.00
RUNOFF VOLUME	(mm)=	85.45	20.74	33.67
TOTAL RAINFALL	(mm)=	86.45	86.45	86.45
RUNOFF COEFFICIENT	=	0.99	0.24	0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 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.

CALIB			
STANDHYD (2203)	Area (ha)= 0.19		
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.06	0.13	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	3.60	
Length	(m)=	35.59	25.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.	(mm/hr)=	134.80	46.14	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	1.22 (ii)	7.30 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.33	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.01	0.01	0.027 (iii)
TIME TO PEAK	(hrs)=	3.00	3.00	3.00
RUNOFF VOLUME	(mm)=	85.45	20.74	33.66
TOTAL RAINFALL	(mm)=	86.45	86.45	86.45
RUNOFF COEFFICIENT	=	0.99	0.24	0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| ADD HYD   (0030) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (2103):     0.44   0.065     3.00    33.67
        + ID2= 2 (2203):     0.19   0.027     3.00    33.66
          ================================================
          ID = 3 (0030):     0.63   0.092     3.00    33.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (0070) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0201):     1.18   0.007     5.17    27.99
        + ID2= 2 (0030):     0.63   0.092     3.00    33.67
          ================================================
          ID = 3 (0070):     1.81   0.096     3.00    29.97

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD   (0070) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)     (cms)    (hrs)     (mm)
          ID1= 3 (0070):     1.81   0.096     3.00    29.97
        + ID2= 2 (0050):     1.17   0.191     3.00    37.70
          ================================================
          ID = 1 (0070):     2.98   0.288     3.00    33.00

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| RESERVOIR (0202) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0430     0.0228
                         0.0001     0.0173   |   0.0913     0.0255
                         0.0006     0.0179   |   0.1374     0.0275
                         0.0094     0.0198   |   0.1695     0.0292
                         0.0236     0.0214   |   0.1892     0.0304

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0070)    2.980     0.288      3.00      33.00
     OUTFLOW: ID= 1 (0202)    2.980     0.181      3.08      27.14

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 62.85
                    TIME SHIFT OF PEAK FLOW         (min)=  5.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0303

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| CALIB            |
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| STANDHYD  (2104) |   Area    (ha)=   0.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  15.00
-------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.10          0.24
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=      47.61         10.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     134.80         50.21
               over (min)         5.00         10.00
     Storage Coeff.  (min)=       1.18 (ii)     5.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.33          0.16
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.02          0.03          0.047 (iii)
     TIME TO PEAK    (hrs)=       3.00          3.00          3.00
     RUNOFF VOLUME    (mm)=      85.45         21.56         31.14
     TOTAL RAINFALL   (mm)=      86.45         86.45         86.45
     RUNOFF COEFFICIENT    =      0.99          0.25          0.36

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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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-------------------
| CALIB            |
| STANDHYD  (2204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
-------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06          0.14
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          3.60
     Length            (m)=      36.51         25.00
     Mannings n            =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     134.80         46.14
               over (min)         5.00         10.00
     Storage Coeff.  (min)=       1.24 (ii)     7.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.33          0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.01          0.028 (iii)
     TIME TO PEAK    (hrs)=       3.00          3.00          3.00
     RUNOFF VOLUME    (mm)=      85.45         20.74         33.66
     TOTAL RAINFALL   (mm)=      86.45         86.45         86.45
     RUNOFF COEFFICIENT    =      0.99          0.24          0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD   (0093) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (2104):     0.34   0.047     3.00    31.14
        + ID2= 2 (2204):     0.20   0.028     3.00    33.66
          ================================================
          ID = 3 (0093):     0.54   0.076     3.00    32.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD   (2000) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0202):     2.98   0.181     3.08    27.14
        + ID2= 2 (0093):     0.54   0.076     3.00    32.07
          ================================================
          ID = 3 (2000):     3.52   0.228     3.00    27.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| CALIB            |
| STANDHYD  (2300) |   Area    (ha)=   0.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  63.00   Dir. Conn.(%)=  63.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05          0.03
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      23.09          5.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     134.80         36.03
               over (min)         5.00          5.00
     Storage Coeff.  (min)=       0.94 (ii)     2.39 (ii)
     Unit Hyd. Tpeak (min)=       5.00          5.00
     Unit Hyd. peak  (cms)=       0.34          0.30
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02          0.00          0.022 (iii)
     TIME TO PEAK    (hrs)=       3.00          3.00           3.00
     RUNOFF VOLUME    (mm)=      85.45         18.49          60.67
     TOTAL RAINFALL   (mm)=      86.45         86.45          86.45
     RUNOFF COEFFICIENT   =       0.99          0.21           0.70

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------
| ADD HYD   (0113) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (2000):     3.52   0.228     3.00    27.89
        + ID2= 2 (2300):     0.08   0.022     3.00    60.67
          ================================================
          ID = 3 (0113):     3.60   0.250     3.00    28.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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  ****************************
  ** SIMULATION NUMBER:   7 **
  ****************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 405.000
| Ptotal= 24.91 mm |                          B=   3.000
--------------------                          C=   0.760
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.17    1.76 |  1.17   11.75 |  2.17    3.88 |  3.17    2.07
                0.33    2.00 |  1.33   57.66 |  2.33    3.35 |  3.33    1.93
                0.50    2.32 |  1.50   15.20 |  2.50    2.96 |  3.50    1.81
                0.67    2.81 |  1.67    8.31 |  2.67    2.66 |  3.67    1.71
                0.83    3.61 |  1.83    5.91 |  2.83    2.42 |  3.83    1.62
                1.00    5.28 |  2.00    4.66 |  3.00    2.23 |  4.00    1.54
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--------------------
| CALIB            |
| NASHYD    (1100) |   Area     (ha)=   2.26   Curve Number    (CN)= 46.4
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.64

        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    1.76 | 1.083   11.75 | 2.083    3.88 |  3.08    2.07
               0.167    1.76 | 1.167   11.75 | 2.167    3.88 |  3.17    2.07
               0.250    2.00 | 1.250   57.66 | 2.250    3.35 |  3.25    1.93
               0.333    2.00 | 1.333   57.66 | 2.333    3.35 |  3.33    1.93
               0.417    2.32 | 1.417   15.20 | 2.417    2.96 |  3.42    1.81
               0.500    2.32 | 1.500   15.20 | 2.500    2.96 |  3.50    1.81
               0.583    2.81 | 1.583    8.31 | 2.583    2.66 |  3.58    1.71
               0.667    2.81 | 1.667    8.31 | 2.667    2.66 |  3.67    1.71
               0.750    3.61 | 1.750    5.91 | 2.750    2.42 |  3.75    1.62
               0.833    3.61 | 1.833    5.91 | 2.833    2.42 |  3.83    1.62
               0.917    5.28 | 1.917    4.66 | 2.917    2.23 |  3.92    1.54
               1.000    5.28 | 2.000    4.66 | 3.000    2.23 |  4.00    1.54

     Unit Hyd Qpeak  (cms)=   0.135

     PEAK FLOW       (cms)=   0.003 (i)
     TIME TO PEAK    (hrs)=   2.333
     RUNOFF VOLUME    (mm)=   1.063
     TOTAL RAINFALL   (mm)=  24.906
     RUNOFF COEFFICIENT   =   0.043

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------
| DIVERT HYD (0107)|
| IN= 1   # OUT= 5 |
--------------------
     Outflow / Inflow  Relationships
```

Flow 1 (cms)	+ Flow 2 (cms)	+ Flow 3 (cms)	+ Flow 4 (cms)	+ Flow 5 (cms)	= Total (cms)
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.00	0.00	0.00	0.00	0.01
0.01	0.00	0.00	0.00	0.00	0.01
0.02	0.01	0.00	0.00	0.00	0.03
0.03	0.01	0.00	0.00	0.00	0.04
0.04	0.02	0.00	0.00	0.00	0.06
0.07	0.03	0.00	0.00	0.00	0.10

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	2.26	0.00	2.33	1.06
ID= 2 (2) :	1.13	0.00	2.33	1.06
ID= 3 (2) :	1.13	0.00	2.33	1.06
ID= 4 (2) :	0.00	0.00	0.00	0.00
ID= 5 (2) :	0.00	0.00	0.00	0.00
ID= 6 (2) :	0.00	0.00	0.00	0.00

CALIB			
STANDHYD (1203)	Area (ha)= 0.19		
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	3.60
Length	(m)=	35.59	25.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.	(mm/hr)=	57.66	1.91
over	(min)	5.00	25.00
Storage Coeff.	(min)=	1.71 (ii)	23.43 (ii)
Unit Hyd. Tpeak	(min)=	5.00	25.00
Unit Hyd. peak	(cms)=	0.32	0.05

				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.006 (iii)
TIME TO PEAK	(hrs)=	1.33	1.75	1.33
RUNOFF VOLUME	(mm)=	23.91	1.60	5.98
TOTAL RAINFALL	(mm)=	24.91	24.91	24.91
RUNOFF COEFFICIENT	=	0.96	0.06	0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 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.

CALIB			
STANDHYD (1202)	Area (ha)= 0.47		
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.14	0.33
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	3.60
Length	(m)=	55.98	25.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.	(mm/hr)=	57.66	1.91

over	(min)	5.00	25.00
Storage Coeff.	(min)=	2.25 (ii)	23.97 (ii)
Unit Hyd. Tpeak	(min)=	5.00	25.00
Unit Hyd. peak	(cms)=	0.30	0.05

				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.015 (iii)
TIME TO PEAK	(hrs)=	1.33	1.75	1.33
RUNOFF VOLUME	(mm)=	23.91	1.60	6.03
TOTAL RAINFALL	(mm)=	24.91	24.91	24.91
RUNOFF COEFFICIENT	=	0.96	0.06	0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 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.

CALIB			
STANDHYD (1201)	Area (ha)= 0.47		
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.14	0.33
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	3.60
Length	(m)=	55.98	25.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.	(mm/hr)=	57.66	1.91
over	(min)	5.00	25.00
Storage Coeff.	(min)=	2.25 (ii)	23.97 (ii)
Unit Hyd. Tpeak	(min)=	5.00	25.00
Unit Hyd. peak	(cms)=	0.30	0.05

				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.015 (iii)
TIME TO PEAK	(hrs)=	1.33	1.75	1.33
RUNOFF VOLUME	(mm)=	23.91	1.60	6.03
TOTAL RAINFALL	(mm)=	24.91	24.91	24.91
RUNOFF COEFFICIENT	=	0.96	0.06	0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 47.8 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.

CALIB			
STANDHYD (1204)	Area (ha)= 0.20		
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 20.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.06	0.14
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	3.60
Length	(m)=	36.51	25.00
Mannings n	=	0.013	0.250

```
     Max.Eff.Inten.(mm/hr)=      57.66         1.91
               over (min)        5.00        25.00
     Storage Coeff.  (min)=       1.74 (ii)   23.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=       0.32         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.006 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.91         1.60          5.98
     TOTAL RAINFALL   (mm)=      24.91        24.91         24.91
     RUNOFF COEFFICIENT   =       0.96         0.06          0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (1201):     0.47   0.015     1.33     6.03
        + ID2= 2 (1202):     0.47   0.015     1.33     6.03
          ================================================
          ID = 3 (0020):     0.94   0.030     1.33     6.03

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

```
--------------------
| ADD HYD   (0020) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0020):     0.94   0.030     1.33     6.03
        + ID2= 2 (1203):     0.19   0.006     1.33     5.98
          ================================================
          ID = 1 (0020):     1.13   0.036     1.33     6.03

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

```
--------------------
| ADD HYD   (0020) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0020):     1.13   0.036     1.33     6.03
        + ID2= 2 (1204):     0.20   0.006     1.33     5.98
          ================================================
          ID = 3 (0020):     1.33   0.043     1.33     6.02

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

```
--------------------
| SHIFT HYD (0114) |
| IN= 2---> OUT= 1 |
| SHIFT= 40.0 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0020):    1.33     0.04      1.33      6.02
    SHIFT ID= 1 (0114):    1.33     0.04      2.00      6.02
```

```
--------------------
| ADD HYD   (1000) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0107):     1.13   0.001     2.33     1.06
        + ID2= 2 (0114):     1.33   0.043     2.00     6.02
          ================================================
          ID = 3 (1000):     2.46   0.044     2.00     3.74

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

```
--------------------
| ADD HYD   (1001) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (1000):     2.46   0.044     2.00     3.74
        + ID2= 2 (0107):     1.13   0.001     2.33     1.06
          ================================================
          ID = 3 (1001):     3.59   0.045     2.00     2.90

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

```
--------------------
| CALIB            |
| STANDHYD  (2101) |   Area    (ha)=   0.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         0.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      68.31        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      57.66         2.47
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       2.53 (ii)   16.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.29         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.00          0.034 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58          1.33
     RUNOFF VOLUME    (mm)=      23.91         1.65          8.31
     TOTAL RAINFALL   (mm)=      24.91        24.91         24.91
     RUNOFF COEFFICIENT   =       0.96         0.07          0.33

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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.
```

```
--------------------
| CALIB            |
| STANDHYD  (2201) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
```

```
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      57.66         1.91
                   over (min)       5.00        25.00
     Storage Coeff.  (min)=       2.25 (ii)   23.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=       0.30         0.05
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.015 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.91         1.60          6.03
     TOTAL RAINFALL   (mm)=      24.91        24.91         24.91
     RUNOFF COEFFICIENT   =       0.96         0.06          0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD   (0050) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (2101):     0.70   0.034     1.33     8.31
       + ID2= 2 (2201):     0.47   0.015     1.33     6.03
         ================================================
         ID = 3 (0050):     1.17   0.049     1.33     7.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| CALIB            |
| STANDHYD  (2102) |   Area    (ha)=   0.71
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  18.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.19         0.52
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       0.60         2.00
     Length            (m)=      68.80        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      57.66         2.26
                   over (min)       5.00        20.00
     Storage Coeff.  (min)=       2.97 (ii)   16.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.28         0.06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.00          0.020 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58          1.33
     RUNOFF VOLUME    (mm)=      23.91         1.56          5.57
     TOTAL RAINFALL   (mm)=      24.91        24.91         24.91
     RUNOFF COEFFICIENT   =       0.96         0.06          0.22

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
```



```
             CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2202) |   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.33
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      55.98        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      57.66         1.91
                   over (min)       5.00        25.00
     Storage Coeff.  (min)=       2.25 (ii)   23.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=       0.30         0.05
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.015 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.91         1.60          6.03
     TOTAL RAINFALL   (mm)=      24.91        24.91         24.91
     RUNOFF COEFFICIENT   =       0.96         0.06          0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD   (0090) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (2102):     0.71   0.020     1.33     5.57
       + ID2= 2 (2202):     0.47   0.015     1.33     6.03
         ================================================
         ID = 3 (0090):     1.18   0.035     1.33     5.76

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0201) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0052     0.0213
                         0.0001     0.0050    |   0.0060     0.0258
                         0.0003     0.0058    |   0.0068     0.0296
                         0.0009     0.0073    |   0.0074     0.0325
                         0.0021     0.0096    |   0.0081     0.0352
                         0.0034     0.0134    |   0.0086     0.0379
                         0.0039     0.0157    |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
```

```
     INFLOW : ID= 2 (0090)      1.180      0.035      1.33       5.76
     OUTFLOW: ID= 1 (0201)      1.180      0.001      4.17       1.00

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.57
                   TIME SHIFT OF PEAK FLOW          (min)=170.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  0.0064

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2103) |   Area    (ha)=   0.44
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.13         0.31
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      54.16        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      57.66         2.35
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       1.79 (ii)   15.55 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.32         0.07
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.014 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58           1.33
     RUNOFF VOLUME    (mm)=      23.91         1.60           6.04
     TOTAL RAINFALL   (mm)=      24.91        24.91          24.91
     RUNOFF COEFFICIENT   =       0.96         0.06           0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2203) |   Area    (ha)=   0.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      35.59        25.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      57.66         1.91
               over (min)        5.00        25.00
     Storage Coeff.  (min)=       1.71 (ii)   23.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=       0.32         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.006 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75           1.33
     RUNOFF VOLUME    (mm)=      23.91         1.60           5.98
     TOTAL RAINFALL   (mm)=      24.91        24.91          24.91
     RUNOFF COEFFICIENT   =       0.96         0.06           0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
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```
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD   (0030) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (2103):      0.44   0.014     1.33     6.04
       + ID2= 2 (2203):      0.19   0.006     1.33     5.98
         ================================================
         ID = 3 (0030):      0.63   0.020     1.33     6.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0070) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0201):      1.18   0.001     4.17     1.00
       + ID2= 2 (0030):      0.63   0.020     1.33     6.02
         ================================================
         ID = 3 (0070):      1.81   0.021     1.33     2.75

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0070) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (0070):      1.81   0.021     1.33     2.75
       + ID2= 2 (0050):      1.17   0.049     1.33     7.39
         ================================================
         ID = 1 (0070):      2.98   0.069     1.33     4.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0202) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0430     0.0228
                          0.0001     0.0173   |   0.0913     0.0255
                          0.0006     0.0179   |   0.1374     0.0275
                          0.0094     0.0198   |   0.1695     0.0292
                          0.0236     0.0214   |   0.1892     0.0304

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0070)      2.980     0.069      1.33       4.57
     OUTFLOW: ID= 1 (0202)      2.980     0.000     10.67       0.08

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.11
                   TIME SHIFT OF PEAK FLOW          (min)=560.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  0.0134

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--------------------
| CALIB            |
| STANDHYD  (2104) |   Area    (ha)=   0.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  29.00   Dir. Conn.(%)=  15.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.10         0.24
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      47.61        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      57.66         2.65
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       1.66 (ii)   14.79 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.32         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.009 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50          1.33
     RUNOFF VOLUME    (mm)=      23.91         1.70          5.01
     TOTAL RAINFALL   (mm)=      24.91        24.91         24.91
     RUNOFF COEFFICIENT   =       0.96         0.07          0.20

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2204) |   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.06         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         3.60
     Length            (m)=      36.51        25.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      57.66         1.91
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       1.74 (ii)   23.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=       0.32         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.006 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.75          1.33
     RUNOFF VOLUME    (mm)=      23.91         1.60          5.98
     TOTAL RAINFALL   (mm)=      24.91        24.91         24.91
     RUNOFF COEFFICIENT   =       0.96         0.06          0.24

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```



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

--------------------
| ADD HYD   (0093) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2104):      0.34   0.009     1.33     5.01
        + ID2= 2 (2204):      0.20   0.006     1.33     5.98
          ================================================
          ID = 3 (0093):      0.54   0.015     1.33     5.37

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (2000) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0202):      2.98   0.000    10.67     0.08
        + ID2= 2 (0093):      0.54   0.015     1.33     5.37
          ================================================
          ID = 3 (2000):      3.52   0.015     1.33     0.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (2300) |   Area    (ha)=   0.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  63.00   Dir. Conn.(%)=  63.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.05         0.03
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      23.09         5.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      57.66         1.95
                over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.32 (ii)    3.36 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.26
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.008 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33          1.33
     RUNOFF VOLUME    (mm)=      23.91         1.33         15.55
     TOTAL RAINFALL   (mm)=      24.91        24.91         24.91
     RUNOFF COEFFICIENT   =       0.96         0.05          0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  47.8    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD   (0113) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (2000):      3.52   0.015     1.33     0.89
        + ID2= 2 (2300):      0.08   0.008     1.33    15.55
          ================================================
          ID = 3 (0113):      3.60   0.023     1.33     1.22
```

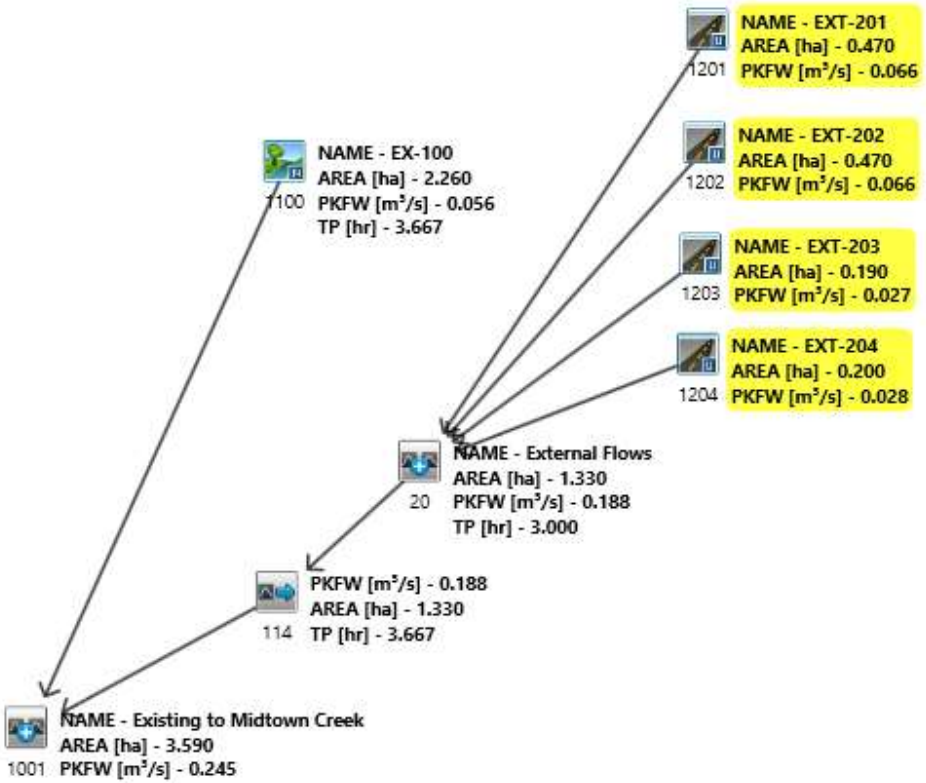
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

==========

Summary Output - All Storm Events
Proposed Condition

VO3 Model Schematic
Existing Condition



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

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                    *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\VO Suite 3.0\VO2\voin.dat

  Output  filename: C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\Scenario.
out
  Summary filename: C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\Scenario.
sum


DATE: 06-05-2020                          TIME: 11:32:07

USER:


COMMENTS: ____________________________________________________________


  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 28.55 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\9a624bb6-1c30-
47e
      remark: 2-Year, 6 hour SCS Type II Storm Distribution, Custom Gauge:

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.00  3.75   1.51 0.05   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.01  3.00   7.24 0.25   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01  3.00   7.20 0.25   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01  3.00   7.20 0.25   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.01  3.00   7.24 0.25   0.000
      [I%=20.0:S%= 3.60]
*
```



```
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.03  3.00   7.24  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.03  3.00   7.23  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.04  3.00   7.22  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.04  3.67   7.22  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.04  3.67   3.63  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 39.33 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\3113dc0e-b5d9-
435
      remark: 5-Year, 6 hour SCS Type II Storm Distribution, Custom Gauge:

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.01  3.67   3.26 0.08   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.02  3.00  11.17 0.28   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01  3.00  11.14 0.28   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01  3.00  11.14 0.28   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.02  3.00  11.17 0.28   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.04  3.00  11.17  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.05  3.00  11.16  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.06  3.00  11.16  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.06  3.67  11.16  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.07  3.67   6.19  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 45.00 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\2a628570-41db-
46e
      remark: 10-Year, 6 hour SCS Type II Storm Distribution, Custom Gauge
```

```
*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.01  3.67   4.42 0.10   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.02  3.00  13.44 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01  3.00  13.43 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01  3.00  13.43 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.02  3.00  13.44 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.05  3.00  13.44  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.06  3.00  13.44  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.07  3.00  13.44  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.07  3.67  13.44  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.08  3.67   7.76  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 61.77 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\9cef4af0-bb2f-
4ba
      remark: 25-Year, 6 hour SCS Type II Storm Distribution, Custom Gauge

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.03  3.67   8.70 0.14   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.04  3.00  20.92 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.02  3.00  20.92 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.02  3.00  20.92 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.04  3.00  20.92 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.08  3.00  20.92  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.10  3.00  20.92  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.11  3.00  20.92  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.11  3.67  20.92  n/a   0.000
      [SHIFT= 40.0 min]
*
```



```
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.14  3.67  13.23  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   5 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 74.28 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\9ac8a4c3-edbc-
414
      remark: 50-Year, 6 hour SCS Type II Storm Distribution, Custom Gauge

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.04  3.67  12.65 0.17   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.05  3.00  27.15 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.02  3.00  27.14 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.02  3.00  27.14 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.05  3.00  27.15 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.11  3.00  27.15  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.13  3.00  27.14  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.15  3.00  27.14  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.15  3.67  27.14  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.19  3.67  18.02  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   6 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 86.45 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\fbaa91b3-0be0-
4cd
      remark: 100-Year, 6 hour SCS Type II Storm Distribution, Custom Gaug

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.06  3.67  17.04 0.20   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.07  3.00  33.67 0.39   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.03  3.00  33.66 0.39   0.000
```

```
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.03  3.00  33.66 0.39   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.07  3.00  33.67 0.39   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.13  3.00  33.67  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.16  3.00  33.67  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.19  3.00  33.67  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.19  3.67  33.67  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.24  3.67  23.20  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   7 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 29.00 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\f39de83f-402c-
4ed
      remark: 2-Year, 12 hour SCS Type II Storm Distribution, Custom Gauge

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.00  6.67   1.57 0.05   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.01  6.00   7.39 0.25   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.00  6.00   7.37 0.25   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.00  6.00   7.37 0.25   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.01  6.00   7.39 0.25   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.02  6.00   7.39  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.03  6.00   7.38  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.03  6.00   7.38  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.03  6.67   7.38  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.03  6.67   3.73  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   8 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms
```



```
      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 40.10 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\76ef7112-047c-
41b
      remark: 5-Year, 12 hour SCS Type II Storm Distribution, Custom Gauge

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.01  6.67   3.41 0.09   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.02  6.00  11.47 0.29   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01  6.00  11.44 0.29   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01  6.00  11.44 0.29   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.02  6.00  11.47 0.29   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.03  6.00  11.47  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.04  6.00  11.46  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.05  6.00  11.46  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.05  6.67  11.46  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.06  6.67   6.39  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   9 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 46.00 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\194ced42-6057-
4b3
      remark: 10-Year, 12 hour SCS Type II Storm Distribution, Custom Gaug

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.01  6.67   4.64 0.10   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.02  6.00  13.86 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01  6.00  13.84 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01  6.00  13.82 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.02  6.00  13.86 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.04  6.00  13.86  n/a   0.000
```

```
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.05  6.00  13.85  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.06  6.00  13.85  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.06  6.67  13.85  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.07  6.67   8.05  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  10 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 63.33 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\c9ee0843-fdd3-
4b3
      remark: 25-Year, 12 hour SCS Type II Storm Distribution, Custom Gaug

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.03  6.58   9.16 0.14   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.03  6.00  21.67 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01  6.00  21.66 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01  6.00  21.64 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.03  6.00  21.67 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.06  6.00  21.67  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.08  6.00  21.66  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.09  6.00  21.66  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.09  6.67  21.66  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.12  6.67  13.79  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  11 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 76.58 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\b5edcc6e-e601-
4c9
      remark: 50-Year, 12 hour SCS Type II Storm Distribution, Custom Gaug

*
```



```
  **  CALIB NASHYD       1100  1  5.0    2.26    0.04  6.58  13.44 0.18   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.05  6.00  28.34 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.02  6.00  28.33 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.02  6.00  28.33 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.05  6.00  28.34 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.09  6.00  28.34  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.11  6.00  28.34  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.13  6.00  28.34  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.13  6.67  28.34  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.17  6.67  18.96  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  12 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 89.58 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\2dbc5c14-1239-
49d
      remark: 100-Year, 12 hour SCS Type II Storm Distribution, Custom Gau

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.05  6.58  18.25 0.20   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.06  6.00  35.42 0.40   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.03  6.00  35.40 0.40   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.02  6.00  35.40 0.40   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.06  6.00  35.42 0.40   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.12  6.00  35.42  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.14  6.00  35.41  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.17  6.00  35.41  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.17  6.67  35.41  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.22  6.67  24.61  n/a   0.000
```

```
*
  ****************************
  ** SIMULATION NUMBER:  13 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 29.58 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\81e6de29-b061-
48b
      remark: 2-Year, 24 hour SCS Type II Storm Distribution, Custom Gauge

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.00 12.67   1.65 0.06   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.01 12.00   7.58 0.26   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.00 12.00   6.46 0.22   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.00 12.00   6.43 0.22   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.01 12.00   7.58 0.26   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.02 12.00   7.58  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.02 12.00   7.39  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.03 12.00   7.25  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.03 12.67   7.25  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.03 12.67   3.73  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  14 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 40.23 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\05f9ce32-e231-
449
      remark: 5-Year, 24 hour SCS Type II Storm Distribution, Custom Gauge

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.01 12.58   3.44 0.09   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.01 12.00  11.51 0.29   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01 12.00  11.50 0.29   0.000
      [I%=20.0:S%= 3.60]
```



```
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01 12.00  11.50 0.29   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.01 12.00  11.51 0.29   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.03 12.00  11.51  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.03 12.00  11.51  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.04 12.00  11.51  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.04 12.67  11.51  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.05 12.67   6.43  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  15 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 46.40 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\a9e5bc93-00b0-
444
      remark: 10-Year, 24 hour SCS Type II Storm Distribution, Custom Gaug

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.01 12.58   4.73 0.10   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.02 12.00  14.02 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01 12.00  14.00 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01 12.00  14.00 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.02 12.00  14.02 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.03 12.00  14.02  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.04 12.00  14.02  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.05 12.00  14.02  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.05 12.67  14.02  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.06 12.67   8.17  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  16 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
```

```
      --------------------
      READ STORM                15.0
      [ Ptot= 64.07 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\6371fa88-a155-
48a
      remark: 25-Year, 24 hour SCS Type II Storm Distribution, Custom Gaug

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.02 12.58   9.38 0.15   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.03 12.00  22.03 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01 12.00  22.01 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01 12.00  22.01 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.03 12.00  22.03 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.05 12.00  22.03  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.07 12.00  22.02  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.08 12.00  22.02  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.08 12.67  22.02  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.10 12.67  14.07  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  17 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 77.75 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\c3afdc7c-c334-
464
      remark: 50-Year, 24 hour SCS Type II Storm Distribution, Custom Gaug

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.03 12.58  13.85 0.18   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.04 12.00  28.97 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.02 12.00  28.95 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.02 12.00  28.95 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.04 12.00  28.97 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.08 12.00  28.97  n/a   0.000
*
```



```
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.09 12.00  28.96  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.11 12.00  28.96  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.11 12.67  28.96  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.14 12.67  19.45  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  18 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 91.28 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\016ded27-f6e7-4991-ac6b-637813500ba4\30f72e32-8e4e-
4c1
      remark: 100-Year, 24 hour SCS Type II Storm Distribution, Custom Gau

*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.04 12.58  18.92 0.21   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.05 12.00  36.37 0.40   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.02 12.00  36.35 0.40   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.02 12.00  36.35 0.40   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.05 12.00  36.37 0.40   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.10 12.00  36.37  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.12 12.00  36.37  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.14 12.00  36.37  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.14 12.67  36.37  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.19 12.67  25.39  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  19 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      CHIC STORM               10.0
      [ Ptot= 28.11 mm ]
*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.01  2.17   1.45 0.05   0.000
      [CN=46.4         ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.02  1.33   7.09 0.25   0.000
```

```
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01  1.33   7.04 0.25   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01  1.33   7.02 0.25   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.02  1.33   7.09 0.25   0.000
     [I%=20.0:S%= 3.60]
*
     ADD [1201 + 1202]  0020  3  5.0    0.94    0.04  1.33   7.09  n/a   0.000
*
     ADD [0020 + 1203]  0020  1  5.0    1.13    0.05  1.33   7.08  n/a   0.000
*
     ADD [0020 + 1204]  0020  3  5.0    1.33    0.06  1.33   7.07  n/a   0.000
*
     SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.06  2.00   7.07  n/a   0.000
     [SHIFT= 40.0 min]
*
     ADD [1100 + 0114]  1001  3  5.0    3.59    0.06  2.00   3.54  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  20 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
     CHIC STORM                10.0
     [ Ptot= 38.49 mm ]
*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.01  2.17   3.11 0.08   0.000
     [CN=46.4         ]
     [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.03  1.33  10.84 0.28   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01  1.33  10.83 0.28   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01  1.33  10.83 0.28   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.03  1.33  10.84 0.28   0.000
     [I%=20.0:S%= 3.60]
*
     ADD [1201 + 1202]  0020  3  5.0    0.94    0.05  1.33  10.84  n/a   0.000
*
     ADD [0020 + 1203]  0020  1  5.0    1.13    0.06  1.33  10.84  n/a   0.000
*
     ADD [0020 + 1204]  0020  3  5.0    1.33    0.08  1.33  10.84  n/a   0.000
*
     SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.08  2.00  10.84  n/a   0.000
     [SHIFT= 40.0 min]
*
     ADD [1100 + 0114]  1001  3  5.0    3.59    0.09  2.00   5.97  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  21 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
```



```
     --------------------
     CHIC STORM                10.0
     [ Ptot= 44.04 mm ]
*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.02  2.17   4.21 0.10   0.000
     [CN=46.4         ]
     [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.03  1.33  13.05 0.30   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.01  1.33  13.02 0.30   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.01  1.33  13.02 0.30   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.03  1.33  13.05 0.30   0.000
     [I%=20.0:S%= 3.60]
*
     ADD [1201 + 1202]  0020  3  5.0    0.94    0.06  1.33  13.05  n/a   0.000
*
     ADD [0020 + 1203]  0020  1  5.0    1.13    0.07  1.33  13.05  n/a   0.000
*
     ADD [0020 + 1204]  0020  3  5.0    1.33    0.09  1.33  13.04  n/a   0.000
*
     SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.09  2.00  13.04  n/a   0.000
     [SHIFT= 40.0 min]
*
     ADD [1100 + 0114]  1001  3  5.0    3.59    0.10  2.00   7.49  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  22 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

     START @  0.00 hrs
     --------------------
     CHIC STORM                10.0
     [ Ptot= 60.23 mm ]
*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.03  2.17   8.26 0.14   0.000
     [CN=46.4         ]
     [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.05  1.33  20.20 0.34   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.02  1.33  20.18 0.33   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.02  1.33  20.18 0.33   0.000
     [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.05  1.33  20.20 0.34   0.000
     [I%=20.0:S%= 3.60]
*
     ADD [1201 + 1202]  0020  3  5.0    0.94    0.09  1.33  20.20  n/a   0.000
*
     ADD [0020 + 1203]  0020  1  5.0    1.13    0.11  1.33  20.19  n/a   0.000
*
     ADD [0020 + 1204]  0020  3  5.0    1.33    0.13  1.33  20.19  n/a   0.000
*
     SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.13  2.00  20.19  n/a   0.000
     [SHIFT= 40.0 min]
*
     ADD [1100 + 0114]  1001  3  5.0    3.59    0.16  2.00  12.68  n/a   0.000
```

```
*
  ****************************
  ** SIMULATION NUMBER:  23 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      CHIC STORM                  10.0
      [ Ptot= 71.95 mm ]
*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.04  2.17  11.87 0.16   0.000
      [CN=46.4        ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.05  1.33  25.95 0.36   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.02  1.33  25.94 0.36   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.02  1.33  25.94 0.36   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.05  1.33  25.95 0.36   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.10  1.33  25.95  n/a   0.000
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.12  1.33  25.95  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.14  1.33  25.95  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.14  2.00  25.95  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.18  2.00  17.09  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  24 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      CHIC STORM                  10.0
      [ Ptot= 83.38 mm ]
*
  **  CALIB NASHYD       1100  1  5.0    2.26    0.06  2.17  15.88 0.19   0.000
      [CN=46.4        ]
      [ N = 3.0:Tp 0.64]
*
  *   CALIB STANDHYD     1202  1  5.0    0.47    0.05  1.33  31.98 0.38   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1204  1  5.0    0.20    0.02  1.33  31.98 0.38   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1203  1  5.0    0.19    0.02  1.33  31.96 0.38   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     1201  1  5.0    0.47    0.05  1.33  31.98 0.38   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [1201 + 1202]  0020  3  5.0    0.94    0.11  1.33  31.98  n/a   0.000
```

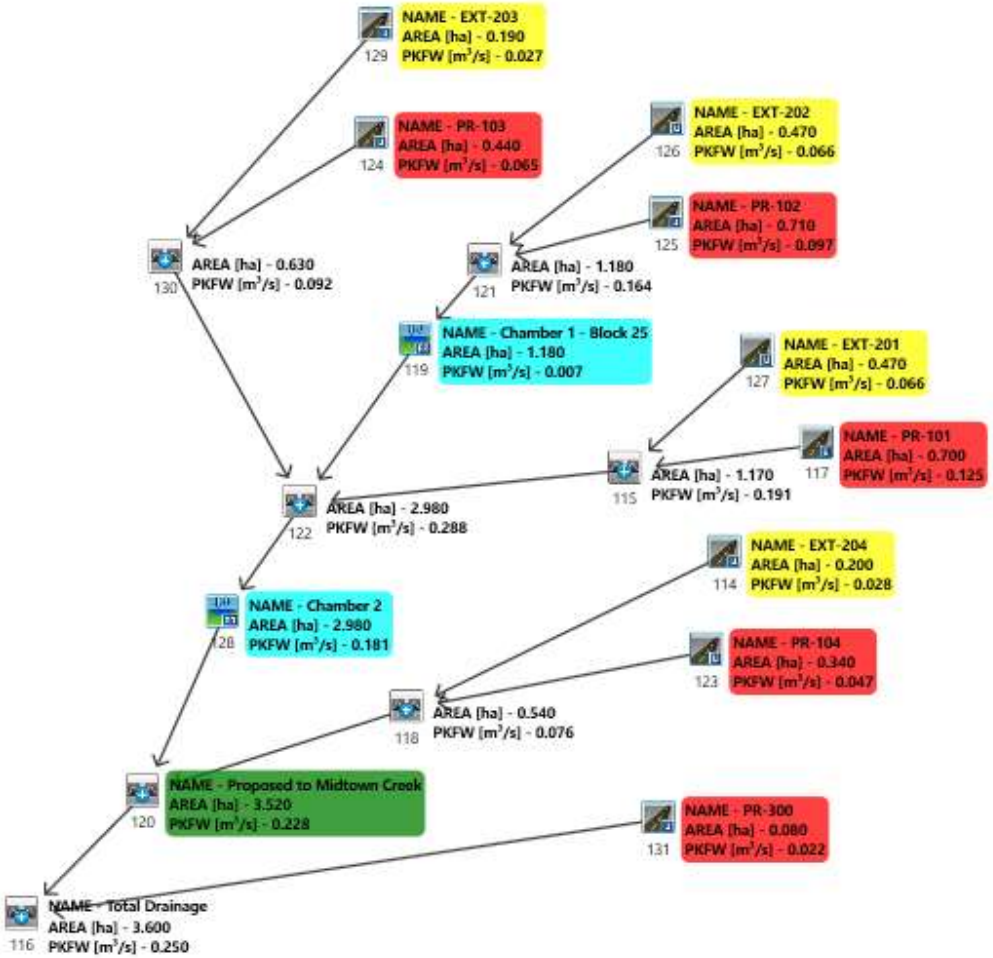


```
*
      ADD [0020 + 1203]  0020  1  5.0    1.13    0.13  1.33  31.98  n/a   0.000
*
      ADD [0020 + 1204]  0020  3  5.0    1.33    0.16  1.33  31.98  n/a   0.000
*
      SHIFT  [ 2 : 0020] 0114  1  5.0    1.33    0.16  2.00  31.98  n/a   0.000
      [SHIFT= 40.0 min]
*
      ADD [1100 + 0114]  1001  3  5.0    3.59    0.21  2.00  21.85  n/a   0.000
*
 FINISH

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

Summary Output - All Storm Events
Existing Condition

VO3 Model Schematic
Proposed Condition



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

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                    *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\VO Suite 3.0\VO2\voin.dat

  Output  filename: C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\Scenario.
out
  Summary filename: C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\Scenario.
sum


DATE: 06-05-2020                          TIME: 11:38:59

USER:


COMMENTS: ____________________________________________________________


  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 28.55 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\9a624bb6-1c30-
47e
      remark: 2-Year, 6 hour SCS Type II Storm Distribution, Custom Gauge:

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01  3.00   7.20 0.25   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.01  3.00   6.09 0.21   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.01  3.00   6.50  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.03  3.00   9.82 0.34   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.01  3.00   7.24 0.25   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.04  3.00   8.78  n/a   0.000
*
```



```
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.02  3.00   6.70 0.23   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.01  3.00   7.24 0.25   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.03  3.00   6.92  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  6.00   2.16  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.01  3.00   7.24 0.25   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01  3.00   7.20 0.25   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.02  3.00   7.23  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.04  3.00   5.46  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.06  3.00   5.83  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.00 15.92   0.14  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.01  3.00   1.12  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01  3.00  18.03 0.63   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.02  3.00   1.49  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 39.33 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\3113dc0e-b5d9-
435
      remark: 5-Year, 6 hour SCS Type II Storm Distribution, Custom Gauge:

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01  3.00  11.14 0.28   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.01  3.00   9.67 0.25   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.02  3.00  10.21  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.04  3.00  14.64 0.37   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.02  3.00  11.17 0.28   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.06  3.00  13.25  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.03  3.00  10.43 0.27   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.02  3.00  11.17 0.28   0.000
```

```
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.05  3.00  10.72  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  5.17   5.97  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.02  3.00  11.17 0.28   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01  3.00  11.14 0.28   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.03  3.00  11.16  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.06  3.00   9.59  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.09  3.00   9.93  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.01  4.67   4.06  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.02  3.00   5.00  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01  3.00  25.54 0.65   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.03  3.00   5.46  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 45.00 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\2a628570-41db-
46e
      remark: 10-Year, 6 hour SCS Type II Storm Distribution, Custom Gauge

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01  3.00  13.43 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.02  3.00  11.78 0.26   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.03  3.00  12.39  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.05  3.00  17.36 0.39   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.02  3.00  13.44 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.08  3.00  15.79  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.04  3.00  12.60 0.28   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.02  3.00  13.44 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.06  3.00  12.94  n/a   0.000
*
```



```
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  5.08   8.18  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.02  3.00  13.45 0.30   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01  3.00  13.43 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.03  3.00  13.44  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.08  3.00  11.97  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.11  3.00  12.28  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.01  3.75   6.42  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.03  3.00   7.33  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01  3.00  29.58 0.66   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.04  3.00   7.83  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 61.77 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\9cef4af0-bb2f-
4ba
      remark: 25-Year, 6 hour SCS Type II Storm Distribution, Custom Gauge

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.02  3.00  20.92 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.03  3.00  18.85 0.31   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.04  3.00  19.62  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.08  3.00  26.06 0.42   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.04  3.00  20.92 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.12  3.00  24.00  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.06  3.00  19.79 0.32   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.04  3.00  20.92 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.10  3.00  20.24  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  5.08  15.49  n/a   0.000
      {ST=  0.02 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.04  3.00  20.93 0.34   0.000
```

```
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.02  3.00  20.92 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.06  3.00  20.92  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.12  3.00  19.72  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.18  3.00  19.98  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.06  3.17  14.11  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.08  3.08  14.96  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.02  3.00  41.85 0.68   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.08  3.08  15.55  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   5 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 74.28 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\9ac8a4c3-edbc-
414
      remark: 50-Year, 6 hour SCS Type II Storm Distribution, Custom Gauge

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.02  3.00  27.14 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.04  3.00  24.82 0.33   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.06  3.00  25.68  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.10  3.00  33.12 0.45   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.05  3.00  27.15 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.15  3.00  30.72  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.08  3.00  25.80 0.35   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.05  3.00  27.15 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.13  3.00  26.34  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.01  5.17  21.58  n/a   0.000
      {ST=  0.02 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.05  3.00  27.15 0.37   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.02  3.00  27.14 0.37   0.000
      [I%=20.0:S%= 3.60]
```



```
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.07  3.00  27.15  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.16  3.00  26.13  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.23  3.00  26.35  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.13  3.08  20.48  n/a   0.000
      {ST=  0.03 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.16  3.08  21.28  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.02  3.00  51.28 0.69   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.16  3.08  21.94  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   6 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 86.45 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\fbaa91b3-0be0-
4cd
      remark: 100-Year, 6 hour SCS Type II Storm Distribution, Custom Gaug

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.03  3.00  33.66 0.39   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.05  3.00  31.14 0.36   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.08  3.00  32.07  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.12  3.00  40.40 0.47   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.07  3.00  33.67 0.39   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.19  3.00  37.70  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.10  3.00  32.14 0.37   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.07  3.00  33.67 0.39   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.16  3.00  32.75  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.01  5.17  27.99  n/a   0.000
      {ST=  0.03 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.06  3.00  33.67 0.39   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.03  3.00  33.66 0.39   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.09  3.00  33.67  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.20  3.00  32.82  n/a   0.000
```

```
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.29  3.00  33.00  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.18  3.08  27.14  n/a   0.000
      {ST=  0.03 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.23  3.00  27.89  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.02  3.00  60.67 0.70   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.25  3.00  28.62  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   7 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 29.00 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\f39de83f-402c-
4ed
      remark: 2-Year, 12 hour SCS Type II Storm Distribution, Custom Gauge

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.00  6.00   7.37 0.25   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.01  6.00   6.22 0.21   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.01  6.00   6.64  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.02  6.00  10.02 0.35   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.01  6.00   7.39 0.25   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.04  6.00   8.96  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.02  6.00   6.85 0.24   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.01  6.00   7.39 0.25   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.03  6.00   7.06  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00 10.25   2.31  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.01  6.00   7.40 0.26   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.00  6.00   7.37 0.25   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.02  6.00   7.39  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.04  6.00   5.62  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.05  6.00   5.99  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.00 20.33   0.17  n/a   0.000
```



```
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.01  6.00   1.16  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01  6.00  17.52 0.60   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.02  6.00   1.52  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   8 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 40.10 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\76ef7112-047c-
41b
      remark: 5-Year, 12 hour SCS Type II Storm Distribution, Custom Gauge

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01  6.00  11.44 0.29   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.01  6.00   9.95 0.25   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.02  6.00  10.50  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.04  6.00  15.00 0.37   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.02  6.00  11.47 0.29   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.05  6.00  13.58  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.02  6.00  10.71 0.27   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.02  6.00  11.47 0.29   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.04  6.00  11.02  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  8.17   6.26  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.02  6.00  11.47 0.29   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01  6.00  11.44 0.29   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.02  6.00  11.46  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.05  6.00   9.91  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.08  6.00  10.24  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.01  8.08   4.37  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.02  6.00   5.31  n/a   0.000
*
```

```
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01  6.00  26.09 0.65   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.03  6.00   5.77  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:   9 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 46.00 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\194ced42-6057-
4b3
      remark: 10-Year, 12 hour SCS Type II Storm Distribution, Custom Gaug

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01  6.00  13.84 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.01  6.00  12.17 0.26   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.02  6.00  12.79  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.05  6.00  17.85 0.39   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.02  6.00  13.86 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.07  6.00  16.25  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.03  6.00  13.00 0.28   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.02  6.00  13.86 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.05  6.00  13.34  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  8.08   8.58  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.02  6.00  13.86 0.30   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01  6.00  13.82 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.03  6.00  13.85  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.07  6.00  12.40  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.10  6.00  12.71  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.01  7.00   6.84  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.02  6.00   7.75  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01  6.00  30.30 0.66   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.03  6.00   8.25  n/a   0.000
```



```
*
  ****************************
  ** SIMULATION NUMBER:  10 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 63.33 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\c9ee0843-fdd3-
4b3
      remark: 25-Year, 12 hour SCS Type II Storm Distribution, Custom Gaug

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01  6.00  21.66 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.02  6.00  19.56 0.31   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.04  6.00  20.34  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.07  6.00  26.91 0.43   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.03  6.00  21.67 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.10  6.00  24.81  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.05  6.00  20.50 0.32   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.03  6.00  21.67 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.08  6.00  20.97  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  8.08  16.21  n/a   0.000
      {ST=  0.02 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.03  6.00  21.67 0.34   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01  6.00  21.64 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.05  6.00  21.66  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.10  6.00  20.49  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.15  6.00  20.74  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.05  6.17  14.87  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.07  6.17  15.71  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01  6.00  43.01 0.68   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.07  6.17  16.32  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  11 **
  ****************************
```

```
  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 76.58 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\b5edcc6e-e601-
4c9
      remark: 50-Year, 12 hour SCS Type II Storm Distribution, Custom Gaug

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.02  6.00  28.33 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.03  6.00  25.98 0.34   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.05  6.00  26.85  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.09  6.00  34.47 0.45   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.05  6.00  28.34 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.14  6.00  32.01  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.07  6.00  26.97 0.35   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.05  6.00  28.34 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.11  6.00  27.52  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.01  8.08  22.76  n/a   0.000
      {ST=  0.02 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.05  6.00  28.35 0.37   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.02  6.00  28.33 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.06  6.00  28.34  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.14  6.00  27.37  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.20  6.00  27.57  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.12  6.08  21.71  n/a   0.000
      {ST=  0.03 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.15  6.08  22.50  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.02  6.00  53.04 0.69   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.15  6.00  23.17  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  12 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms
```



```
      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 89.58 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\2dbc5c14-1239-
49d
      remark: 100-Year, 12 hour SCS Type II Storm Distribution, Custom Gau

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.03  6.00  35.40 0.40   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.04  6.00  32.82 0.37   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.07  6.00  33.78  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.11  6.00  42.33 0.47   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.06  6.00  35.42 0.40   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.17  6.00  39.55  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.09  6.00  33.83 0.38   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.06  6.00  35.42 0.40   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.15  6.00  34.46  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.01  8.17  29.71  n/a   0.000
      {ST=  0.03 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.06  6.00  35.42 0.40   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.02  6.00  35.40 0.40   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.08  6.00  35.41  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.17  6.00  34.61  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.26  6.00  34.78  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.17  6.08  28.92  n/a   0.000
      {ST=  0.03 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.22  6.00  29.66  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.02  6.00  63.11 0.70   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.24  6.00  30.40  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  13 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 29.58 mm ]
```

fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\81e6de29-b061-
48b
remark: 2-Year, 24 hour SCS Type II Storm Distribution, Custom Gauge

```
*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.00 12.00   6.46 0.22   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.01 12.00   6.40 0.22   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.01 12.00   6.42  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.02 12.00  10.26 0.35   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.01 12.00   7.58 0.26   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.03 12.00   9.18  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.01 12.00   7.03 0.24   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.01 12.00   7.58 0.26   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.02 12.00   7.25  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00 16.42   2.49  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.01 12.00   7.59 0.26   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.00 12.00   6.43 0.22   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.01 12.00   7.24  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.03 12.00   5.82  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.04 12.00   6.12  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.00 29.58   0.26  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.01 12.00   1.21  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.00 12.00  16.28 0.55   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.01 12.00   1.54  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  14 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 40.23 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\05f9ce32-e231-
449
      remark: 5-Year, 24 hour SCS Type II Storm Distribution, Custom Gauge
```



```
*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01 12.00  11.50 0.29   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.01 12.00   9.98 0.25   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.02 12.00  10.55  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.03 12.00  15.06 0.37   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.01 12.00  11.51 0.29   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.04 12.00  13.64  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.02 12.00  10.76 0.27   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.01 12.00  11.51 0.29   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.03 12.00  11.06  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00 14.42   6.30  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.01 12.00  11.52 0.29   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01 12.00  11.50 0.29   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.02 12.00  11.51  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.04 12.00   9.95  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.06 12.00  10.28  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.00 15.08   4.42  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.02 12.00   5.36  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01 12.00  24.76 0.62   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.02 12.00   5.79  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  15 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 46.40 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\a9e5bc93-00b0-
444
      remark: 10-Year, 24 hour SCS Type II Storm Distribution, Custom Gaug

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01 12.00  14.00 0.30   0.000
      [I%=20.0:S%= 3.60]
*
```

```
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.01 12.00  12.33 0.27   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.02 12.00  12.95  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.04 12.00  18.05 0.39   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.02 12.00  14.02 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.05 12.00  16.43  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.02 12.00  13.16 0.28   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.02 12.00  14.02 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.04 12.00  13.50  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00 14.25   8.74  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.02 12.00  14.03 0.30   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01 12.00  14.00 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.03 12.00  14.02  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.05 12.00  12.57  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.08 12.00  12.88  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.01 14.08   7.01  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.02 12.00   7.92  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01 12.00  28.87 0.62   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.03 12.00   8.39  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  16 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      ---------------------
      READ STORM                15.0
      [ Ptot= 64.07 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\6371fa88-a155-
48a
      remark: 25-Year, 24 hour SCS Type II Storm Distribution, Custom Gaug

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01 12.00  22.01 0.34   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.02 12.00  19.90 0.31   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.03 12.00  20.68  n/a   0.000
```



```
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.06 12.00  27.33 0.43   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.03 12.00  22.03 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.09 12.00  25.20  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.04 12.00  20.86 0.33   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.03 12.00  22.03 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.07 12.00  21.32  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00 14.17  16.57  n/a   0.000
      {ST=  0.02 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.03 12.00  22.03 0.34   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01 12.00  22.01 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.04 12.00  22.03  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.09 12.00  20.86  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.13 12.00  21.11  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.04 12.25  15.24  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.05 12.17  16.08  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01 12.00  43.57 0.68   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.05 12.17  16.69  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  17 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      ---------------------
      READ STORM                15.0
      [ Ptot= 77.75 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\c3afdc7c-c334-
464
      remark: 50-Year, 24 hour SCS Type II Storm Distribution, Custom Gaug

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.02 12.00  28.95 0.37   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.03 12.00  26.58 0.34   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.04 12.00  27.46  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.08 12.00  35.16 0.45   0.000
      [I%=30.0:S%= 2.00]
*
```

```
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.04 12.00  28.97 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.11 12.00  32.67  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.06 12.00  27.57 0.35   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.04 12.00  28.97 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.10 12.00  28.12  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.01 14.17  23.37  n/a   0.000
      {ST=  0.02 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.04 12.00  28.97 0.37   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.02 12.00  28.95 0.37   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.05 12.00  28.96  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.12 12.00  28.00  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.17 12.00  28.20  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.10 12.08  22.34  n/a   0.000
      {ST=  0.03 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.12 12.08  23.12  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01 12.00  53.94 0.69   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.13 12.00  23.81  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  18 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 91.28 mm ]
      fname : C:\Users\rrajachockalingam\AppData\Local\Temp\d329f9c9-d880-40f9-9f52-81db70dfb595\30f72e32-8e4e-
4c1
      remark: 100-Year, 24 hour SCS Type II Storm Distribution, Custom Gau

*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.02 12.00  36.35 0.40   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.04 12.00  33.76 0.37   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.06 12.00  34.72  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.09 12.00  43.39 0.48   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.05 12.00  36.37 0.40   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.14 12.00  40.57  n/a   0.000
```



```
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.07 12.00  34.76 0.38   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.05 12.00  36.37 0.40   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.12 12.00  35.40  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.01 14.17  30.65  n/a   0.000
      {ST=  0.03 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.05 12.00  36.37 0.40   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.02 12.00  36.35 0.40   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.07 12.00  36.37  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.15 12.00  35.59  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.22 12.00  35.75  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.15 12.08  29.89  n/a   0.000
      {ST=  0.03 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.20 12.00  30.63  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.02 12.00  64.44 0.71   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.21 12.00  31.38  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  19 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      CHIC STORM                 10.0
      [ Ptot= 28.11 mm ]
*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01  1.33   7.04 0.25   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.01  1.33   5.96 0.21   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.02  1.33   6.36  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.05  1.33   9.64 0.34   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.02  1.33   7.09 0.25   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.07  1.33   8.62  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.03  1.33   6.56 0.23   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.02  1.33   7.09 0.25   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.05  1.33   6.77  n/a   0.000
```

```
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  3.17   2.02  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.02  1.33   7.10 0.25   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01  1.33   7.02 0.25   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.03  1.33   7.07  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.07  1.33   5.30  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.10  1.33   5.68  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.00 13.50   0.13  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.02  1.33   1.09  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01  1.33  17.47 0.62   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.03  1.33   1.45  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  20 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      CHIC STORM                10.0
      [ Ptot= 38.49 mm ]
*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01  1.33  10.83 0.28   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.02  1.33   9.37 0.24   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.03  1.33   9.91  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.06  1.33  14.25 0.37   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.03  1.33  10.84 0.28   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.09  1.33  12.88  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.04  1.33  10.12 0.26   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.03  1.33  10.84 0.28   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.06  1.33  10.41  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  2.83   5.66  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.03  1.33  10.85 0.28   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01  1.33  10.83 0.28   0.000
```



```
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.04  1.33  10.84  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.09  1.33   9.25  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.13  1.33   9.59  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.01  2.50   3.72  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.03  1.33   4.67  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.01  1.33  24.88 0.65   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.04  1.33   5.12  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  21 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      CHIC STORM                10.0
      [ Ptot= 44.04 mm ]
*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.01  1.33  13.02 0.30   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.02  1.33  11.42 0.26   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.03  1.33  12.01  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.07  1.33  16.89 0.38   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.03  1.33  13.05 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.10  1.33  15.35  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.05  1.33  12.22 0.28   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.03  1.33  13.05 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.08  1.33  12.55  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  2.75   7.80  n/a   0.000
      {ST=  0.01 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.03  1.33  13.06 0.30   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.01  1.33  13.02 0.30   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.05  1.33  13.05  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.10  1.33  11.56  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.15  1.33  11.87  n/a   0.000
*
```

```
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.02  2.08   6.01  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.03  1.33   6.93  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.02  1.33  28.89 0.66   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.05  1.33   7.42  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  22 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      CHIC STORM                10.0
      [ Ptot= 60.23 mm ]
*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.02  1.33  20.18 0.33   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.03  1.33  18.16 0.30   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.05  1.33  18.91  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.10  1.33  25.23 0.42   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.05  1.33  20.20 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.14  1.33  23.21  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.07  1.33  19.09 0.32   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.05  1.33  20.20 0.34   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.11  1.33  19.53  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.00  2.83  14.77  n/a   0.000
      {ST=  0.02 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.05  1.33  20.20 0.34   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.02  1.33  20.18 0.33   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.06  1.33  20.19  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.15  1.33  18.97  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.21  1.33  19.23  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.07  1.67  13.36  n/a   0.000
      {ST=  0.02 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.09  1.67  14.21  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.02  1.33  40.71 0.68   0.000
      [I%=63.0:S%= 2.00]
*
```



```
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.10  1.67  14.80  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  23 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      CHIC STORM                10.0
      [ Ptot= 71.95 mm ]
*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.02  1.33  25.94 0.36   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.03  1.33  23.67 0.33   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.05  1.33  24.51  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.10  1.33  31.77 0.44   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.05  1.33  25.95 0.36   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.15  1.33  29.44  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.07  1.33  24.64 0.34   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.05  1.33  25.95 0.36   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.12  1.33  25.17  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.01  3.08  20.41  n/a   0.000
      {ST=  0.03 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.05  1.33  25.95 0.36   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.02  1.33  25.94 0.36   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.07  1.33  25.95  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.15  1.33  24.90  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.22  1.33  25.13  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.10  1.67  19.26  n/a   0.000
      {ST=  0.03 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.13  1.58  20.06  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.02  1.33  49.51 0.69   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.14  1.58  20.72  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:  24 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha   '  cms   hrs     mm          cms
```

```
      START @  0.00 hrs
      --------------------
      CHIC STORM                 10.0
      [ Ptot= 83.38 mm ]
*
  *   CALIB STANDHYD     0114  1  5.0    0.20    0.02  1.33  31.98 0.38   0.000
      [I%=20.0:S%= 3.60]
*
  *   CALIB STANDHYD     0123  1  5.0    0.34    0.04  1.33  29.50 0.35   0.000
      [I%=15.0:S%= 2.00]
*
      ADD [0114 + 0123]  0118  3  5.0    0.54    0.06  1.33  30.42  n/a   0.000
*
  *   CALIB STANDHYD     0117  1  5.0    0.70    0.11  1.33  38.53 0.46   0.000
      [I%=30.0:S%= 2.00]
*
  *   CALIB STANDHYD     0127  1  5.0    0.47    0.05  1.33  31.98 0.38   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0117 + 0127]  0115  3  5.0    1.17    0.17  1.33  35.90  n/a   0.000
*
  *   CALIB STANDHYD     0125  1  5.0    0.71    0.08  1.33  30.50 0.37   0.000
      [I%=18.0:S%= 2.00]
*
  *   CALIB STANDHYD     0126  1  5.0    0.47    0.05  1.33  31.98 0.38   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0125 + 0126]  0121  3  5.0    1.18    0.14  1.33  31.09  n/a   0.000
*
      RESRVR [ 2 : 0121] 0119  1  5.0    1.18    0.01  3.25  26.33  n/a   0.000
      {ST=  0.03 ha.m }
*
  *   CALIB STANDHYD     0124  1  5.0    0.44    0.05  1.33  31.99 0.38   0.000
      [I%=20.0:S%= 2.00]
*
  *   CALIB STANDHYD     0129  1  5.0    0.19    0.02  1.33  31.96 0.38   0.000
      [I%=20.0:S%= 3.60]
*
      ADD [0124 + 0129]  0130  3  5.0    0.63    0.08  1.33  31.98  n/a   0.000
*
      ADD [0115 + 0119]  0122  3  5.0    2.35    0.17  1.33  31.10  n/a   0.000
*
      ADD [0122 + 0130]  0122  1  5.0    2.98    0.25  1.33  31.28  n/a   0.000
*
      RESRVR [ 2 : 0122] 0128  1  5.0    2.98    0.14  1.58  25.42  n/a   0.000
      {ST=  0.03 ha.m }
*
      ADD [0118 + 0128]  0120  3  5.0    3.52    0.18  1.58  26.18  n/a   0.000
*
  *   CALIB STANDHYD     0131  1  5.0    0.08    0.02  1.33  58.28 0.70   0.000
      [I%=63.0:S%= 2.00]
*
      ADD [0120 + 0131]  0116  3  5.0    3.60    0.19  1.58  26.90  n/a   0.000
*
 FINISH

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

Appendix C

Quantity Control Calculations

Stage-Storage-Discharge: Chamber System 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / RC/CPB
Date: June 5, 2020

Storage Summary		
Top of Dead Storage:	100.83	m
Dead Storage Volume:	50.1	m^3
Active Storage Volume:	329.1	m^3

Outlet Capacity Summary				
Type	Diameter	Slope	Peak Flow	% Full

Discharge Summary				
Stage	Type	Invert Elev (m)	Diameter / Width (mm)	(m)
1	Orifice Plate: Vertical	100.83	75	

Stage-Storage-Discharge Summary Table

Elevation	Stage	Stage 1 Orifice Plate						Total Storage	Total Discharge	Notes
m	m	m^3/s						ha*m	m^3/s	
100.83	0.00	0.000						**0.0050**	**0.000**	
100.84	0.01	**0.000**						**0.0054**	**0.000**	
100.85	0.02	**0.000**						**0.0058**	**0.000**	
100.86	0.03	**0.001**						**0.0065**	**0.001**	<= 25 mm: 64 m³ (100.86m)
100.87	0.04	**0.001**						**0.0073**	**0.001**	
100.88	0.05	**0.001**						**0.0080**	**0.001**	<= 2 Yr: 74 m³ (100.88m)
100.89	0.06	**0.002**						**0.0088**	**0.002**	
100.90	0.07	**0.002**						**0.0096**	**0.002**	
100.91	0.08	**0.002**						**0.0104**	**0.002**	
100.92	0.09	**0.003**						**0.0111**	**0.003**	<= 5 Yr: 104.1 m³ (100.92m)
100.93	0.10	**0.003**						**0.0119**	**0.003**	
100.94	0.11	**0.003**						**0.0127**	**0.003**	<= 10 Yr: 123 m³ (100.94m)
100.95	0.12	**0.003**						**0.0134**	**0.003**	
100.96	0.13	**0.004**						**0.0142**	**0.004**	
100.97	0.14	**0.004**						**0.0149**	**0.004**	
100.98	0.15	**0.004**						**0.0157**	**0.004**	
100.99	0.16	**0.004**						**0.0164**	**0.004**	
101.00	0.17	**0.004**						**0.0171**	**0.004**	
101.01	0.18	**0.004**						**0.0178**	**0.004**	
101.02	0.19	**0.005**						**0.0185**	**0.005**	
101.03	0.20	**0.005**						**0.0192**	**0.005**	<= 25 Yr: 191 m³ (101.03m)
101.04	0.21	**0.005**						**0.0199**	**0.005**	
101.05	0.22	**0.005**						**0.0206**	**0.005**	
101.06	0.23	**0.005**						**0.0213**	**0.005**	
101.07	0.24	**0.005**						**0.0220**	**0.005**	
101.08	0.25	**0.005**						**0.0226**	**0.005**	
101.09	0.26	**0.006**						**0.0233**	**0.006**	
101.10	0.27	**0.006**						**0.0239**	**0.006**	
101.11	0.28	**0.006**						**0.0246**	**0.006**	
101.12	0.29	**0.006**						**0.0252**	**0.006**	<= 50 Yr: 249 m³ (101.12m)
101.13	0.30	**0.006**						**0.0258**	**0.006**	
101.14	0.31	**0.006**						**0.0264**	**0.006**	
101.15	0.32	**0.006**						**0.0270**	**0.006**	
101.16	0.33	**0.006**						**0.0276**	**0.006**	
101.17	0.34	**0.006**						**0.0281**	**0.006**	
101.18	0.35	**0.007**						**0.0286**	**0.007**	
101.19	0.36	**0.007**						**0.0291**	**0.007**	
101.20	0.37	**0.007**						**0.0296**	**0.007**	
101.21	0.38	**0.007**						**0.0300**	**0.007**	
101.22	0.39	**0.007**						**0.0305**	**0.007**	
101.23	0.40	**0.007**						**0.0309**	**0.007**	
101.24	0.41	**0.007**						**0.0313**	**0.007**	<= 100 Yr: 311 m³ (101.24m)
101.25	0.42	**0.007**						**0.0317**	**0.007**	
101.26	0.43	**0.007**						**0.0321**	**0.007**	
101.27	0.44	**0.007**						**0.0325**	**0.007**	
101.28	0.45	**0.008**						**0.0329**	**0.008**	
101.29	0.46	**0.008**						**0.0332**	**0.008**	
101.30	0.47	**0.008**						**0.0336**	**0.008**	
101.31	0.48	**0.008**						**0.0340**	**0.008**	

Stage-Storage-Discharge Summary Table										
Elevation	Stage	Stage 1 Orifice Plate						Total Storage	Total Discharge	Notes
m	m	m^3/s						ha*m	m^3/s	
101.32	0.49	**0.008**						**0.0344**	**0.008**	
101.33	0.50	**0.008**						**0.0348**	**0.008**	
101.34	0.51	**0.008**						**0.0352**	**0.008**	
101.35	0.52	**0.008**						**0.0356**	**0.008**	
101.36	0.53	**0.008**						**0.0359**	**0.008**	
101.37	0.54	**0.008**						**0.0363**	**0.008**	
101.38	0.55	**0.008**						**0.0367**	**0.008**	
101.39	0.56	**0.008**						**0.0371**	**0.008**	
101.40	0.57	**0.009**						**0.0375**	**0.009**	
101.41	0.58	**0.009**						**0.0379**	**0.009**	
101.41	0.58	**0.009**						**0.0379**	**0.009**	

Project:

Chamber Model -	SC-310	
Units -	**Metric**	Click Here for Imperial
Number of chambers -	419	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	100.70	m
Amount of Stone Above Chambers -	152	mm
Amount of Stone Below Chambers -	152	mm
Area of system -	963	sq.meters

☑ Include Perimeter Stone in Calculations

Min. Area - 923.778 sq.meter

StormTech SC-310 Cumulative Storage Volumes

Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Total Chamber *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Ch & St *(cubic meters)*	Cumulative Chamber *(cubic meters)*	Elevation *(meters)*
711	0.00	0.00	9.79	9.79	379.180	101.41
686	0.00	0.00	9.79	9.79	369.394	101.39
660	0.00	0.00	9.79	9.79	359.607	101.36
635	0.00	0.00	9.79	9.79	349.821	101.34
610	0.00	0.00	9.79	9.79	340.034	101.31
584	0.00	0.00	9.79	9.79	330.247	101.28
559	0.00	0.70	9.51	10.21	320.461	101.26
533	0.00	1.84	9.05	10.89	310.255	101.23
508	0.01	3.16	8.52	11.68	299.366	101.21
483	0.02	6.47	7.20	13.67	287.686	101.18
457	0.02	8.36	6.44	14.80	274.018	101.16
432	0.02	9.79	5.87	15.66	259.215	101.13
406	0.03	10.98	5.40	16.37	243.555	101.11
381	0.03	12.05	4.97	17.02	227.181	101.08
356	0.03	13.00	4.59	17.58	210.163	101.06
330	0.03	13.71	4.30	18.01	192.579	101.03
305	0.03	14.43	4.02	18.44	174.569	101.00
279	0.04	15.14	3.73	18.87	156.127	100.98
254	0.04	15.73	3.50	19.22	137.257	100.95
229	0.04	16.21	3.30	19.51	118.034	100.93
203	0.04	16.68	3.11	19.80	98.523	100.90
178	0.04	17.03	2.97	20.01	78.727	100.88
152	0.00	0.00	9.79	9.79	58.720	100.85
127	0.00	0.00	9.79	9.79	48.933	100.83
102	0.00	0.00	9.79	9.79	39.146	100.80
76	0.00	0.00	9.79	9.79	29.360	100.78
51	0.00	0.00	9.79	9.79	19.573	100.75
25	0.00	0.00	9.79	9.79	9.787	100.73

Stage-Storage-Discharge: Chamber System 2

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / RC/CPB
Date: =TODAY(

Storage Summary		
Top of Dead Storage:	100.02	m
Dead Storage Volume:	172.6	m^3
Active Storage Volume:	131.6	m^3

Outlet Capacity Summary				
Type	Diameter	Slope	Peak Flow	% Full

Discharge Summary				
Stage	Type	Invert Elev (m)	Diameter / Width (mm)	(m)
1	Orifice Plate: Vertical	100.02	390	

Stage-Storage-Discharge Summary Table

Elevation	Stage	Stage 1 Orifice Plate						Total Storage	Total Discharge	Notes
m	m	m^3/s						ha*m	m^3/s	
100.02	0.00	0.000						**0.0173**	**0.000**	<= 2 Yr: 170 m³ (100.01m)
100.03	0.01	**0.000**						**0.0176**	**0.000**	
100.04	0.02	**0.001**						**0.0179**	**0.001**	
100.05	0.03	**0.001**						**0.0182**	**0.001**	
100.06	0.04	**0.002**						**0.0186**	**0.002**	
100.07	0.05	**0.004**						**0.0189**	**0.004**	
100.08	0.06	**0.005**						**0.0192**	**0.005**	
100.09	0.07	**0.007**						**0.0195**	**0.007**	<= 5 Yr: 194.1 m³ (100.09m)
100.10	0.08	**0.009**						**0.0198**	**0.009**	
100.11	0.09	**0.012**						**0.0201**	**0.012**	
100.12	0.10	**0.014**						**0.0204**	**0.014**	<= 10 Yr: 204 m³ (100.12m)
100.13	0.11	**0.017**						**0.0207**	**0.017**	
100.14	0.12	**0.020**						**0.0211**	**0.020**	
100.15	0.13	**0.024**						**0.0214**	**0.024**	
100.16	0.14	**0.027**						**0.0217**	**0.027**	
100.17	0.15	**0.031**						**0.0219**	**0.031**	
100.18	0.16	**0.035**						**0.0222**	**0.035**	
100.19	0.17	**0.039**						**0.0225**	**0.039**	
100.20	0.18	**0.043**						**0.0228**	**0.043**	
100.21	0.19	**0.047**						**0.0231**	**0.047**	
100.22	0.20	**0.052**						**0.0234**	**0.052**	
100.23	0.21	**0.056**						**0.0237**	**0.056**	
100.24	0.22	**0.061**						**0.0239**	**0.061**	<= 25 Yr: 239 m³ (100.24m)
100.25	0.23	**0.066**						**0.0242**	**0.066**	
100.26	0.24	**0.071**						**0.0245**	**0.071**	
100.27	0.25	**0.076**						**0.0247**	**0.076**	
100.28	0.26	**0.081**						**0.0250**	**0.081**	
100.29	0.27	**0.086**						**0.0252**	**0.086**	
100.30	0.28	**0.091**						**0.0255**	**0.091**	
100.31	0.29	**0.096**						**0.0257**	**0.096**	
100.32	0.30	**0.101**						**0.0260**	**0.101**	
100.33	0.31	**0.107**						**0.0262**	**0.107**	
100.34	0.32	**0.112**						**0.0264**	**0.112**	
100.35	0.33	**0.116**						**0.0266**	**0.116**	
100.36	0.34	**0.121**						**0.0268**	**0.121**	
100.37	0.35	**0.126**						**0.0270**	**0.126**	
100.38	0.36	**0.130**						**0.0272**	**0.130**	<= 50 Yr: 271 m³ (100.38m)
100.39	0.37	**0.134**						**0.0274**	**0.134**	
100.40	0.38	**0.137**						**0.0275**	**0.137**	
100.41	0.39	**0.140**						**0.0277**	**0.140**	
100.42	0.40	**0.144**						**0.0279**	**0.144**	
100.43	0.41	**0.147**						**0.0281**	**0.147**	
100.44	0.42	**0.151**						**0.0282**	**0.151**	
100.45	0.43	**0.154**						**0.0284**	**0.154**	
100.46	0.44	**0.157**						**0.0286**	**0.157**	
100.47	0.45	**0.160**						**0.0287**	**0.160**	
100.48	0.46	**0.163**						**0.0289**	**0.163**	
100.49	0.47	**0.166**						**0.0291**	**0.166**	
100.50	0.48	**0.169**						**0.0292**	**0.169**	

Stage-Storage-Discharge Summary Table										
Elevation	**Stage**	**Stage 1 Orifice Plate**						**Total Storage**	**Total Discharge**	**Notes**
m	**m**	**m^3/s**						**ha*m**	**m^3/s**	
100.51	0.49	**0.172**						**0.0294**	**0.172**	
100.52	0.50	**0.175**						**0.0296**	**0.175**	
100.53	0.51	**0.178**						**0.0298**	**0.178**	
100.54	0.52	**0.181**						**0.0299**	**0.181**	
100.55	0.53	**0.184**						**0.0301**	**0.184**	
100.56	0.54	**0.186**						**0.0303**	**0.186**	
100.57	0.55	**0.189**						**0.0304**	**0.189**	<= 100 Yr: 303 m³ (100.57m)

Project:

Chamber Model -	SC-740	
Units -	**Metric**	Click Here for Imperial
Number of chambers -	134	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	99.40	m
Amount of Stone Above Chambers -	152	mm
Amount of Stone Below Chambers -	250	mm
Area of system -	427	sq.meters

☑ Include Perimeter Stone in Calculations

Min. Area - 420.759 sq.meters

StormTech SC-740 Cumulative Storage Volumes

Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Total Chamber *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Ch & St *(cubic meters)*	Cumulative Chamber *(cubic meters)*	Elevation *(meters)*
1168	0.00	0.00	4.34	4.34	304.170	100.57
1143	0.00	0.00	4.34	4.34	299.831	100.54
1118	0.00	0.00	4.34	4.34	295.493	100.52
1092	0.00	0.00	4.34	4.34	291.155	100.49
1067	0.00	0.00	4.34	4.34	286.817	100.47
1041	0.00	0.00	4.34	4.34	282.479	100.44
1016	0.00	0.21	4.25	4.46	278.141	100.42
991	0.00	0.62	4.09	4.71	273.677	100.39
965	0.01	1.07	3.91	4.98	268.968	100.37
940	0.02	2.29	3.42	5.71	263.988	100.34
914	0.02	3.04	3.12	6.16	258.275	100.31
889	0.03	3.61	2.90	6.50	252.112	100.29
864	0.03	4.08	2.71	6.78	245.609	100.26
838	0.03	4.48	2.55	7.03	238.825	100.24
813	0.04	4.80	2.42	7.22	231.799	100.21
787	0.04	5.14	2.28	7.42	224.579	100.19
762	0.04	5.52	2.13	7.65	217.156	100.16
737	0.04	5.79	2.02	7.81	209.508	100.14
711	0.04	6.00	1.94	7.94	201.698	100.11
686	0.05	6.23	1.85	8.08	193.758	100.09
660	0.05	6.45	1.76	8.21	185.681	100.06
635	0.05	6.65	1.68	8.33	177.473	100.04
610	0.05	6.84	1.60	8.44	169.144	100.01
584	0.05	7.04	1.52	8.56	160.702	99.98
559	0.05	7.18	1.46	8.65	152.140	99.96
533	0.05	7.34	1.40	8.74	143.492	99.93
508	0.06	7.49	1.34	8.83	134.751	99.91
483	0.06	7.63	1.29	8.91	125.916	99.88
457	0.06	7.76	1.23	8.99	117.002	99.86
432	0.06	7.87	1.19	9.06	108.008	99.83
406	0.06	7.99	1.14	9.13	98.946	99.81
381	0.06	8.09	1.10	9.19	89.816	99.78
356	0.06	8.17	1.07	9.24	80.624	99.76
330	0.06	8.26	1.03	9.29	71.383	99.73
305	0.06	8.34	1.00	9.34	62.088	99.70
279	0.06	8.38	0.99	9.36	52.745	99.68
254	0.00	0.00	4.34	4.34	43.381	99.65
229	0.00	0.00	4.34	4.34	39.043	99.63
203	0.00	0.00	4.34	4.34	34.705	99.60
178	0.00	0.00	4.34	4.34	30.367	99.58
152	0.00	0.00	4.34	4.34	26.029	99.55
127	0.00	0.00	4.34	4.34	21.691	99.53
102	0.00	0.00	4.34	4.34	17.353	99.50
76	0.00	0.00	4.34	4.34	13.014	99.48
51	0.00	0.00	4.34	4.34	8.676	99.45
25	0.00	0.00	4.34	4.34	4.338	99.43

Appendix D

Quality Control Calculations

Infiltration Facility Design - Chamber System 1

Project No: 10-10122
Project Name: Nickerson Woods
Designed/Checked By: CPB / MH/RC
Date: 5-Jun-20

Site Characteristics		
Contributing Area	1.18	ha
Water Quality Storm	25	mm
Runoff Coefficient	0.34	
Groundwater Elevation	100.20	m
Bedrock Elevation	N/A	
Infiltration Characteristics		
Native Soil Infiltration Rate[1]	50.0	mm/hr
Safety Correction Factor	2.5	
Adjusted Infiltration Rate	20.0	mm/hr

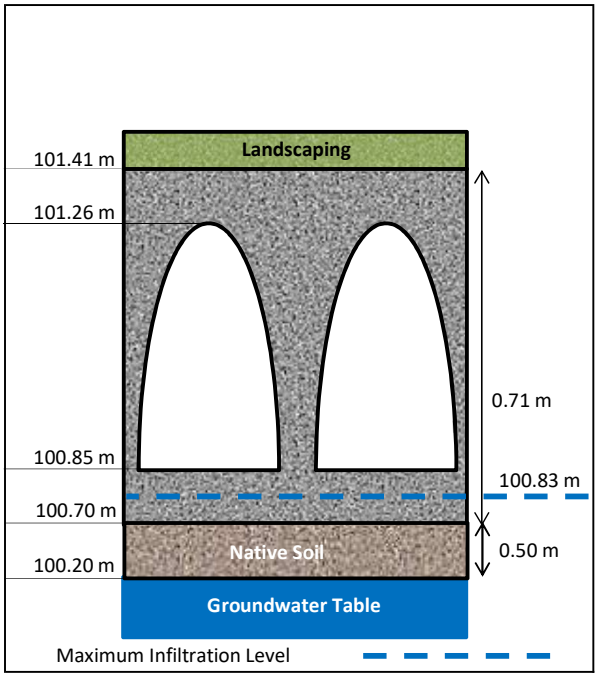
Surface Storage	
Surface Storage Type	None

Underground Storage		
Underground Storage Type	Chamber System	
Pretreatment	Grassed Swale	
Underground Storage Footprint	963	m^2
Bottom Elevation	100.70	m
Inlet Elevation	101.70	m
Outlet Elevation	100.83	m
Top Elevation	101.41	m
Underground Storage Volume	379.0	m^3
Infiltration Design		
Infiltration Footprint	963	m^2
Max Infiltration Storage Depth	0.13	m
Estimated Drawdown Time	2.6	hours
Infiltration Storage Volume	50.0	m^3
Provided Storage Summary		
Total Storage Depth	0.71	m
Groundwater Separation	0.50	m
Quality Control Volume	50.0	m^3
Quantity Control Volume	379.0	m^3
Total Storage Volume	379.0	m^3

Design Constraints & Assumptions		
Water Quality Control Volume	29.5	m^3
Quantity Control Volume	379.0	m^3
Quantity Control Volume Includes Infiltration Storage?	Yes	
Max Allowable Drawdown Time	48	hours
Seperation to Groundwater	1.00	m
Stone Void Ratio	0.40	

Chamber System Characteristics		
Chamber Type	StormTech SC-310	
Number of Chambers	419	
Chamber Height	405	mm

Infiltration Facility Typical Section



Notes:

1. Runoff Coefficient determined based on the Hydrologic Parameters of the contributing drainage area
   Water Quality Control Volume based on MOE Table 3.2 for Infiltration Facilities
2. Native soil infiltration rate incorporates a safety correction factor in accordance with the method outlined in the LID Design Manual Appendix C, Table C2
3. Infiltration Storage Drawdown Time calculated using the following equation:

$$t_d = \frac{d_i}{i}$$

t_d = Drawdown Time (hours)
d_i = Max infiltration storage depth (m)
i = Adjusted Infiltration Rate (mm/hr)

Infiltration Facility Design - Chamber System 2

Project No: 10-10122
Project Name: Nickerson Woods
Designed/Checked By: CPB / MH/RC
Date: 5-Jun-20

Site Characteristics		
Contributing Area	1.80	ha
Water Quality Storm	25	mm
Runoff Coefficient	0.38	
Groundwater Elevation	98.90	m
Bedrock Elevation	N/A	
Infiltration Characteristics		
Native Soil Infiltration Rate[1]	50.0	mm/hr
Safety Correction Factor	2.5	
Adjusted Infiltration Rate	20.0	mm/hr

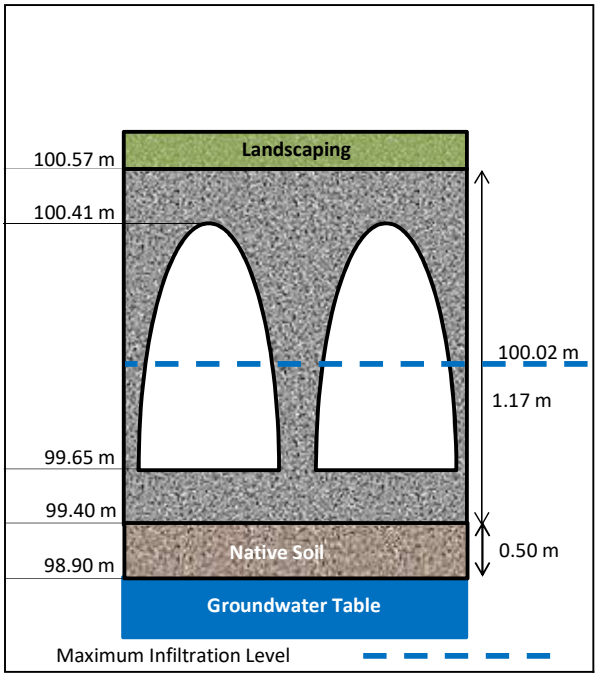
Surface Storage	
Surface Storage Type	None

Underground Storage		
Underground Storage Type	Chamber System	
Pretreatment	Oil-Grit Separator	
Underground Storage Footprint	427	m^2
Bottom Elevation	99.40	m
Inlet Elevation	99.65	m
Outlet Elevation	100.02	m
Top Elevation	100.57	m
Underground Storage Volume	304.0	m^3
Infiltration Design		
Infiltration Footprint	427	m^2
Max Infiltration Storage Depth	0.62	m
Estimated Drawdown Time	12.4	hours
Infiltration Storage Volume	173.0	m^3
Provided Storage Summary		
Total Storage Depth	1.17	m
Groundwater Separation	0.50	m
Quality Control Volume	173.0	m^3
Quantity Control Volume	304.0	m^3
Total Storage Volume	304.0	m^3

Design Constraints & Assumptions		
Water Quality Control Volume	45.0	m^3
Quantity Control Volume	253.0	m^3
Quantity Control Volume Includes Infiltration Storage?	Yes	
Max Allowable Drawdown Time	48	hours
Seperation to Groundwater	1.00	m
Stone Void Ratio	0.40	

Chamber System Characteristics		
Chamber Type	StormTech SC-740	
Number of Chambers	134	
Chamber Height	760	mm

Infiltration Facility Typical Section



Notes:

1. Runoff Coefficient determined based on the Hydrologic Parameters of the contributing drainage area
   Water Quality Control Volume based on MOE Table 3.2 for Infiltration Facilities
2. Native soil infiltration rate incorporates a safety correction factor in accordance with the method outlined in the LID Design Manual Appendix C, Table C2
3. Infiltration Storage Drawdown Time calculated using the following equation:

$$t_d = \frac{d_i}{i}$$

t_d = Drawdown Time (hours)
d_i = Max infiltration storage depth (m)
i = Adjusted Infiltration Rate (mm/hr)

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

ESTIMATED NET ANNNUAL SEDIMENT (TSS) LOAD REDUCTION STORMCEPTOR®

Province:	Ontario
City:	Cobourg
Nearest Rainfall Station:	PETERBOROUGH AP
NCDC Rainfall Station Id:	6418
Years of Rainfall Data:	32

Site Name:	Nickerson Woods
Drainage Area (ha):	1.17
% Imperviousness:	36.00

Runoff Coefficient 'c': 0.51

Particle Size Distribution:	Fine
Target TSS Removal (%):	60.0

Require Hydrocarbon Spill Capture?	No
Upstream Flow Control?	No
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	21.15
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Project Name:	Nickerson Woods
Project Number:	10-10122
Designer Name:	Christopher Sokol
Designer Company:	D.M. Wills
Designer Email/Phone:	csokol@dmwills.com
EOR Name:	
EOR Company:	
EOR Email/Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EF4	75
EF6	83
EF8	86
EF10	89
EF12	90

Recommended Stormceptor EF Model: EF4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 75

Water Quality Runoff Volume Capture (%): > 90

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THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	50.7	50.7	1.68	101.0	84.0	89	45.1	45.1
2	9.4	60.1	3.36	201.0	168.0	80	7.6	52.7
3	6.0	66.1	5.04	302.0	252.0	72	4.3	57.0
4	4.4	70.5	6.71	403.0	336.0	64	2.8	59.8
5	3.8	74.3	8.39	504.0	420.0	58	2.2	62.0
6	2.8	77.1	10.07	604.0	504.0	57	1.6	63.6
7	2.5	79.6	11.75	705.0	587.0	56	1.4	65.0
8	2.6	82.2	13.43	806.0	671.0	56	1.4	66.4
9	2.0	84.2	15.11	906.0	755.0	55	1.1	67.5
10	1.9	86.1	16.78	1007.0	839.0	55	1.0	68.6
11	1.8	87.9	18.46	1108.0	923.0	54	1.0	69.6
12	1.5	89.4	20.14	1208.0	1007.0	54	0.8	70.4
13	1.0	90.4	21.82	1309.0	1091.0	55	0.6	70.9
14	1.0	91.4	23.50	1410.0	1175.0	56	0.6	71.5
15	0.9	92.3	25.18	1511.0	1259.0	57	0.5	72.0
16	0.7	93.0	26.85	1611.0	1343.0	58	0.4	72.4
17	0.6	93.6	28.53	1712.0	1427.0	58	0.3	72.8
18	1.0	94.6	30.21	1813.0	1511.0	55	0.5	73.3
19	0.6	95.2	31.89	1913.0	1594.0	52	0.3	73.6
20	0.4	95.6	33.57	2014.0	1678.0	49	0.2	73.8
21	0.3	95.9	35.25	2115.0	1762.0	47	0.1	74.0
22	0.6	96.5	36.92	2215.0	1846.0	45	0.3	74.2
23	0.3	96.8	38.60	2316.0	1930.0	43	0.1	74.4
24	0.4	97.2	40.28	2417.0	2014.0	41	0.2	74.5
25	0.3	97.5	41.96	2518.0	2098.0	40	0.1	74.6

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
26	0.2	97.7	43.64	2618.0	2182.0	38	0.1	74.7
27	0.1	97.8	45.32	2719.0	2266.0	37	0.0	74.7
28	0.1	97.9	46.99	2820.0	2350.0	35	0.0	74.8
29	0.1	98.0	48.67	2920.0	2434.0	34	0.0	74.8
30	0.1	98.1	50.35	3021.0	2518.0	33	0.0	74.8
31	0.1	98.2	52.03	3122.0	2601.0	32	0.0	74.9
32	0.2	98.4	53.71	3222.0	2685.0	32	0.1	74.9
33	0.1	98.5	55.39	3323.0	2769.0	31	0.0	75.0
34	0.2	98.7	57.06	3424.0	2853.0	30	0.1	75.0
35	0.1	98.8	58.74	3525.0	2937.0	28	0.0	75.1
36	0.0	98.8	60.42	3625.0	3021.0	28	0.0	75.1
37	0.1	98.9	62.10	3726.0	3105.0	27	0.0	75.1
38	0.0	98.9	63.78	3827.0	3189.0	27	0.0	75.1
39	0.0	98.9	65.46	3927.0	3273.0	26	0.0	75.1
40	0.0	98.9	67.13	4028.0	3357.0	25	0.0	75.1
41	0.1	99.0	68.81	4129.0	3441.0	24	0.0	75.1
42	0.0	99.0	70.49	4229.0	3525.0	24	0.0	75.1
43	0.0	99.0	72.17	4330.0	3608.0	23	0.0	75.1
44	0.0	99.0	73.85	4431.0	3692.0	23	0.0	75.1
45	0.0	99.0	75.53	4532.0	3776.0	22	0.0	75.1
46	0.0	99.0	77.20	4632.0	3860.0	22	0.0	75.1
47	0.0	99.0	78.88	4733.0	3944.0	21	0.0	75.1
48	0.1	99.1	80.56	4834.0	4028.0	21	0.0	75.1
49	0.0	99.1	82.24	4934.0	4112.0	20	0.0	75.1
50	0.1	99.2	83.92	5035.0	4196.0	20	0.0	75.2
						Estimated Net Annual Sediment (TSS) Load Reduction =		**75 %**

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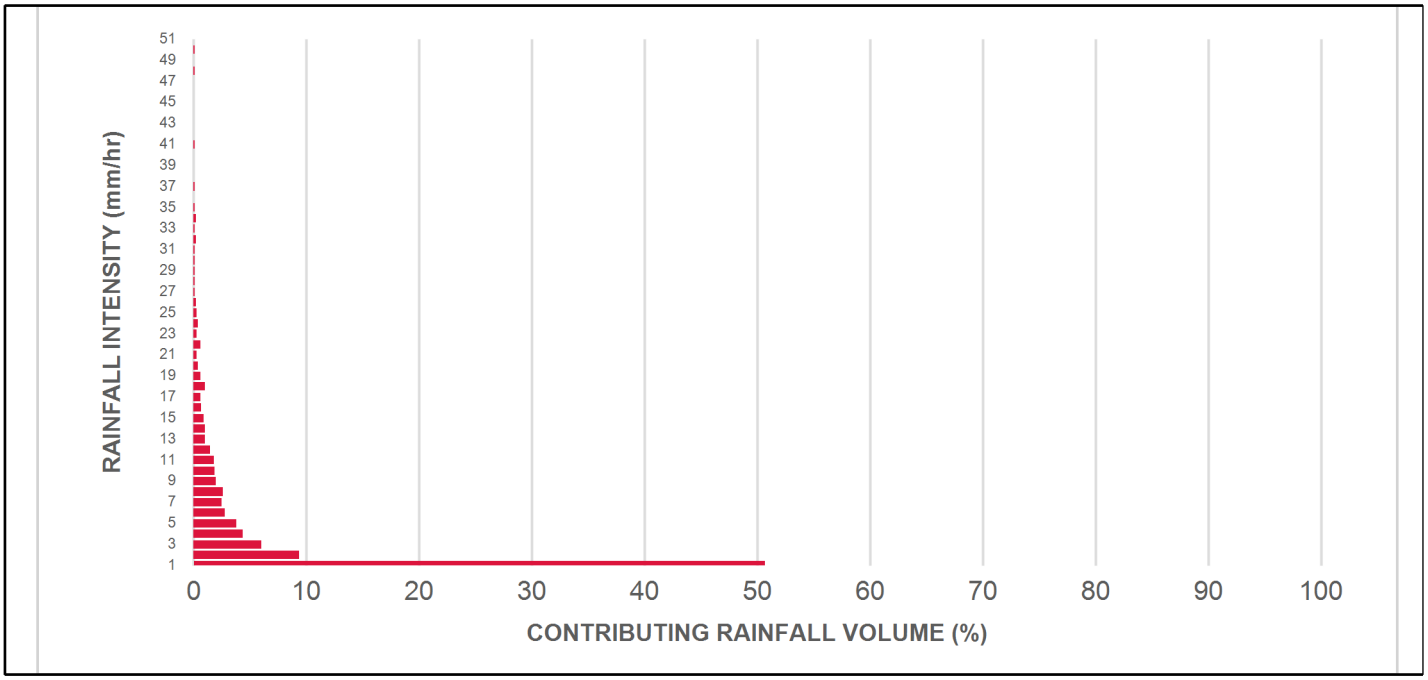
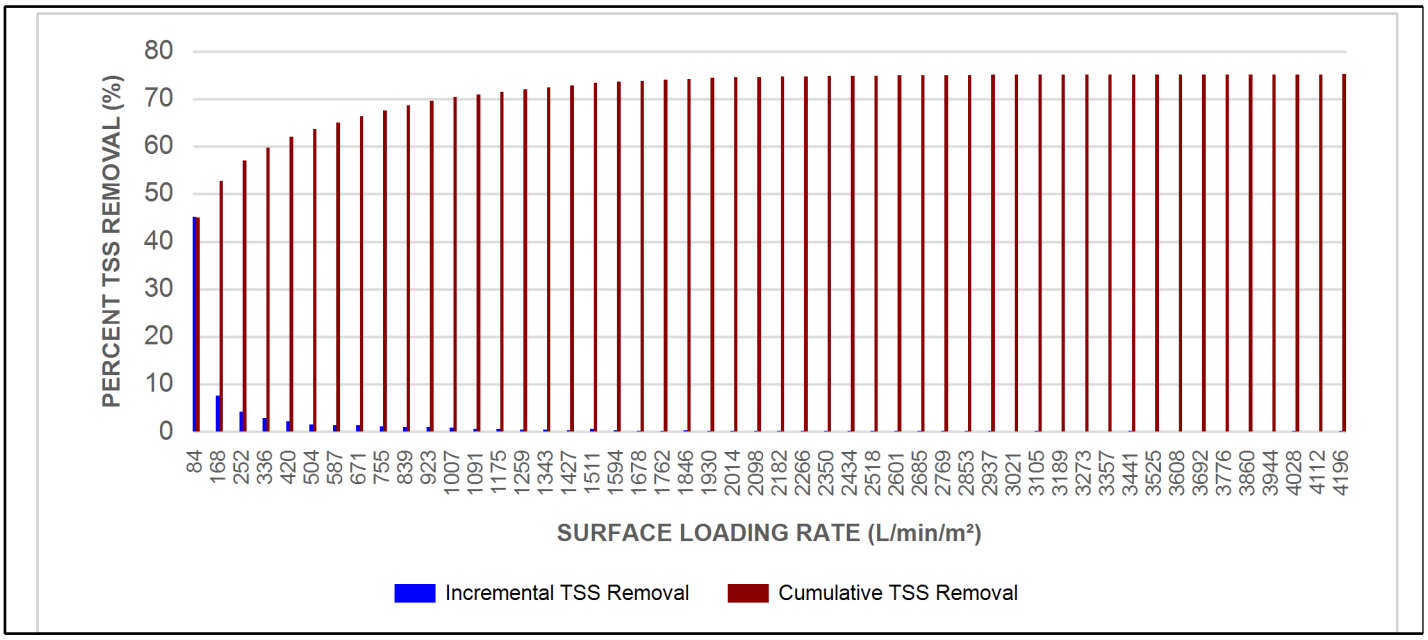
RAINFALL DATA FROM PETERBOROUGH AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

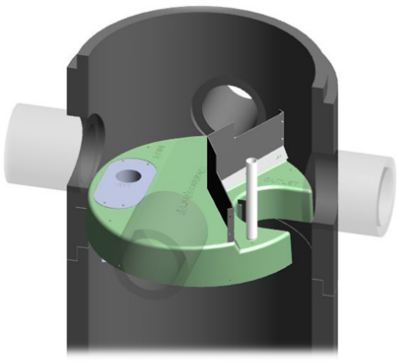
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

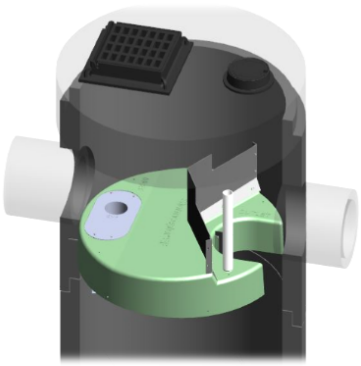
DESIGN FLEXIBILITY

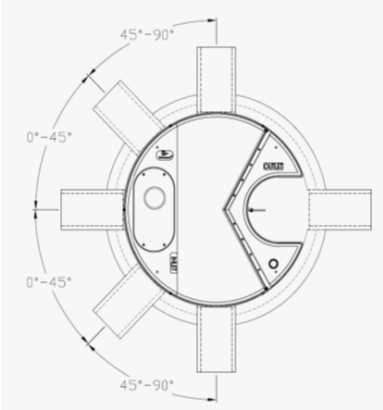
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	197	52	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	348	92	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	545	144	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	874	231	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	1219	322	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

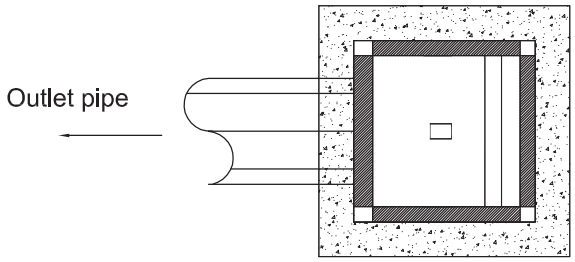
STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

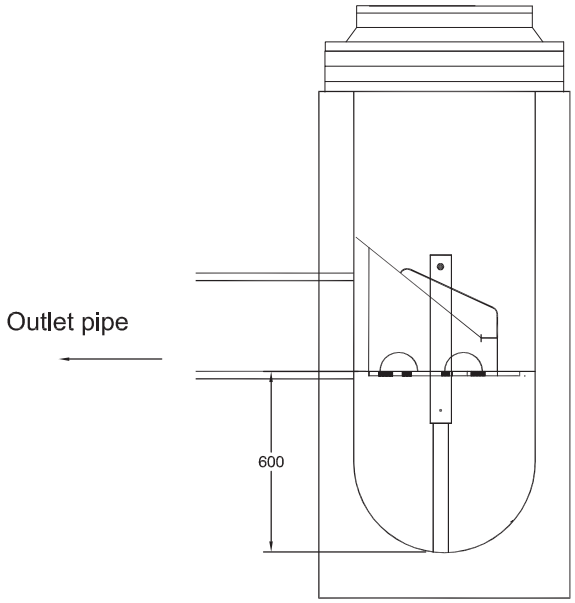
STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

Notes
1. CB Shield can be installed at any time. In a non frozen condition.
2. The frame and cover should be well aligned with the catchbasin for proper installation
3. The catchbasin sump must be clean before installation
4. The grate should be at the same level as the standing water in the sump.



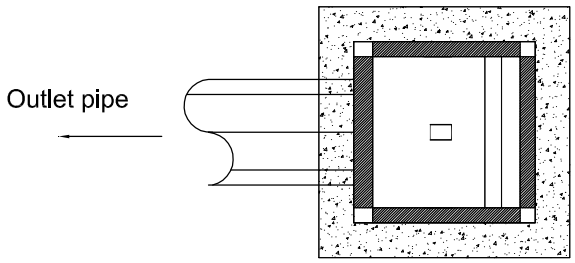
Top view



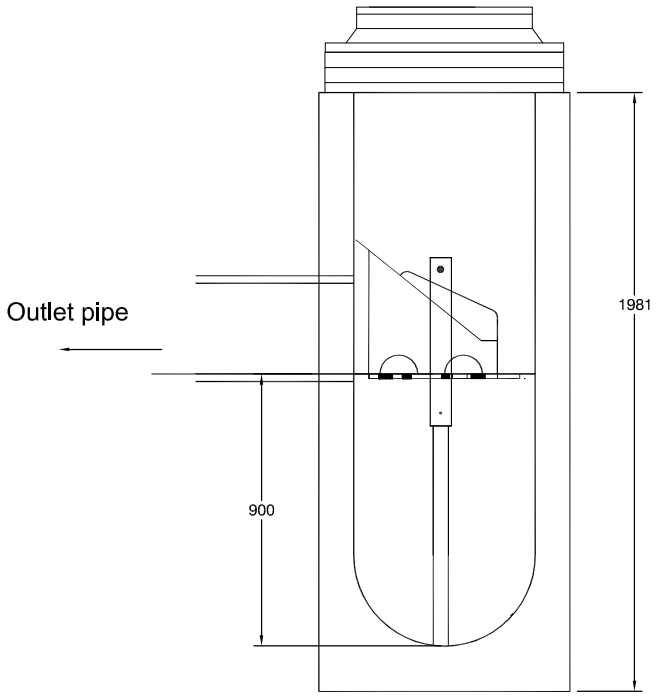
Profile view

CB Shield (600mm Sump)

Notes
1. CB Shield can be installed at any time. In a non frozen condition.
2. The frame and cover should be well aligned with the catchbasin for proper installation
3. The catchbasin sump must be clean before installation
4. The grate should be at the same level as the standing water in the sump.



Top view



Profile view

CB Shield (900mm Sump)

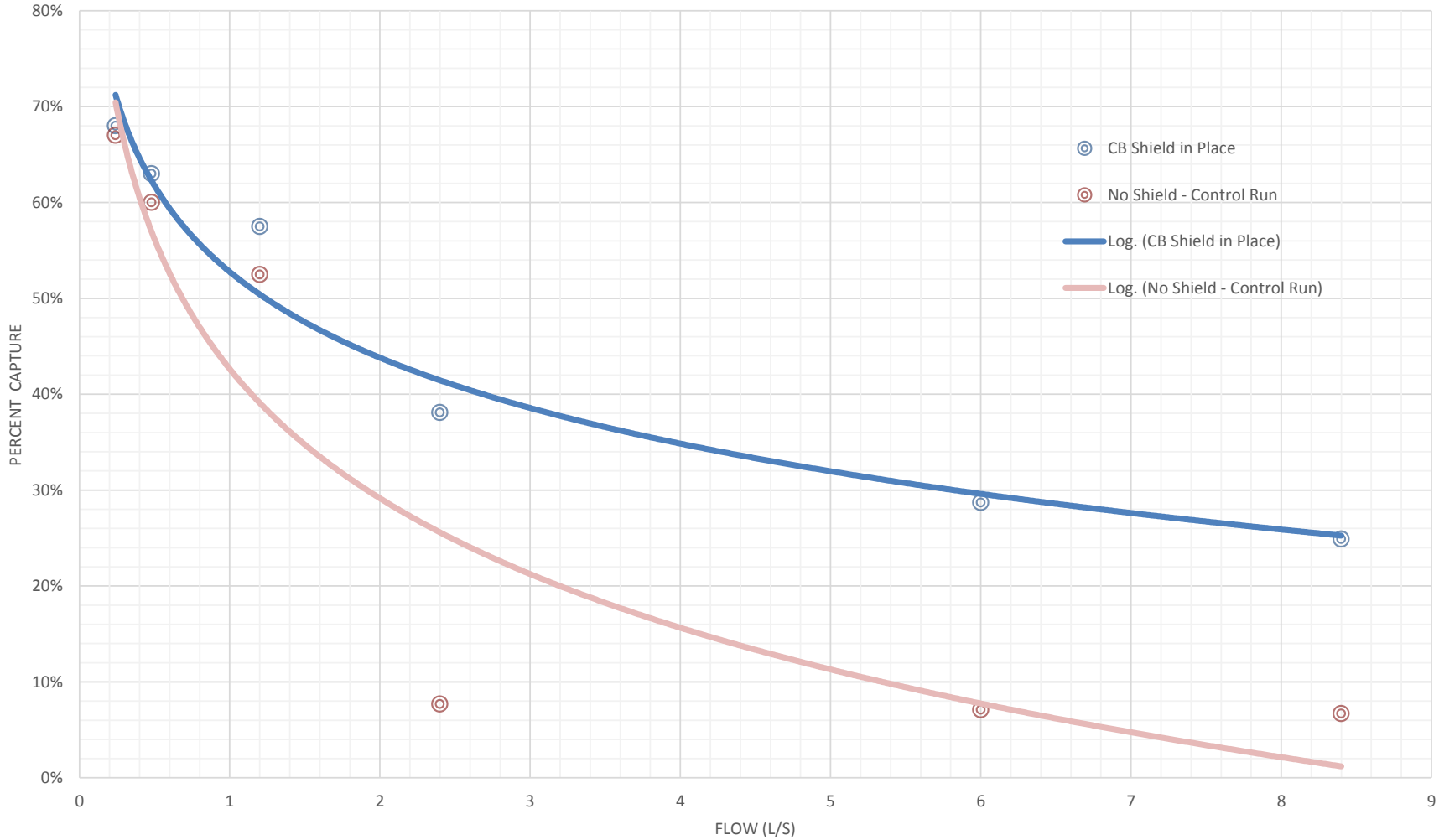
Average Annual Sediment Removal Rates (%) using a CB Shield (based on ETV Sediment - 1 to 1000 micron Particle Size Distribution)

Area to CB (ha)	Imperviousness[1] (%)					
	20%	35%	50%	65%	80%	100%
0.02	57%	57%	57%	57%	56%	56%
0.05	56%	56%	56%	55%	55%	54%
0.10	56%	55%	54%	53%	52%	51%
0.20	54%	53%	51%	49%	48%	46%
0.30	53%	50%	48%	46%	45%	43%
0.40	51%	48%	46%	44%	42%	40%
0.50	50%	47%	44%	42%	40%	38%
0.60	49%	45%	43%	40%	39%	36%

Notes:

1. Runoff Coefficient 'C' is approximately equal to 0.05 + 0.9*Impervious Fraction.
2. Above chart is based on long term continuous hydrologic analysis of Toronto, Ontario (Bloor St) rainfall data.
3. Assumes 0.6 m sump in CB and that maintenance is performed (i.e. CB cleaning) when required by sediment/pollutant build-up or otherwise.
4. See accompanying chart for suggested maintenance scheduling - AND - get CB Shield Inc. to monitor it for you in field.
5. Sediment/Pollutant removal rates based on third party certified laboratory testing using ETV sediment (PSD analysis available on request).
6. See additional discussion regarding scour protection from CB Shield during more infrequent runoff events.

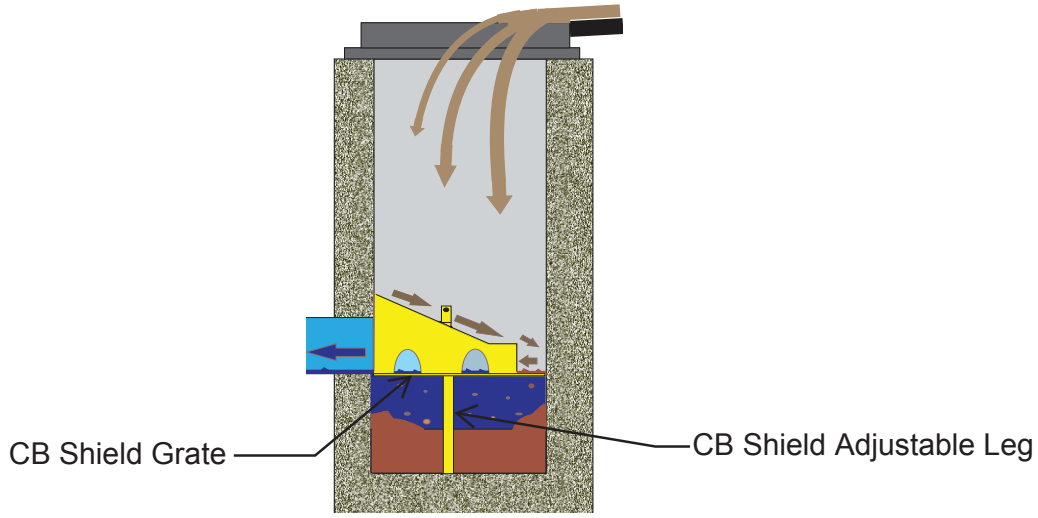
Lab Testing Results for CB Shield - % Capture vs. Flow Rate



CB Shield Operations Manual

Installing CB Shield

It is important the catch basin frame and cover is aligned properly with the catch basin below
If it is misaligned it may be difficult to install the CB Shield insert
Determine the depth of the sump (i.e. the distance from the invert of the outlet pipe to the bottom of the catch basin). If the catch basin is in service the sump depth will be the depth of the water. The grate section of the CB Shield insert should be the same elevation as the water depth in the sump.



Adjust the leg of the CB Shield to achieve the appropriate elevation
The CB Shield is lowered into place with the rope attached to the top of the leg. The high side of the sloped plate should face the wall with the outlet pipe. (The incoming water should be directed to the wall furthest from the outlet)
The flexible plastic skirt around the outer edges of the CB Shield insert may interfere with some misaligned frame and grates. If so a slice can be cut into the skirt with a utility knife at the point of interference.
Make sure the grate is at the desired level or remove CB Shield and re-adjust the leg length.

Inspecting a CB Shield Enhanced Catch Basin

Open grate
A lifting rope is attached to the top of the centered leg of the CB Shield insert. Lift and remove the insert.
Inspect CB Shield for any possible damage. Quite often leaves will accumulate on the grate. This can actually improve the Shield's ability to capture sediment and assist in preventing leave litter from being washed down stream.
Use a Sludge Judge to measure the sediment depth in 4 - 6 locations of the sump.
If the sediment depth is 300mm – 600mm deep it is recommended that the unit be cleaned.

Cleaning a CB Shield Enhanced Catch Basin

Open grate and remove CB Shield with lift rope.
Clean catch basin as usual with a Vacuum truck.
Clean CB Shield (if needed) and re-install into catch basin.
If there is any significant damage to a CB Shield please send a picture and its location to CB Shield Inc. (info@cbshield.com).

Appendix E

Water Balance Calculations

Monthly Water Budget Calculations

WILLS

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

CANADIAN CLIMATE NORMALS FOR 'COBOURG STP (4905)' (1981-2010)

Climate ID = 6151689
Latitude = 43.97
Longitude = 78.18

Thornthwaite (1948) Inputs				Monthly Water Budget Analysis				
Month	Mean Temperature (°C)[1]	Total Precipitation (mm)[1]	Heat Index	PET (mm)	Daylight Correction Factor	Adjusted PET (mm)	Surplus (mm)	Deficit (mm)
January	-5.6	66.7	0.00	0.0	0.78	0.0	66.7	0.0
February	-4.3	54.1	0.00	0.0	0.87	0.0	54.1	0.0
March	-0.5	56.8	0.00	0.0	0.99	0.0	56.8	0.0
April	5.9	76.2	1.28	27.3	1.12	30.6	48.9	0.0
May	11.7	81.2	3.62	58.5	1.23	71.9	22.7	0.0
June	16.9	80.5	6.32	83.8	1.29	107.6	0.0	27.1
July	19.9	64.8	8.10	103.0	1.26	129.6	0.0	64.8
August	19.4	71.7	7.79	100.2	1.16	116.7	0.0	45.0
September	15.4	93.2	5.49	75.9	1.04	79.1	17.3	0.0
October	9.0	76.3	2.43	44.3	0.92	40.6	32.0	0.0
November	3.7	93.2	0.63	16.6	0.81	13.4	76.6	0.0
December	-2.0	75.8	0.00	0.0	0.75	0.0	75.8	0.0
Totals		**890.5**	35.67			**589.6**	**450.9**	**136.9**
	Thornthwaite Coefficient (α)		**1.064**			Total Water Surplus (mm)		**300.9**

Notes:

1. Temperature and Precipitation are taken from Canadian Climate Normals 1981-2010
2. Water budget adjusted for latitude and length of daylight
3. Potential Evapotranspiration (PET) is calculated based on the Thornthwaite 1948 equation
4. Total Water Surplus (Thornthwaite, 1948) is calculated as total precipitation minus adjusted evapotranspiration

Water Balance Calculations for Existing Conditions

WILLS

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

Catchment Parameters	Internal	External						Total
Drainage Area (m^2)	22600	13400						**36000**
Pervious Area (m^2)	22600	9400						**32000**
Impervious Area (m^2)	0	4000						**4000**
Evapotranspiration Factors								
Pervious PET Ratio	0.66	0.66						**0.66**
Impervious Evapotranspiration[3]	0.20	0.20						**0.20**
Infiltration Factors								
Topography Infiltration Factor	0.15	0.10						**0.14**
Soil Infiltration Factor	0.35	0.35						**0.35**
Land Cover Infiltration Factor	0.13	0.10						**0.12**
MOE Infiltration Factor	0.63	0.55						**0.61**
Actual Infiltration Factor	0.63	0.55						**0.61**
Run-Off Coefficient	0.37	0.45						**0.39**
Runoff from Impervious Surfaces	0.80	0.80						**0.80**
Inputs (mm/yr)								
Precipitation	890.5	890.5						**890.5**
Run-On	0.0	0.0						**0.0**
Other Inputs	0.0	0.0						**0.0**
Total Inputs	890.5	890.5						**890.5**
Outputs (mm/yr)								
Precipitation Surplus	300.9	423.8						**346.7**
Net Surplus	300.9	423.8						**346.7**
Evapotranspiration	589.6	466.7						**543.8**
Infiltration	190.6	116.1						**162.8**
Infiltration Features[4]	0.0	0.0						**0.0**
Total Infiltration	**190.6**	**116.1**						**162.8**
Runoff Pervious Areas	110.4	135.4						**117.7**
Runoff Impervious Areas	0.0	712.4						**712.4**
Total Unadjusted Runoff	110.4	307.7						**183.8**
Total Adjusted Runoff[5]	**110.4**	**307.7**						**183.8**
Total Outputs	**890.5**	**890.5**						**890.5**
Inputs (m^3/yr)								
Precipitation	20125	11933						**32058**
Run-On	0	0						**0**
Other Inputs	0	0						**0**
Total Inputs	**20125**	**11933**						**32058**
Outputs (m^3/yr)								
Precipitation Surplus	6801	5678						**12480**
Net Surplus	6801	5678						**12480**
Evapotranspiration	13324	6254						**19578**
Infiltration	4307	1556						**5862**
Infiltration Features[4]	0	0						**0**
Total Infiltration	4307	1556						**5862**
Runoff Pervious Areas	2495	1273						**3768**
Runoff Impervious Areas	0	2850						**2850**
Total Unadjusted Runoff	2495	4123						**6617**
Total Adjusted Runoff[5]	2495	4123						**6617**
Total Outputs	**20125**	**11933**						**32058**

Notes:

1. Water Balance Calculations area in based on methodology described in the Conservation Authority Guidelines for Hydrogeological Assessments
2. Annual Precipitation and Evapotranspiration values were determined using the Thornthwaite (1948) method for monthly water budget calculations
3. Evaporation from impervious areas was assumed to be 20% of Precipitation
4. Infiltration Features are calculated using daily Precipitation data and averaged over the number of years of available data. The entire Catchment is assumed to contribute with no infiltration occuring during months with a negative average temperature.
5. Total Adjusted Runoff is calculated as (Pervious Runoff + Impervious Runoff) - (Infiltration Features)

Water Balance Calculations for Proposed Conditions

WILLS

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

Catchment Parameters	Chamber 1	Chamber 2	Uncontrolled					Total
Drainage Area (m^2)	11800	18000	6200					**36000**
Pervious Area (m^2)	8500	11800	4100					**24400**
Impervious Area (m^2)	3300	6200.0	2100					**11600**
Evapotranspiration Factors								
Pervious PET Ratio	0.66	0.66	0.66					**0.66**
Impervious Evapotranspiration[3]	0.20	0.20	0.20					**0.20**
Infiltration Factors								
Topography Infiltration Factor	0.15	0.15	0.15					**0.15**
Soil Infiltration Factor	0.35	0.35	0.35					**0.35**
Land Cover Infiltration Factor	0.10	0.10	0.10					**0.10**
MOE Infiltration Factor	0.60	0.60	0.60					**0.60**
Actual Infiltration Factor	0.60	0.60	0.60					**0.60**
Run-Off Coefficient	0.40	0.40	0.40					**0.40**
Runoff from Impervious Surfaces	0.80	0.80	0.80					**0.80**
Inputs (mm/yr)								
Precipitation	890.5	890.5	890.5					**890.5**
Run-On	0.0	0.0	0.0					**0.0**
Other Inputs	0.0	0.0	0.0					**0.0**
Total Inputs	890.5	890.5	890.5					**890.5**
Outputs (mm/yr)								
Precipitation Surplus	416.0	442.7	440.3					**433.5**
Net Surplus	416.0	442.7	440.3					**433.5**
Evapotranspiration	474.5	447.8	450.2					**457.0**
Infiltration	130.1	118.4	119.4					**122.4**
Infiltration Features[4]	174.6	258.9	0.0					**186.7**
Total Infiltration	**304.7**	**377.3**	**119.4**					**309.1**
Runoff Pervious Areas	120.4	120.4	120.4					**120.4**
Runoff Impervious Areas	712.4	712.4	712.4					**712.4**
Total Unadjusted Runoff	285.9	324.3	320.9					**311.1**
Total Adjusted Runoff[5]	111.3	65.4	320.9					**124.5**
Total Outputs	**890.5**	**890.5**	**890.5**					**890.5**
Inputs (m^3/yr)								
Precipitation	10508	16029	5521					**32058**
Run-On	0	0	0					**0**
Other Inputs	0	0	0					**0**
Total Inputs	**10508**	**16029**	**5521**					**32058**
Outputs (m^3/yr)								
Precipitation Surplus	4909	7968	2730					**15607**
Net Surplus	4909	7968	2730					**15607**
Evapotranspiration	5599	8061	2791					**16451**
Infiltration	1535	2131	740					**4406**
Infiltration Features[4]	2061	4660	0					**6721**
Total Infiltration	3596	6791	740					**11127**
Runoff Pervious Areas	1023	1420	494					**2937**
Runoff Impervious Areas	2351	4417	1496					**8264**
Total Unadjusted Runoff	3374	5837	1990					**11201**
Total Adjusted Runoff[5]	1313	1177	1990					**4480**
Total Outputs	**10508**	**16029**	**5521**					**32058**

Notes:

1. Water Balance Calculations area in based on methodology described in the Conservation Authority Guidelines for Hydrogeological Assessments
2. Annual Precipitation and Evapotranspiration values were determined using the Thornthwaite (1948) method for monthly water budget calculations
3. Evaporation from impervious areas was assumed to be 20% of Precipitation
4. Infiltration Features are calculated using daily Precipitation data and averaged over the number of years of available data. The entire Catchment is assumed to contribute with no infiltration occuring during months with a negative average temperature.
5. Total Adjusted Runoff is calculated as (Pervious Runoff + Impervious Runoff) - (Infiltration Features)

Water Balance Assessment

WILLS

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

Characteristic	Existing	Proposed No Mitigation	Change	Proposed With Mitigation	Change
Inputs (m^3/yr)					
Precipitation	32058	32058	0.0%	32058	0.0%
Run-On	0	0	0.0%	0	0.0%
Other Inputs	0	0	0.0%	0	0.0%
Total Inputs	32058	32058	0.0%	32058	0.0%
Outputs (m^3/yr)					
Precipitation Surplus	12480	15607	25.1%	15607	25.1%
Net Surplus	12480	15607	25.1%	15607	25.1%
Evapotranspiration	19578	16451	-16.0%	16451	-16.0%
Infiltration	5862	4406	-24.8%	4406	-24.8%
Infiltration Features	0	0	0.0%	6721	0.0%
Total Infiltration	**5862**	**4406**	**-24.8%**	**11127**	**89.8%**
Runoff Pervious Areas	3768	2937	-22.0%	2937	-22.0%
Runoff Impervious Areas	2850	8264	190.0%	8264	190.0%
Total Runoff	**6617**	**11201**	**69.3%**	**4480**	**-32.3%**
Total Outputs	32058	32058	0.0%	32058	0.0%

Infiltration Factor Calculations for Internal	Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

Topography	
Average Slope	0.91%
Slope Description	Rolling/Hilly Land
Topography Infiltration Factor	**0.15**

Soils		
Hydrologic Soil Group[2]	AB	Total
Soil Type	Tecumseth Sandy Loam	
Area (ha)	2.26	2.26
Soil Infiltration Factor	0.35	**0.35**

Cover		
Land Use	Area (ha)	**Cover Infiltration Factor**
Agriculture		
Range		
Grass	1.51	0.10
Woods	0.75	0.20
Wetland		
Bare Earth (>70% Rock)		
Impervious		
Total[3]	2.26	**0.13**

MOE Infiltration Factor	**0.63**
Actual Infiltration Factor	**0.63**

Notes:

1. Infiltration Factors are derived from Table 3.1, MOE SWM Design Manual 2003
2. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
3. Composite Infiltration Factors are calculated using pervious areas only

Infiltration Factor Calculations for External	Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

Topography	
Average Slope	3.60%
Slope Description	Hilly Land
Topography Infiltration Factor	**0.10**

Soils	EXT-201	EXT-301	EXT-302	EXT-302	
Hydrologic Soil Group[2]	AB	AB	AB	AB	
Soil Type	Tecumseth Sandy Loam	Tecumseth Sandy Loam	Tecumseth Sandy Loam	Tecumseth Sandy Loam	Total
Area (ha)	0.20	0.48	0.47	0.19	1.34
Soil Infiltration Factor	0.35	0.35	0.35	0.35	**0.35**

Cover		
Land Use	Area (ha)	**Cover Infiltration Factor**
Agriculture		
Range		
Grass	0.94	0.10
Woods		
Wetland		
Bare Earth (>70% Rock)		
Impervious	0.40	
Total[3]	0.94	**0.10**

MOE Infiltration Factor	**0.55**
Actual Infiltration Factor	**0.55**

Notes:

1. Infiltration Factors are derived from Table 3.1, MOE SWM Design Manual 2003
2. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
3. Composite Infiltration Factors are calculated using pervious areas only

Infiltration Factor Calculations for Chamber 1	Sheet 1 of 2

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

Topography	
Average Slope	2.50%
Slope Description	Rolling/Hilly Land
Topography Infiltration Factor	**0.15**

Soils	PR-102	EXT-302	Total
Hydrologic Soil Group[2]	AB	AB	
Soil Type	Tecumseth Sandy Loam	Tecumseth Sandy Loam	
Area (ha)	0.71	0.47	1.18
Soil Infiltration Factor	0.35	0.35	**0.35**

Cover		
Land Use	Area (ha)	**Cover Infiltration Factor**
Agriculture		
Range		
Grass	0.85	0.10
Woods		
Wetland		
Bare Earth (>70% Rock)		
Impervious	0.33	
Total[3]	0.85	**0.10**

MOE Infiltration Factor	**0.60**
Actual Infiltration Factor	**0.60**

Notes:

1. Infiltration Factors are derived from Table 3.1, MOE SWM Design Manual 2003
2. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
3. Composite Infiltration Factors are calculated using pervious areas only

Infiltration Features for Chamber 1

Sheet 2 of 2

WILLS

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

Infiltration Features Summary		
Total Storage Volume[1]	50.0	m^3
Contributing Area[2]	11800	m^2
Pervious Area	8500	m^2
Impervious Area	3300	m^2
Maximum Drawdown	24	hrs
Average Infiltration Volume[3]	**2061**	**m^3/yr**
	174.6	**mm/yr**

Notes:

1. Total Storage Volume from all Infiltration Features in the catchment
2. The entire catchment contributes flow to the Infiltration Features
3. Average Infiltration Volume is calculated using daily climate data and averaged over the number of years of available data. No benefit is assumed for Infiltration Features during months with a negative average temperature.
4. Daily climate data is taken from Environment Canada Station 'COBOURG STP' from 1981-2006

Infiltration Factor Calculations for Chamber 2

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

Topography	
Average Slope	2.50%
Slope Description	Rolling/Hilly Land
Topography Infiltration Factor	**0.15**

Soils	PR-101	EXT-201	PR-103	PR-103	
Hydrologic Soil Group[2]	AB	AB	AB	AB	
Soil Type	Tecumseth Sandy Loam	Tecumseth Sandy Loam	Tecumseth Sandy Loam	Tecumseth Sandy Loam	Total
Area (ha)	0.70	0.47	0.44	0.19	1.80
Soil Infiltration Factor	0.35	0.35	0.35	0.35	**0.35**

Cover		
Land Use	Area (ha)	**Cover Infiltration Factor**
Agriculture Range Grass Woods Wetland Bare Earth (>70% Rock)	1.18	0.10
Impervious	0.62	
Total[3]	1.18	**0.10**

MOE Infiltration Factor	**0.60**
Actual Infiltration Factor	**0.60**

Notes:

1. Infiltration Factors are derived from Table 3.1, MOE SWM Design Manual 2003
2. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
3. Composite Infiltration Factors are calculated using pervious areas only

Infiltration Features for Chamber 2

WILLS

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

Infiltration Features Summary		
Total Storage Volume[1]	173.0	m^3
Contributing Area[2]	18000	m^2
Pervious Area	11800	m^2
Impervious Area	6200	m^2
Maximum Drawdown	24	hrs
Average Infiltration Volume[3]	**4660**	**m^3/yr**
	258.9	**mm/yr**

Notes:

1. Total Storage Volume from all Infiltration Features in the catchment
2. The entire catchment contributes flow to the Infiltration Features
3. Average Infiltration Volume is calculated using daily climate data and averaged over the number of years of available data. No benefit is assumed for Infiltration Features during months with a negative average temperature.
4. Daily climate data is taken from Environment Canada Station 'COBOURG STP' from 1981-2006

Infiltration Factor Calculations for Uncontrolled	Sheet 1 of 1

Project No: 10122
Project Name: Nickerson Woods
Designed/Checked By: CS / CPB
Date: 4-Jun-20

Topography	
Average Slope	2.00%
Slope Description	Rolling/Hilly Land
Topography Infiltration Factor	**0.15**

Soils	PR-104	EXT-201	PR-400	
Hydrologic Soil Group[2]	AB	AB	AB	
Soil Type	Tecumseth Sandy Loam	Tecumseth Sandy Loam	Tecumseth Sandy Loam	Total
Area (ha)	0.34	0.20	0.08	0.62
Soil Infiltration Factor	0.35	0.35	0.35	**0.35**

Cover		
Land Use	Area (ha)	**Cover Infiltration Factor**
Agriculture Range Grass Woods Wetland Bare Earth (>70% Rock)	0.41	0.10
Impervious	0.21	
Total[3]	0.41	**0.10**

MOE Infiltration Factor	**0.60**
Actual Infiltration Factor	**0.60**

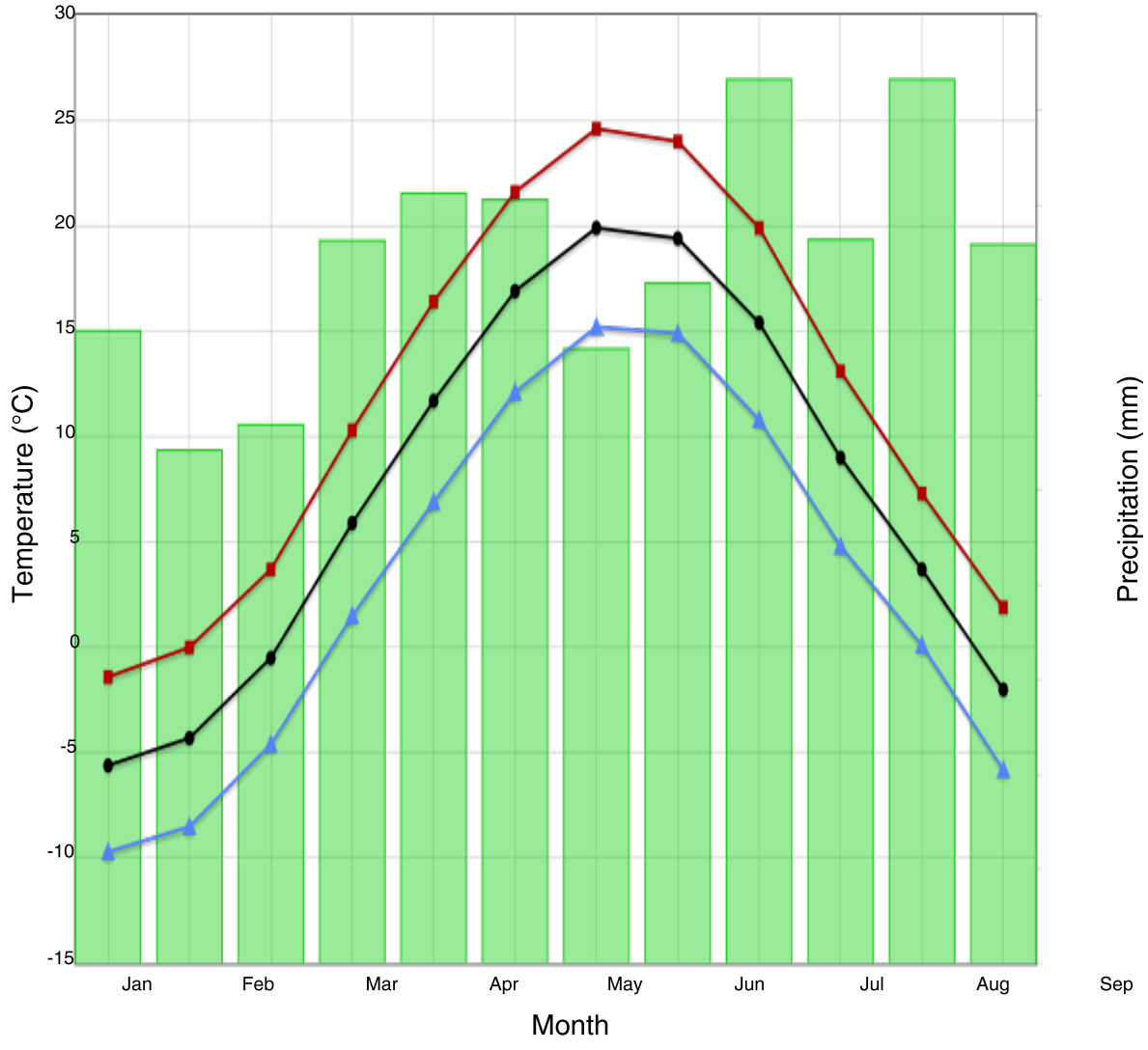
Notes:

1. Infiltration Factors are derived from Table 3.1, MOE SWM Design Manual 2003
2. Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
3. Composite Infiltration Factors are calculated using pervious areas only

Canadian Climate Normals 1981-2010 Station Data

▼ Temperature and Precipitation Graph

Temperature and Precipitation Graph for 1981 to 2010 Canadian Climate Normals COBOURG STP



Daily Maximum Temperature (°C)

	Daily Average Temperature (°C)
	Daily Minimum Temperature (°C)
	Precipitation (mm)

▼ Normals Data

The minimum number of years used to calculate these Normals is indicated by a code for each element. A "+" beside an extreme date indicates that this date is the first occurrence of the extreme value. Values and dates in bold indicate all-time extremes for the location.

Data used in the calculation of these Normals may be subject to further quality assurance checks. This may result in minor changes to some values presented here.

COBOURG STP
ONTARIO
Current Station Operator: CCN

Latitude:	43°58'00.000" N
Longitude:	78°11'00.000" W
Elevation:	79.20 m
Climate ID:	6151689
WMO ID:	
TC ID:	

▼ Temperature

Temperature

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Co
Daily Average (°C)	-5.6	-4.3	-0.5	5.9	11.7	16.9	19.9	19.4	15.4	9.0	3.7	-2.0	7.5	
Standard Deviation	3.2	2.1	1.5	1.3	1.6	1.4	1.2	1.3	1.3	1.0	1.2	2.6	1.0	
Daily Maximum (°C)	-1.4	0.0	3.7	10.3	16.4	21.6	24.6	24.0	19.9	13.1	7.3	1.9	11.8	

Temperature

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Daily Minimum (°C)	-9.7	-8.5	-4.6	1.5	6.9	12.1	15.2	14.9	10.8	4.8	0.1	-5.8	3.1	C
Extreme Maximum (°C)	13.0	13.0	20.0	26.0	29.0	31.5	**36.0**	34.0	30.0	24.0	18.0	15.5		
Date (yyyy/dd)	1995/ 14	1994/ 19	1998/ 31	1990/ 28	1977/ 28	2005/ 25	**1988/ 08**	2001/ 07	1973/ 04	1997/ 06	1977/ 04	1982/ 03		
Extreme Minimum (°C)	**-39.0**	-27.8	-26.0	-12.0	-5.0	-1.0	5.0	1.0	-5.0	-10.0	-16.0	-29.0		
Date (yyyy/dd)	**1981/ 04**	1976/ 02	2003/ 03	1982/ 05	1978/ 01	1983/ 08	1988/ 03	1986/ 30	1990/ 18	1978/ 09	1978/ 27	1980/ 25		

▼ Precipitation

Precipitation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall (mm)	34.0	32.9	42.7	74.3	81.2	80.5	64.8	71.7	93.2	76.3	89.2	53.1	793.9
Snowfall (cm)	32.7	21.2	14.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0	4.0	22.7	96.5
Precipitation (mm)	66.7	54.1	56.8	76.2	81.2	80.5	64.8	71.7	93.2	76.3	93.2	75.8	890.4
Extreme Daily Rainfall (mm)	65.0	31.0	49.5	46.1	53.0	52.5	62.5	70.0	**73.4**	51.0	54.8	40.0	
Date (yyyy/dd)	1979/ 24	1998/ 17	1980/ 21	1992/ 16	1989/ 31	1998/ 25	1992/ 17	1998/ 23	**1986/ 10**	1980/ 25	1985/ 03	1990/ 03	
Extreme Daily Snowfall (cm)	20.0	**35.6**	17.0	17.3	0.0	0.0	0.0	0.0	0.0	0.0	13.2	25.4	
Date (yyyy/dd)	1997/ 10	**1971/ 13**	1980/ 13	1975/ 03	1971/ 01	1971/ 01	1970/ 01	1970/ 01	1970/ 01	1970/ 01	1991/ 28	1975/ 09	
Extreme Daily Precipitation (mm)	65.0	35.6	49.5	46.1	53.0	52.5	62.5	70.0	**73.4**	51.0	54.8	44.0	

Precipitation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Cc
Date (yyyy/dd)	1979/ 24	1971/ 13	1980/ 21	1992/ 16	1989/ 31	1998/ 25	1992/ 17	1998/ 23	**1986/ 10**	1980/ 25	1985/ 03	1990/ 03		
Extreme Snow Depth (cm)	**44**	35	22	3	0	0	0	0	0	0	12	25		
Date (yyyy/dd)	**1999/ 13**	1993/ 23	1993/ 01	2003/ 07	1983/ 01	1983/ 01	1983/ 01	1983/ 01	1983/ 01	1983/ 01	1995/ 15	2005/ 17		

► Days with Maximum Temperature

► Days with Minimum Temperature

► Days with Rainfall

► Days With Snowfall

► Days with Precipitation

► Degree Days

► Frost-Free

Legend

- A = WMO "3 and 5 rule" (i.e. no more than 3 consecutive and no more than 5 total missing for **either** temperature **or** precipitation)
- B = At least 25 years
- C = At least 20 years
- D = At least 15 years

▼ Station / Element Metadata

Statistics listed below are provided as a guide to determine the validity of Normals and Extremes calculations. For example, a station with 30 years of record between 1981 and 2010 with no missing years would be a more reliable normal than a station with 15 years of record and 2 missing years. Less than 100% possible observations indicates that out of the total number of observations used, some records were missing.

COBOURG STP

Province	ON
Latitude (dd mm):	43 58 N
Country	CAN
Longitude (ddd mm):	78 11 W
Time Zone	EST
Latitude (decimal degrees):	43.97 N
Climate ID:	6151689
Longitude (decimal degrees):	78.18 W
WMO ID:	
Elevation (m):	79.2
TC ID:	

▼ Temperature

Temperature						
	Begin Year	End Year	Total Number of Years	Missing Years	Total Count of Observations	% of Possible Observations
Daily Average (°C)	1981	2006	26	1	9332	98.6
Standard Deviation	1981	2006	26	1	9332	98.6
Daily Maximum (°C)	1981	2006	26	1	9338	98.7
Daily Minimum (°C)	1981	2006	26	1	9337	98.7
Extreme Maximum (°C)	1972	2006			12397	99.6

Temperature

	Begin Year	End Year	Total Number of Years	Missing Years	Total Count of Observations	% of Possible Observations
Extreme Minimum (°C)	1972	2006			12454	99.8

▼ Precipitation

Precipitation

	Begin Year	End Year	Total Number of Years	Missing Years	Total Count of Observations	% of Possible Observations
Rainfall (mm)	1981	2006	26	1	9376	99
Snowfall (cm)	1981	2006	26	1	9376	99
Precipitation (mm)	1981	2006	26	1	9376	99
Extreme Daily Rainfall (mm)	1970	2006			13045	99.9
Extreme Daily Snowfall (cm)	1970	2006			13068	99.9
Extreme Daily Precipitation (mm)	1970	2006			13035	99.8
Extreme Snow Depth (cm)	1983	2006			4942	78.3

► Days with Maximum Temperature

► Days with Minimum Temperature

► Days with Rainfall

► Days With Snowfall

► Days with Precipitation

► Degree Days

► Frost-Free

Date modified:

2019-06-11

Appendix F

Conveyance Calculations

STORM SEWER DESIGN SHEET

Rain Station:	Cobourg
Design Storm:	5 Year
Intensity-Duration-Frequency Parameters a =	530.0
b =	3.300
c =	0.74
Max. Allowable Pipe Capacity:	85%
Minimum Time of Concentration:	15 min

Project Information			
Project Name	Nickerson	**Project No.**	10122
Project Location	Town of Cobourg	**Designed by**	MBJ
Municipality	Town of Cobourg	**Checked by**	AH
Design Standards	Ganaraska	**Date**	July 8, 2019

D.M. Wills Associates Ltd.
150 Jameson Drive
Peterborough, ON · K9J 0B9
Tel: (705) 742-2297
Fax: (705) 741-3568

LOCATION				TIME OF CONCENTRATION (MIN)										PIPE PROPERTIES							
STREET	CATCHMENT ID	FROM	TO	TO UPPER END	IN REACH	INTENSITY (mm/hr)	AREA (ha)	RUNOFF COEFFICIENT, C	AC	CUMUL AC	EXTRANEOUS FLOWS (m^3/s) (OPTIONAL)	CUMULATIVE EXTRANEOUS FLOWS (m^3/s)	RUNOFF (m^3/s)	PIPE MATERIAL	LENGTH (m)	GRADE (%)	PIPE DIA. (mm)	CAPACITY (m^3/s)	FULL FLOW VELOCITY (m/s)	% FULL	NOTES
Street 'A'		Chamber 1	MH 13	15.0	0.1	61.7	0.00	0.00	0.00	0.00	0.03	0.03	0.026	PVC	5.2	1.00	300	0.10	1.37	26.9	
Street 'A'		MH 13	CBMH 14	15.1	0.6	61.4	0.20	0.60	0.12	0.12	0.00	0.03	0.046	PVC	47.2	1.00	300	0.10	1.37	48.1	
Street 'A'		CBMH 14	CBMH 15	15.7	0.2	60.0	0.07	0.60	0.04	0.16	0.00	0.03	0.053	PVC	19.5	1.00	300	0.10	1.37	54.8	
Street 'A'		CBMH 15	OGS 16	15.9	0.3	59.5	0.07	0.60	0.04	0.20	0.00	0.03	0.060	PVC	23.0	0.70	300	0.08	1.14	73.8	
Street 'A'		CB 18	OGS 16	15.0	0.6	61.7	0.15	0.70	0.11	0.11	0.00	0.00	0.018	PVC	36.0	0.50	300	0.07	0.97	26.3	
Street 'A'		AD 9	CB 10	15.0	0.8	61.7	0.08	0.10	0.01	0.01	0.00	0.00	0.001	PVC	35.5	0.50	200	0.02	0.74	5.9	
Street 'A'		CB 10	OGS 16	15.8	0.4	59.7	0.77	0.60	0.46	0.47	0.00	0.00	0.078	PVC	31.5	0.80	375	0.16	1.42	49.7	
Street 'A'		OGS 16	Chamber 2	16.2	0.1	58.8	0.00	0.00	0.00	0.78	0.00	0.03	0.153	PVC	7.5	0.50	450	0.20	1.27	76.0	
D'Arcy Street		CB 102	CBMH 101	15.0	0.1	61.7	0.01	0.80	0.01	0.01	0.00	0.00	0.001	PVC	10.5	1.00	300	0.10	1.37	1.4	
D'Arcy Street		CBMH 101	EX MH 100	15.1	0.2	61.4	0.05	0.80	0.04	0.05	0.00	0.00	0.008	PVC	12.5	1.00	300	0.10	1.37	8.5	

Input Column
Formulated Column
U/S End of Pipe Run
D/S End of Pipe Run
Exceeds Max Capacity

Flow Calculations

$Q = V \times A$

$V = (1/n) \times R^{2/3} \times S^{1/2}$

Manning's n Values

HDPE	0.010
PVC	0.013
Concrete	0.013
Clay	0.014
Brick	0.015

Enhanced Grass Swale Sizing for Eastern Swale (PR-102)

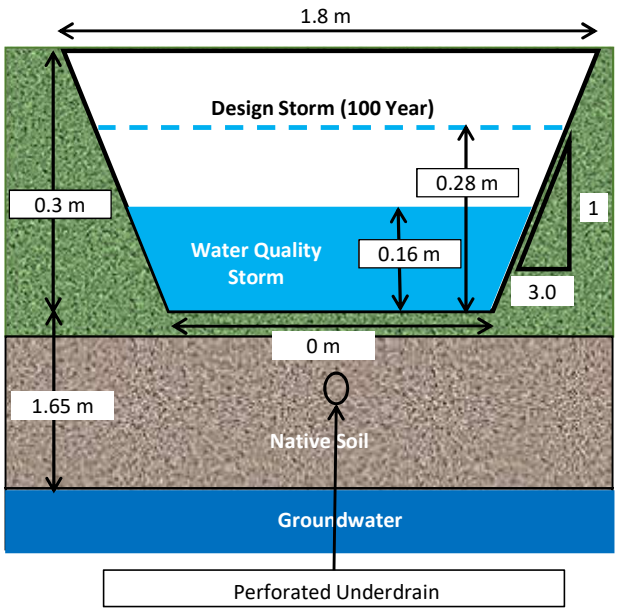
Project No: 10-10122
Project Name: Nickerson Woods
Designed/Checked By: CPB / RC
Date: 5-Jun-20

Site Characteristics		
Catchment Area	1.18	ha
Water Quality Storm	25	mm
Runoff Coefficient	0.34	
Water Quality Control Volume	100.3	m^3
Water Quality Peak Flow Rate	0.035	m^3/s
100 Year Storm Peak Flow Rate	0.164	m^3/s
Proposed Surface Elevation	102.15	m
Groundwater Elevation	100.20	m

Design Constraints		
Check Dams Required	No	
Max Water Quality Flow Depth	0.1	m
Max Water Quality Velocity	0.5	m/s
Max Design Storm Velocity	1.5	m/s
Min Depth to Groundwater	1.0	m

Design Calculations		
Pretreatment Utilized	None	
Check Dams Included	No	
Longitudinal Slope	0.5	%
Manning's n	0.027	
Maximum Swale Capacity	0.19	m^3/s
Under-drain Capaciy	0.013	m^3/s
Under-drain Storage	4.68	m^3
Water Quality Depth	0.16	m
Water Quality Velocity	0.47	m/s
Design Storm Velocity	0.69	m/s

Enhanced Grassed Swale
Proposed Cross-Section



Notes:

1. Flow Depth and Velocity were determined using Manning's Equation for the proposed swale cross-section.
2. Design Constraints were determined from CVC/TRCA Low Impact Development Stormwater Management Planning and Design Guide

Enhanced Grass Swale Sizing for Rear Yard Swale (PR-103)

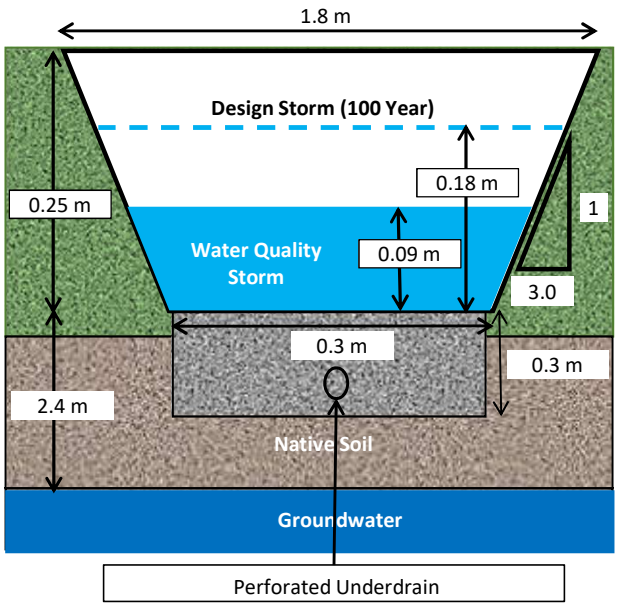
Project No: 10-10122
Project Name: Nickerson Woods
Designed/Checked By: CPB / RC
Date: 5-Jun-20

Site Characteristics		
Catchment Area	0.63	ha
Water Quality Storm	25	mm
Runoff Coefficient	0.35	
Water Quality Control Volume	55.1	m^3
Water Quality Peak Flow Rate	0.020	m^3/s
100 Year Storm Peak Flow Rate	0.092	m^3/s
Proposed Surface Elevation	101.55	m
Groundwater Elevation	98.90	m

Design Constraints		
Check Dams Required	No	
Max Water Quality Flow Depth	0.1	m
Max Water Quality Velocity	0.5	m/s
Max Design Storm Velocity	1.5	m/s
Min Depth to Groundwater	1.0	m

Design Calculations		
Pretreatment Utilized	None	
Check Dams Included	No	
Longitudinal Slope	0.5	%
Manning's n	0.027	
Maximum Swale Capacity	0.18	m^3/s
Under-drain Capacity	0.013	m^3/s
Under-drain Storage	14.21	m^3
Water Quality Depth	0.090	m
Water Quality Velocity	0.40	m/s
Design Storm Velocity	0.59	m/s

Enhanced Grassed Swale
Proposed Cross-Section



Notes:

1. Flow Depth and Velocity were determined using Manning's Equation for the proposed swale cross-section.
2. Design Constraints were determined from CVC/TRCA Low Impact Development Stormwater Management Planning and Design Guide

Emergency Spill Ditch-100 Year Storm Event

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.02000	m/m
Left Side Slope	3.00	m/m (H:V)
Right Side Slope	3.00	m/m (H:V)
Bottom Width	0.30	m
Discharge	0.29	m³/s

Results

Normal Depth	0.23	m
Flow Area	0.23	m²
Wetted Perimeter	1.78	m
Hydraulic Radius	0.13	m
Top Width	1.70	m
Critical Depth	0.24	m
Critical Slope	0.01801	m/m
Velocity	1.22	m/s
Velocity Head	0.08	m
Specific Energy	0.31	m
Froude Number	1.05	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	m
Length	0.00	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.23	m
Critical Depth	0.24	m
Channel Slope	0.02000	m/m

Emergency Spill Ditch-100 Year Storm Event

GVF Output Data

Critical Slope	0.01801	m/m

Emergency Spill Channel

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.02000	m/m
Normal Depth	0.30	m
Left Side Slope	3.00	m/m (H:V)
Right Side Slope	3.00	m/m (H:V)
Bottom Width	0.30	m

Results

Discharge	0.51	m^3/s
Flow Area	0.36	m^2
Wetted Perimeter	2.20	m
Hydraulic Radius	0.16	m
Top Width	2.10	m
Critical Depth	0.31	m
Critical Slope	0.01669	m/m
Velocity	1.41	m/s
Velocity Head	0.10	m
Specific Energy	0.40	m
Froude Number	1.09	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	m
Length	0.00	m
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	m
Profile Description		
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	0.30	m
Critical Depth	0.31	m
Channel Slope	0.02000	m/m

Emergency Spill Channel

GVF Output Data

Critical Slope	0.01669	m/m

Emergency Walkway Weir

Project Description

Solve For	Discharge

Input Data

Headwater Elevation		100.80	m
Crest Elevation		100.69	m
Tailwater Elevation		100.62	m
Weir Coefficient		1.62	SI
Crest Length		5.80	m
Number Of Contractions	0		

Results

Discharge	0.34	m³/s
Headwater Height Above Crest	0.11	m
Tailwater Height Above Crest	-0.07	m
Flow Area	0.64	m²
Velocity	0.54	m/s
Wetted Perimeter	6.02	m
Top Width	5.80	m

Appendix G

Soil Investigation Summary Report

25 May 2015

LeBlanc Enterprises
1035416 Ontario Ltd., P.O. Box 216
Cobourg, ON K9A 4K5

Attention: Mr. Al LeBlanc

Re: Soil Infiltration Rate for Storm Water Management
Nickerson Woods Subdivision,
Cobourg, ON
Our Project № G030232B1

Dear Mr. Leblanc:

Further to your request, Geo-Logic carried out a subsurface investigation at the proposed Nickerson Woods Subdivision development located north of Nickerson Dr. on the continuation of D'Arcy Street in the Municipality of Cobourg. It is proposed to determine the soil conditions present and based on the findings determine the feasibility of infiltration method for storm water management techniques and the relevant soil parameters to aid in the design.

The field work consisted of subsurface exploration by means of excavating three (3) testholes to depths ranging from 1.5 to 2.0 metres below existing grade (mbeg) on May 12, 2015. A detailed log of the testhole was maintained and is attached to this letter along with a test hole location plan. Representative soil samples of the materials encountered in the testhole were obtained and inspected in the field immediately upon retrieval for type, texture, and colour. All samples were sealed in clean plastic bags and transported to the Geo-Logic laboratory for further visual-tactile examination and for laboratory testing including moisture content, gradation and specific gravity. The soil percolation rate was measured in the testholes, using the methodology described in section 6.3.4 Falling Head Percolation Test of the MOE Manual of Policy, Procedures and Guidelines for Private Sewage Dispoal Systems. The depth the test occurred in each test hole is shown on the logs.

Groundwater observations were made during the excavation and on completion of the test holes and the depth groundwater was encountered was recorded on the testhole logs.

The general area of the site is north of Nickerson Drive on the continuation of D'Arcy Street in the Municipality of Cobourg. This portion of Cobourg lies within the physiographic region known as Lake Iroquois Plain according to Chapman and Putnam in "Physiography of Southern Ontario (2nd Edition 1984). During the Pleistocene, the Iroquois Plain formed when the Lake Ontario basin was flooded with glacial melt water. The glaciers had previously deposited the underlying till soil found at depth, and created the drumlin hill to the west of the site area. The surficial sand soils found on site were deposited in a near shore environment of glacial Lake Iroquois and alluvial soils deposited from the river that eventually became the Creek flowing west of the site.

The topography of the site generally slopes downward from Nickerson Drive to the creek which flows from northeast to southwest.

Details of the subsurface conditions encountered at the site are presented graphically on the test hole logs. It should be noted that the boundary between the topsoil and underlying silts and sands have been inferred from the test hole observations. They generally represent a transition from one soil type to another, and should not be inferred to represent an exact plane of geological change. Further, conditions will vary beyond the test hole.

This investigation was performed to provide geotechnical engineering parameters to aid in the design of the stormwater management for the site including the possibility of infiltration techniques on site as part of the stormwater management.

The test holes advanced on site indicated the soil profile would consist of 0.30 m of surficial topsoil followed by fine sand to silty sand to well below the water table to the termination of the test holes. Based on the observed soil conditions in the test pit, the soil gradation and the percolation tests the infiltration rate for the sand is 50 to 75 mm/hr for water at 20 degrees Celsius. The testing was carried out in spring conditions with the water table at1.15 m to 1.6 m depth. It was concluded that the site soils are conducive to infiltration techniques for storm water management provided some grade raise over the site area occurs.

Should you require any additional information, or have questions, please contact our office at

member of Inspec-Sol Inc.

your convenience.

Yours very truly,
Geo-Logic Inc.
GEOTECHNICAL ENGINEERS
AND HYDROGEOLOGISTS

AF/

Andy Fawcett, P. Eng.
Senior Engineer

STATEMENT OF LIMITATIONS

The report is intended for the guidance of the stormwater engineer. From a construction standpoint, contractors must make their own assessments of the groundwater and soil conditions at the site and how these will affect their proposed construction methods, techniques and schedules.

The conclusions and recommendations in this report are based on information determined at the test hole locations and on geological data of a general nature which may be available for the area investigated. Soil and groundwater conditions beyond the test hole may differ from those encountered at the test hole location and conditions may become apparent during construction which could not be detected or anticipated at the time of the investigation.

This report is applicable only to the project described in the introduction, constructed substantially in accordance with details of alignment and elevations quoted in the text. This report has been prepared for the sole use of Leblanc Enterprises and Greenland Consulting Engineers. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Geo-Logic accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

APPENDIX A

TESTHOLE LOGS AND LOCATION PLAN

GEO-LOGIC
member of Inspec-Sol Inc.

TEST PIT 1

Location: N43.98106, W078.16400

Depth (m)	Soil Type	Remarks
0 to 0.3	Topsoil	
0.3 to 2.0	Light brown Fine sand few silt	Moist, compact

Test pit terminated at 2.0 m depth, Static water level at 1.6 m depth

TEST PIT 2

Location: N43.98161, W078.16296

Depth (m)	Soil Type	Remarks
0 to 0.3	Topsoil	
0.3 to 1.5	Light brown Fine sand few silt	Moist, compact

Test pit terminated at 1.5 m depth, Static water level at 1.15 m depth

TEST PIT 3

Location: N43.98316, W078.16171

Depth (m)	Soil Type	Remarks
0 to 0.4	Topsoil	
0.4 to 1.7	Light brown Fine sand few silt	Moist, compact

Test pit terminated at 1.7 m depth, Static water level at 1.4 m depth

NOTES:

Original document: Development Site Plan, by RFA Planning Consultant Inc.

Test Pits located with hand held GPS during testing.

Testing locations shown on this drawing are approximate. Specific locations of test pits are as follows:

TP-1: N43.98106, W078.16400

TP-2: N43.98161, W078.16296

TP-3: N43.98316, W078.16171

PERCOLATION TEST LOCATION PLAN

NICKERSON WOODS SUBDIVISION
COBOURG ONTARIO

GEO-LOGIC INC.

PROJECT NUMBER: G030232-B3	PROJECT DATE: MAY 2015
SCALE: NOT SCALED	DRAWN BY: SS
ENCLOSURE NUMBER: 01	APPROVED BY: AF
DRAWING NUMBER: A101	APPROVED DATE: 19/05/2015

GEO-LOGIC INC.

A member of the INSPEC-SOL group
347 PIDO ROAD, UNIT 31
PETERBOROUGH, ON K9J 6X7
(705) 749-3317 FAX (705) 749-9248 E-MAIL: peterborough@geo-logic.ca

APPENDIX B

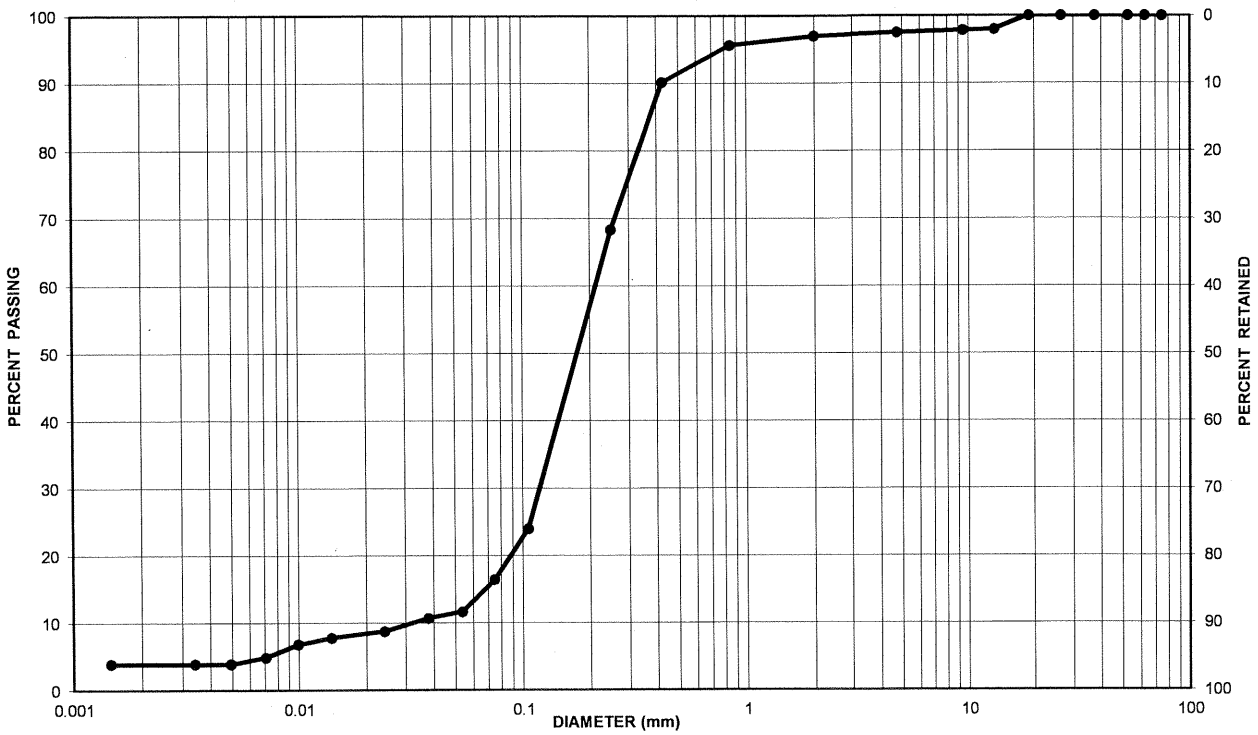
GRADATION TESTS

347 Pido Road, Unit 29, Peterborough (Ontario) K9J 6X7
T 705 749-3317 F 705 749-9248
QMS ISO 9001 : 2008
WWW.GEO-LOGIC.CA

GEO-LOGIC INC.
Member of the INSPEC-SOL Group

PARTICLE-SIZE ANALYSIS OF SOILS (GEOTECHNICAL) (ASTM D422)

CLIENT:	Leblanc Enterprises	**LAB No.:**	SS-15-44
PROJECT/ SITE:	Nickerson Woods, Cobourg	**PROJECT No.:**	G030232 B3
Borehole No.:		Sample No.:	TP1 -A
Depth:		Enclosure:	



CLAY & SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE
UNIFIED SOIL CLASSIFICATION SYSTEM					

Soil Description	Gravel	Sand	Clay & Silt
TP1 -A	3	81	16

REMARKS:

PERFORMED BY:		**DATE:**	May 15, 2015
VERIFIED BY:		**DATE:**	May 15, 2015

GEO-LOGIC INC.
Member of the INSPEC-SOL Group

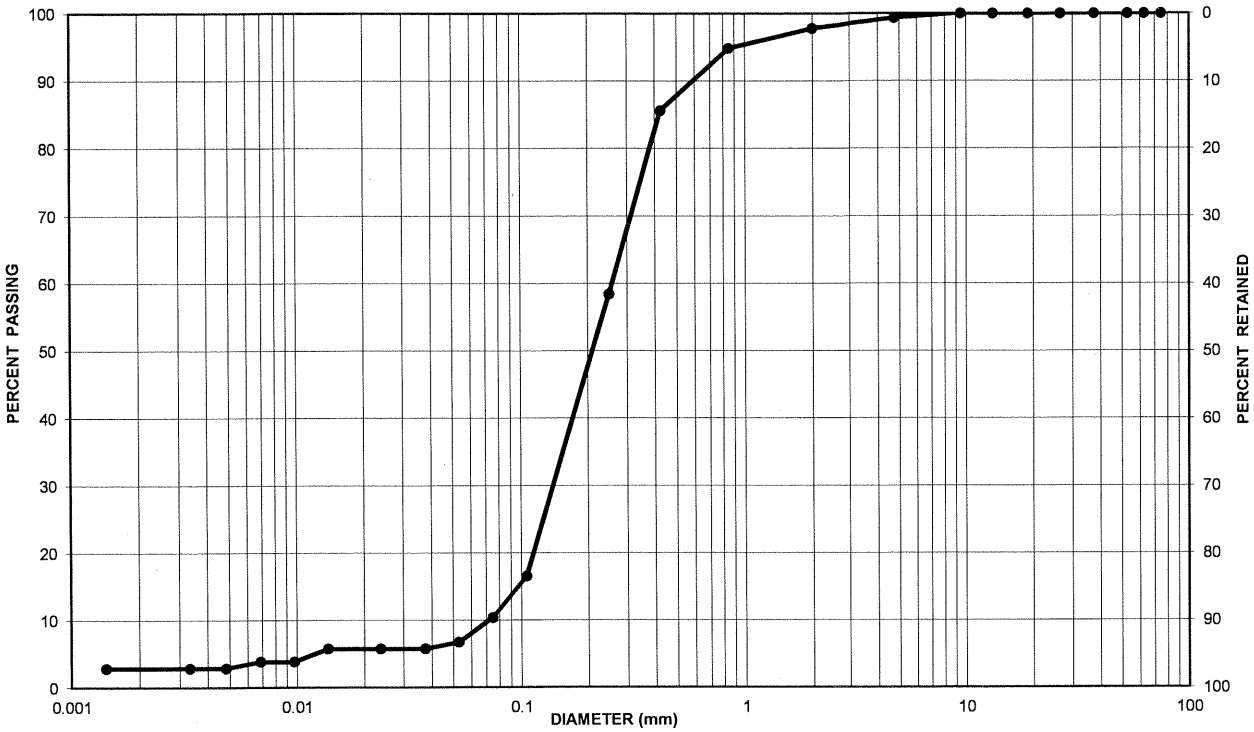
PARTICLE-SIZE ANALYSIS OF SOILS (GEOTECHNICAL)
(ASTM D422)

CLIENT: Leblanc Enterprises **LAB No.:** SS-15-44

PROJECT/ SITE: Nickerson Woods, Cobourg, ON **PROJECT No.:** G030232 B3

Borehole No.: Sample No.: TP1-B

Depth: Enclosure:



CLAY & SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE
UNIFIED SOIL CLASSIFICATION SYSTEM					

Soil Description	Gravel	Sand	Clay & Silt
TP1-B	1	89	10

REMARKS:

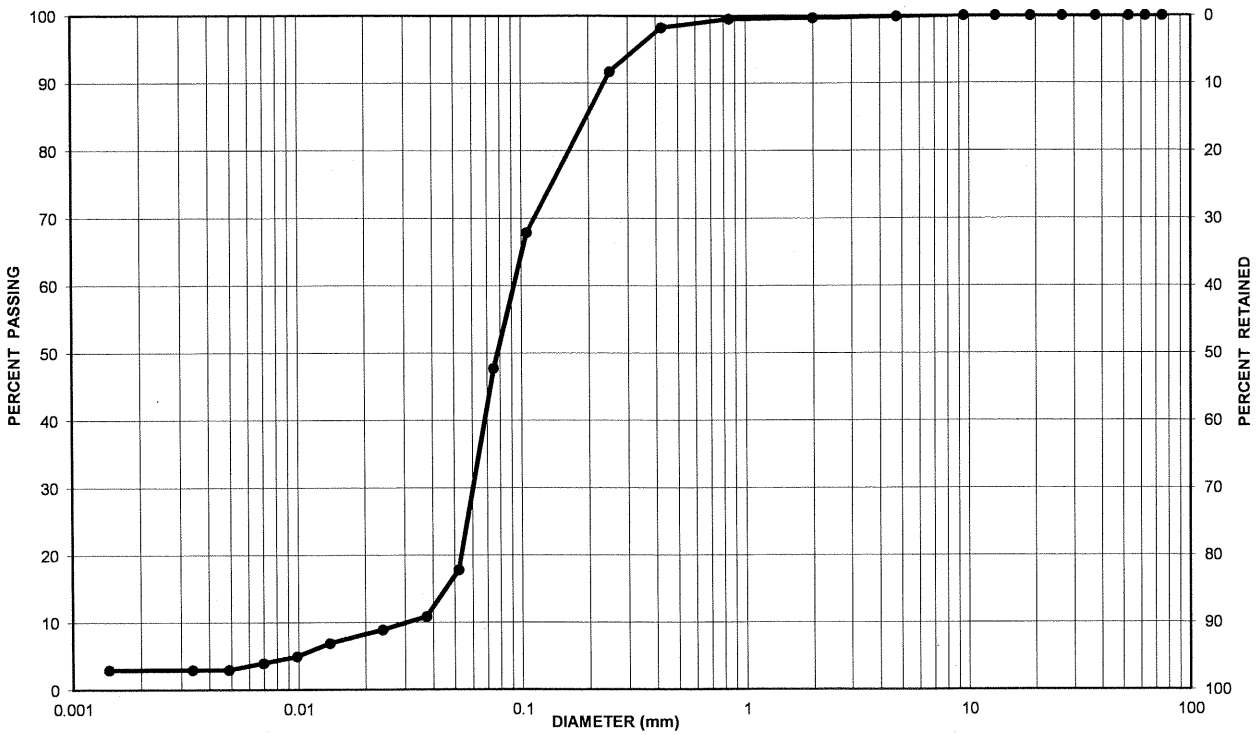
PERFORMED BY: **DATE:** May 15, 2015

VERIFIED BY: **DATE:** May 15, 2015

GEO-LOGIC INC.
Member of the INSPEC-SOL Group

PARTICLE-SIZE ANALYSIS OF SOILS (GEOTECHNICAL)
(ASTM D422)

CLIENT:	Leblanc Enterprises	**LAB No.:**	SS-15-44
PROJECT/ SITE:	Nickerson Woods, Cobourg	**PROJECT No.:**	G030232 B3
Borehole No.:		Sample No.:	TP2-A
Depth:		Enclosure:	



CLAY & SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE
UNIFIED SOIL CLASSIFICATION SYSTEM					

Soil Description	Gravel	Sand	Clay & Silt
TP2-A	0	52	48

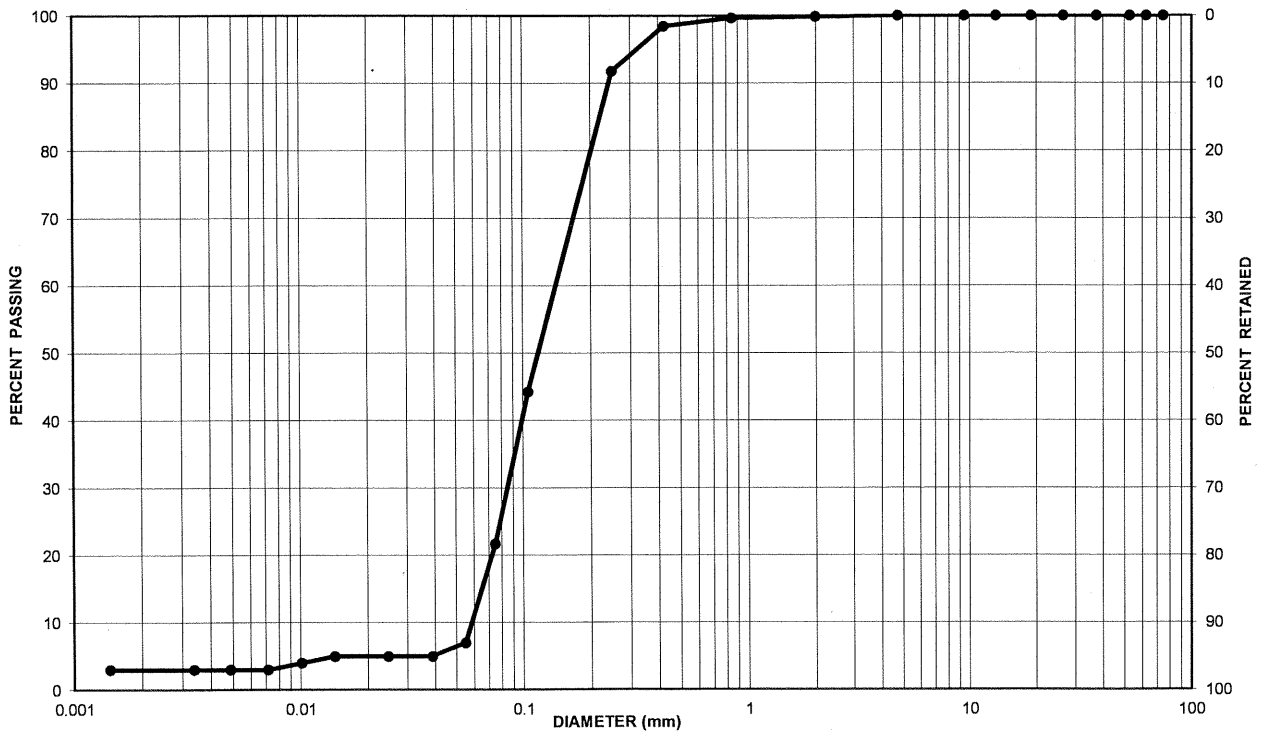
REMARKS:

PERFORMED BY:		**DATE:**	May 15, 2015
VERIFIED BY:		**DATE:**	May 15, 2015

GEO-LOGIC INC.
Member of the INSPEC-SOL Group

PARTICLE-SIZE ANALYSIS OF SOILS (GEOTECHNICAL)
(ASTM D422)

CLIENT:	Leblanc Enterprises	**LAB No.:**	SS-15-44
PROJECT/ SITE:	Nickerson Woods, Cobourg	**PROJECT No.:**	G030232 B3
Borehole No.:		Sample No.:	TP2-B
Depth:		Enclosure:	



CLAY & SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE
UNIFIED SOIL CLASSIFICATION SYSTEM					

Soil Description	Gravel	Sand	Clay & Silt
TP2-B	0	78	22

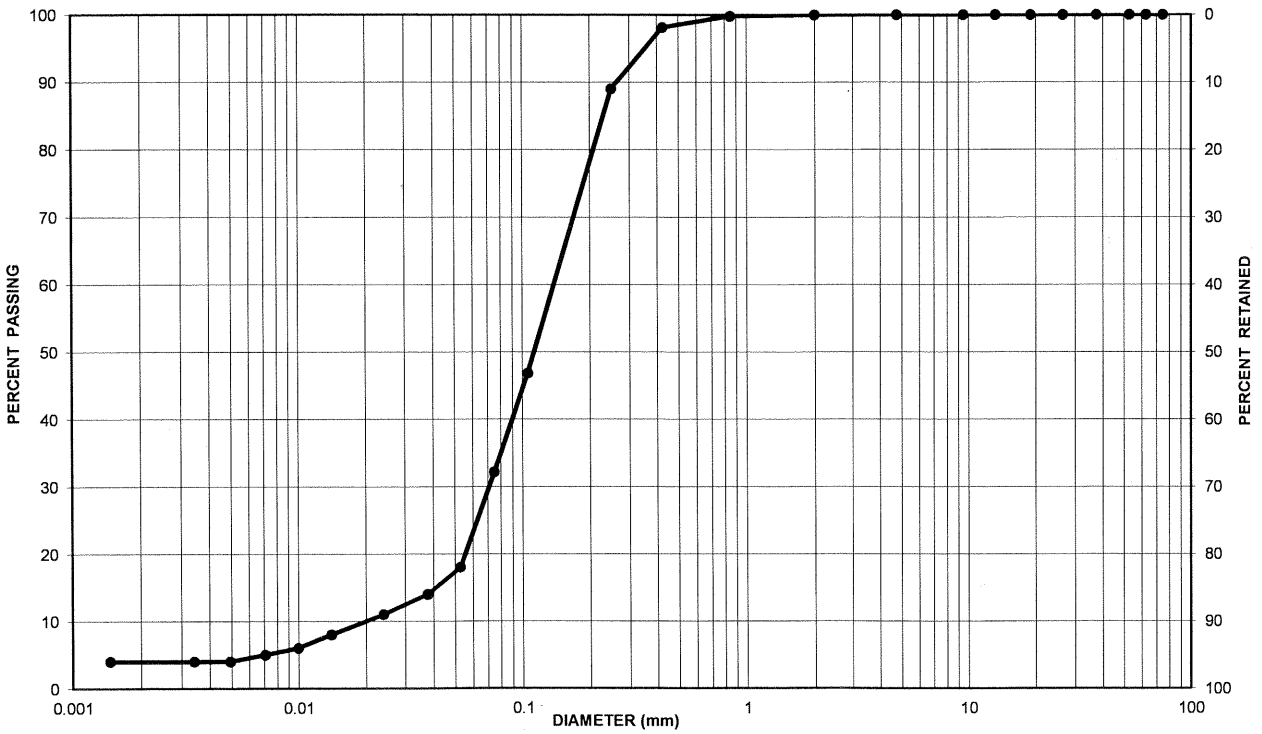
REMARKS:

PERFORMED BY:		**DATE:**	May 15, 2015
VERIFIED BY:		**DATE:**	May 15, 2015

GEO-LOGIC INC.
Member of the INSPEC-SOL Group

PARTICLE-SIZE ANALYSIS OF SOILS (GEOTECHNICAL)
(ASTM D422)

CLIENT:	Leblanc Enterprises	**LAB No.:**	SS-15-44
PROJECT/ SITE:	Nickerson Woods, Cobourg	**PROJECT No.:**	G030232 B3
Borehole No.:		Sample No.:	TP3-A
Depth:		Enclosure:	



CLAY & SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE
UNIFIED SOIL CLASSIFICATION SYSTEM					

Soil Description	Gravel	Sand	Clay & Silt
TP3-A	0	68	32

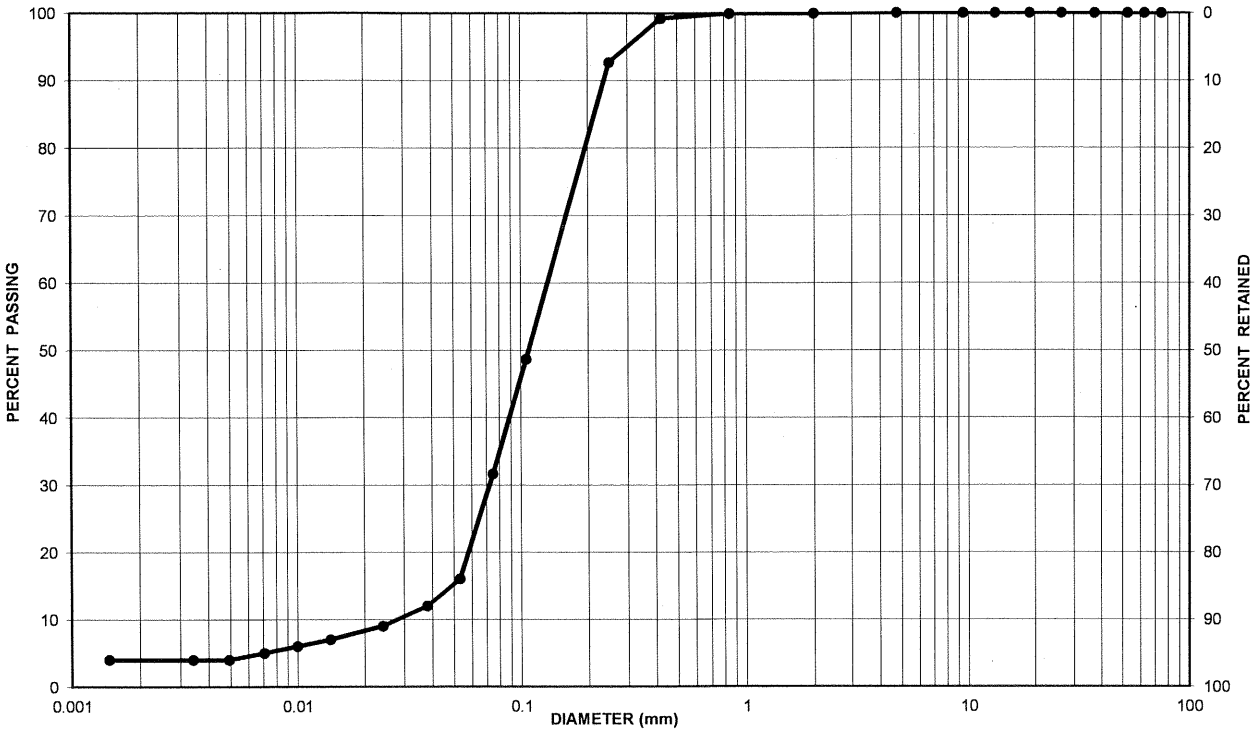
REMARKS:

PERFORMED BY:		**DATE:**	May 15, 2015
VERIFIED BY:		**DATE:**	May 15, 2015

GEO-LOGIC INC.
Member of the INSPEC-SOL Group

PARTICLE-SIZE ANALYSIS OF SOILS (GEOTECHNICAL) (ASTM D422)

CLIENT:	Leblanc Enterprises	**LAB No.:**	SS-15-44
PROJECT/ SITE:	Nickerson Woods, Cobourg	**PROJECT No.:**	G030232 B3
Borehole No.:		Sample No.:	TP3-B
Depth:		Enclosure:	



CLAY & SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE
UNIFIED SOIL CLASSIFICATION SYSTEM					

Soil Description	Gravel	Sand	Clay & Silt
TP3-B	0	68	32

REMARKS:

PERFORMED BY:		**DATE:**	May 15, 2015
VERIFIED BY:		**DATE:**	May 15, 2015

July 7, 2016 Reference No. G030232-B3

Mr. Al LeBlanc
LeBlanc Enterprises
1035416 Ontario Ltd.
P.O. Box 216
Cobourg, Ontario
K9A 4K5

Re: Supplementary Hydrogeologic Testing
Proposed Storm Water Management Facility
Nickerson Woods Subdivision, Cobourg

Dear Mr. LeBlanc:

In response to an e-mail from Ms. Christie Peacock, P.Eng. from the Ganaraska Region Conservation Authority (GRCA) dated May 10, 2016, the following report presents the results of added hydrogeologic testing that has been completed at the above captioned site. Reference is made to our previous letter-report dated May 25, 2015 for details of a subsurface investigation that was completed for a planned residential development in the Town of Cobourg. The site is situated northwest of Nickerson Drive and extends from the northern end of D'Arcy Street. The location of the site with respect to neighbouring roads and water courses is illustrated on the Vicinity Plan, Figure 1. A more detailed depiction of the ground surface topography is presented on the Site Plan, Figure 2. The layout of the proposed residential development is illustrated on the Hydraulic Conductivity Test Location plan, Figure 3.

The purpose of the supplementary testing was to further evaluate the existing hydraulic conductivity of the existing native soil to determine if it is suitable for the proposed storm water management facility. The following scope of work was performed to accomplish the foregoing purposes.

1. A walkover inspection was conducted to review surficial ground characteristics. Buried services were located at this time in advance of the drilling operations.

2. The subsurface conditions were explored by advancing, sampling and logging two (2) supplemental boreholes to a target depth of 4.6m. The subsurface conditions were recorded and are summarized in detail in Appendix A. A monitoring well was installed in each borehole to facilitate water level measurements.

3. Raising head and falling head slug testing was completed within each monitoring well.

4. The slug tests were complimented by conducting in-situ constant head permeameter tests in the vicinity of the monitoring wells to further assess the hydraulic conductivity of the soil in the vadose zone. The testing was conducted in accordance with protocol outlined in "Low Impact Development Stormwater Management Planning and Design Guide", Version 1.0 dated 2010 prepared by Credit Valley Conservation and Toronto and Region Conservation Authority.

GHD Limited
65 Sunray Street Whitby Ontario L1N 8Y3 Canada
T 905 686 6402 **F** 905 432 7877 **W** www.ghd.com

5. Prepared the following report which presents the results of the supplementary testing and our opinion of the in-situ hydraulic conductivity.

The supplementary subsurface exploration investigation was conducted on June 1, 2016. Borehole records are provided in Appendix A. The site is within the physiographic region known as the Lake Iroquois Plain (Chapman and Putnam, 1984). The local topography gently slopes toward the northwest in the direction of Midtown Creek situated approximately 35m from the site. The boreholes encountered a surficial (0.15m thick) layer of topsoil underlain by brown fine grained sand. The sand extended to the full depth of borehole BH-101 and to a depth of 1.5m in BH-102. At BH-102, the fine sand was found to be underlain by a layer of grey silty sand. At both locations, the fine sand was moist and became visibly wet at approximate depths of 1.5m (BH-102) to 1.8m (BH-101). The subsurface conditions were similar to what was documented in our previous report.

Groundwater seepage or accumulation was observed in both boreholes. Water level measurements were conducted within the monitoring wells upon completion of drilling and then ten (10) days thereafter. Based on this information, the groundwater existed at a depth of 1.6m below the ground surface at the time of the supplemental investigation. The measured groundwater corresponds to elevations 98.9m and 99.9m in boreholes BH-101 and BH-102, respectively. Based on the water level data collected and the surrounding topography, the shallow groundwater flow direction is expected to be northwestward in the direction of Midtown Creek.

Hydraulic conductivity (K) testing was completed in the monitoring wells at the supplementary boreholes on June 10, 2016. The testing consisted of rising and falling head testing and was completed using a one-metre long slug. The water levels were measured using data loggers programmed at five (5) second intervals. The data was analyzed using AQTESOLV and the Bouwer-Rice solution for each rising and falling head test (see Appendix B for solution data). The K values for the hydraulic conductivity testing are on the order of 10^{-2} (BH-102) to 10^{-4} cm/sec (BH-101). The K values from the slug test completed at BH-102 did not correspond to typical values that would be expected for fine sand. As such, additional testing (described below) was conducted on the same date.

In-situ constant head permeameter tests were completed at two (2) locations close to the monitoring wells to evaluate hydraulic conductivity of the shallow soil zone. The testing was conducted in accordance with protocol presented in the aforementioned Guide prepared by Credit Valley Conservation and Toronto and Region Conservation Authority. The testing utilized an ETC Pask (constant head well) permeameter. The results are graphically presented in Appendix B. In general, the testing indicated that the fine sand soil exhibits a field saturated hydraulic conductivity that ranged from 2.8×10^{-3} cm/sec (BH-101) to 1.6×10^{-4} cm/sec (BH-102). The corresponding percolation rate (T-time) is 10min/cm (60mm/hour).

Conclusion

Based on the results of the supplementary hydrogeologic testing, it is our professional opinion that the site is suitable for the proposed residential development and storm water facility. The storm water facility should be designed based on an in-situ percolation rate of 60mm/hour. It is our professional opinion that there is low potential for groundwater and surface water impact as a result of developing the site. Of the two (2) areas tested, it is our opinion that the area corresponding to BH-101 is more suitable for constructing the proposed storm water facility.

We trust that this report meets with your immediate requirements. Should you have any questions, please contact our office.

Sincerely,

GHD Limited

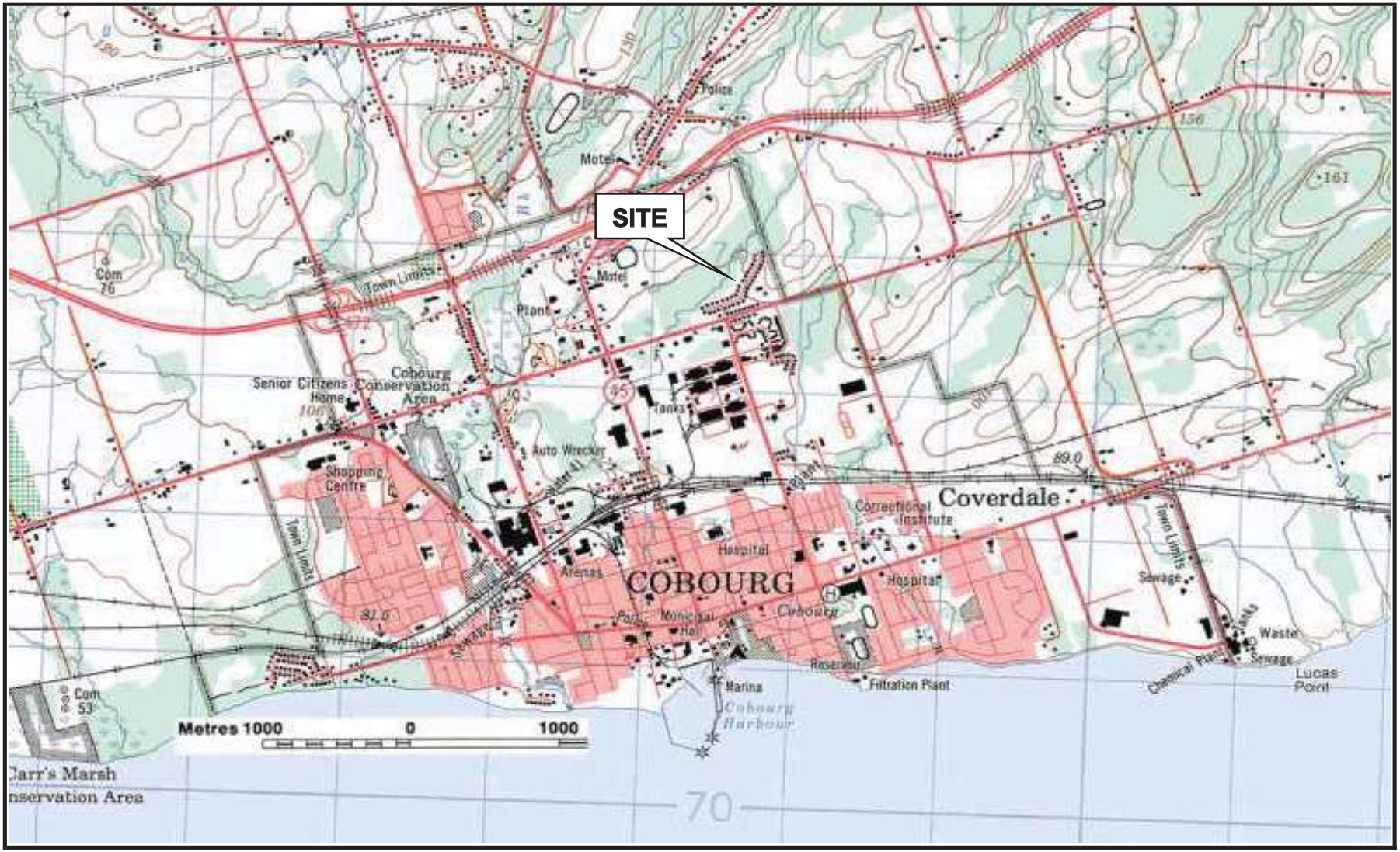
David Workman, P.Geo.

Andy Fawcett, P.Eng.

/dw/af

Encl.
Vicinity Plan
Site Plan
Hydraulic Conductivity Test Locations
Appendix A: Subsurface Exploration Data
Appendix B: Hydraulic Conductivity Test Data

Enclosures



Source: Department of Energy, Mines, and Resources (1989) Published 1994

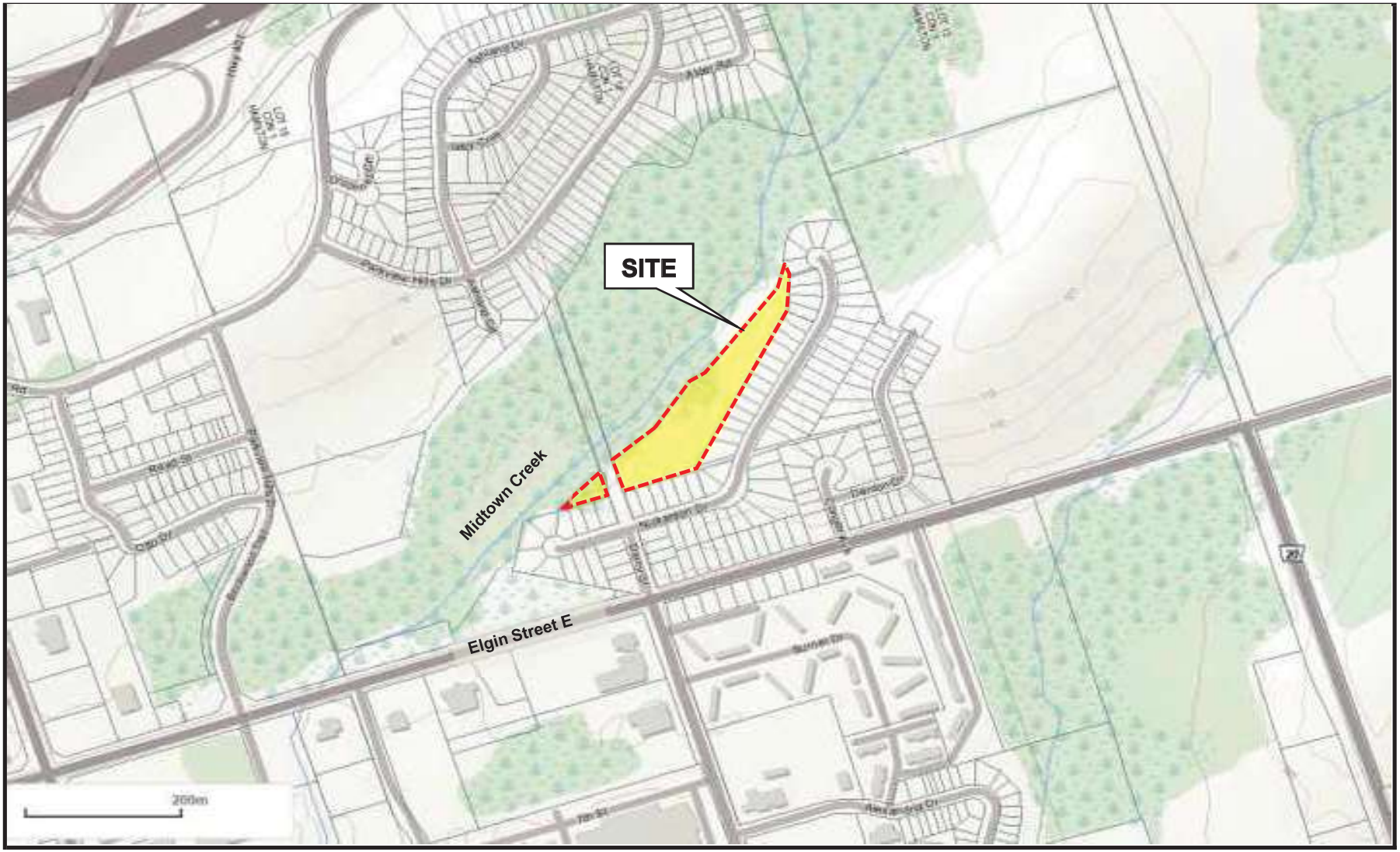
Scale:
1:50,000
Coordinate System:
NAD 1989 UTM Zone 17

Nickerson Woods Subdivision
Cobourg, Ontario
Hydrogeologic Investigation

G030232-B3
July 7, 2016

Vicinity Plan

FIGURE 1



Source: Ministry of Natural Resources and Forestry online Topographic Map tool.

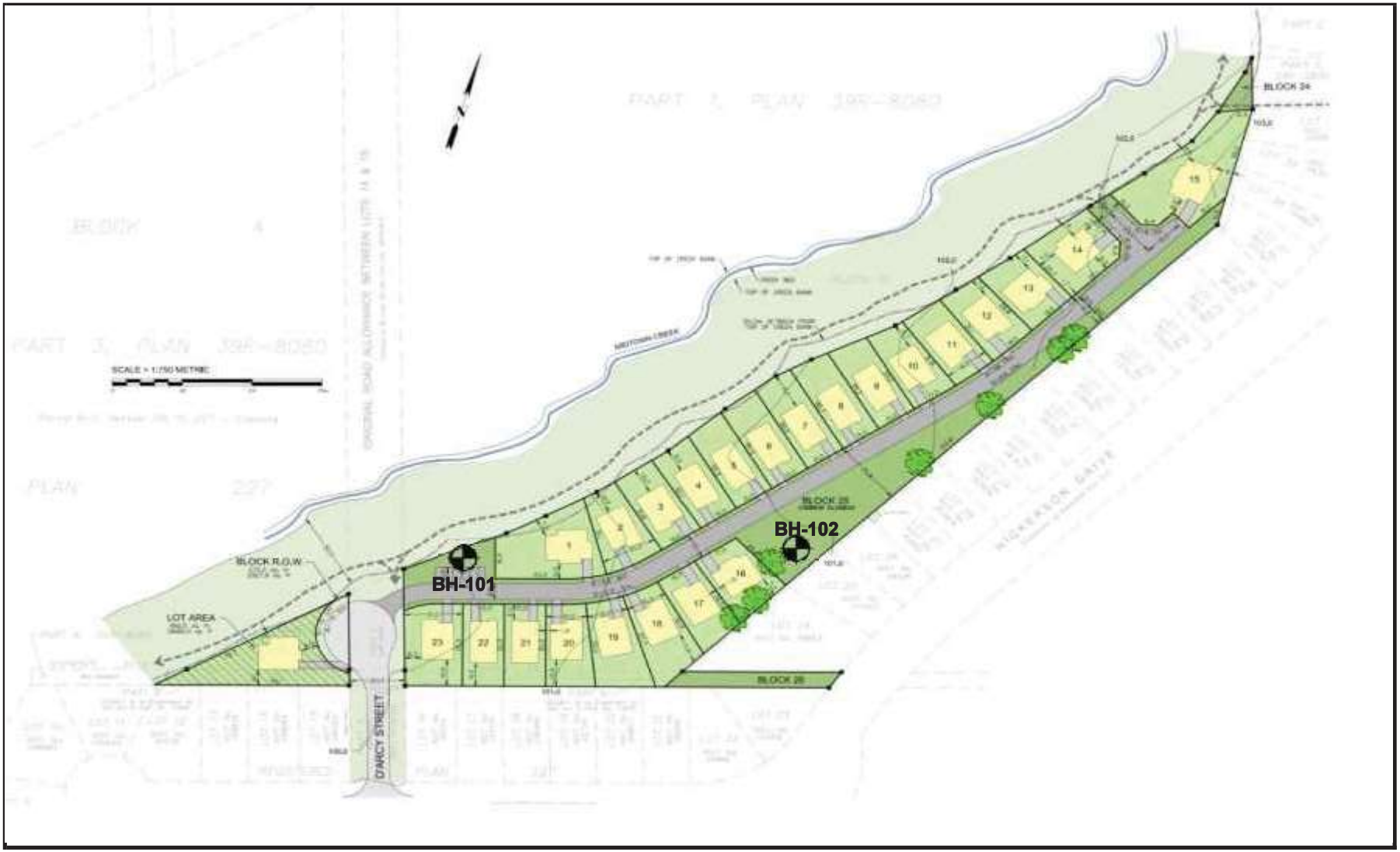
Scale:
Refer to Scale Bar
Coordinate System:
NAD 1989 UTM Zone 17

Nickerson Woods Subdivision
Cobourg, Ontario
Hydrogeologic Investigation

G030232-B3
July 7, 2016

Site Plan

FIGURE 2



Source: Leblanc Enterprises Development Site Plan, Registered Plan 227. Prepared by RFA Planning Consultants Inc.

Scale:
Refer to Scale Bar
Coordinate System:
NAD 1989 UTM Zone 17

Nickerson Woods Subdivision
Cobourg, Ontario
Hydrogeologic Investigation

Hydraulic Conductivity Test Locations

G030232-B3
July 7, 2016

FIGURE 3

Appendix A:

Subsurface Exploration Data

REFERENCE No.: G030232-B3 ENCLOSURE No.: A-1

BOREHOLE No.: BH-101
ELEVATION: Existing Grade

BOREHOLE REPORT

Page: 1 of 1

CLIENT: Leblanc Enterprises
PROJECT: Nickerson Drive
LOGGED BY: P. Hynes DATE: June 1, 2016
DRILLING COMPANY: Sonic Soil Search METHOD: Truck-mounted, Solid Stem Auger
NOTES:

LEGEND

- SS - SPLIT SPOON
- AS - AUGER SAMPLE
- ST - SHELBY TUBE
- CS - CORE SAMPLE
- ▼ - WATER LEVEL

Depth (ft)	Depth (m)	m Below Existing Grade	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Recovery %	Moisture Content %	Blows per 6 in. / 15 cm	Penetration Index N	Shear test (Cu) / Sensitivity (S) / Water content (%) / Atterberg limits (%) / "N" Value (blows / 0.3 m) / RQD / CONE — 10 20 30 40 50 60 70 80 90	COMMENTS
		0.0		GROUND SURFACE							
		0.2		**TOPSOIL** (150 mm)							
1	0.5			**SAND -** Brown Sand, moist, compact	AS-1						
3	1.0										
4					AS-2						
5	1.5										WL - 1.6 m 6/10/2016
6		1.8		Grey, wet							WL - 1.8 m 6/1/2016
7	2.0				AS-3						
8	2.5										
9					AS-4						
10	3.0										Borehole cave-in encountered at 3.0 mbeg
11	3.5										
12											
13	4.0										
14					AS-5						
15	4.5	4.6		END OF BOREHOLE							
16	5.0										
17											
18	5.5										
19	6.0										

BOREHOLE LOG GEOTECH G030232-B3, 16-06-22, BOREHOLE LOGS.GPJ GEOLOGIC.GDT 6/22/16

REFERENCE No.: G030232-B3 ENCLOSURE No.: A-2

BOREHOLE No.: BH-102
ELEVATION: Existing Grade

BOREHOLE REPORT

Page: 1 of 1

CLIENT: Leblanc Enterprises
PROJECT: Nickerson Drive
LOGGED BY: P. Hynes DATE: June 1, 2016
DRILLING COMPANY: Sonic Soil Search METHOD: Truck-mounted, Solid Stem Auger
NOTES:

LEGEND

- SS - SPLIT SPOON
- AS - AUGER SAMPLE
- ST - SHELBY TUBE
- CS - CORE SAMPLE
- ▼ - WATER LEVEL

Depth (ft)	Depth (m)	m Below Existing Grade	Stratigraphy	DESCRIPTION OF SOIL AND BEDROCK	Type and Number	Recovery %	Moisture Content %	Blows per 6 in. / 15 cm	Penetration Index N
		0.0		GROUND SURFACE					
		0.2		**TOPSOIL** (150 mm)					
1	0.5			**SAND -** Brown Sand with Silt, trace Gravel, moist, compact	AS-1				
2									
3	1.0								
4					AS-2				
5	1.5	1.5		**SILTY SAND** Grey Silty Sand, wet, compact					
6	2.0								
7					AS-3				
8	2.5								
9					AS-4				
10	3.0								
11	3.5								
12									
13	4.0								
14					AS-5				
15	4.5	4.6		END OF BOREHOLE					
16									
17	5.0								
18									
19	5.5								
	6.0								

Shear test (Cu) △ Field
Sensitivity (S) □ Lab
○ Water content (%)
W_p W_l Atterberg limits (%)
× "N" Value (blows / 0.3 m) ◆ RQD ◎ CONE

10 20 30 40 50 60 70 80 90

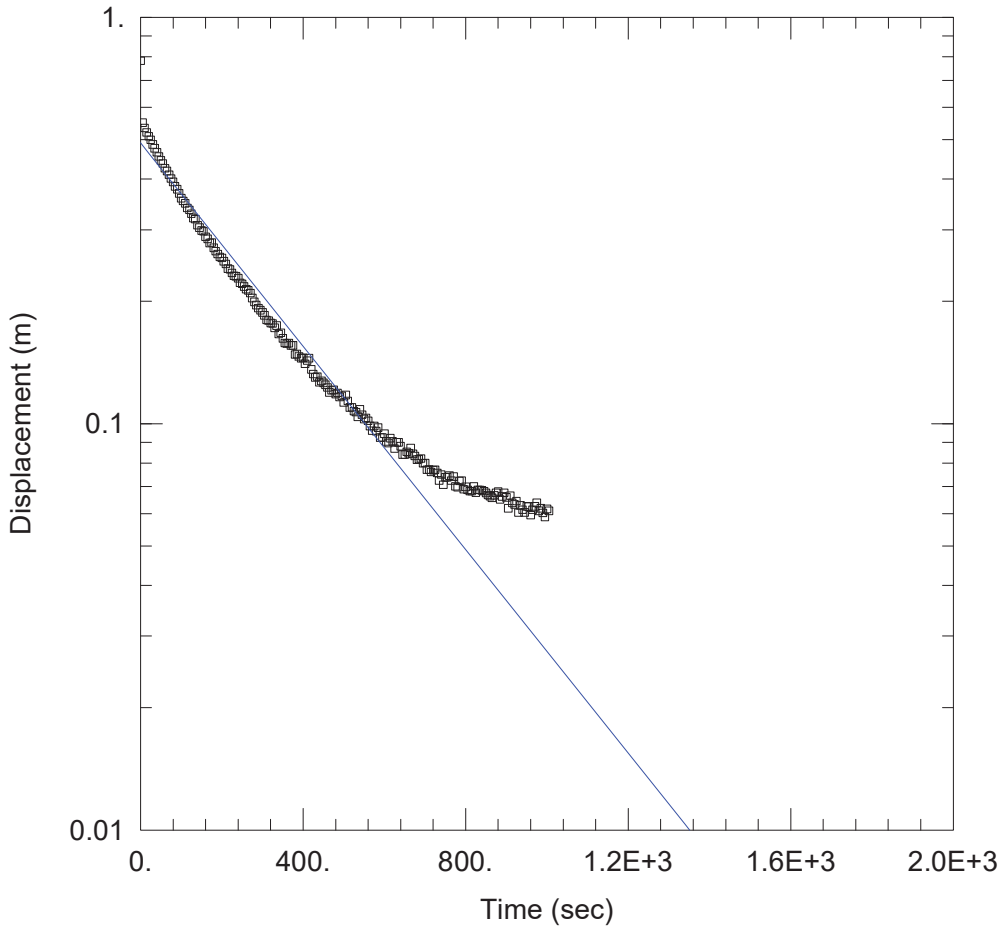
COMMENTS

WL - 1.6 m
6/10/2016

WL - 1.8 m
6/1/2016

BOREHOLE LOG GEOTECH G030232-B3, 16-06-22, BOREHOLE LOGS.GPJ GEOLOGIC.GDT 6/22/16

Appendix B:
Hydraulic Conductivity Test Data



BH-101 FALLING HEAD TEST

Data Set: I:\...\G030232B3, 16-06-30, BH-101 (OW-5), Falling Head Test.aqt
Date: 06/30/16 Time: 11:41:09

PROJECT INFORMATION

Company: GHD
Client: Leblanc Enterprises
Project: G030232-B3
Location: Nickerson Drive
Test Well: BH-101
Test Date: June 10, 2016

AQUIFER DATA

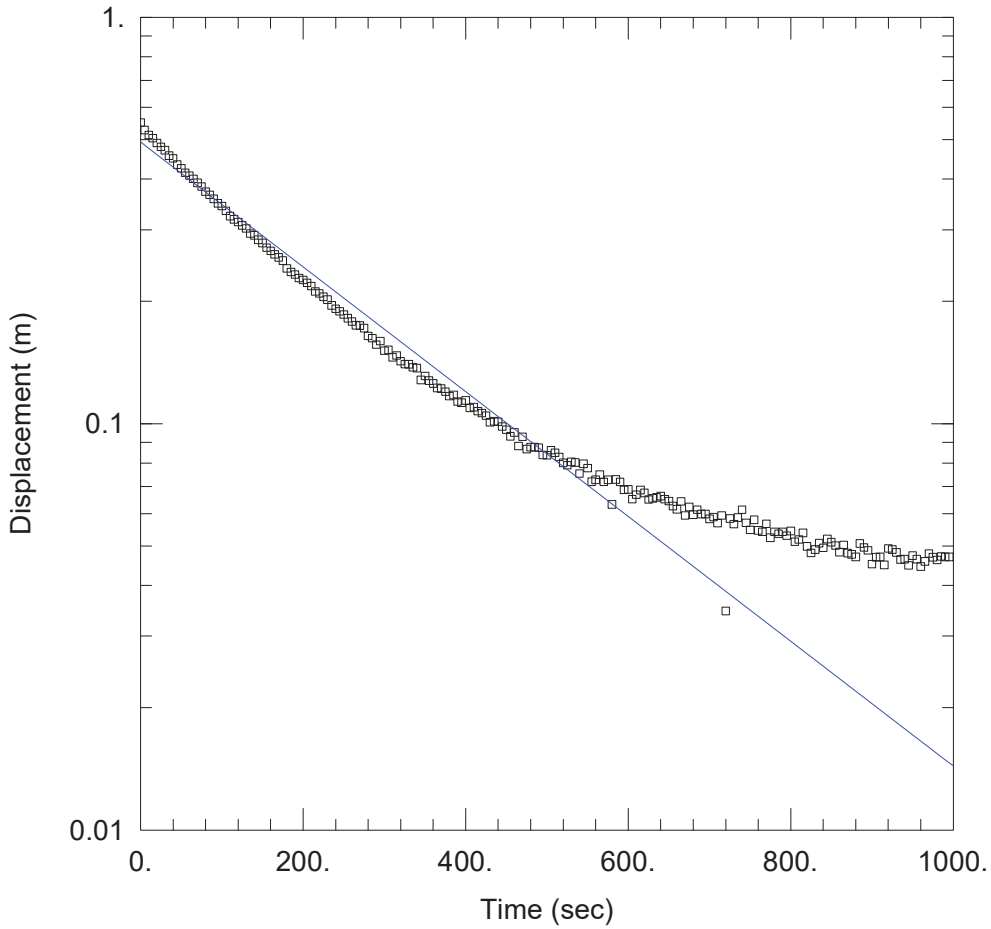
Saturated Thickness: 1.7 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH-101)

Initial Displacement: 0.782 m
Total Well Penetration Depth: 1.7 m
Casing Radius: 0.025 m
Static Water Column Height: 1.7 m
Screen Length: 1.5 m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0001934 cm/sec
y0 = 0.4912 m



BH-101 RAISING HEAD TEST

Data Set: I:\...\G030232B3, 16-06-30, BH-101 (OW-5), Raising Head Test.aqt
Date: 06/30/16 Time: 11:43:01

PROJECT INFORMATION

Company: GHD
Client: Leblanc Enterprises
Project: G030232-B3
Location: Nickerson Drive
Test Well: BH-101
Test Date: June 10, 2016

AQUIFER DATA

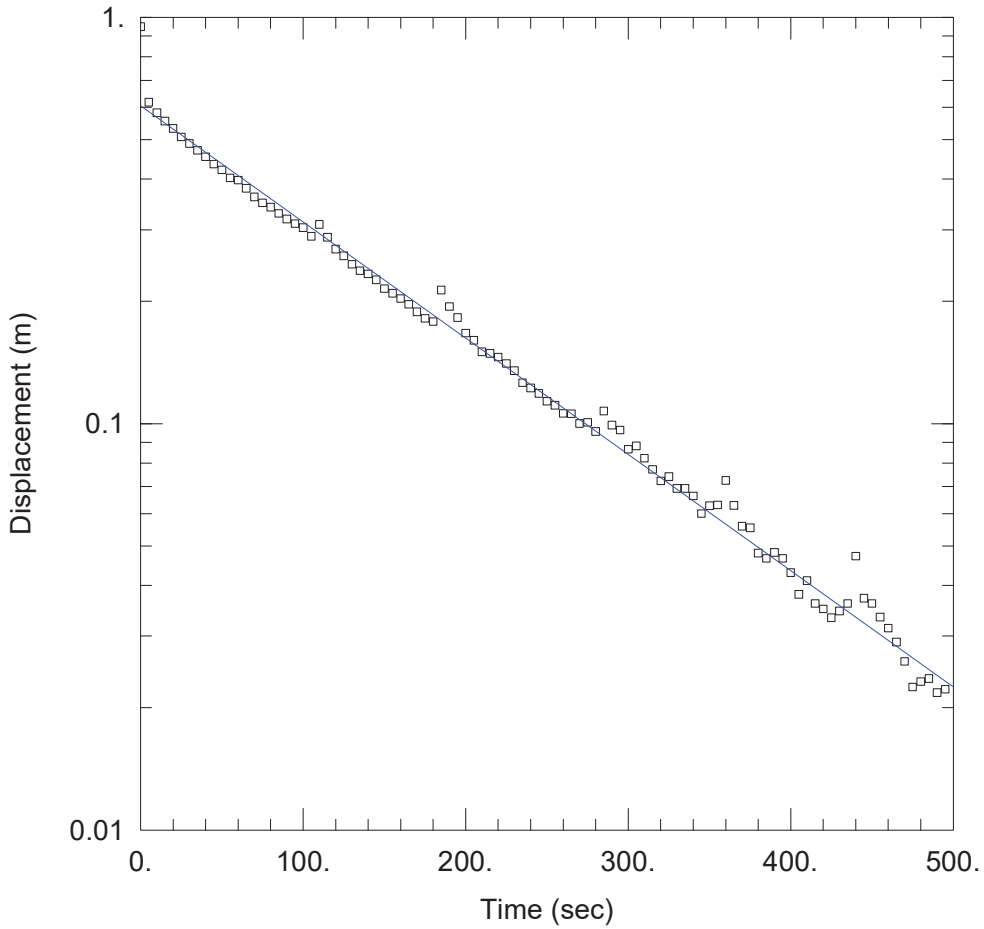
Saturated Thickness: 1.7 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH-101)

Initial Displacement: 0.5505 m
Static Water Column Height: 1.7 m
Total Well Penetration Depth: 1.7 m
Screen Length: 1.5 m
Casing Radius: 0.025 m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0002372 cm/sec
y0 = 0.4931 m



BH-102 FALLING HEAD TEST

Data Set: I:\...\G030232B3, 16-06-30, BH-102 (OW-4), Falling Head Test.aqt
Date: 06/30/16 Time: 11:55:54

PROJECT INFORMATION

Company: GHD
Client: Leblanc Enterprises
Project: G030232-B3
Location: Nickerson Drive
Test Well: BH-102
Test Date: June 10, 2016

AQUIFER DATA

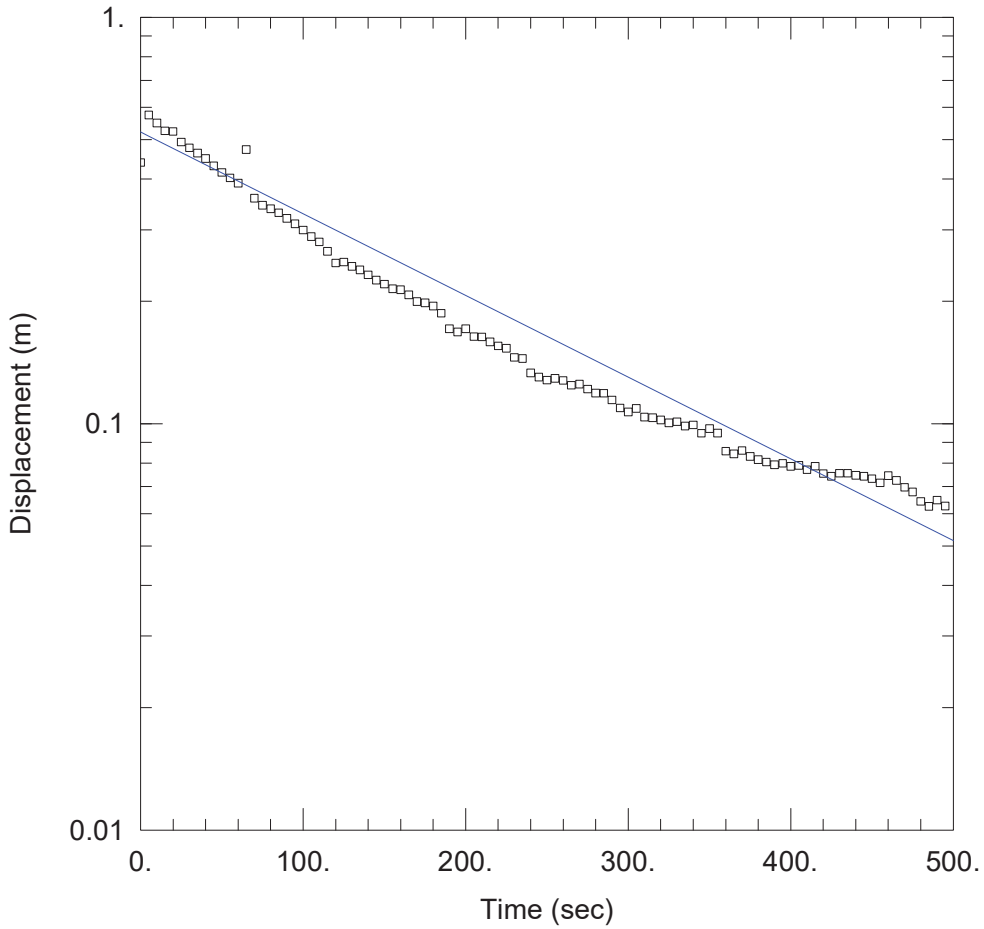
Saturated Thickness: 2.97 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH-102)

Initial Displacement: 0.9482 m Static Water Column Height: 2.97 m
Total Well Penetration Depth: 2.97 m Screen Length: 1.5 m
Casing Radius: 0.025 m Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.07038 cm/sec y0 = 0.6056 m



BH-102 RAISING HEAD TEST

Data Set: I:\...\G030232B3, 16-06-30, BH-102 (OW-4), Raising Head Test.aqt
Date: 06/30/16 Time: 11:53:43

PROJECT INFORMATION

Company: GHD
Client: Leblanc Enterprises
Project: G030232-B3
Location: Nickerson Drive
Test Well: BH-102
Test Date: June 10, 2016

AQUIFER DATA

Saturated Thickness: 2.97 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH-102)

Initial Displacement: 0.4393 m Static Water Column Height: 2.97 m
Total Well Penetration Depth: 2.97 m Screen Length: 1.5 m
Casing Radius: 0.025 m Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.04949 cm/sec y0 = 0.5221 m

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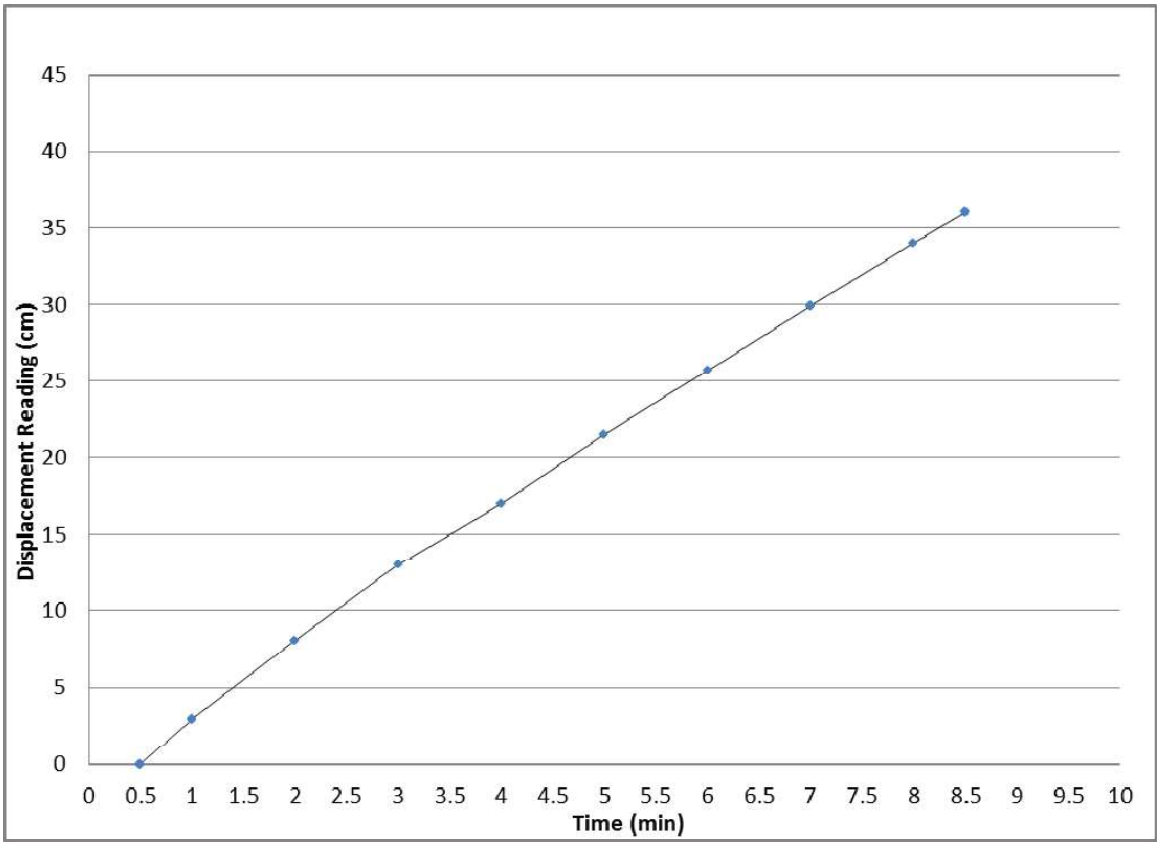
CONSTANT HEAD INFILTRATION TEST – BH-101

Client:	Leblanc Enterprises.	Project No.:	G030232-B3
Project:	Nickerson Woods Subdivision	Borehole No.	BH-101
Date:	June 10, 2016	Test Performed by:	K. Geraldi



TEST PARAMETERS

Well hole diameter (cm) =	8.3	Selected sat/unsat flow ratio (cm-1) =	0.36
Height of water in well (cm) =	15	Shape factor =	1.36

RESULTS

R- quasi steady-state rate of fall =	4.1 cm/min
Ksf – field saturated hydraulic conductivity =	2.8E-05 m/sec

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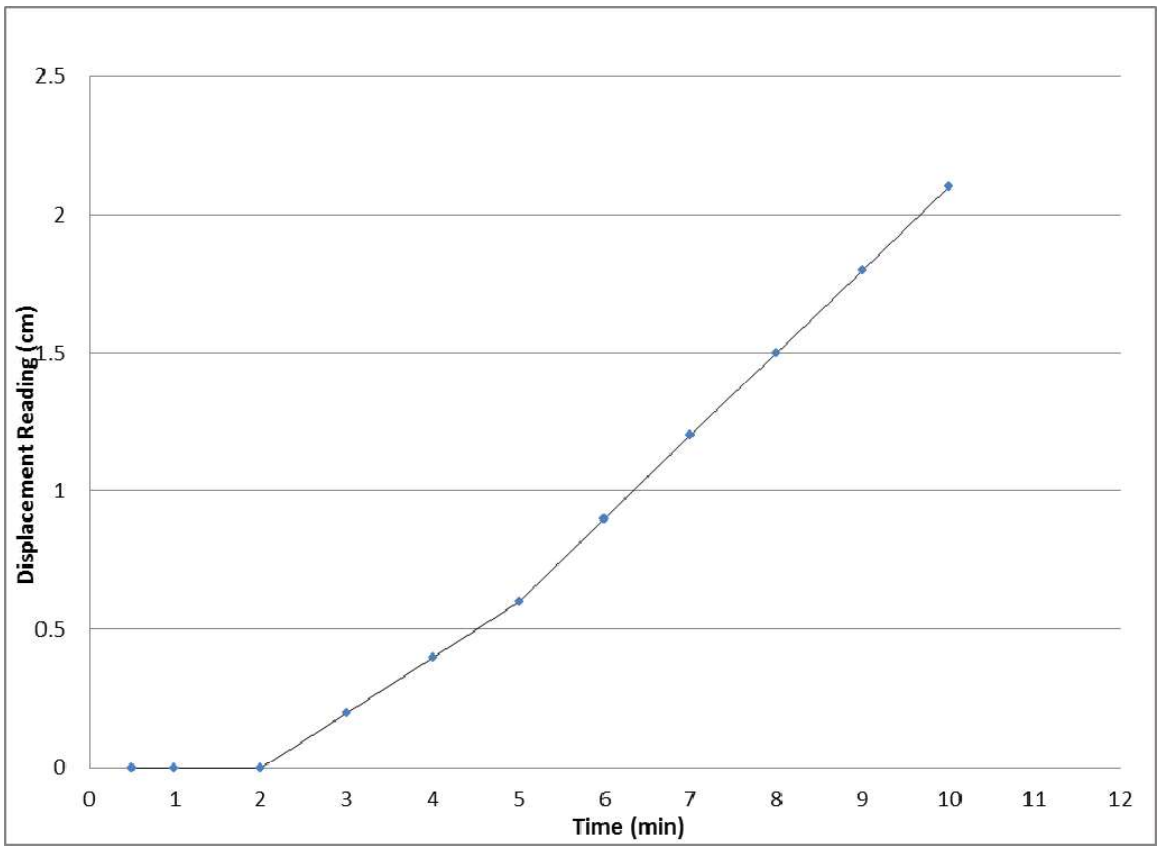
CONSTANT HEAD INFILTRATION TEST – BH-102

Client:	Leblanc Enterprises.	Project No.:	G030232-B3
Project:	Nickerson Woods Subdivision	Borehole No.	BH-102
Date:	June 10, 2016	Test Performed by:	K. Geraldi



TEST PARAMETERS

Well hole diameter (cm) =	8.3	Selected sat/unsat flow ratio (cm-1) =	0.12
Height of water in well (cm) =	15	Shape factor =	1.36

RESULTS

R- quasi steady-state rate of fall =	0.3 cm/min
Ksf – field saturated hydraulic conductivity =	1.6E-06 m/sec

Appendix H

Detailed Design Drawings