Preliminary Stormwater Management Report

Syer Line

County of Peterborough

Engage Project Number 23035

Engage Engineering Ltd.

Issued for Review

September 2023

Revision Summary

Revision No.	Revision Title	Date	Revision Summary
1	Issued for Review	2023-09-20	Draft

Land Acknowledgement

Engage Engineering would like to acknowledge that our concern is in the traditional territory of the Michi Saagiig Anishinaabe and is part of the land and people encompassed within Treaty #20 and the Williams Treaty. We believe it is important to acknowledge these treaties, as our projects and designs often have a lasting impact on the lands, waters, wildlife, and people of this territory. We thank our local First Nations and communities for their ongoing stewardship of these lands and waters and strive to centre their voices in our work and honor our treaty obligations. May we dedicate ourselves as treaty people to moving forward in the spirit of reconciliation and enduring collaboration.

Accessibility for Ontarians With Disabilities (AODA)

This report was prepared and formatted to comply with AODA guidelines. Engage is committed to taking all reasonable steps to ensure that anyone who accesses our services will be able to do so in a way that respects their needs. As such, if you require any assistance with the access or interpretation of this proposal, please do not hesitate to reach out and we will be pleased to accommodate you.

Rights and Distribution

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1.0 Introduction

1.1 Purpose

Engage Engineering Limited (Engage) has been retained to prepare a Preliminary Stormwater Management (SWM) Report in support of the proposed development of an industrial subdivision on Syer Line located in the County of Peterborough. The development will include the roadway and drainage swales in preparation to sever the proposed lots. The purpose of this report is to quantify the impact that the proposed roadway will have on stormwater runoff rates and to recommend any stormwater management measures required to maintain post-development to pre-development flows and reduce water quality impact on downstream receivers.

Recommendations made in this report will be in accordance with Otonabee Region Conservation Authority (ORCA) and County of Peterborough requirements, in addition to current stormwater management best practices.

1.2 Site Description

The property is in the County of Peterborough on the north side of Syer Line, 0.5km west of County Road 10; the entire site is 31.49ha in size. A residential building is to the southwest of the subject site and highway 115 is on the northern boundary of the site. Surrounding land use is predominantly agricultural and residential. The property itself includes a fallow field, laneway, and a utility shed. The location of the subject site is identified on the Location Plan included as **Figure 1**.

2.0 Hydrologic Analysis

2.1 Hydrologic Model

As part of this study, a hydrologic model for the site under both existing and proposed conditions was developed using Visual OTTHYMO (VO) software. The model was used to simulate peak flows from the site under both pre-development and post-development conditions as well as to verify stormwater management storage requirements and performance. As per the County of Peterborough Engineering Standards the 2, 5 and 100-year storm distributions and durations were utilized in developing our model.

City of Peterborough rainfall data was utilized to develop the storm distributions in the model. This type of soil for the purposes of developing our models are assumed to be composed of sand and loam that extends to the bedrock. This assumption is based on available soils mapping “Soils of Durham County”, produced by Agriculture Canada. The type of soils mentioned above are classified as Hydrologic Soils Group C for the purposes of this report. Weighted Curve Numbers (CN*) were used for hydrologic calculations. The soil map excerpt is included as **Appendix F.** It is expected that a geotechnical study will be completed at the detailed design stage.

Figure 1: Location Plan

2.2 Existing Conditions

The subject site is approximately 31.49 ha in size. The subject site consists of a driveway, garage, and fallow field. There is a small watercourse that traverses the south east corner of the subject site.

J.D. Barnes Limited was retained to perform a topographic survey of the site. The survey was utilized to determine existing elevations, locations of existing features on the site, and to establish proposed grading and servicing design for the proposed development of the site. The topography is shown on the **Topographic Survey Plan** prepared by J.D. Barnes and is included as **Figure 4**.

- Existing catchment area **EX1** is 13.15ha and includes drainage for the northern portion of the site. This area drains north and eventually conveyed offsite to the MTO allowance for Highway 115. This catchment consists of fallow fields.

- Existing catchment area **EX2** is 18.33ha and includes drainage for the south portion of the site. This area drains east towards a small drainage ditch and eventually offsite into a neighbor's property. This catchment consists of fallow fields, a driveway, and utility garage.

The drainage areas are shown on the **Existing Storm Drainage Area Plan** which is included as **Figure 2**. The existing characteristics of the drainage areas are summarized in **Table 1** below.

Table 1: Existing Catchment Area Characteristics

Catchment	Area (ha)	TIMP	XIMP	CN*	VO Command
EX1	13.151	0.0	0.0	82	NASHYD
EX2	18.334	0.0	0.5	82	NASHYD

2.3 Proposed Conditions

Under the proposed condition, the topography will change to accommodate the grading for the proposed roadway. This mostly involves modifying the topography of the site to accommodate the proposed roadway, this will be accomplished while generally following existing topography. There are three proposed drainage catchment areas identified on the **Proposed Storm Drainage Area Plan** included as **Figure 3.** The respective catchment areas and their characteristics are summarized below. The development on each individual lot has not been considered within this proposed condition.

- Proposed catchment area **PR1** is 12.16ha and includes drainage for the north portion of the site. This area will remain largely untouched from the existing condition (**EX1**), with some drainage from the southern periphery directed south along the road allowance.

- Proposed catchment area **PR2** is 17.01ha and includes drainage for the south portion of the site. A short segment of roadway will traverse the catchment in the central area.

- Proposed catchment area **PR3** is 2.31ha and includes drainage for majority of the proposed roadway. This catchment will drain south within drainage ditches prior to being conveyed offsite through **PR2**. Drainage from the road is immediately deposited in the adjacent swales prior to leaving the catchment. Considering this, the directly connected impervious surfaces have been reduced by 1/3.

The characteristics of the proposed catchment areas are summarized in **Table 2** below. A complete list of the VO input data is included in **Appendix A.**

Table 2: Proposed Catchment Area Characteristics

Catchment	Area (ha)	TIMP	XIMP	CN*	VO Command
PR1	12.163	0.0	0.0	82	NASHYD
PR2	17.011	0.9	0.9	82	NASHYD
PR3	2.310	21.2	14.0	82	STANDHYD

The 6-hour SCS type II storm distribution was utilized for the modeling of on-site hydrology. The hydrologic model was used to simulate existing and proposed peak flows for the 2, 5, 10, 25, 50, and 100-year storm events. The existing conditions results are summarized in **Table 3** below.

Table 3: Existing Uncontrolled Peak Flows (m^3/s)

Catchment	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
EX1	0.81	1.39	1.81	2.36	2.79	3.22
EX2	0.66	1.15	1.51	1.99	2.37	2.76
Total	**1.32**	**2.32**	**3.05**	**4.02**	**4.78**	**5.55**

Results from the proposed conditions model are summarized in **Table 4** below. Results from the VO model are included in **Appendix B and C.**

Table 4: Proposed Uncontrolled Peak Flows (m^3/s)

Catchment	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
PR1	0.75	1.28	1.67	2.18	2.58	2.98
PR2	0.61	1.07	1.40	1.85	2.20	2.56
PR3	0.06	0.08	0.10	0.12	0.14	0.17
Total	**1.28**	**2.23**	**2.93**	**3.85**	**4.57**	**5.31**

The results indicate that in the absence of any quantity controls, the peak flows leaving the site will decrease in the proposed condition when compared to the existing condition. This is largely due to the increase in drainage lengths within **PR3**. Considering this, no quantity control is required for the proposed development.

A summary of allowable vs. proposed flows leaving the site towards the highway allowance (MTO) and the neighboring property (South) are provided below.

Table 5: Allowable vs. Proposed Peak Flows (m^3/s)

Design Storm	Allowable (South)	Proposed (South)	Allowable (MTO)	Proposed (MTO)
2 Year	0.66	0.67	0.81	0.75
5 Year	1.15	1.15	1.39	1.28
10 Year	1.51	1.50	1.81	1.67
25 Year	1.99	1.97	2.36	2.18
50 Year	2.37	2.34	2.79	2.58
100 Year	2.76	2.73	3.22	2.98

3.0 Stormwater Management

3.1 Quality Control

Quality control will be required for this site as the runoff from the proposed development will include asphalt areas. Quality control will be provided within the drainage swales

through infiltration volume and retention to reduce loading of any suspended sediments or other contaminants towards downstream receivers.

To provide quality control for the proposed development the roadside drainage swales will provide enhanced TSS removal through infiltration. Drainage from contributing areas will be directed to the swales which will provide water quality volume (WQV) for infiltration based on Table 3.2 Water Quality Storage Requirements, from the MOE Stormwater Management Planning and Design Guide. This runoff area has an impervious level of 21% which requires a WQV of 22m^3/ha to provide enhanced 80% long term TSS removal. Based on the 2.31ha drainage area and 21% impervious area, the required WQV would be 51m^3. It is noted that the ability of the swale areas to promote infiltration may depend on the infiltration capacity of the soils. It is expected that a geotechnical study will be completed at the detailed design stage to confirm the ability of the swales to promote infiltration and not have frequent standing water.

The actual quality control volume was calculated in the combined facilities to be 168m^3 based on the identified ponding area within the proposed swales.

Beyond the provided water quality volume within the swales, the proposed swales will act as enhanced grass swales. This has the benefit of reducing flow rates and encouraging sedimentation during water quality events. The 4-hour 25mm Chicago design storm was modeled using VO to ensure the velocity within the swales was below the recommended 0.5m/s criteria for long term 80% TSS removal. A summary of the water quality peak flows is included below in **Table 5**. Model parameters and outputs are available in **Appendix A** and **Appendix C** respectively. Swale capacity calculations have been included in **Appendix E.**

4.0 Conveyance

Runoff from the site will be conveyed overland away from the crown of the roadway into the drainage ditch and eventually discharge offsite. All stormwater events from **PR3** will be conveyed along the roadside swales. Calculations demonstrating the capacity of the swales are included in **Appendix E** and summarized in **Table 5** below.

Table 6: Grass Swale Water Quality Flows and Capacity

Event	Peak Flow (m³/s)	Effective Slope (%)	Capacity (%)	Velocity (m/s)
Chicago 25mm	0.05	0.5	3.3	0.46
100 Year	0.17	0.5	11.1	0.63

Flows from **PR2** will pass underneath the proposed road allowance through dual 525mm steel culverts during the 2 and 5-year design storms. Flows were estimated at

half the peak discharge rate of **PR2**, as the upstream area accounts for only a small portion of the overall area of the site. The culvert is 12.8m in length and incorporates a 0.5% slope. A summary culvert report has been included in **Appendix E.** The design of the culvert will be reviewed and further refined at the detailed design stage.

During the 100 year event discharge velocity from the culvert will be 1.7m/s which will require riprap reinforcement on the downstream end. For this purpose, 200mm riprap has been specified for the downstream area. Sizing chart for the riprap has been included in **Appendix E.** Additional reinforcement will be provided over the medium to long term by planting a row of red-osier dogwoods and highbush cranberry between the existing channel and the downstream end of the proposed culvert. This will have the added benefit of providing habitat for wildlife while reducing the long-term impacts of erosion.

5.0 Future Stormwater Management for Individual Lots

It is expected that stormwater quantity and quality control features will be required for each individual severed lot. In the future it is expected that the design of these lots would be completed through the Site Plan Application process for each lot.

Drainage easement areas have been incorporated within the Draft Plan to ensure that lots have access to a downstream receiver without discharging runoff to adjacent lots.

6.0 Summary

The proposed development includes the construction of a roadway, swales, and landscape features which will increase the existing site imperviousness while still decreasing post-development runoff rates due to an overall increase in drainage lengths. To mitigate the effects of the development on water quality a stormwater management strategy is proposed that incorporates swales to provide infiltration volume and long-term sediment retention. The facilities combined will provide 165.8m^3 of storage to provide water quantity and infiltration volume which exceeds the storage requirement of 51m^3.

The use of the above noted facilities will provide the required quality control and will ensure that the proposed development does not have a negative impact on downstream receivers and the environment.

Prepared by: Reviewed by:

Dylan Radcliffe, C.Tech. H.BSc. MA.
Water Resources Technician

Lucas Parsons P. Eng
Water Resources Engineer

Figure 2: Existing Drainage Area Plan

HIGHWAY 115

EX1
0.55 | 13.2

EX2
0.55 | 18.3

EXISTING WATERCOURSE

EXISTING DRAINAGE SWALE

SYER LINE

ENGAGE ENGINEERING

www.engageeng.ca • 171 King Street, Suite 120, Peterborough, ON • Phone: (705) 755-0427

1066 SYER LINE

FIGURE 2 - PRE DEVELOPMENT DRAINAGE AREA PLAN

DRAWN:	APPROVED:	SCALE:	DATE:	PROJECT No.:
D. RAD.	L. PARSONS	1:4000	23-08-29	23035

S:\01 - Projects\23000\23035 - 1066 Syer Line\02 Design\01 - Drawings\01 - Current Drawings\23035-ST1.dwg PRINTED: Sep 19, 2023

Figure 3: Proposed Drainage Area Plan

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1066 SYER LINE

FIGURE 3 - POST DEVELOPMENT DRAINAGE AREA PLAN

DRAWN:	APPROVED:	SCALE:	DATE:	PROJECT No.:
D. RAD.	L. PARSONS	1:4000	23-08-29	23035

S:\01 - Projects\23000\23035 - 1066 Syer Line\02 Design\01 - Drawings\01 - Current Drawings\23035-ST2.dwg PRINTED: Sep 19, 2023

Figure 4: Topographic Survey

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT SET
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
PB	DENOTES	PLASTIC BAR
WIT	DENOTES	WITNESS
M	DENOTES	MEASURED
MTO	DENOTES	MINISTRY OF TRANSPORTATION OF ONTARIO
E&P	DENOTES	ELLIOTT & PARR LTD.
JDB	DENOTES	J.D. BARNES LIMITED
P1	DENOTES	PLAN 9R-1993(P-3056-40)
P2	DENOTES	PLAN 9R-2072
P3	DENOTES	PLAN 9R-1463
P4	DENOTES	PLAN 9R-1407
P5	DENOTES	PLAN OF SURVEY BY ELLIOTT & PARR LTD. DATED 29 MARCH 2012
P6	DENOTES	PLAN 9R-2034(P-3056-43)

ALL SET SSIB AND PB MONUMENTS WERE USED DUE TO LACK OF OVERBURDEN AND/OR PROXIMITY OF UNDERGROUND UTILITIES IN ACCORDANCE WITH SECTION 11 (4) OF O.REG. 525/91.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON APRIL 19th, 2023.

_____ DATE

_____ SHAWN M. O'CONNOR
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER XXXXXXX

NOTES

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010.0).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 1.000076

FOR BEARING COMPARISONS, A ROTATION OF 1°42'00" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P2, P3 AND P4 AND 1°03'00" COUNTER-CLOCKWISE TO P1

INTEGRATION DATA		
OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 17, NAD83 (CSRS) (2010.0).		
COORDINATES TO RURAL ACCURACY PER SECTION 14 (2) OF O.REG 216/10.		
POINT ID	EASTING	NORTHING
ORP (A)	703 303.0	4 895 970.8
ORP (B)	703 852.6	4 896 172.1
COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.		

THE RESULTANT TIE BETWEEN ORP (A) AND ORP (B) IS 492.6 N69°47'40"E

SCHEDULE				
PART	LOT	CON	PIN	AREA
1	PART OF LOT 14	8	ALL OF 28004-0187(LT)	31.481ha

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE _____

_____
SHAWN M. O'CONNOR
ONTARIO LAND SURVEYOR

PLAN 45R-

RECEIVED AND DEPOSITED

DATE _____

_____
REPRESENTATIVE FOR THE LAND REGISTRAR FOR THE LAND TITLES DIVISION OF PETERBOROUGH(N°45)

PLAN OF SURVEY OF

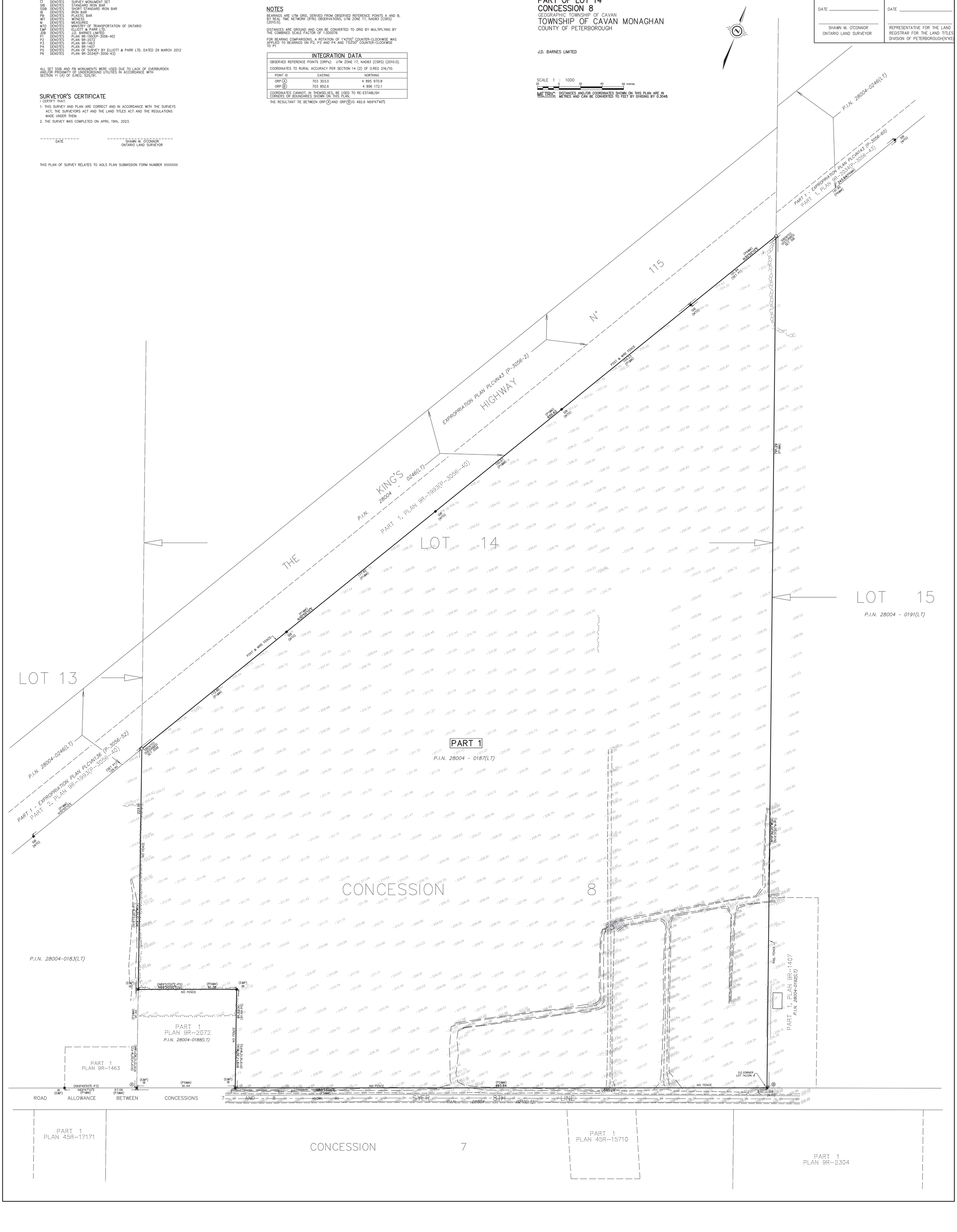
PART OF LOT 14
CONCESSION 8

GEOGRAPHIC TOWNSHIP OF CAVAN
TOWNSHIP OF CAVAN MONAGHAN
COUNTY OF PETERBOROUGH

J.D. BARNES LIMITED

SCALE 1 : 1000
20 0 20 40 60 metres

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.



Appendix A: Hydrologic Model

Hydrologic Model and Catchment Summary

Project Name: Syer Line
Project No: 23035
Designed By: DR
Date: 2023-09-14

Catchment Name		Land Use and Areas (ha)								Hydrologic Calculations										
Name	Description	Wetland CN = 91	Grass CN = 74	Gravel CN = 89	Crop & Other Unimproved Land CN = 82	Pasture & Other Unimproved Land CN = 76	Woodlands and Forests CN = 71	Impervious CN = 98	Total	CN Weighted	CN Weighted | Pervious Areas	Percent Impervious	Directly Connected Impervious	Soils Group	Total Length (m)	Average Slope: Overall (%)	Time of Concentration (Minimum 10 Minutes)	Time to Peak (Hours)	Recession Period (k)	Composite Runoff Coefficient
EX1	North	0.000	0.000	0.000	13.151	0.000	0.000	0.000	13.151	82	82	0.0%	0%	C	200	0.5%	10.1	0.11	14.09	0.55
EX2	South	0.000	0.000	0.236	18.008	0.000	0.000	0.091	18.334	82	82	0.5%	0%	C	475	0.5%	23.3	0.26	15.26	0.55
PR1	North	0.000	0.000	0.000	12.163	0.000	0.000	0.000	12.163	82	82	0.0%	0%	C	200	0.5%	10.2	0.11	13.83	0.55
PR2	South	0.000	0.000	0.000	16.865	0.000	0.000	0.145	17.011	82	82	0.9%	1%	C	475	0.5%	23.4	0.26	14.99	0.55
PR3	Central + Road	0.000	0.000	0.000	1.820	0.000	0.000	0.490	2.310	85	82	21.2%	21%	C	270	0.5%	16.3	0.18	9.28	0.62

Visual OTTHYMO Input Parameters

Project Name: Syer Line **Designed By:** DR

Project No: 23035 **Date:** 2023-09-14

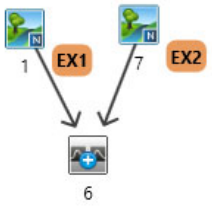
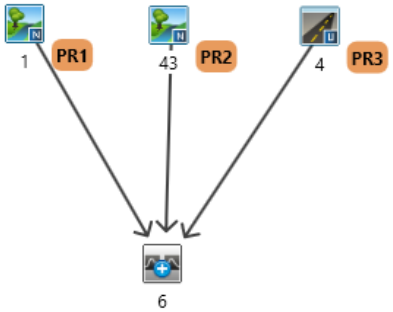
Parameter	Description	EX1	EX2	PR1	PR2	PR3
COMMAND	STANDHYD or NASHYD	NASHYD	NASHYD	NASHYD	NASHYD	STANDHYD
AREA	Catchment Area (ha)	13.151	18.334	12.163	17.011	2.310
DT	Time Step Increment (min)	5	5	5	5	5
TIMP	Total Impervious Area (%)	0.0%	0.5%	0.0%	0.9%	21.2%
XIMP	Directly Connected Impervious Area (%)	0.0%	0.3%	0.0%	0.9%	14.0%
DWF	Dry Weather Flow (m^3/s)	0	0	0	0	0
CN	Pervious Weighted Curve Number	82	82	82	82	82
LOSS[1]	Modified CN*	82	82	82	82	82
IA	Initial Abstraction (Pervious)	5.0	5.0	5.0	5.0	5.0
TP	Unit Hydrograph Time to Peak (Hr)	0.11	0.26	0.11	0.26	0.18
K	Williams Recession Period (Hr)	14.09	15.26	13.83	14.99	9.28
SLPP	Average Slope Pervious Area (%)	-	-	-	-	0.5%
LGP	Overland Flow Length Pervious Area (m)	-	-	-	-	270
MNP	Manning's Roughness Coefficient (Pervious)	-	-	-	-	0.25
SCP	Storage Coefficient Pervious Area	-	-	-	-	0
DPSI	Depression Storage Impervious Area (mm/hr)	-	-	-	-	1
SLPI	Average Slope Impervious Area (%)	-	-	-	-	0.5%
LGI	Impervious Overland Flow Length √(A/1.5) x 100 (m)	-	-	-	-	124.09
MNI	Manning's Roughness Coefficient (Impervious)	-	-	-	-	0.013
SCI	Storage Coefficient Impervious Area	-	-	-	-	0
RAIN	Optional Rainfall Intensity (mm/hr)	-	-	-	-	0

Notes:

1. CN values based on Design Chart 1.09 in MTO Drainage Manual
2. Modified CN derived from IA and CN using functionality in Visual OTTHYMO v6
3. Initial abstraction values derived from UNESCO Manual on Drainage in Urban Areas, 1987.
4. TC calculated using Airport Equation for C<0.4 and Bransby Williams for C>0.4.
5. Time to Peak estimated at 0.67Tc.
6. K values calculated based on $16.1 \times a^{0.24} \times s^{-0.84}$

Visual OTTHYMO Model

Project Name: Syer Line
Project No: 23035
Designed By: DR
Date: 2023-09-14

PRE-DEVELOPMENT MODEL	POST-DEVELOPMENT MODEL
	

Appendix B: VO Model Outputs (Pre-Development)

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

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO     TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```



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  Summary filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\e456d8bd


DATE: 09-14-2023                          TIME: 02:14:37

USER:


COMMENTS: ____________________________________________________________


---------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 01 - Ptbo_SCS_6hr_2yr         **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\dradcliffe\AppD
|                  |              ata\Local\Temp\
|                  |              d3fb464b-ea4e-4972-b8a7-1b53da16d273\9f072e7e
| Ptotal= 38.75 mm |    Comments: Ptbo_SCS_6hr_2yr
--------------------
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.00    1.60 |  1.50    3.90 |  3.00    8.50 |  4.50    2.30
                 0.25    1.60 |  1.75    3.90 |  3.25    8.50 |  4.75    2.30
                 0.50    2.30 |  2.00    4.60 |  3.50    3.90 |  5.00    1.60
                 0.75    2.30 |  2.25    4.60 |  3.75    3.90 |  5.25    1.60
                 1.00    2.30 |  2.50   23.20 |  4.00    3.10 |  5.50    1.60
                 1.25    2.30 |  2.75   60.40 |  4.25    3.10 |  5.75    1.60

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

--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=  13.15   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.11

         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    1.60 | 1.583    3.90 | 3.083    8.50 |  4.58    2.30
                0.167    1.60 | 1.667    3.90 | 3.167    8.50 |  4.67    2.30
                0.250    1.60 | 1.750    3.90 | 3.250    8.50 |  4.75    2.30
                0.333    1.60 | 1.833    3.90 | 3.333    8.50 |  4.83    2.30
                0.417    1.60 | 1.917    3.90 | 3.417    8.50 |  4.92    2.30
                0.500    1.60 | 2.000    3.90 | 3.500    8.50 |  5.00    2.30
                0.583    2.30 | 2.083    4.60 | 3.583    3.90 |  5.08    1.60
                0.667    2.30 | 2.167    4.60 | 3.667    3.90 |  5.17    1.60
                0.750    2.30 | 2.250    4.60 | 3.750    3.90 |  5.25    1.60
                0.833    2.30 | 2.333    4.60 | 3.833    3.90 |  5.33    1.60
                0.917    2.30 | 2.417    4.60 | 3.917    3.90 |  5.42    1.60
                1.000    2.30 | 2.500    4.60 | 4.000    3.90 |  5.50    1.60
                1.083    2.30 | 2.583   23.20 | 4.083    3.10 |  5.58    1.60
                1.167    2.30 | 2.667   23.20 | 4.167    3.10 |  5.67    1.60
                1.250    2.30 | 2.750   23.20 | 4.250    3.10 |  5.75    1.60
                1.333    2.30 | 2.833   60.40 | 4.333    3.10 |  5.83    1.60
                1.417    2.30 | 2.917   60.40 | 4.417    3.10 |  5.92    1.60
                1.500    2.30 | 3.000   60.40 | 4.500    3.10 |  6.00    1.60

     Unit Hyd Qpeak  (cms)=   4.566

     PEAK FLOW      (cms)=   0.808 (i)
     TIME TO PEAK   (hrs)=   3.000
     RUNOFF VOLUME   (mm)=  12.492
     TOTAL RAINFALL  (mm)=  38.750
     RUNOFF COEFFICIENT   =   0.322

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

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

--------------------
| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=  18.33   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.26

         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    1.60 | 1.583    3.90 | 3.083    8.50 |  4.58    2.30
                0.167    1.60 | 1.667    3.90 | 3.167    8.50 |  4.67    2.30
                0.250    1.60 | 1.750    3.90 | 3.250    8.50 |  4.75    2.30
                0.333    1.60 | 1.833    3.90 | 3.333    8.50 |  4.83    2.30
                0.417    1.60 | 1.917    3.90 | 3.417    8.50 |  4.92    2.30
                0.500    1.60 | 2.000    3.90 | 3.500    8.50 |  5.00    2.30
                0.583    2.30 | 2.083    4.60 | 3.583    3.90 |  5.08    1.60
                0.667    2.30 | 2.167    4.60 | 3.667    3.90 |  5.17    1.60
                0.750    2.30 | 2.250    4.60 | 3.750    3.90 |  5.25    1.60
                0.833    2.30 | 2.333    4.60 | 3.833    3.90 |  5.33    1.60
                0.917    2.30 | 2.417    4.60 | 3.917    3.90 |  5.42    1.60
                1.000    2.30 | 2.500    4.60 | 4.000    3.90 |  5.50    1.60
                1.083    2.30 | 2.583   23.20 | 4.083    3.10 |  5.58    1.60
                1.167    2.30 | 2.667   23.20 | 4.167    3.10 |  5.67    1.60
                1.250    2.30 | 2.750   23.20 | 4.250    3.10 |  5.75    1.60
                1.333    2.30 | 2.833   60.40 | 4.333    3.10 |  5.83    1.60
                1.417    2.30 | 2.917   60.40 | 4.417    3.10 |  5.92    1.60
                1.500    2.30 | 3.000   60.40 | 4.500    3.10 |  6.00    1.60

     Unit Hyd Qpeak  (cms)=   2.693

     PEAK FLOW      (cms)=   0.660 (i)
     TIME TO PEAK   (hrs)=   3.167
     RUNOFF VOLUME   (mm)=  12.717
     TOTAL RAINFALL  (mm)=  38.750
     RUNOFF COEFFICIENT   =   0.328

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

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

--------------------
| ADD HYD  (  0006)|
|  1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     13.15    0.808     3.00    12.49
     + ID2= 2 (  0007):     18.33    0.660     3.17    12.72
       ===================================================
       ID = 3 (  0006):     31.48    1.323     3.00    12.62

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

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

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

       V    V   I    SSSSS  U   U    A    L             (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

```
       OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\ac6971bb
  Summary filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\ac6971bb

DATE: 09-14-2023                          TIME: 02:14:37

USER:


COMMENTS: _____________________________________________________________

---------------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 02 - Ptbo_SCS_6hr_5yr         **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\dradcliffe\AppD
|                  |              ata\Local\Temp\
|                  |              d3fb464b-ea4e-4972-b8a7-1b53da16d273\9f5cc1ed
| Ptotal= 52.44 mm |    Comments: Ptbo_SCS_6hr_5yr
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.10 |  1.50    5.20 |  3.00   11.50 |  4.50    3.20
                0.25    2.10 |  1.75    5.20 |  3.25   11.50 |  4.75    3.20
                0.50    3.20 |  2.00    6.30 |  3.50    5.20 |  5.00    2.10
                0.75    3.20 |  2.25    6.30 |  3.75    5.20 |  5.25    2.10
                1.00    3.20 |  2.50   31.40 |  4.00    4.20 |  5.50    2.10
                1.25    3.20 |  2.75   81.78 |  4.25    4.20 |  5.75    2.10

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

--------------------
| CALIB            |
| NASHYD   (  0001)|   Area     (ha)=  13.15   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.11

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.10 | 1.583    5.20 | 3.083   11.50 |  4.58    3.20
               0.167    2.10 | 1.667    5.20 | 3.167   11.50 |  4.67    3.20
               0.250    2.10 | 1.750    5.20 | 3.250   11.50 |  4.75    3.20
               0.333    2.10 | 1.833    5.20 | 3.333   11.50 |  4.83    3.20
               0.417    2.10 | 1.917    5.20 | 3.417   11.50 |  4.92    3.20
               0.500    2.10 | 2.000    5.20 | 3.500   11.50 |  5.00    3.20
               0.583    3.20 | 2.083    6.30 | 3.583    5.20 |  5.08    2.10
               0.667    3.20 | 2.167    6.30 | 3.667    5.20 |  5.17    2.10
               0.750    3.20 | 2.250    6.30 | 3.750    5.20 |  5.25    2.10
               0.833    3.20 | 2.333    6.30 | 3.833    5.20 |  5.33    2.10
               0.917    3.20 | 2.417    6.30 | 3.917    5.20 |  5.42    2.10
               1.000    3.20 | 2.500    6.30 | 4.000    5.20 |  5.50    2.10
               1.083    3.20 | 2.583   31.40 | 4.083    4.20 |  5.58    2.10
               1.167    3.20 | 2.667   31.40 | 4.167    4.20 |  5.67    2.10
               1.250    3.20 | 2.750   31.40 | 4.250    4.20 |  5.75    2.10
               1.333    3.20 | 2.833   81.78 | 4.333    4.20 |  5.83    2.10
               1.417    3.20 | 2.917   81.78 | 4.417    4.20 |  5.92    2.10
               1.500    3.20 | 3.000   81.78 | 4.500    4.20 |  6.00    2.10

    Unit Hyd Qpeak  (cms)=   4.566

    PEAK FLOW       (cms)=   1.388 (i)
    TIME TO PEAK    (hrs)=   3.000
    RUNOFF VOLUME    (mm)=  21.411
    TOTAL RAINFALL   (mm)=  52.445
    RUNOFF COEFFICIENT   =   0.408

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

---------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0007)|   Area     (ha)=  18.33   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.26

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.10 | 1.583    5.20 | 3.083   11.50 |  4.58    3.20
               0.167    2.10 | 1.667    5.20 | 3.167   11.50 |  4.67    3.20
               0.250    2.10 | 1.750    5.20 | 3.250   11.50 |  4.75    3.20
               0.333    2.10 | 1.833    5.20 | 3.333   11.50 |  4.83    3.20
               0.417    2.10 | 1.917    5.20 | 3.417   11.50 |  4.92    3.20
               0.500    2.10 | 2.000    5.20 | 3.500   11.50 |  5.00    3.20
               0.583    3.20 | 2.083    6.30 | 3.583    5.20 |  5.08    2.10
               0.667    3.20 | 2.167    6.30 | 3.667    5.20 |  5.17    2.10
               0.750    3.20 | 2.250    6.30 | 3.750    5.20 |  5.25    2.10
               0.833    3.20 | 2.333    6.30 | 3.833    5.20 |  5.33    2.10
               0.917    3.20 | 2.417    6.30 | 3.917    5.20 |  5.42    2.10
               1.000    3.20 | 2.500    6.30 | 4.000    5.20 |  5.50    2.10
               1.083    3.20 | 2.583   31.40 | 4.083    4.20 |  5.58    2.10
               1.167    3.20 | 2.667   31.40 | 4.167    4.20 |  5.67    2.10
               1.250    3.20 | 2.750   31.40 | 4.250    4.20 |  5.75    2.10
               1.333    3.20 | 2.833   81.78 | 4.333    4.20 |  5.83    2.10
               1.417    3.20 | 2.917   81.78 | 4.417    4.20 |  5.92    2.10
               1.500    3.20 | 3.000   81.78 | 4.500    4.20 |  6.00    2.10

    Unit Hyd Qpeak  (cms)=   2.693

    PEAK FLOW       (cms)=   1.151 (i)
    TIME TO PEAK    (hrs)=   3.167
    RUNOFF VOLUME    (mm)=  21.797
    TOTAL RAINFALL   (mm)=  52.445
    RUNOFF COEFFICIENT   =   0.416

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

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

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK      R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0001):    13.15   1.388     3.00     21.41
     + ID2= 2 (  0007):    18.33   1.151     3.17     21.80
       ==========================================
       ID = 3 (  0006):    31.48   2.321     3.00     21.64

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\be3e695b
  Summary filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\be3e695b

DATE: 09-14-2023                          TIME: 02:14:37
```

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : 03 - Ptbo_SCS_6hr_10yr        **
  ************************************************
```

```
--------------------
|    READ STORM    |    Filename: C:\Users\dradcliffe\AppD
|                  |              ata\Local\Temp\
|                  |              d3fb464b-ea4e-4972-b8a7-1b53da16d273\d983eb35
| Ptotal= 61.60 mm |    Comments: Ptbo_SCS_6hr_10yr
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.50	1.50	6.20	3.00	13.50	4.50	3.70
0.25	2.50	1.75	6.20	3.25	13.50	4.75	3.70
0.50	3.70	2.00	7.40	3.50	6.20	5.00	2.50
0.75	3.70	2.25	7.40	3.75	6.20	5.25	2.50
1.00	3.70	2.50	36.90	4.00	4.90	5.50	2.50
1.25	3.70	2.75	95.90	4.25	4.90	5.75	2.50

```
--------------------
| CALIB            |
| NASHYD  (  0001)|   Area    (ha)=  13.15   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.11

        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	13.50	4.58	3.70
0.167	2.50	1.667	6.20	3.167	13.50	4.67	3.70
0.250	2.50	1.750	6.20	3.250	13.50	4.75	3.70
0.333	2.50	1.833	6.20	3.333	13.50	4.83	3.70
0.417	2.50	1.917	6.20	3.417	13.50	4.92	3.70
0.500	2.50	2.000	6.20	3.500	13.50	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	36.90	4.083	4.90	5.58	2.50
1.167	3.70	2.667	36.90	4.167	4.90	5.67	2.50
1.250	3.70	2.750	36.90	4.250	4.90	5.75	2.50
1.333	3.70	2.833	95.90	4.333	4.90	5.83	2.50
1.417	3.70	2.917	95.90	4.417	4.90	5.92	2.50
1.500	3.70	3.000	95.90	4.500	4.90	6.00	2.50

```
     Unit Hyd Qpeak  (cms)=   4.566

     PEAK FLOW       (cms)=   1.807 (i)
     TIME TO PEAK    (hrs)=   3.000
     RUNOFF VOLUME    (mm)=  27.988
     TOTAL RAINFALL   (mm)=  61.600
     RUNOFF COEFFICIENT   =   0.454

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

```
--------------------
| CALIB            |
| NASHYD  (  0007)|   Area    (ha)=  18.33   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.26

        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	13.50	4.58	3.70
0.167	2.50	1.667	6.20	3.167	13.50	4.67	3.70
0.250	2.50	1.750	6.20	3.250	13.50	4.75	3.70
0.333	2.50	1.833	6.20	3.333	13.50	4.83	3.70
0.417	2.50	1.917	6.20	3.417	13.50	4.92	3.70
0.500	2.50	2.000	6.20	3.500	13.50	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	36.90	4.083	4.90	5.58	2.50
1.167	3.70	2.667	36.90	4.167	4.90	5.67	2.50
1.250	3.70	2.750	36.90	4.250	4.90	5.75	2.50
1.333	3.70	2.833	95.90	4.333	4.90	5.83	2.50
1.417	3.70	2.917	95.90	4.417	4.90	5.92	2.50
1.500	3.70	3.000	95.90	4.500	4.90	6.00	2.50

```
     Unit Hyd Qpeak  (cms)=   2.693

     PEAK FLOW       (cms)=   1.510 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  28.493
     TOTAL RAINFALL   (mm)=  61.600
     RUNOFF COEFFICIENT   =   0.463

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

```
--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0001):    13.15   1.807     3.00    27.99
     + ID2= 2 (  0007):    18.33   1.510     3.17    28.49
       ==========================================================
       ID = 3 (  0006):    31.48   3.052     3.00    28.28

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

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

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

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\7bc7e297
  Summary filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\7bc7e297

DATE: 09-14-2023                          TIME: 02:14:37

USER:

COMMENTS: _____
```

```
  ************************************************
  ** SIMULATION : 04 - Ptbo_SCS_6hr_25yr        **
  ************************************************

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

READ STORM	Filename: C:\Users\dradcliffe\AppD ata\Local\Temp\ d3fb464b-ea4e-4972-b8a7-1b53da16d273\caacfc01 Comments: Ptbo_SCS_6hr_25yr
Ptotal= 72.90 mm	

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.90	1.50	7.30	3.00	16.00	4.50	4.40
0.25	2.90	1.75	7.30	3.25	16.00	4.75	4.40
0.50	4.40	2.00	8.80	3.50	7.30	5.00	2.90
0.75	4.40	2.25	8.80	3.75	7.30	5.25	2.90
1.00	4.40	2.50	43.70	4.00	5.80	5.50	2.90
1.25	4.40	2.75	113.70	4.25	5.80	5.75	2.90

CALIB			
NASHYD (0001)	Area (ha)=	13.15	Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.11	

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	2.90	1.583	7.30	3.083	16.00	4.58	4.40
0.167	2.90	1.667	7.30	3.167	16.00	4.67	4.40
0.250	2.90	1.750	7.30	3.250	16.00	4.75	4.40
0.333	2.90	1.833	7.30	3.333	16.00	4.83	4.40
0.417	2.90	1.917	7.30	3.417	16.00	4.92	4.40
0.500	2.90	2.000	7.30	3.500	16.00	5.00	4.40
0.583	4.40	2.083	8.80	3.583	7.30	5.08	2.90
0.667	4.40	2.167	8.80	3.667	7.30	5.17	2.90
0.750	4.40	2.250	8.80	3.750	7.30	5.25	2.90
0.833	4.40	2.333	8.80	3.833	7.30	5.33	2.90
0.917	4.40	2.417	8.80	3.917	7.30	5.42	2.90
1.000	4.40	2.500	8.80	4.000	7.30	5.50	2.90
1.083	4.40	2.583	43.70	4.083	5.80	5.58	2.90
1.167	4.40	2.667	43.70	4.167	5.80	5.67	2.90
1.250	4.40	2.750	43.70	4.250	5.80	5.75	2.90
1.333	4.40	2.833	113.70	4.333	5.80	5.83	2.90
1.417	4.40	2.917	113.70	4.417	5.80	5.92	2.90
1.500	4.40	3.000	113.70	4.500	5.80	6.00	2.90

Unit Hyd Qpeak (cms)= 4.566

PEAK FLOW (cms)= 2.359 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 36.598
TOTAL RAINFALL (mm)= 72.900
RUNOFF COEFFICIENT = 0.502

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

CALIB			
NASHYD (0007)	Area (ha)=	18.33	Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.26	

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	2.90	1.583	7.30	3.083	16.00	4.58	4.40
0.167	2.90	1.667	7.30	3.167	16.00	4.67	4.40
0.250	2.90	1.750	7.30	3.250	16.00	4.75	4.40
0.333	2.90	1.833	7.30	3.333	16.00	4.83	4.40
0.417	2.90	1.917	7.30	3.417	16.00	4.92	4.40
0.500	2.90	2.000	7.30	3.500	16.00	5.00	4.40
0.583	4.40	2.083	8.80	3.583	7.30	5.08	2.90
0.667	4.40	2.167	8.80	3.667	7.30	5.17	2.90
0.750	4.40	2.250	8.80	3.750	7.30	5.25	2.90
0.833	4.40	2.333	8.80	3.833	7.30	5.33	2.90
0.917	4.40	2.417	8.80	3.917	7.30	5.42	2.90
1.000	4.40	2.500	8.80	4.000	7.30	5.50	2.90
1.083	4.40	2.583	43.70	4.083	5.80	5.58	2.90
1.167	4.40	2.667	43.70	4.167	5.80	5.67	2.90
1.250	4.40	2.750	43.70	4.250	5.80	5.75	2.90
1.333	4.40	2.833	113.70	4.333	5.80	5.83	2.90
1.417	4.40	2.917	113.70	4.417	5.80	5.92	2.90
1.500	4.40	3.000	113.70	4.500	5.80	6.00	2.90

Unit Hyd Qpeak (cms)= 2.693

PEAK FLOW (cms)= 1.991 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 37.259
TOTAL RAINFALL (mm)= 72.900
RUNOFF COEFFICIENT = 0.511

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

ADD HYD (0006)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0001):	13.15	2.359	3.00	36.60
	+ ID2= 2 (0007):	18.33	1.991	3.08	37.26
	ID = 3 (0006):	31.48	4.022	3.00	36.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U A   A  L
         VV     I    SSSSS  UUUUU A   A  LLLLL

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

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

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\24f8b8e4
  Summary filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\24f8b8e4

DATE: 09-14-2023                          TIME: 02:14:37

USER:


COMMENTS: _____________________________________________________
```

```
  ************************************************
  ** SIMULATION : 05 - Ptbo_SCS_6hr_50yr        **
  ************************************************
```

READ STORM	Filename: C:\Users\dradcliffe\AppD ata\Local\Temp\ d3fb464b-ea4e-4972-b8a7-1b53da16d273\c9322ff2 Comments: Ptbo_SCS_6hr_50yr
Ptotal= 81.47 mm	

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.30	1.50	8.10	3.00	17.90	4.50	4.90
0.25	3.30	1.75	8.10	3.25	17.90	4.75	4.90
0.50	4.90	2.00	9.80	3.50	8.10	5.00	3.30
0.75	4.90	2.25	9.80	3.75	8.10	5.25	3.30
1.00	4.90	2.50	48.90	4.00	6.50	5.50	3.30
1.25	4.90	2.75	127.00	4.25	6.50	5.75	3.30

```
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=  13.15   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.11

        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    3.30 | 1.583    8.10 | 3.083   17.90 |  4.58    4.90
   0.167    3.30 | 1.667    8.10 | 3.167   17.90 |  4.67    4.90
   0.250    3.30 | 1.750    8.10 | 3.250   17.90 |  4.75    4.90
   0.333    3.30 | 1.833    8.10 | 3.333   17.90 |  4.83    4.90
   0.417    3.30 | 1.917    8.10 | 3.417   17.90 |  4.92    4.90
   0.500    3.30 | 2.000    8.10 | 3.500   17.90 |  5.00    4.90
   0.583    4.90 | 2.083    9.80 | 3.583    8.10 |  5.08    3.30
   0.667    4.90 | 2.167    9.80 | 3.667    8.10 |  5.17    3.30
   0.750    4.90 | 2.250    9.80 | 3.750    8.10 |  5.25    3.30
   0.833    4.90 | 2.333    9.80 | 3.833    8.10 |  5.33    3.30
   0.917    4.90 | 2.417    9.80 | 3.917    8.10 |  5.42    3.30
   1.000    4.90 | 2.500    9.80 | 4.000    8.10 |  5.50    3.30
   1.083    4.90 | 2.583   48.90 | 4.083    6.50 |  5.58    3.30
   1.167    4.90 | 2.667   48.90 | 4.167    6.50 |  5.67    3.30
   1.250    4.90 | 2.750   48.90 | 4.250    6.50 |  5.75    3.30
   1.333    4.90 | 2.833  127.00 | 4.333    6.50 |  5.83    3.30
   1.417    4.90 | 2.917  127.00 | 4.417    6.50 |  5.92    3.30
   1.500    4.90 | 3.000  127.00 | 4.500    6.50 |  6.00    3.30

     Unit Hyd Qpeak  (cms)=   4.566

     PEAK FLOW       (cms)=   2.787 (i)
     TIME TO PEAK    (hrs)=   3.000
     RUNOFF VOLUME    (mm)=  43.415
     TOTAL RAINFALL   (mm)=  81.475
     RUNOFF COEFFICIENT   =   0.533

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=  18.33   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.26

        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    3.30 | 1.583    8.10 | 3.083   17.90 |  4.58    4.90
   0.167    3.30 | 1.667    8.10 | 3.167   17.90 |  4.67    4.90
   0.250    3.30 | 1.750    8.10 | 3.250   17.90 |  4.75    4.90
   0.333    3.30 | 1.833    8.10 | 3.333   17.90 |  4.83    4.90
   0.417    3.30 | 1.917    8.10 | 3.417   17.90 |  4.92    4.90
   0.500    3.30 | 2.000    8.10 | 3.500   17.90 |  5.00    4.90
   0.583    4.90 | 2.083    9.80 | 3.583    8.10 |  5.08    3.30
   0.667    4.90 | 2.167    9.80 | 3.667    8.10 |  5.17    3.30
   0.750    4.90 | 2.250    9.80 | 3.750    8.10 |  5.25    3.30
   0.833    4.90 | 2.333    9.80 | 3.833    8.10 |  5.33    3.30
   0.917    4.90 | 2.417    9.80 | 3.917    8.10 |  5.42    3.30
   1.000    4.90 | 2.500    9.80 | 4.000    8.10 |  5.50    3.30
   1.083    4.90 | 2.583   48.90 | 4.083    6.50 |  5.58    3.30
   1.167    4.90 | 2.667   48.90 | 4.167    6.50 |  5.67    3.30
   1.250    4.90 | 2.750   48.90 | 4.250    6.50 |  5.75    3.30
   1.333    4.90 | 2.833  127.00 | 4.333    6.50 |  5.83    3.30
   1.417    4.90 | 2.917  127.00 | 4.417    6.50 |  5.92    3.30
   1.500    4.90 | 3.000  127.00 | 4.500    6.50 |  6.00    3.30

     Unit Hyd Qpeak  (cms)=   2.693

     PEAK FLOW       (cms)=   2.371 (i)
     TIME TO PEAK    (hrs)=   3.083
     RUNOFF VOLUME    (mm)=  44.199
     TOTAL RAINFALL   (mm)=  81.475
     RUNOFF COEFFICIENT   =   0.542

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

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

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK      R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0001):    13.15   2.787     3.00    43.42
     + ID2= 2 (  0007):    18.33   2.371     3.08    44.20
       ================================================
       ID = 3 (  0006):    31.48   4.780     3.00    43.87

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

      V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\5acefacb
  Summary filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\5acefacb


DATE: 09-14-2023                          TIME: 02:14:37

USER:


COMMENTS: _____________________________________________________


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  ************************************************
  ** SIMULATION : 06 - Ptbo_SCS_6hr_100yr       **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\dradcliffe\AppD
|                  |              ata\Local\Temp\
|                  |              d3fb464b-ea4e-4972-b8a7-1b53da16d273\b855f372
| Ptotal= 89.93 mm |    Comments: Ptbo_SCS_6hr_100yr
--------------------
    TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
     hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
   0.00     3.60 |  1.50    9.00 |  3.00   19.80 |  4.50    5.40
   0.25     3.60 |  1.75    9.00 |  3.25   19.80 |  4.75    5.40
   0.50     5.40 |  2.00   10.80 |  3.50    9.00 |  5.00    3.60
   0.75     5.40 |  2.25   10.80 |  3.75    9.00 |  5.25    3.60
   1.00     5.40 |  2.50   53.90 |  4.00    7.20 |  5.50    3.60
   1.25     5.40 |  2.75  140.20 |  4.25    7.20 |  5.75    3.60

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

--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=  13.15   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.11

        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    3.60 | 1.583    9.00 | 3.083   19.80 |  4.58    5.40
   0.167    3.60 | 1.667    9.00 | 3.167   19.80 |  4.67    5.40
```

0.250	3.60	1.750	9.00	3.250	19.80	4.75	5.40
0.333	3.60	1.833	9.00	3.333	19.80	4.83	5.40
0.417	3.60	1.917	9.00	3.417	19.80	4.92	5.40
0.500	3.60	2.000	9.00	3.500	19.80	5.00	5.40
0.583	5.40	2.083	10.80	3.583	9.00	5.08	3.60
0.667	5.40	2.167	10.80	3.667	9.00	5.17	3.60
0.750	5.40	2.250	10.80	3.750	9.00	5.25	3.60
0.833	5.40	2.333	10.80	3.833	9.00	5.33	3.60
0.917	5.40	2.417	10.80	3.917	9.00	5.42	3.60
1.000	5.40	2.500	10.80	4.000	9.00	5.50	3.60
1.083	5.40	2.583	53.90	4.083	7.20	5.58	3.60
1.167	5.40	2.667	53.90	4.167	7.20	5.67	3.60
1.250	5.40	2.750	53.90	4.250	7.20	5.75	3.60
1.333	5.40	2.833	140.20	4.333	7.20	5.83	3.60
1.417	5.40	2.917	140.20	4.417	7.20	5.92	3.60
1.500	5.40	3.000	140.20	4.500	7.20	6.00	3.60

Unit Hyd Qpeak (cms)= 4.566

PEAK FLOW (cms)= 3.220 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 50.324
TOTAL RAINFALL (mm)= 89.925
RUNOFF COEFFICIENT = 0.560

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

CALIB			
NASHYD (0007)	Area (ha)= 18.33	Curve Number (CN)= 82.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.26		

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	3.60	1.583	9.00	3.083	19.80	4.58	5.40
0.167	3.60	1.667	9.00	3.167	19.80	4.67	5.40
0.250	3.60	1.750	9.00	3.250	19.80	4.75	5.40
0.333	3.60	1.833	9.00	3.333	19.80	4.83	5.40
0.417	3.60	1.917	9.00	3.417	19.80	4.92	5.40
0.500	3.60	2.000	9.00	3.500	19.80	5.00	5.40
0.583	5.40	2.083	10.80	3.583	9.00	5.08	3.60
0.667	5.40	2.167	10.80	3.667	9.00	5.17	3.60
0.750	5.40	2.250	10.80	3.750	9.00	5.25	3.60
0.833	5.40	2.333	10.80	3.833	9.00	5.33	3.60
0.917	5.40	2.417	10.80	3.917	9.00	5.42	3.60
1.000	5.40	2.500	10.80	4.000	9.00	5.50	3.60
1.083	5.40	2.583	53.90	4.083	7.20	5.58	3.60
1.167	5.40	2.667	53.90	4.167	7.20	5.67	3.60
1.250	5.40	2.750	53.90	4.250	7.20	5.75	3.60
1.333	5.40	2.833	140.20	4.333	7.20	5.83	3.60
1.417	5.40	2.917	140.20	4.417	7.20	5.92	3.60
1.500	5.40	3.000	140.20	4.500	7.20	6.00	3.60

Unit Hyd Qpeak (cms)= 2.693

PEAK FLOW (cms)= 2.758 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 51.232
TOTAL RAINFALL (mm)= 89.925
RUNOFF COEFFICIENT = 0.570

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

ADD HYD (0006)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	13.15	3.220	3.00	50.32
+ ID2= 2 (0007):	18.33	2.758	3.08	51.23
ID = 3 (0006):	31.48	5.548	3.00	50.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Appendix C: VO Model Outputs (Post-Development)

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\a61da390
  Summary filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\a61da390


DATE: 09-14-2023                          TIME: 04:31:38

USER:


COMMENTS: _____________________________________________________


----------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 01 - Ptbo_SCS_6hr_2yr         **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\dradcliffe\AppD
|                  |              ata\Local\Temp\
|                  |              082ad1fa-a753-43bb-8704-c729dd0c110b\9f072e7e
| Ptotal= 38.75 mm |    Comments: Ptbo_SCS_6hr_2yr
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    1.60 |  1.50    3.90 |  3.00    8.50 |  4.50    2.30
               0.25    1.60 |  1.75    3.90 |  3.25    8.50 |  4.75    2.30
               0.50    2.30 |  2.00    4.60 |  3.50    3.90 |  5.00    1.60
               0.75    2.30 |  2.25    4.60 |  3.75    3.90 |  5.25    1.60
               1.00    2.30 |  2.50   23.20 |  4.00    3.10 |  5.50    1.60
               1.25    2.30 |  2.75   60.40 |  4.25    3.10 |  5.75    1.60

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

--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=  12.16   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.11

        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    1.60 | 1.583    3.90 | 3.083    8.50 |  4.58    2.30
               0.167    1.60 | 1.667    3.90 | 3.167    8.50 |  4.67    2.30
               0.250    1.60 | 1.750    3.90 | 3.250    8.50 |  4.75    2.30
               0.333    1.60 | 1.833    3.90 | 3.333    8.50 |  4.83    2.30
               0.417    1.60 | 1.917    3.90 | 3.417    8.50 |  4.92    2.30
               0.500    1.60 | 2.000    3.90 | 3.500    8.50 |  5.00    2.30
               0.583    2.30 | 2.083    4.60 | 3.583    3.90 |  5.08    1.60
               0.667    2.30 | 2.167    4.60 | 3.667    3.90 |  5.17    1.60
               0.750    2.30 | 2.250    4.60 | 3.750    3.90 |  5.25    1.60
               0.833    2.30 | 2.333    4.60 | 3.833    3.90 |  5.33    1.60
               0.917    2.30 | 2.417    4.60 | 3.917    3.90 |  5.42    1.60
               1.000    2.30 | 2.500    4.60 | 4.000    3.90 |  5.50    1.60
               1.083    2.30 | 2.583   23.20 | 4.083    3.10 |  5.58    1.60
               1.167    2.30 | 2.667   23.20 | 4.167    3.10 |  5.67    1.60
               1.250    2.30 | 2.750   23.20 | 4.250    3.10 |  5.75    1.60
               1.333    2.30 | 2.833   60.40 | 4.333    3.10 |  5.83    1.60
               1.417    2.30 | 2.917   60.40 | 4.417    3.10 |  5.92    1.60
               1.500    2.30 | 3.000   60.40 | 4.500    3.10 |  6.00    1.60

     Unit Hyd Qpeak  (cms)=   4.223

     PEAK FLOW       (cms)=   0.747 (i)
     TIME TO PEAK    (hrs)=   3.000
     RUNOFF VOLUME    (mm)=  12.492
     TOTAL RAINFALL   (mm)=  38.750
     RUNOFF COEFFICIENT   =   0.322

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0043)|   Area    (ha)=  17.01   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.26

        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    1.60 | 1.583    3.90 | 3.083    8.50 |  4.58    2.30
               0.167    1.60 | 1.667    3.90 | 3.167    8.50 |  4.67    2.30
               0.250    1.60 | 1.750    3.90 | 3.250    8.50 |  4.75    2.30
               0.333    1.60 | 1.833    3.90 | 3.333    8.50 |  4.83    2.30
               0.417    1.60 | 1.917    3.90 | 3.417    8.50 |  4.92    2.30
               0.500    1.60 | 2.000    3.90 | 3.500    8.50 |  5.00    2.30
               0.583    2.30 | 2.083    4.60 | 3.583    3.90 |  5.08    1.60
               0.667    2.30 | 2.167    4.60 | 3.667    3.90 |  5.17    1.60
               0.750    2.30 | 2.250    4.60 | 3.750    3.90 |  5.25    1.60
               0.833    2.30 | 2.333    4.60 | 3.833    3.90 |  5.33    1.60
               0.917    2.30 | 2.417    4.60 | 3.917    3.90 |  5.42    1.60
               1.000    2.30 | 2.500    4.60 | 4.000    3.90 |  5.50    1.60
               1.083    2.30 | 2.583   23.20 | 4.083    3.10 |  5.58    1.60
               1.167    2.30 | 2.667   23.20 | 4.167    3.10 |  5.67    1.60
               1.250    2.30 | 2.750   23.20 | 4.250    3.10 |  5.75    1.60
               1.333    2.30 | 2.833   60.40 | 4.333    3.10 |  5.83    1.60
               1.417    2.30 | 2.917   60.40 | 4.417    3.10 |  5.92    1.60
               1.500    2.30 | 3.000   60.40 | 4.500    3.10 |  6.00    1.60

     Unit Hyd Qpeak  (cms)=   2.499

     PEAK FLOW       (cms)=   0.612 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  12.717
     TOTAL RAINFALL   (mm)=  38.750
     RUNOFF COEFFICIENT   =   0.328

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   2.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  21.00   Dir. Conn.(%)=  14.00
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.49          1.82
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       0.50          0.50
     Length            (m)=     124.10        270.00
     Mannings n            =      0.013         0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.60 | 1.583    3.90 | 3.083    8.50 |  4.58    2.30
               0.167    1.60 | 1.667    3.90 | 3.167    8.50 |  4.67    2.30
               0.250    1.60 | 1.750    3.90 | 3.250    8.50 |  4.75    2.30
               0.333    1.60 | 1.833    3.90 | 3.333    8.50 |  4.83    2.30
               0.417    1.60 | 1.917    3.90 | 3.417    8.50 |  4.92    2.30
               0.500    1.60 | 2.000    3.90 | 3.500    8.50 |  5.00    2.30
               0.583    2.30 | 2.083    4.60 | 3.583    3.90 |  5.08    1.60
               0.667    2.30 | 2.167    4.60 | 3.667    3.90 |  5.17    1.60
               0.750    2.30 | 2.250    4.60 | 3.750    3.90 |  5.25    1.60
```

0.833	2.30	2.333	4.60	3.833	3.90	5.33	1.60
0.917	2.30	2.417	4.60	3.917	3.90	5.42	1.60
1.000	2.30	2.500	4.60	4.000	3.90	5.50	1.60
1.083	2.30	2.583	23.20	4.083	3.10	5.58	1.60
1.167	2.30	2.667	23.20	4.167	3.10	5.67	1.60
1.250	2.30	2.750	23.20	4.250	3.10	5.75	1.60
1.333	2.30	2.833	60.40	4.333	3.10	5.83	1.60
1.417	2.30	2.917	60.40	4.417	3.10	5.92	1.60
1.500	2.30	3.000	60.40	4.500	3.10	6.00	1.60

Max.Eff.Inten.(mm/hr)=	60.40	10.56	
over (min)	5.00	90.00	
Storage Coeff. (min)=	4.38 (ii)	87.06 (ii)	
Unit Hyd. Tpeak (min)=	5.00	90.00	
Unit Hyd. peak (cms)=	0.23	0.01	
			TOTALS
PEAK FLOW (cms)=	0.05	0.02	0.056 (iii)
TIME TO PEAK (hrs)=	3.00	4.42	3.00
RUNOFF VOLUME (mm)=	37.75	13.67	17.02
TOTAL RAINFALL (mm)=	38.75	38.75	38.75
RUNOFF COEFFICIENT =	0.97	0.35	0.44

***** 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* = 82.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):		12.16	0.747	3.00	12.49
+ ID2= 2 (0004):		2.31	0.056	3.00	17.02
ID = 3 (0006):		14.47	0.803	3.00	13.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0006):		14.47	0.803	3.00	13.21
+ ID2= 2 (0043):		17.01	0.612	3.17	12.72
ID = 1 (0006):		31.48	1.281	3.00	12.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2011)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\22d5e63f
Summary filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\22d5e63f

DATE: 09-14-2023 TIME: 04:31:38

USER:

COMMENTS: _____

** SIMULATION : 02 - Ptbo_SCS_6hr_5yr **

READ STORM | Filename: C:\Users\dradcliffe\AppData\Local\Temp\082ad1fa-a753-43bb-8704-c729dd0c110b\9f5cc1ed
Ptotal= 52.44 mm | Comments: Ptbo_SCS_6hr_5yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.10	1.50	5.20	3.00	11.50	4.50	3.20
0.25	2.10	1.75	5.20	3.25	11.50	4.75	3.20
0.50	3.20	2.00	6.30	3.50	5.20	5.00	2.10
0.75	3.20	2.25	6.30	3.75	5.20	5.25	2.10
1.00	3.20	2.50	31.40	4.00	4.20	5.50	2.10
1.25	3.20	2.75	81.78	4.25	4.20	5.75	2.10

CALIB
NASHYD (0001) | Area (ha)= 12.16 Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.11

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	2.10	1.583	5.20	3.083	11.50	4.58	3.20
0.167	2.10	1.667	5.20	3.167	11.50	4.67	3.20
0.250	2.10	1.750	5.20	3.250	11.50	4.75	3.20
0.333	2.10	1.833	5.20	3.333	11.50	4.83	3.20
0.417	2.10	1.917	5.20	3.417	11.50	4.92	3.20
0.500	2.10	2.000	5.20	3.500	11.50	5.00	3.20
0.583	3.20	2.083	6.30	3.583	5.20	5.08	2.10
0.667	3.20	2.167	6.30	3.667	5.20	5.17	2.10
0.750	3.20	2.250	6.30	3.750	5.20	5.25	2.10
0.833	3.20	2.333	6.30	3.833	5.20	5.33	2.10
0.917	3.20	2.417	6.30	3.917	5.20	5.42	2.10
1.000	3.20	2.500	6.30	4.000	5.20	5.50	2.10
1.083	3.20	2.583	31.40	4.083	4.20	5.58	2.10
1.167	3.20	2.667	31.40	4.167	4.20	5.67	2.10
1.250	3.20	2.750	31.40	4.250	4.20	5.75	2.10
1.333	3.20	2.833	81.78	4.333	4.20	5.83	2.10
1.417	3.20	2.917	81.78	4.417	4.20	5.92	2.10
1.500	3.20	3.000	81.78	4.500	4.20	6.00	2.10

Unit Hyd Qpeak (cms)= 4.223

PEAK FLOW (cms)= 1.283 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 21.411
TOTAL RAINFALL (mm)= 52.445
RUNOFF COEFFICIENT = 0.408

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

CALIB
NASHYD (0043) | Area (ha)= 17.01 Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.26

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	2.10	1.583	5.20	3.083	11.50	4.58	3.20
0.167	2.10	1.667	5.20	3.167	11.50	4.67	3.20
0.250	2.10	1.750	5.20	3.250	11.50	4.75	3.20
0.333	2.10	1.833	5.20	3.333	11.50	4.83	3.20
0.417	2.10	1.917	5.20	3.417	11.50	4.92	3.20
0.500	2.10	2.000	5.20	3.500	11.50	5.00	3.20
0.583	3.20	2.083	6.30	3.583	5.20	5.08	2.10
0.667	3.20	2.167	6.30	3.667	5.20	5.17	2.10
0.750	3.20	2.250	6.30	3.750	5.20	5.25	2.10
0.833	3.20	2.333	6.30	3.833	5.20	5.33	2.10
0.917	3.20	2.417	6.30	3.917	5.20	5.42	2.10
1.000	3.20	2.500	6.30	4.000	5.20	5.50	2.10
1.083	3.20	2.583	31.40	4.083	4.20	5.58	2.10
1.167	3.20	2.667	31.40	4.167	4.20	5.67	2.10
1.250	3.20	2.750	31.40	4.250	4.20	5.75	2.10
1.333	3.20	2.833	81.78	4.333	4.20	5.83	2.10
1.417	3.20	2.917	81.78	4.417	4.20	5.92	2.10
1.500	3.20	3.000	81.78	4.500	4.20	6.00	2.10

Unit Hyd Qpeak (cms)= 2.499

PEAK FLOW (cms)= 1.068 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 21.797
TOTAL RAINFALL (mm)= 52.445
RUNOFF COEFFICIENT = 0.416

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

CALIB			
STANDHYD (0004)	Area (ha)= 2.31		
ID= 1 DT= 5.0 min	Total Imp(%)= 21.00	Dir. Conn.(%)= 14.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.49	1.82
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.50	0.50
Length	(m)=	124.10	270.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.10	1.583	5.20	3.083	11.50	4.58	3.20
0.167	2.10	1.667	5.20	3.167	11.50	4.67	3.20
0.250	2.10	1.750	5.20	3.250	11.50	4.75	3.20
0.333	2.10	1.833	5.20	3.333	11.50	4.83	3.20
0.417	2.10	1.917	5.20	3.417	11.50	4.92	3.20
0.500	2.10	2.000	5.20	3.500	11.50	5.00	3.20
0.583	3.20	2.083	6.30	3.583	5.20	5.08	2.10
0.667	3.20	2.167	6.30	3.667	5.20	5.17	2.10
0.750	3.20	2.250	6.30	3.750	5.20	5.25	2.10
0.833	3.20	2.333	6.30	3.833	5.20	5.33	2.10
0.917	3.20	2.417	6.30	3.917	5.20	5.42	2.10
1.000	3.20	2.500	6.30	4.000	5.20	5.50	2.10
1.083	3.20	2.583	31.40	4.083	4.20	5.58	2.10
1.167	3.20	2.667	31.40	4.167	4.20	5.67	2.10
1.250	3.20	2.750	31.40	4.250	4.20	5.75	2.10
1.333	3.20	2.833	81.78	4.333	4.20	5.83	2.10
1.417	3.20	2.917	81.78	4.417	4.20	5.92	2.10
1.500	3.20	3.000	81.78	4.500	4.20	6.00	2.10

Max.Eff.Inten.(mm/hr)=	81.78	18.13	
over (min)	5.00	75.00	
Storage Coeff. (min)=	3.88 (ii)	70.49 (ii)	
Unit Hyd. Tpeak (min)=	5.00	75.00	
Unit Hyd. peak (cms)=	0.25	0.02	
			TOTALS
PEAK FLOW (cms)=	0.07	0.05	0.080 (iii)
TIME TO PEAK (hrs)=	3.00	4.17	3.00
RUNOFF VOLUME (mm)=	51.44	23.11	27.06
TOTAL RAINFALL (mm)=	52.45	52.45	52.45
RUNOFF COEFFICIENT =	0.98	0.44	0.52

***** 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* = 82.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	12.16	1.283	3.00	21.41
+ ID2= 2 (0004):	2.31	0.080	3.00	27.06
ID = 3 (0006):	14.47	1.363	3.00	22.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0006):	14.47	1.363	3.00	22.31
+ ID2= 2 (0043):	17.01	1.068	3.17	21.80
ID = 1 (0006):	31.48	2.229	3.00	22.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2011)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\bc311119
Summary filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\bc311119

DATE: 09-14-2023 TIME: 04:31:39

USER:

COMMENTS: _____

** SIMULATION : 03 - Ptbo_SCS_6hr_10yr **

READ STORM	Filename: C:\Users\dradcliffe\AppData\Local\Temp\082ad1fa-a753-43bb-8704-c729dd0c110b\d983eb35
Ptotal= 61.60 mm	Comments: Ptbo_SCS_6hr_10yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.50	1.50	6.20	3.00	13.50	4.50	3.70
0.25	2.50	1.75	6.20	3.25	13.50	4.75	3.70
0.50	3.70	2.00	7.40	3.50	6.20	5.00	2.50
0.75	3.70	2.25	7.40	3.75	6.20	5.25	2.50
1.00	3.70	2.50	36.90	4.00	4.90	5.50	2.50
1.25	3.70	2.75	95.90	4.25	4.90	5.75	2.50

```
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=  12.16   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.11

        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	13.50	4.58	3.70
0.167	2.50	1.667	6.20	3.167	13.50	4.67	3.70
0.250	2.50	1.750	6.20	3.250	13.50	4.75	3.70
0.333	2.50	1.833	6.20	3.333	13.50	4.83	3.70
0.417	2.50	1.917	6.20	3.417	13.50	4.92	3.70
0.500	2.50	2.000	6.20	3.500	13.50	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	36.90	4.083	4.90	5.58	2.50
1.167	3.70	2.667	36.90	4.167	4.90	5.67	2.50
1.250	3.70	2.750	36.90	4.250	4.90	5.75	2.50
1.333	3.70	2.833	95.90	4.333	4.90	5.83	2.50
1.417	3.70	2.917	95.90	4.417	4.90	5.92	2.50
1.500	3.70	3.000	95.90	4.500	4.90	6.00	2.50

```
    Unit Hyd Qpeak  (cms)=   4.223

    PEAK FLOW       (cms)=   1.671 (i)
    TIME TO PEAK    (hrs)=   3.000
    RUNOFF VOLUME    (mm)=  27.988
    TOTAL RAINFALL   (mm)=  61.600
    RUNOFF COEFFICIENT   =   0.454

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

--------------------
| CALIB            |
| NASHYD   (  0043)|   Area    (ha)=  17.01   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.26

        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	13.50	4.58	3.70
0.167	2.50	1.667	6.20	3.167	13.50	4.67	3.70
0.250	2.50	1.750	6.20	3.250	13.50	4.75	3.70
0.333	2.50	1.833	6.20	3.333	13.50	4.83	3.70
0.417	2.50	1.917	6.20	3.417	13.50	4.92	3.70
0.500	2.50	2.000	6.20	3.500	13.50	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	36.90	4.083	4.90	5.58	2.50
1.167	3.70	2.667	36.90	4.167	4.90	5.67	2.50
1.250	3.70	2.750	36.90	4.250	4.90	5.75	2.50
1.333	3.70	2.833	95.90	4.333	4.90	5.83	2.50
1.417	3.70	2.917	95.90	4.417	4.90	5.92	2.50
1.500	3.70	3.000	95.90	4.500	4.90	6.00	2.50

```
    Unit Hyd Qpeak  (cms)=   2.499

    PEAK FLOW       (cms)=   1.401 (i)
    TIME TO PEAK    (hrs)=   3.167
    RUNOFF VOLUME    (mm)=  28.493
    TOTAL RAINFALL   (mm)=  61.600
    RUNOFF COEFFICIENT   =   0.463

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

--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   2.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  21.00   Dir. Conn.(%)=  14.00
--------------------

                          IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.49          1.82
    Dep. Storage     (mm)=       1.00          5.00
    Average Slope     (%)=       0.50          0.50
    Length            (m)=     124.10        270.00
    Mannings n            =      0.013         0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.50	1.583	6.20	3.083	13.50	4.58	3.70
0.167	2.50	1.667	6.20	3.167	13.50	4.67	3.70
0.250	2.50	1.750	6.20	3.250	13.50	4.75	3.70
0.333	2.50	1.833	6.20	3.333	13.50	4.83	3.70
0.417	2.50	1.917	6.20	3.417	13.50	4.92	3.70
0.500	2.50	2.000	6.20	3.500	13.50	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	36.90	4.083	4.90	5.58	2.50
1.167	3.70	2.667	36.90	4.167	4.90	5.67	2.50
1.250	3.70	2.750	36.90	4.250	4.90	5.75	2.50
1.333	3.70	2.833	95.90	4.333	4.90	5.83	2.50
1.417	3.70	2.917	95.90	4.417	4.90	5.92	2.50
1.500	3.70	3.000	95.90	4.500	4.90	6.00	2.50

```
    Max.Eff.Inten.(mm/hr)=      95.90         23.61
              over (min)         5.00         65.00
    Storage Coeff.  (min)=       3.64 (ii)    63.56 (ii)
    Unit Hyd. Tpeak (min)=       5.00         65.00
    Unit Hyd. peak  (cms)=       0.25          0.02
                                                      *TOTALS*
    PEAK FLOW       (cms)=       0.09          0.07     0.099 (iii)
    TIME TO PEAK    (hrs)=       3.00          4.00      3.00
    RUNOFF VOLUME    (mm)=      60.60         30.03     34.29
    TOTAL RAINFALL   (mm)=      61.60         61.60     61.60
    RUNOFF COEFFICIENT   =       0.98          0.49      0.56

***** 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*  =  82.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0001):    12.16   1.671     3.00    27.99
     + ID2= 2 (  0004):     2.31   0.099     3.00    34.29
       ================================================
       ID = 3 (  0006):    14.47   1.769     3.00    28.99

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 3 (  0006):    14.47   1.769     3.00    28.99
     + ID2= 2 (  0043):    17.01   1.401     3.17    28.49
       ================================================
       ID = 1 (  0006):    31.48   2.925     3.00    28.72
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\b7f21eb4
Summary filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\b7f21eb4

DATE: 09-14-2023 TIME: 04:31:38

USER:

COMMENTS: _____

****
** SIMULATION : 04 - Ptbo_SCS_6hr_25yr **
****

READ STORM	Filename: C:\Users\dradcliffe\AppData\Local\Temp\082ad1fa-a753-43bb-8704-c729dd0c110b\caacfc01
Ptotal= 72.90 mm	Comments: Ptbo_SCS_6hr_25yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.90	1.50	7.30	3.00	16.00	4.50	4.40
0.25	2.90	1.75	7.30	3.25	16.00	4.75	4.40
0.50	4.40	2.00	8.80	3.50	7.30	5.00	2.90
0.75	4.40	2.25	8.80	3.75	7.30	5.25	2.90
1.00	4.40	2.50	43.70	4.00	5.80	5.50	2.90
1.25	4.40	2.75	113.70	4.25	5.80	5.75	2.90
1.083	4.40	2.583	43.70	4.083	5.80	5.58	2.90
1.167	4.40	2.667	43.70	4.167	5.80	5.67	2.90
1.250	4.40	2.750	43.70	4.250	5.80	5.75	2.90
1.333	4.40	2.833	113.70	4.333	5.80	5.83	2.90
1.417	4.40	2.917	113.70	4.417	5.80	5.92	2.90
1.500	4.40	3.000	113.70	4.500	5.80	6.00	2.90

CALIB	Area (ha)= 12.16	Curve Number (CN)= 82.0
NASHYD (0001)	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)= 0.11	

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	2.90	1.583	7.30	3.083	16.00	4.58	4.40
0.167	2.90	1.667	7.30	3.167	16.00	4.67	4.40
0.250	2.90	1.750	7.30	3.250	16.00	4.75	4.40
0.333	2.90	1.833	7.30	3.333	16.00	4.83	4.40
0.417	2.90	1.917	7.30	3.417	16.00	4.92	4.40
0.500	2.90	2.000	7.30	3.500	16.00	5.00	4.40
0.583	4.40	2.083	8.80	3.583	7.30	5.08	2.90
0.667	4.40	2.167	8.80	3.667	7.30	5.17	2.90
0.750	4.40	2.250	8.80	3.750	7.30	5.25	2.90
0.833	4.40	2.333	8.80	3.833	7.30	5.33	2.90
0.917	4.40	2.417	8.80	3.917	7.30	5.42	2.90
1.000	4.40	2.500	8.80	4.000	7.30	5.50	2.90
1.083	4.40	2.583	43.70	4.083	5.80	5.58	2.90
1.167	4.40	2.667	43.70	4.167	5.80	5.67	2.90
1.250	4.40	2.750	43.70	4.250	5.80	5.75	2.90
1.333	4.40	2.833	113.70	4.333	5.80	5.83	2.90
1.417	4.40	2.917	113.70	4.417	5.80	5.92	2.90
1.500	4.40	3.000	113.70	4.500	5.80	6.00	2.90

Unit Hyd Qpeak (cms)= 4.223

PEAK FLOW (cms)= 2.182 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 36.598
TOTAL RAINFALL (mm)= 72.900
RUNOFF COEFFICIENT = 0.502

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

CALIB	Area (ha)= 17.01	Curve Number (CN)= 82.0
NASHYD (0043)	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)= 0.26	

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	2.90	1.583	7.30	3.083	16.00	4.58	4.40
0.167	2.90	1.667	7.30	3.167	16.00	4.67	4.40
0.250	2.90	1.750	7.30	3.250	16.00	4.75	4.40
0.333	2.90	1.833	7.30	3.333	16.00	4.83	4.40
0.417	2.90	1.917	7.30	3.417	16.00	4.92	4.40
0.500	2.90	2.000	7.30	3.500	16.00	5.00	4.40
0.583	4.40	2.083	8.80	3.583	7.30	5.08	2.90
0.667	4.40	2.167	8.80	3.667	7.30	5.17	2.90
0.750	4.40	2.250	8.80	3.750	7.30	5.25	2.90
0.833	4.40	2.333	8.80	3.833	7.30	5.33	2.90
0.917	4.40	2.417	8.80	3.917	7.30	5.42	2.90
1.000	4.40	2.500	8.80	4.000	7.30	5.50	2.90
1.083	4.40	2.583	43.70	4.083	5.80	5.58	2.90
1.167	4.40	2.667	43.70	4.167	5.80	5.67	2.90
1.250	4.40	2.750	43.70	4.250	5.80	5.75	2.90
1.333	4.40	2.833	113.70	4.333	5.80	5.83	2.90
1.417	4.40	2.917	113.70	4.417	5.80	5.92	2.90
1.500	4.40	3.000	113.70	4.500	5.80	6.00	2.90

Unit Hyd Qpeak (cms)= 2.499

PEAK FLOW (cms)= 1.848 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 37.259
TOTAL RAINFALL (mm)= 72.900
RUNOFF COEFFICIENT = 0.511

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

CALIB	Area (ha)= 2.31	
STANDHYD (0004)	Total Imp(%)= 21.00	Dir. Conn.(%)= 14.00
ID= 1 DT= 5.0 min		

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.49	1.82
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.50	0.50
Length	(m)=	124.10	270.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.90	1.583	7.30	3.083	16.00	4.58	4.40
0.167	2.90	1.667	7.30	3.167	16.00	4.67	4.40
0.250	2.90	1.750	7.30	3.250	16.00	4.75	4.40
0.333	2.90	1.833	7.30	3.333	16.00	4.83	4.40
0.417	2.90	1.917	7.30	3.417	16.00	4.92	4.40
0.500	2.90	2.000	7.30	3.500	16.00	5.00	4.40

0.583	4.40	2.083	8.80	3.583	7.30	5.08	2.90
0.667	4.40	2.167	8.80	3.667	7.30	5.17	2.90
0.750	4.40	2.250	8.80	3.750	7.30	5.25	2.90
0.833	4.40	2.333	8.80	3.833	7.30	5.33	2.90
0.917	4.40	2.417	8.80	3.917	7.30	5.42	2.90
1.000	4.40	2.500	8.80	4.000	7.30	5.50	2.90
1.083	4.40	2.583	43.70	4.083	5.80	5.58	2.90
1.167	4.40	2.667	43.70	4.167	5.80	5.67	2.90
1.250	4.40	2.750	43.70	4.250	5.80	5.75	2.90
1.333	4.40	2.833	113.70	4.333	5.80	5.83	2.90
1.417	4.40	2.917	113.70	4.417	5.80	5.92	2.90
1.500	4.40	3.000	113.70	4.500	5.80	6.00	2.90

Max.Eff.Inten.(mm/hr)=	113.70	32.42	
over (min)	5.00	60.00	
Storage Coeff. (min)=	3.40 (ii)	56.19 (ii)	
Unit Hyd. Tpeak (min)=	5.00	60.00	
Unit Hyd. peak (cms)=	0.26	0.02	
			TOTALS
PEAK FLOW (cms)=	0.10	0.10	0.123 (iii)
TIME TO PEAK (hrs)=	3.00	3.92	3.00
RUNOFF VOLUME (mm)=	71.90	39.04	43.62
TOTAL RAINFALL (mm)=	72.90	72.90	72.90
RUNOFF COEFFICIENT =	0.99	0.54	0.60

***** 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* = 82.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0001):	12.16	2.182	3.00	36.60
+	ID2= 2 (0004):	2.31	0.123	3.00	43.62
	ID = 3 (0006):	14.47	2.305	3.00	37.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)					
3 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 3 (0006):	14.47	2.305	3.00	37.72
+	ID2= 2 (0043):	17.01	1.848	3.08	37.26
	ID = 1 (0006):	31.48	3.848	3.00	37.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
      V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

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

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Output filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\90993e27
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DATE: 09-14-2023 TIME: 04:31:38

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : 05 - Ptbo_SCS_6hr_50yr        **
  ************************************************
```

READ STORM	Filename: C:\Users\dradcliffe\AppD ata\Local\Temp\ 082ad1fa-a753-43bb-8704-c729dd0c110b\c9322ff2
Ptotal= 81.47 mm	Comments: Ptbo_SCS_6hr_50yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.30	1.50	8.10	3.00	17.90	4.50	4.90
0.25	3.30	1.75	8.10	3.25	17.90	4.75	4.90
0.50	4.90	2.00	9.80	3.50	8.10	5.00	3.30
0.75	4.90	2.25	9.80	3.75	8.10	5.25	3.30
1.00	4.90	2.50	48.90	4.00	6.50	5.50	3.30
1.25	4.90	2.75	127.00	4.25	6.50	5.75	3.30

CALIB			
NASHYD (0001)	Area (ha)=	12.16	Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.11	

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	3.30	1.583	8.10	3.083	17.90	4.58	4.90
0.167	3.30	1.667	8.10	3.167	17.90	4.67	4.90
0.250	3.30	1.750	8.10	3.250	17.90	4.75	4.90
0.333	3.30	1.833	8.10	3.333	17.90	4.83	4.90
0.417	3.30	1.917	8.10	3.417	17.90	4.92	4.90
0.500	3.30	2.000	8.10	3.500	17.90	5.00	4.90
0.583	4.90	2.083	9.80	3.583	8.10	5.08	3.30
0.667	4.90	2.167	9.80	3.667	8.10	5.17	3.30
0.750	4.90	2.250	9.80	3.750	8.10	5.25	3.30
0.833	4.90	2.333	9.80	3.833	8.10	5.33	3.30
0.917	4.90	2.417	9.80	3.917	8.10	5.42	3.30
1.000	4.90	2.500	9.80	4.000	8.10	5.50	3.30
1.083	4.90	2.583	48.90	4.083	6.50	5.58	3.30
1.167	4.90	2.667	48.90	4.167	6.50	5.67	3.30
1.250	4.90	2.750	48.90	4.250	6.50	5.75	3.30
1.333	4.90	2.833	127.00	4.333	6.50	5.83	3.30
1.417	4.90	2.917	127.00	4.417	6.50	5.92	3.30
1.500	4.90	3.000	127.00	4.500	6.50	6.00	3.30

Unit Hyd Qpeak (cms)=	4.223	
PEAK FLOW (cms)=	2.578 (i)	
TIME TO PEAK (hrs)=	3.000	
RUNOFF VOLUME (mm)=	43.415	
TOTAL RAINFALL (mm)=	81.475	
RUNOFF COEFFICIENT =	0.533	

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

CALIB			
NASHYD (0043)	Area (ha)=	17.01	Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.26	

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	3.30	1.583	8.10	3.083	17.90	4.58	4.90
0.167	3.30	1.667	8.10	3.167	17.90	4.67	4.90
0.250	3.30	1.750	8.10	3.250	17.90	4.75	4.90
0.333	3.30	1.833	8.10	3.333	17.90	4.83	4.90
0.417	3.30	1.917	8.10	3.417	17.90	4.92	4.90
0.500	3.30	2.000	8.10	3.500	17.90	5.00	4.90
0.583	4.90	2.083	9.80	3.583	8.10	5.08	3.30
0.667	4.90	2.167	9.80	3.667	8.10	5.17	3.30
0.750	4.90	2.250	9.80	3.750	8.10	5.25	3.30
0.833	4.90	2.333	9.80	3.833	8.10	5.33	3.30
0.917	4.90	2.417	9.80	3.917	8.10	5.42	3.30
1.000	4.90	2.500	9.80	4.000	8.10	5.50	3.30
1.083	4.90	2.583	48.90	4.083	6.50	5.58	3.30
1.167	4.90	2.667	48.90	4.167	6.50	5.67	3.30
1.250	4.90	2.750	48.90	4.250	6.50	5.75	3.30
1.333	4.90	2.833	127.00	4.333	6.50	5.83	3.30
1.417	4.90	2.917	127.00	4.417	6.50	5.92	3.30
1.500	4.90	3.000	127.00	4.500	6.50	6.00	3.30

Unit Hyd Qpeak (cms)= 2.499

PEAK FLOW (cms)= 2.200 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 44.199
TOTAL RAINFALL (mm)= 81.475
RUNOFF COEFFICIENT = 0.542

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

CALIB
STANDHYD (0004)
ID= 1 DT= 5.0 min

Area (ha)= 2.31
Total Imp(%)= 21.00 Dir. Conn.(%)= 14.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.49	1.82
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.50	0.50
Length	(m)=	124.10	270.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.30	1.583	8.10	3.083	17.90	4.58	4.90
0.167	3.30	1.667	8.10	3.167	17.90	4.67	4.90
0.250	3.30	1.750	8.10	3.250	17.90	4.75	4.90
0.333	3.30	1.833	8.10	3.333	17.90	4.83	4.90
0.417	3.30	1.917	8.10	3.417	17.90	4.92	4.90
0.500	3.30	2.000	8.10	3.500	17.90	5.00	4.90
0.583	4.90	2.083	9.80	3.583	8.10	5.08	3.30
0.667	4.90	2.167	9.80	3.667	8.10	5.17	3.30
0.750	4.90	2.250	9.80	3.750	8.10	5.25	3.30
0.833	4.90	2.333	9.80	3.833	8.10	5.33	3.30
0.917	4.90	2.417	9.80	3.917	8.10	5.42	3.30
1.000	4.90	2.500	9.80	4.000	8.10	5.50	3.30
1.083	4.90	2.583	48.90	4.083	6.50	5.58	3.30
1.167	4.90	2.667	48.90	4.167	6.50	5.67	3.30
1.250	4.90	2.750	48.90	4.250	6.50	5.75	3.30
1.333	4.90	2.833	127.00	4.333	6.50	5.83	3.30
1.417	4.90	2.917	127.00	4.417	6.50	5.92	3.30
1.500	4.90	3.000	127.00	4.500	6.50	6.00	3.30

Max.Eff.Inten.(mm/hr)=		127.00	40.66	
over (min)		5.00	55.00	
Storage Coeff. (min)=		3.25 (ii)	51.47 (ii)	
Unit Hyd. Tpeak (min)=		5.00	55.00	
Unit Hyd. peak (cms)=		0.27	0.02	
				TOTALS
PEAK FLOW	(cms)=	0.11	0.12	0.145 (iii)
TIME TO PEAK	(hrs)=	3.00	3.75	3.00
RUNOFF VOLUME	(mm)=	80.47	46.14	50.94
TOTAL RAINFALL	(mm)=	81.48	81.48	81.48
RUNOFF COEFFICIENT	=	0.99	0.57	0.63

***** 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* = 82.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)
1 + 2 = 3

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):		12.16	2.578	3.00	43.42
+ ID2= 2 (0004):		2.31	0.145	3.00	50.94
ID = 3 (0006):		14.47	2.723	3.00	44.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)
3 + 2 = 1

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0006):		14.47	2.723	3.00	44.62
+ ID2= 2 (0043):		17.01	2.200	3.08	44.20
ID = 1 (0006):		31.48	4.571	3.00	44.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
      V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

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

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  Output  filename: C:\Users\dradcliffe\AppData\Local\Civica\VH5\0fa5ea42-b161-4b65-88be-130f56eff9b2\2d127b0e
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DATE: 09-14-2023 TIME: 04:31:38

USER:

COMMENTS: _____

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  ************************************************
  ** SIMULATION : 06 - Ptbo_SCS_6hr_100yr       **
  ************************************************
```

READ STORM
Ptotal= 89.93 mm

Filename: C:\Users\dradcliffe\AppD
ata\Local\Temp\
082ad1fa-a753-43bb-8704-c729dd0c110b\b855f372
Comments: Ptbo_SCS_6hr_100yr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.60	1.50	9.00	3.00	19.80	4.50	5.40
0.25	3.60	1.75	9.00	3.25	19.80	4.75	5.40
0.50	5.40	2.00	10.80	3.50	9.00	5.00	3.60

0.75	5.40	2.25	10.80	3.75	9.00	5.25	3.60
1.00	5.40	2.50	53.90	4.00	7.20	5.50	3.60
1.25	5.40	2.75	140.20	4.25	7.20	5.75	3.60

CALIB			
NASHYD (0001)	Area (ha)= 12.16	Curve Number (CN)= 82.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.11		

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	3.60	1.583	9.00	3.083	19.80	4.58	5.40
0.167	3.60	1.667	9.00	3.167	19.80	4.67	5.40
0.250	3.60	1.750	9.00	3.250	19.80	4.75	5.40
0.333	3.60	1.833	9.00	3.333	19.80	4.83	5.40
0.417	3.60	1.917	9.00	3.417	19.80	4.92	5.40
0.500	3.60	2.000	9.00	3.500	19.80	5.00	5.40
0.583	5.40	2.083	10.80	3.583	9.00	5.08	3.60
0.667	5.40	2.167	10.80	3.667	9.00	5.17	3.60
0.750	5.40	2.250	10.80	3.750	9.00	5.25	3.60
0.833	5.40	2.333	10.80	3.833	9.00	5.33	3.60
0.917	5.40	2.417	10.80	3.917	9.00	5.42	3.60
1.000	5.40	2.500	10.80	4.000	9.00	5.50	3.60
1.083	5.40	2.583	53.90	4.083	7.20	5.58	3.60
1.167	5.40	2.667	53.90	4.167	7.20	5.67	3.60
1.250	5.40	2.750	53.90	4.250	7.20	5.75	3.60
1.333	5.40	2.833	140.20	4.333	7.20	5.83	3.60
1.417	5.40	2.917	140.20	4.417	7.20	5.92	3.60
1.500	5.40	3.000	140.20	4.500	7.20	6.00	3.60

Unit Hyd Qpeak (cms)= 4.223

PEAK FLOW (cms)= 2.978 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 50.324
TOTAL RAINFALL (mm)= 89.925
RUNOFF COEFFICIENT = 0.560

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

CALIB			
NASHYD (0043)	Area (ha)= 17.01	Curve Number (CN)= 82.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.26		

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	3.60	1.583	9.00	3.083	19.80	4.58	5.40
0.167	3.60	1.667	9.00	3.167	19.80	4.67	5.40
0.250	3.60	1.750	9.00	3.250	19.80	4.75	5.40
0.333	3.60	1.833	9.00	3.333	19.80	4.83	5.40
0.417	3.60	1.917	9.00	3.417	19.80	4.92	5.40
0.500	3.60	2.000	9.00	3.500	19.80	5.00	5.40
0.583	5.40	2.083	10.80	3.583	9.00	5.08	3.60
0.667	5.40	2.167	10.80	3.667	9.00	5.17	3.60
0.750	5.40	2.250	10.80	3.750	9.00	5.25	3.60
0.833	5.40	2.333	10.80	3.833	9.00	5.33	3.60
0.917	5.40	2.417	10.80	3.917	9.00	5.42	3.60
1.000	5.40	2.500	10.80	4.000	9.00	5.50	3.60
1.083	5.40	2.583	53.90	4.083	7.20	5.58	3.60
1.167	5.40	2.667	53.90	4.167	7.20	5.67	3.60
1.250	5.40	2.750	53.90	4.250	7.20	5.75	3.60
1.333	5.40	2.833	140.20	4.333	7.20	5.83	3.60
1.417	5.40	2.917	140.20	4.417	7.20	5.92	3.60
1.500	5.40	3.000	140.20	4.500	7.20	6.00	3.60

Unit Hyd Qpeak (cms)= 2.499

PEAK FLOW (cms)= 2.559 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 51.232

TOTAL RAINFALL (mm)= 89.925
RUNOFF COEFFICIENT = 0.570

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

CALIB			
STANDHYD (0004)	Area (ha)= 2.31		
ID= 1 DT= 5.0 min	Total Imp(%)= 21.00	Dir. Conn.(%)= 14.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.49	1.82
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.50	0.50
Length	(m)=	124.10	270.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.60	1.583	9.00	3.083	19.80	4.58	5.40
0.167	3.60	1.667	9.00	3.167	19.80	4.67	5.40
0.250	3.60	1.750	9.00	3.250	19.80	4.75	5.40
0.333	3.60	1.833	9.00	3.333	19.80	4.83	5.40
0.417	3.60	1.917	9.00	3.417	19.80	4.92	5.40
0.500	3.60	2.000	9.00	3.500	19.80	5.00	5.40
0.583	5.40	2.083	10.80	3.583	9.00	5.08	3.60
0.667	5.40	2.167	10.80	3.667	9.00	5.17	3.60
0.750	5.40	2.250	10.80	3.750	9.00	5.25	3.60
0.833	5.40	2.333	10.80	3.833	9.00	5.33	3.60
0.917	5.40	2.417	10.80	3.917	9.00	5.42	3.60
1.000	5.40	2.500	10.80	4.000	9.00	5.50	3.60
1.083	5.40	2.583	53.90	4.083	7.20	5.58	3.60
1.167	5.40	2.667	53.90	4.167	7.20	5.67	3.60
1.250	5.40	2.750	53.90	4.250	7.20	5.75	3.60
1.333	5.40	2.833	140.20	4.333	7.20	5.83	3.60
1.417	5.40	2.917	140.20	4.417	7.20	5.92	3.60
1.500	5.40	3.000	140.20	4.500	7.20	6.00	3.60

Max.Eff.Inten.(mm/hr)=		140.20	50.36	
over (min)		5.00	50.00	
Storage Coeff. (min)=		3.13 (ii)	47.39 (ii)	
Unit Hyd. Tpeak (min)=		5.00	50.00	
Unit Hyd. peak (cms)=		0.27	0.02	
				TOTALS
PEAK FLOW	(cms)=	0.13	0.15	0.169 (iii)
TIME TO PEAK	(hrs)=	3.00	3.67	3.00
RUNOFF VOLUME	(mm)=	88.92	53.33	58.30
TOTAL RAINFALL	(mm)=	89.93	89.93	89.93
RUNOFF COEFFICIENT	=	0.99	0.59	0.65

***** 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* = 82.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	12.16	2.978	3.00	50.32
+ ID2= 2 (0004):	2.31	0.169	3.00	58.30
ID = 3 (0006):	14.47	3.147	3.00	51.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0006):	14.47	3.147	3.00	51.60

```
      + ID2= 2 (  0043):    17.01   2.559     3.08    51.23
        ================================================
        ID = 1 (  0006):    31.48   5.308     3.00    51.40

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2011)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
        V  V    I       SS  U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
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DATE: 09-14-2023                          TIME: 04:31:39

USER:


COMMENTS: _____________________________________________________


----------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 07 - 25mm CHI                 **
  ************************************************

--------------------
| 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
               0.00    1.76 |  1.00   11.75 |  2.00    3.88 |  3.00    2.07
               0.17    2.00 |  1.17   57.66 |  2.17    3.35 |  3.17    1.93
               0.33    2.32 |  1.33   15.20 |  2.33    2.96 |  3.33    1.81
               0.50    2.81 |  1.50    8.31 |  2.50    2.66 |  3.50    1.71
               0.67    3.61 |  1.67    5.91 |  2.67    2.42 |  3.67    1.62
               0.83    5.28 |  1.83    4.66 |  2.83    2.23 |  3.83    1.54

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=  12.16   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.11

        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)=   4.223

     PEAK FLOW       (cms)=   0.220 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=   5.141
     TOTAL RAINFALL   (mm)=  24.906
     RUNOFF COEFFICIENT   =   0.206

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0043)|   Area    (ha)=  17.01   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.26

        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)=   2.499

     PEAK FLOW       (cms)=   0.199 (i)
     TIME TO PEAK    (hrs)=   1.583
     RUNOFF VOLUME    (mm)=   5.234
     TOTAL RAINFALL   (mm)=  24.906
     RUNOFF COEFFICIENT   =   0.210

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   2.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  21.00   Dir. Conn.(%)=  14.00
--------------------

                                  IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=          0.49          1.82
     Dep. Storage     (mm)=          1.00          5.00
     Average Slope     (%)=          0.50          0.50
     Length            (m)=        124.10        270.00
     Mannings n             =        0.013         0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    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
```

```
     Max.Eff.Inten.(mm/hr)=      57.66         4.26
                 over (min)       5.00       125.00
     Storage Coeff.  (min)=       4.46 (ii)  123.30 (ii)
     Unit Hyd. Tpeak (min)=       5.00       125.00
     Unit Hyd. peak  (cms)=       0.23         0.01
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.01          0.047 (iii)
     TIME TO PEAK    (hrs)=       1.33         3.75          1.33
     RUNOFF VOLUME    (mm)=      23.91         5.77          8.28
     TOTAL RAINFALL   (mm)=      24.91        24.91         24.91
     RUNOFF COEFFICIENT   =       0.96         0.23          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*  =  82.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):    12.16   0.220     1.42     5.14
      + ID2= 2 (  0004):     2.31   0.047     1.33     8.28
        ==================================================
        ID = 3 (  0006):    14.47   0.256     1.33     5.64

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

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):    14.47   0.256     1.33     5.64
      + ID2= 2 (  0043):    17.01   0.199     1.58     5.23
        ==================================================
        ID = 1 (  0006):    31.48   0.386     1.50     5.42

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

 FINISH
================================================================================================================
```

Appendix D: Water Quality Calculations

Water Quality Requirements

Project Name: Syer Line **Designed By:** DR
Project No: 23035 **Date:** 2023-09-19

Site Data			
Protection Level:		Enhanced	
Facility Type:		Infiltration	
Area	=	2.31	ha
% Impervious Calculated	=	21%	%
Impervious Area	=	0.49	ha
Total Required Storage Volume (Vs)*			
Vs	=	22	m^3/ha
	=	51	m^3
Provided Volumes vs. Required Volumes			
Quantity Control Volume Required	=	0.0	m^3
Quantity Control Volume Provided	=	165.8	m^3
Total Pond Volume Required	=	118	m^3
Total Pond Volume Provided	=	166	m^3

*Required volumes calculated utilizing linear regression including a slope (m) of 27.66 and an intercept (b) of 16.25 based on the below table.

**Extended Detention is required only for wet facilities and based on the MOE reqirement of 40m^3/ha

Notes:

Table 3.2: Water Quality Storage Requirements based on Receiving Waters (MOE SWMPD Manual)

		Storage Volume (m^3/ha) for Impervious Level				
Protection Level	SWMP Type	0%	35%	55%	70%	85%
Enhanced 80% long-term S.S. removal	Infiltration	16.25	25	30	35	40
	Wetlands	36.25	80	105	120	140
	Hybrid Wet Pond/Wetland	40	110	150	175	195
	Wet Pond	52.5	140	190	225	250
Normal 70% long-term S.S. removal	Infiltration	20	20	20	25	30
	Wetlands	42.5	60	70	80	90
	Hybrid Wet Pond/Wetland	48.75	75	90	105	120
	Wet Pond	55	90	110	130	150
Basic 60% long-term S.S. removal	Infiltration	20	20	20	20	20
	Wetlands	60	60	60	60	60
	Hybrid Wet Pond/Wetland	42.5	60	70	75	80
	Wet Pond	33.75	60	75	85	95
	Dry Pond (Continuous Flow)	0	90	150	200	240

Appendix E: Conveyance Calculations

Culvert Report - 5 Year Design Storm

Circular Culvert

Invert Elev Dn (m)	=	207.9300
Pipe Length (m)	=	12.8000
Slope (%)	=	0.5001
Invert Elev Up (m)	=	207.9940
Rise (mm)	=	500.0
Shape	=	Circular
Span (mm)	=	500.0
No. Barrels	=	2
n-Value	=	0.012
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

Top Elevation (m)	=	208.6900
Top Width (m)	=	9.5000
Crest Width (m)	=	34.0000

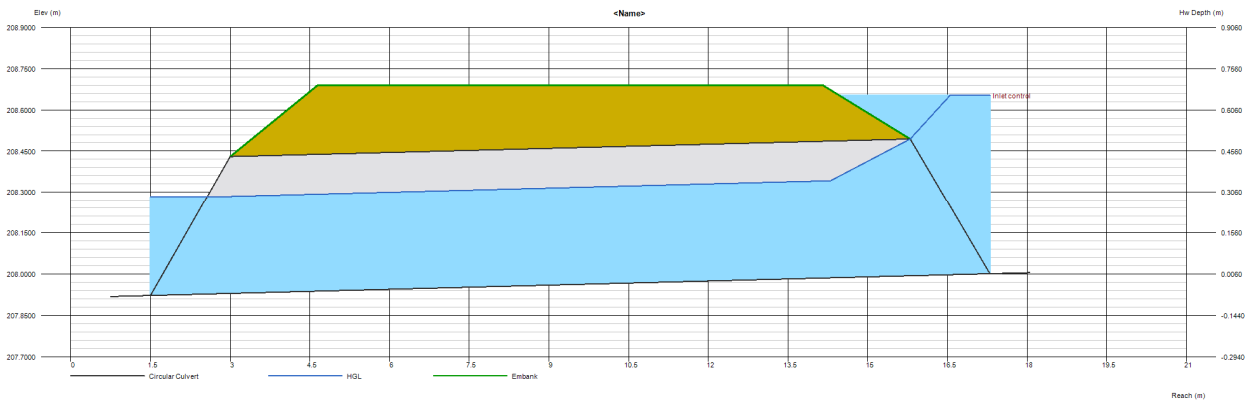
(Q values at 50% of 5-Year flow)

Calculations

Qmin (cms)	=	0.5350
Qmax (cms)	=	0.5350
Tailwater Elev (m)	=	0.00

Highlighted

Qtotal (cms)	=	0.5350
Qpipe (cms)	=	0.5350
Qovertop (cms)	=	0.0000
Veloc Dn (m/s)	=	1.7964
Veloc Up (m/s)	=	1.7903
HGL Dn (m)	=	208.2846
HGL Up (m)	=	208.3497
Hw Elev (m)	=	208.6527
Hw/D (m)	=	1.3174
Flow Regime	=	Inlet Control



Channel Design Sheet

Project Name: Syer Line
Project No: 23035
Designed By: DR
Date: 2023-09-19

Channel Description	Peak Flows (m^3/s)	Bed Slope (%)	Side Slope (X : 1)	Bottom Width (m)	Depth (m)	Lining Material	Manning's Number	Cross Sectional Area	Channel Capacity	% Capacity	Flow Depth	Velocity
25mm Chicago	0.05	0.50%	3.00	0.5	0.6	Earth, Grass	0.030	1.38 m^2	1.53 m^3/s	3.3%	0.13 m	0.46 m/s
100 Year Flows	0.17	0.50%	3.00	0.5	0.6	Earth, Grass	0.030	1.38 m^2	1.53 m^3/s	11.1%	0.23 m	0.63 m/s

Erosion Protection Requirements
Culvert/Storm Sewer Outlets

Project Name: Syer Line
Project No: 23035

Designed By: DR
Date: 2023-09-15

Location	Peak Flow Rate (m^3/s)	Velocity (m/s)	Min Rip Rap Size (mm)	Max Velocity for Rip Rap (m/s)	Turf Reinforcement	Max Velocity (m/s)
Downstream of Culvert	0.54	1.80	200	2.50	No	-

Notes:

1. Rip Rap Sizing based on MTO Drainage Design Standard WC-3: Scour and Armouring for Low Volume Roads with 25% factor of safety.

2. Turf reinforcement velocities taken from manufacturer supplied specifications based on unvegated conditions.

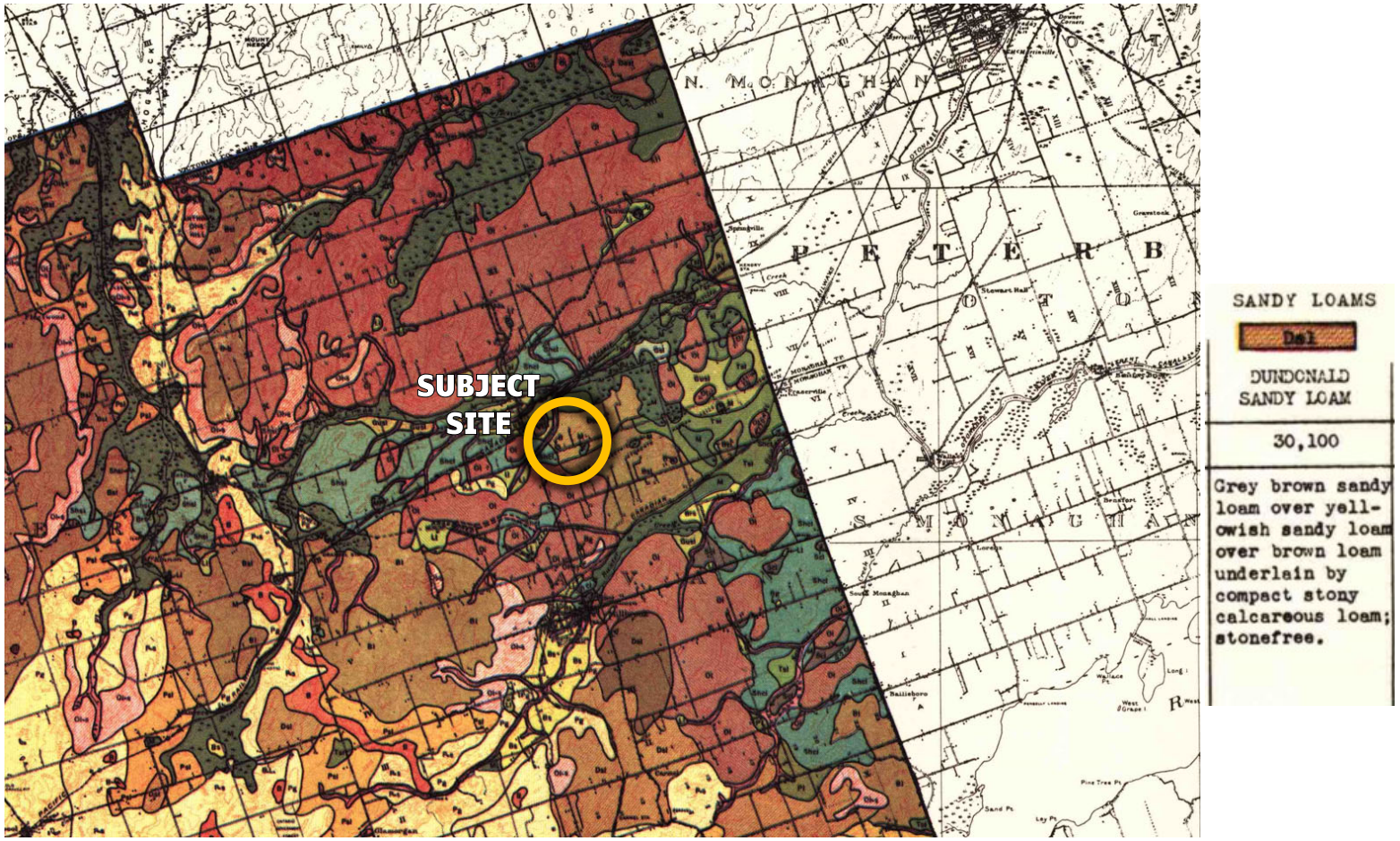
Appendix F: Soils Map

Soils Map Excerpt

Project Name: Syer Line
Project No: 23035
Designed By: DR
Date: 2023-08-28

Soils Of Durham County

Research Branch, Agriculture Canada, Ottawa



Appendix G: Detailed Design

N

HIGHWAY 115

SYER LINE

EXPROPRIATION PLAN PLCVN43 (P-3056-2)

PART 1 - EXPROP

DEVELOPMENT BOUNDARY

POST & WIRE FENCE

NO FENCE

RAIL FENCE

LOT 1
SEVERANCE
(14601.58m²)

LOT 2
(39446.69m²)

LOT 3
(40683.54m²)

LOT 4
(29673.04m²)

LOT 5
(42493.39m²)

LOT 6
(33128.89m²)

LOT 7
(22861.61m²)

LOT 8
(32457.78m²)

LOT 9
SEVERANCE
(7756.08m²)

LOT 10
(9193.58m²)

LOT 11
(25582.52m²)

BLOCK 11
(5053.00m²)

NATURAL LINKAGE ZONE

30m WETLAND BUFFER

LIMIT OF GRADING

PROPOSED DRAINAGE EASEMENT
TO PROVIDE FUTURE STORMWATER
OUTLET FOR LOTS 6 & 7

PROPOSED RIP-RAP
EROSION CONTROL
AT CULVERT OUTLET

TWIN 22.1m-525mm Ø
HDPE STM @ 0.5%

EXISTING WATERCOURSE

WELL

LINE BETWEEN LOTS 14 AND 15
AS ESTABLISHED BY PLAN OPR 1983

S.E.CORNER
LOT 14 CON 8

FENCE POST
ON LINE

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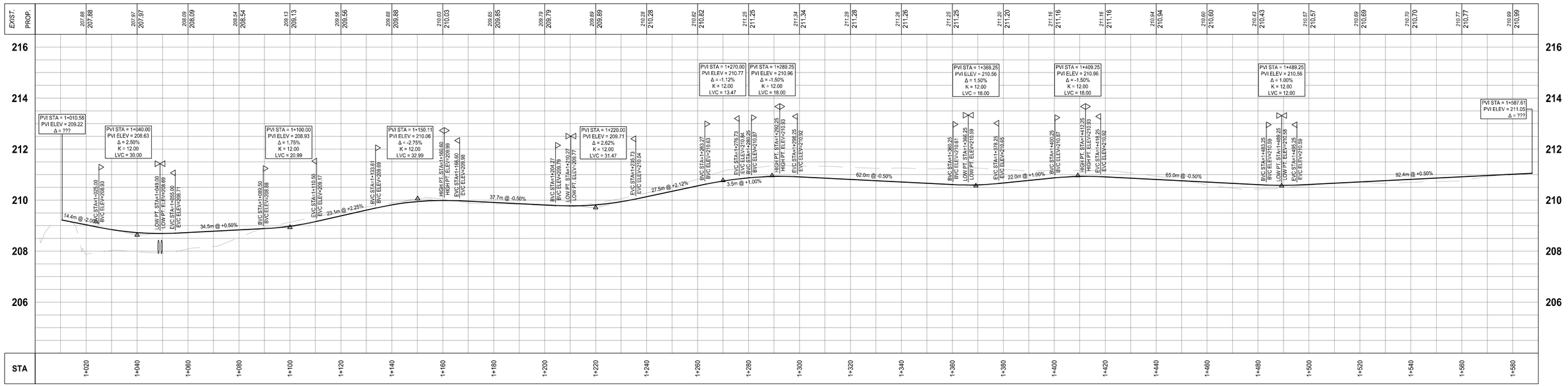
SYER LINE INDUSTRIAL SUBDIVISION

FIGURE 1 - PRELIMINARY GRADING & DRAINAGE PLAN

DRAWN:	APPROVED:	SCALE:	DATE:	PROJECT No.:
JD	LP	1:1250	2023-09-14	23035

S:\01 - Projects\23000\23035 - 1066 Syer Line\02 Design\01 - Drawings\01 - Current Drawings\23035-GP1.dwg PRINTED: Sep 20, 2023

STREET A PROFILE



STREET A STA: 1+120

STREET A STA: 1+450

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SYER LINE INDUSTRIAL SUBDIVISION

FIGURE 2 - PRELIMINARY ROAD PROFILE AND CROSS SECTION

DRAWN:	APPROVED:	SCALE:	DATE:	PROJECT No.:
JD	JD	AS NOTED	2023-09-19	23035