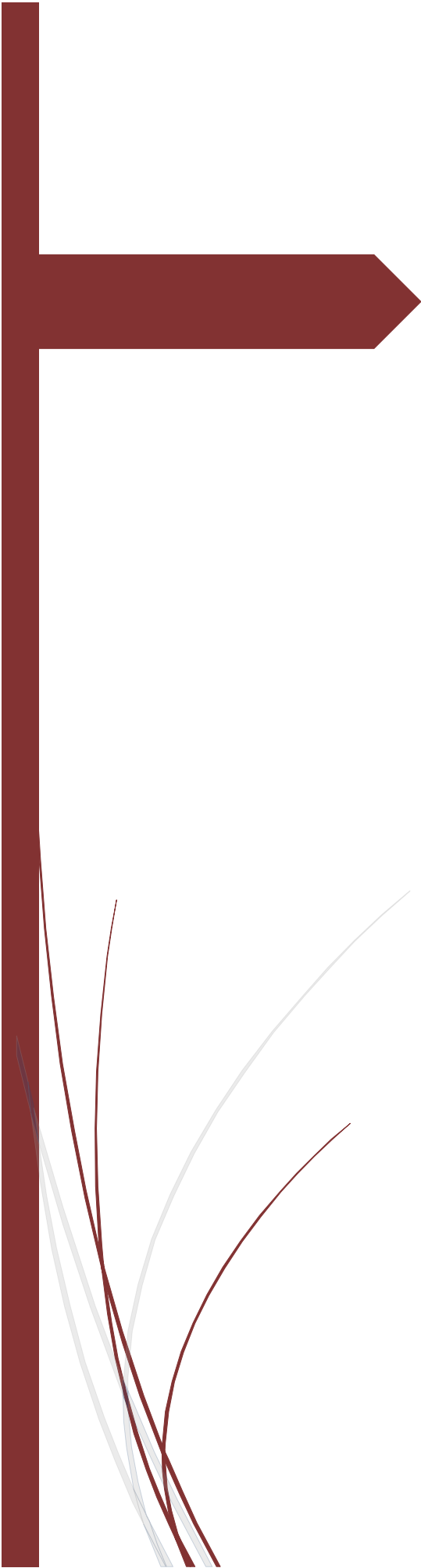




Preliminary Stormwater Management Report - Jeffery Homes Development Project No. 21-1-6814



973 Crawford Drive,
Peterborough, ON K9J 3X1
Telephone: 705-743-5780



8440 Danforth Road,
Coburg, ON K9A 0T7
Telephone: 289-251-0923

Table of Contents

1	Introduction	1
2	Project Objectives	1
3	Site Description and Topographic Data	1
4	Soil Data	2
5	Approval Requirements	2
5.1	Peterborough County (City of Peterborough, 2016)	2
5.2	Municipality of Trent Lakes.....	2
6	Pre-Development Drainage Conditions	4
7	Post- Development Drainage Conditions.....	5
8	Hydrologic Modeling.....	6
8.1	Calculation Parameters.....	6
8.1.1	Runoff Coefficients.....	6
8.1.2	Time of Concentration / Time to Peak.....	6
8.1.3	SCS Curve Number	7
8.1.4	Initial Abstraction.....	7
8.1.5	XIMP/TIMP	7
8.1.6	SLPP/SLPI.....	7
8.1.7	LGP/LGI.....	7
8.2	Pre-Development Hydrologic Model	7
8.3	Post-development (Controlled) Hydrologic Model.....	9
9	Stormwater Management	12
9.1	Quantity Control	12
9.1.1	SWM Ponds	12
9.2	9.2 Quality Control.....	13
9.2.1	Additional Best Management Practices.....	13
9.2.2	Mitigation of Construction Impacts and Temporary Sediment Control Measures	14
	Statement of Limitations	15
10	References	16

List of Appendices

Appendix A: Topographic Map

Appendix B: Hydrologic Calculations

Appendix C: Draft Plan and Stormwater Drawings

Appendix D: Geotechnical Repor

1 Introduction

The Greer Galloway Group Inc. has been retained by Jeffery Homes to prepare a stormwater management report for the proposed development at 168 County Road 49 in the Township of Harvey, Municipality of Trent Lakes, Ontario. This report describes storm drainage regimes within the property boundaries of the subject lot and act as the Master Drainage Plan for the development and future expansions.

The subject lot is located approximately 4 km north of Bobcaygeon close to the northwestern shore of Pigeon Lake. The lot is about 48.33 hectares in extent, consisting of farmland, forest, and un-evaluated wetland. The proposed development has been divided into two phases, Phase 1 and Phase 2. Phase 1 will contain 22 estates sized lots (0.44 to 1.56 hectares) and 2 stormwater management pond, and Phase 2 will contain 26 estate sized lots (0.40 to 1.02 hectares). The site layout and aerial map of the property can be found in Appendix A and the conceptual home placement drawing and draft plan drawing can be found in Appendix B. This report has been prepared to address the potential storm water impact due to development of the entire property (Phase 1 and Phase 2).

2 Project Objectives

The objective of this report is to examine the stormwater runoff impacts created by the proposed development and to provide design recommendations to achieve both quantity and quality controls. The primary intention is to attenuate and mimic the post-development flows to the existing pre-development flows and improving the quality of the runoff generated.

This report contains a complete stormwater management strategy using the Ministry of Environment's Stormwater Planning and Design Manual (2003) and Low Impact Development Stormwater Management Planning and Design Guide which mandates the prevention of adverse stormwater effects onto neighboring properties (from the proposed development). The following standards were selected to achieve quantity and quality controls as a part of Stormwater Management:

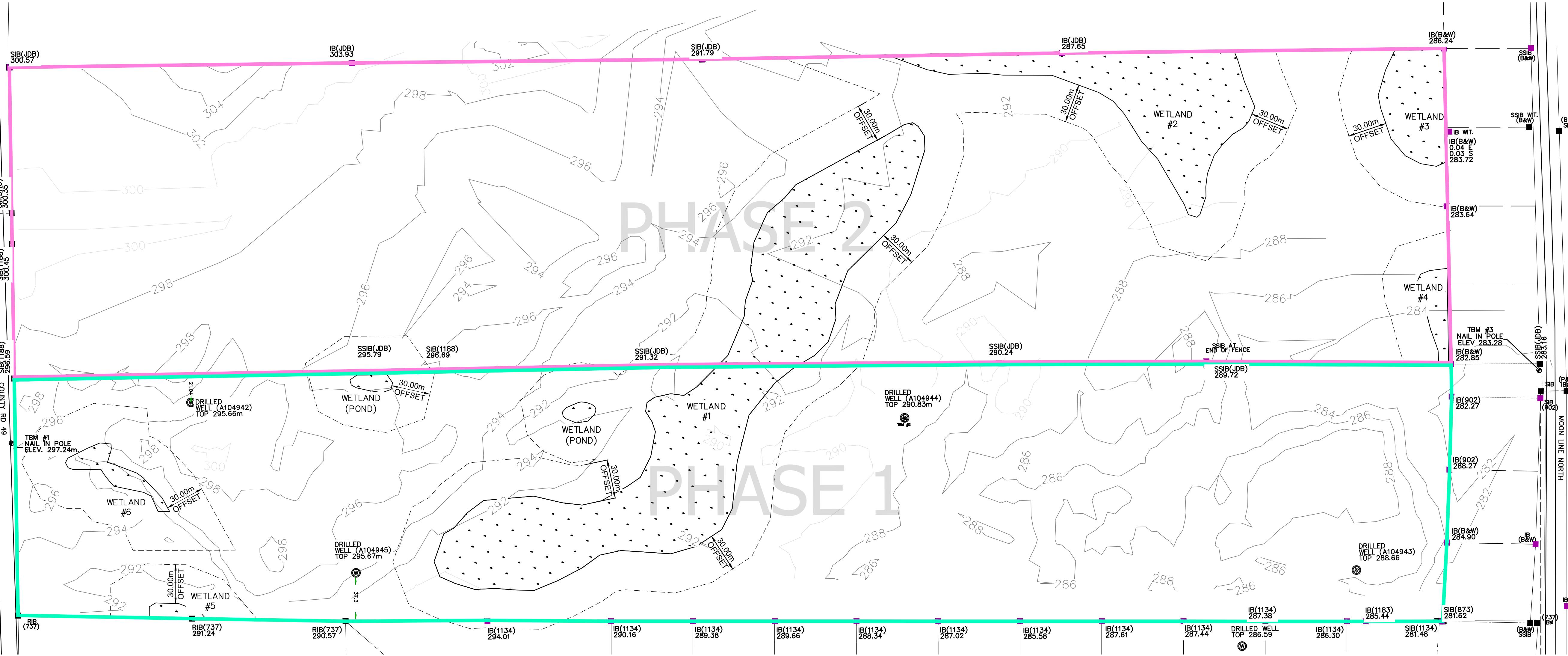
- 1- By establishing the enhanced (Level 1) treatment for Water quality as defined by the MOE shall be achieved – 80% Total Suspended Solids (T.S.S) removal
- 2- By addressing the requirements of the review agencies (i.e., the Ministry of the Environment, Peterborough County and the Municipality of Trent Lakes);
- 3- By establishing and controlling runoff from the proposed site to the Pre-Development conditions.

3 Site Description and Topographic Data

Privately owned lands has houses on its east and south boundaries, Highway 49 on its east boundary and Farm areas on its north boundary. Property can be accessed via Highway 49 Road to the west, and Moon Line N Road to the East. Pasture Land is the main land cover on the site. The property contains six (6) un-evaluated wetlands. Wetland 1 is the largest wetland of all located in the central portion of the property, wetland 2 and wetland 3 are located at northeast portion of the property, wetland 4 is located at the east entrance, and wetland 4 and wetland 5 are located on the southwest side of property. Figure 1 below provides the overview of the property.

FILE PATH: P:\Belleville Project\Peterborough Jobs\2116814 - Subdivision Jeffrey Homes\Drawing\Anderson Predevelopment Catchment Area - Leo - IT_reserve.dwg PLOTTER: Isolah Todasco
PLOT SCALE: 1:1
DATE PLOTTED: 2022 / 12 / 22 @ 02:16 PM
BORDER SIZE: ISO A1 (841mm x 594mm)

NOTE:
PROPERTY BOUNDARY AS INDICATED:
PHASE 1 BOUNDARY: —
PHASE 2 BOUNDARY: —



GREER GALLOWAY
CONSULTING ENGINEERS
PETERBOROUGH
BELLEVILLE
KINGSTON
1620 WALLBRIDGE LOYALIST ROAD
BELLEVILLE, ONTARIO, K8N 4Z5
PHONE: 613-966-3068
FAX: 613-966-3087

NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH RELEVANT CODES AND GUIDELINES.
2. ALL DRAWINGS AND ADDENDA ARE TO BE READ AS, AND IN CONJUNCTION WITH THE SPECIFICATIONS.
3. ALL EQUIPMENT SHALL BE INSTALLED AS SPECIFIED OR APPROVED EQUIVALENT.
4. CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH WORK AND BE RESPONSIBLE FOR SAME.
5. CONTRACTOR MUST REPORT ANY DISCREPANCIES TO ENGINEER FOR RESOLUTION BEFORE COMMENCING THE WORK.
6. ANY CHANGES MUST BE APPROVED BY THE ENGINEER.

A

B

A DETAIL NO.

B DRAWING NO. - WHERE DETAILED

LEGAL SURVEY SOURCE: PART OF LOT 19
CONCESSION 19, MUNICIPALITY OF TRENT LAKES
ELLIOT AND PARR (PETERBOROUGH) LTD. 20/4/9

01	-	YY/MM/DD
REVISION	DESCRIPTION	DATE
NORTH		

PROJECT
ANDERSON
PREDEVELOPMENT
CATCHMENT AREA
TRENT LAKES, ONTARIO

JEFFERY HOMES

DRAWING TITLE
FIGURE 1
PREDEVELOPMENT

DESIGNED BY
Y. CHOKSHI

DRAWN BY
I. TODESCO

REVIEWED BY
—

APPROVED BY
—

PROJECT DATE
2022/04/26
(YYYY/MM/DD)

PROJECT #
21-1-6814

DRAWING #
FIG1

DRAWING SCALE (ISO A1)
HOR: 1:1750
VER: 1:1750

The property contains a dominant peak at its northwest end and a low point to the southeast side of the south parcel, ultimately conveying to the ditch on the sides of Moon Line Road. For the ease of understanding of this report, two outfalls have been selected. One outfall is located on Moon Line Road and another on County Road 49.

The topographic data was acquired from a survey conducted by Elliott and Parr Ltd, dated March 9th 2020, which shows elevations ranging between 301 m (geodetic datum) at the top of the peak and 282 m the outfall ditch on the Moon Line Road.

4 Soil Data

A Geotechnical Investigation was completed by Terraspec Engineering Inc. A copy of the report dated December 06, 2021 summarizing the findings of this investigation has been included in Appendix D of this report for reference.

A desktop review of the site soils was assessed using the Ministry of Agriculture online database and GIS viewer 'AgMaps'. It was found that existing soil condition is described as 'Douro Loam'. The soils are classified as Hydrologic Soil Group 'B', considered to be moderately drained when thoroughly wetted.

5 Approval Requirements

In addition to the MOE Design Guidelines, requirements from local approval agencies are summarized below.

5.1 Peterborough County (City of Peterborough, 2016)

- Peak regulated post-development flow must match or be lower than the pre-development conditions.
- Initial abstraction should range from 2.5mm to 5.0mm. Minimum freeboard of 100mm must be provided above 100-year ponding level
- Use rainfall depth of 89.9mm for 100-year design storms, using 2006 Peterborough airport IDF data.

5.2 Municipality of Trent Lakes

Official Plan of Township of Galway-Cavendish and Harvey.

Section 5.1.26

"development proposals for lands on or close in proximity to pigeon lake shoreline, the council shall require an environmental Review report as set out in Section 5.1.10 of the plan to assess the impacts on the development on the waterbody.

Section 5.1.27

"Stormwater management facilities shall be designed and constructed to protect receiving watercourse and adjacent lands from potential adverse impacts resulting from stormwater runoff including the degradation of water quality, increase in flood potential, interference or reduction of the drainage

capacity of an existing watercourse, erosion and sedimentation and damage or destruction of fish habitat or other environmentally sensitive areas and features.

The municipality may undertake the preparation of a comprehensive Master Drainage Plan for a specific watershed area or development area [...] site-specific stormwater management plans for development or re-development proposal within the area covered by the Master Drainage Plan shall conform to the policies and requirements of the master drainage plan

In the absence of a comprehensive Master Drainage Plan, the post-development rate of stormwater flow from a development or re-development site should not exceed the pre-development rate. [...]

An open channel, stormwater detention/retention facility and adjacent lands which form part of a stormwater management system for a subdivision or other development proposal shall not necessarily be accepted as part of the parkland dedication requirements under the planning act. Such lands shall be landscaped to the satisfaction of council and shall be suitable width and grade to permit maintenance and operation.

The retention of existing tree or natural vegetation [...] shall be encouraged.”

6 Pre-Development Drainage Conditions

There are four drainage areas identified based on the contours as follows;

- i. Basin A flows through the wetlands 5 and 6 and ultimately into the adjacent property to its south.
- ii. Basin B drains into the un-evaluated wetland 1, eventually into the neighboring property to its south.
- iii. Basin C drains into the un-evaluated wetlands 1 and 2 and portion of wetland 3 located in the central region from which it eventually drains to basin D.
- iv. Upper portion of basin D flows through the northern region and merges with the flow regime of the lower region near the outfall ditch on the Moon line Road. A portion of the lower part of the basin D flows towards the adjacent property to its south.

Figure 2 demonstrates the flow regimes and their respective catchment areas and the runoff coefficients in the lot based on the existing site conditions.

The property is currently undeveloped. Table 6-1 presents the existing land cover characteristics.

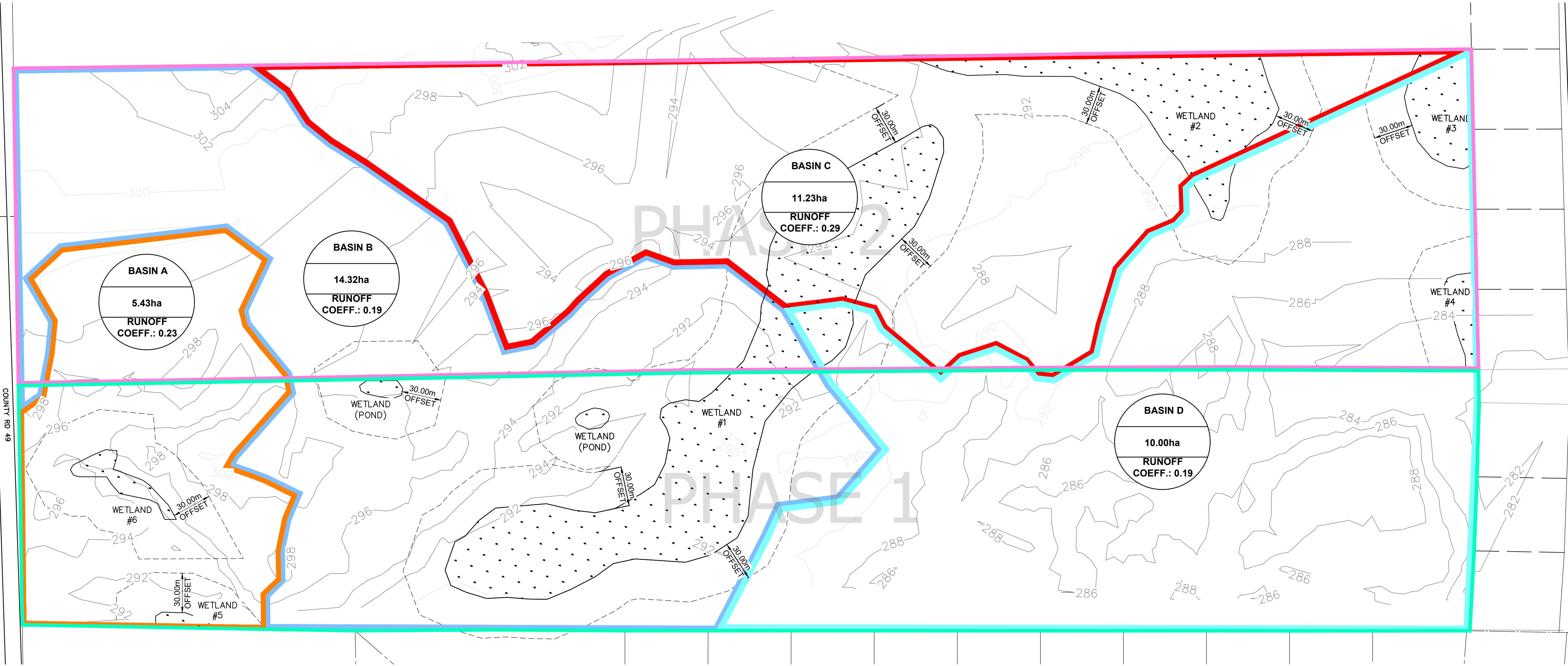
Drainage Basin ID	Area (ha)	Gravel Area (ha)	Wetland (ha)	Woodland Area (ha)	Pasture Area (ha)
A	5.26	0	0	0	5.26
B	13.99	0	2.40	2.14	9.45
C	13.60	0	0.37	2.05	11.18
D	15.47	0	1.94	6.52	7.01

Table 6-1 Pre-Development Basin Land Use Areas

FILE PATH: P:\Belleville Project\Peterborough Jobs\2116814 - Subdivision Jeffery Homes\Drawing\ANDERSON Predevelopment Catchment Area - Leo - IT_resolved.dwg PLOTTER: Isidoh Todasco
PLOT SCALE: 1:1
DATE PLOTTED: 2022 / 12 / 22 @ 02:16 PM
BORDER SIZE: ISO A1 (841mm x 594mm)

NOTE:
PROPERTY BOUNDARY AS INDICATED:
PHASE 1 BOUNDARY: —
PHASE 2 BOUNDARY: —

NOTE:
BASIN BOUNDARY AS INDICATED:
BASIN A: —
BASIN B: —
BASIN C: —
BASIN D: —



- NOTES:
1. ALL WORK SHALL BE IN ACCORDANCE WITH RELEVANT CODES AND GUIDELINES.
 2. ALL DRAWINGS AND ADDENDA ARE TO BE READ AS, AND IN CONJUNCTION WITH THE SPECIFICATIONS.
 3. ALL EQUIPMENT SHALL BE INSTALLED AS SPECIFIED OR APPROVED EQUIVALENT.
 4. CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH WORK AND BE RESPONSIBLE FOR SAME.
 5. CONTRACTOR MUST REPORT ANY DISCREPANCIES TO ENGINEER FOR RESOLUTION BEFORE COMMENCING THE WORK.
 6. ANY CHANGES MUST BE APPROVED BY THE ENGINEER.

A	A DETAIL NO.
B	B DRAWING NO. - WHERE DETAILED

LEGAL SURVEY SOURCE: PART OF LOT 19
CONCESSION 19, MUNICIPALITY OF TRENT LAKES
ELLIOT AND PARR (PETERBOROUGH) LTD. 20/4/9

01	-	YY/MM/DD
REVISION	DESCRIPTION	DATE
NORTH		STAMP

PROJECT
ANDERSON
PREDEVELOPMENT
CATCHMENT AREA
TRENT LAKES, ONTARIO

JEFFERY HOMES
DRAWING TITLE
FIGURE 2
PREDEVELOPMENT

DESIGNED BY
Y. CHOKSHI

DRAWN BY
I. TODESCO

REVIEWED BY
—

APPROVED BY
—

PROJECT DATE
2022/04/26
(YY/MM/DD)

PROJECT #
21-1-6814

DRAWING # FIG2	DRAWING SCALE (ISO A1) HOR: 1:1750 VER: 1:1750
-------------------	--

7 Post- Development Drainage Conditions

The post-development site is intended to contain a 52-estate lots ranging from 0.44 to 1.56 hectares. Only the southern half of the lot is being planned to be developed at the time of writing this report. However, the stormwater management has been designed to take additional flows from the future Phase 2 development of the property. Figure 3 shows the proposed basins boundary and proposed site layout of the development.

Table 7-1 and Table 7-2 show the various land cover for the ten (10) basins in the post-development conditions. For modeling, catchments have been divided into East basin and West basin. East basin consists of all the proposed development on the east side of the central wetland, while the West basin consists of proposed development west of the central wetland. The purpose of this split was to isolate the runoff of the developmental area for quality and quantity control.

The land cover was estimated for roads, houses, and driveways as seen in Figure 3. The existing pastures areas would be converted to landscaped areas. There will be an increase in stormwater runoff due to the increased impervious areas from the gravel roadways and the rooftops. The wetlands will be kept undisturbed with appropriate buffers to preserve their ecosystems.

East Drainage Basin ID	Area (ha)	Pavement (ha)	Roofs (ha)	Wetland Areas (ha)	Landscaped Areas (ha)
A	11.83	0.17	0.22	4.59	6.85
B	5.85	0.08	0.11	2.56	3.10
C	8.39	0.19	0.20	2.54	5.47
R.O.W.	1.96	0.82	0	0	1.14

Table 7-1 Post-Development East Basin Areas

West Drainage Basin ID	Area (ha)	Pavement (ha)	Roofs (ha)	Wetland Areas (ha)	Landscaped Areas (ha)
A	5.47	0.22	0.22	0	5.03
B	5.57	0.17	0.25	0	5.15
C	1.97	0.08	0.11	0	1.78
D	2.46	0.08	0.11	0	2.27
E	2.35	0.03	0.11	0	2.21
R.O.W.	2.47	0.93	0	0	1.54

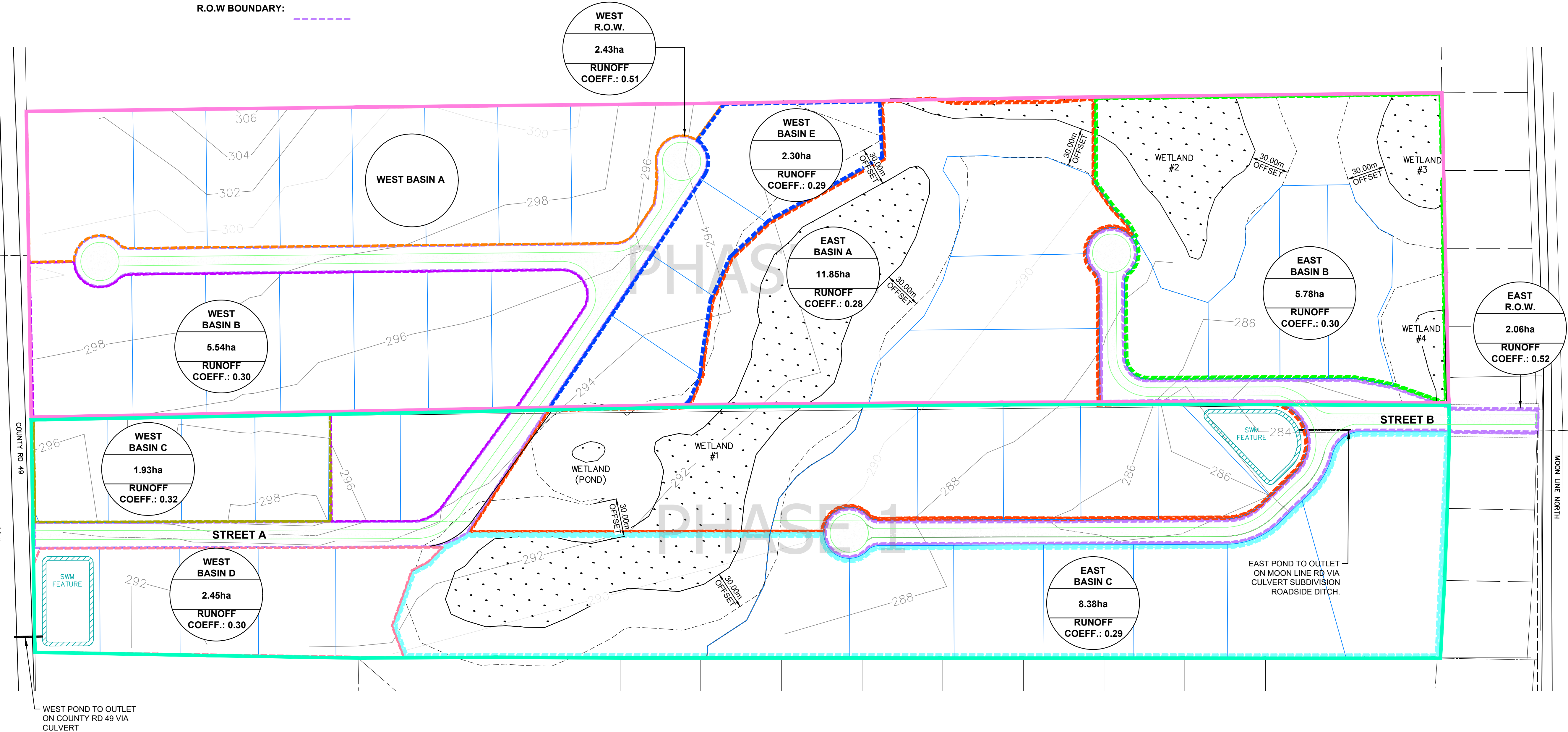
Table 7-2 Post-Development West Basin Areas

The development areas were estimated based on engineering assumptions, suggesting 10 to 15 percent of each lot to be impervious includes the roofs and driveways, 85 to 90 percent to be allotted for landscape areas. The increased runoff will be treated for quantity and quality, so that the neighboring properties remain unaffected in the post-development scenario.

All post-development stormwater leaving the site under a variety of rainfall conditions will be controlled to pre-development runoff conditions.

FILE PATH: P:\Belleville Project\Peterborough Jobs\2116814 - Subdivision Jeffery Homes\Drawing\Anderson Predevelopment Catchment Area - Leo - IT_resolved.dwg PLOTTER: Isidiah Todesco
PLOT SCALE: 1:1
DATE PLOTTED: 2022 / 12 / 22 @ 02:17 PM
BORDER SIZE: ISO A1 (841mm x 594mm)

- NOTE:
PROPERTY BOUNDARY AS INDICATED:
PHASE 1 BOUNDARY:
PHASE 2 BOUNDARY:
- NOTE:
BASIN BOUNDARY AS INDICATED:
WEST BASIN A:
WEST BASIN B:
WEST BASIN C:
WEST BASIN D:
WEST BASIN E:
EAST BASIN A:
EAST BASIN B:
EAST BASIN C:
R.O.W BOUNDARY:



GREER GALLOWAY
CONSULTING ENGINEERS
PETERBOROUGH
BELLEVILLE
KINGSTON
1620 WALLBRIDGE LOYALIST ROAD
BELLEVILLE, ONTARIO, K8N 4Z5
PHONE: 613-966-3068
FAX: 613-966-3087

NOTES:
1. ALL WORK SHALL BE IN ACCORDANCE WITH RELEVANT CODES AND GUIDELINES.
2. ALL DRAWINGS AND ADDENDA ARE TO BE READ AS, AND IN CONJUNCTION WITH THE SPECIFICATIONS.
3. ALL EQUIPMENT SHALL BE INSTALLED AS SPECIFIED OR APPROVED EQUIVALENT.
4. CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH WORK AND BE RESPONSIBLE FOR SAME.
5. CONTRACTOR MUST REPORT ANY DISCREPANCIES TO ENGINEER FOR RESOLUTION BEFORE COMMENCING THE WORK.
6. ANY CHANGES MUST BE APPROVED BY THE ENGINEER.

A
B

A DETAIL NO.
B DRAWING NO. - WHERE DETAILED

LEGAL SURVEY SOURCE: PART OF LOT 19
CONCESSION 19, MUNICIPALITY OF TRENT LAKES
ELLIOT AND PARR (PETERBOROUGH) LTD. 20/4/9

01	-	YY/MM/DD
REVISION	DESCRIPTION	DATE
NORTH		
	STAMP	

PROJECT
ANDERSON
PREDEVELOPMENT
CATCHMENT AREA
TRENT LAKES, ONTARIO

JEFFERY HOMES

DRAWING TITLE
FIGURE 3
POST DEVELOPMENT

DESIGNED BY
Y. CHOKSHI

DRAWN BY
I. TODESCO

REVIEWED BY
-

APPROVED BY
-

PROJECT DATE
2022/04/26
(YY/MM/DD)

PROJECT #
21-1-6814

DRAWING #
FIG3

DRAWING SCALE (ISO A1)
HOR: 1:1750
VER: 1:1750

(METRIC SCALE - ALL DIMS IN METERS U.N.O.)

8 Hydrologic Modeling

Hydrologic modeling was performed using the software Visual Otthymo 2 (VO2). The following scenarios were analyzed:

1. Pre-Development
2. Post-development with storm water magement controls

Each scenario was analyzed considering the SCS Type II distributions of 6 hours duration for the 2, 5, 10, 25, 50, and 100-year storm events. Rainfall data was taken from the Peterborough Airport (2006) Intensity-Duration-Frequency curves.

8.1 Calculation Parameters

NASHYD and STANDHYD command represent the basins in the Visual OTTHYMO models. The NASHYD command was used for rural areas with imperviousness less than 20%, and the STANDHYD command was used for urban areas with more than 20% imperviousness (Greenland International Consulting Inc, 2002). Different input parameters are required depending on the use of NASHHYD or STANDHYD commands. The various calculations parameters used throughout the model were selected and estimated based on the latest preliminary concept plans for the development. Reasonable engineering assumptions were made based on industry standards and other supporting studies that have been completed to date. The delineation and the feasibility study for splitting the basin were checked using GIS.

8.1.1 Runoff Coefficients

The runoff coefficients (C) were based on the following typical values:

- C=0.90 for Pavement
- C=0.90 for Roofs
- C=0.20 for Wooded Areas
- C=0.25 for Landscaped Areas
- C=0.05 for Wetland Areas

The composite C value was calculated based on a area- weighted average of individual C values.

8.1.2 Time of Concentration / Time to Peak

The time of concentration (T_c) was calculated using two methods, as mentioned in the MOE Stormwater Management Planning and Design Manual (Ministry of Environment, 2003). For C values less than 0.4, the T_c was calculated using the Airport formula, and for C values greater than 0.4, the Bransby Williams formula was used. A minimum T_c of 10min was used when the calculated value is more than the allowed minimum (Ministry of Environment, 2003).

Time to Peak (T_p) was calculated as $2/3 \times T_c$.

8.1.3 SCS Curve Number

Based on geotechnical information for sites in the area, the SCS curve number (CN) for all areas has been assumed based on the table from TR-55. The average weighted CN number was estimated, were required based on the above assumptions.

8.1.4 Initial Abstraction

The initial abstraction (I_A) was determined based on the SCS CN method and was calculated as follows (Ministry of Environment, 2003):

- $CN \leq 70$ $I_A = 0.075S$ Where $S = (25400 / CN) - 254$ (Metric Equation)
- $CN < 70 \leq 80$ $I_A = 0.1S$
- $CN > 80 \leq 90$ $I_A = 0.15S$
- $CN > 90$ $I_A = 0.20S$

8.1.5 XIMP/TIMP

The amount of directly connected imperviousness (XIMP) and total imperviousness (TIMP) were estimated based on the following typical values and the actual site proposals (Greenland International Consulting Inc, 2002).

Land Use	XIMP	TIMP
Estate Residential	20	40
Low Density Residential (single Units)	25	50
Medium Density Residential (Semi-Detached)	35	55
High Density Residential Townhouses)	50	60
School	55	55
Commercial	85	85
Park	0	0

Table 8-1 Typical Imperviousness percentage for different land use

8.1.6 SLPP/SLPI

The pervious area ground slope (SLPP) and the impervious area ground slope (SLPI) were selected based on the average slopes provided in the latest concept plan.

8.1.7 LGP/LGI

The flow length of the pervious area (LGP) and the flow length of the impervious were selected based on the latest concept plan.

8.2 Pre-Development Hydrologic Model

NASHYD represents the basins A, B, C and D in the pre-development scenario as the imperviousness levels of these areas are below 20 percent. Flow from Basin A and B drains into the existing outlet to the west of the lot while the basins C and D drains into the wetland marked on the east boundary and eventually

merges the roadside ditch in Moon Line road. Hence the two AddHYD commands were used to analyze the combined flows in the identified outlets. The pre-development VO2 model layout is presented in Figure 8-1.

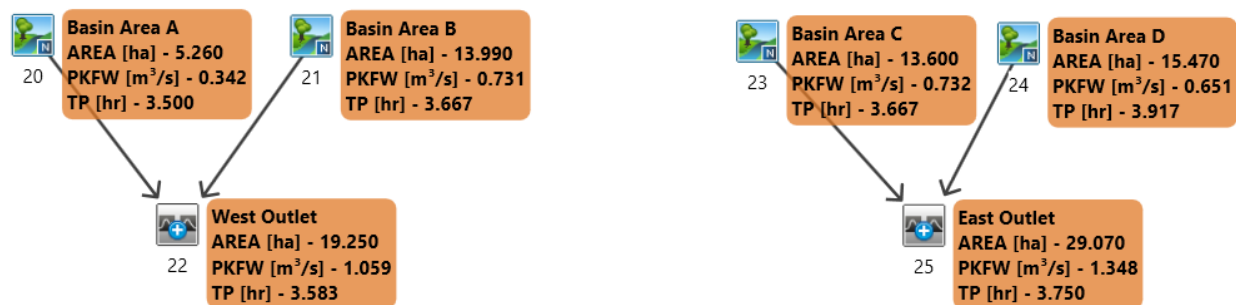


Figure 8-1 Pre-Development scenario VO2 Model

Pre-development Basins are represented by the NASHYD command and its input parameters used in the VO2 model are given in Table 8-2. Detailed calculation of these parameters can be found in **Appendix C**.

Basin ID	Area (ha)	CN*	IA (mm)	N	T _P (hr)
A	5.26	67.0	5	3	0.37
B	13.99	66.0	5	3	0.48
C	13.60	67.0	5	3	0.48
D	15.47	67.0	5	3	0.68

Table 8-2 Pre-development VO2 model input parameters

The resulting peak flow calculations for the pre-development scenario generated by hydrologic modeling utilizing VO2 are summarized in Table 8-3.

Basin ID	6-Hour SCS Type II Peak Flow (L/s)					
	2 year	5 year	10 year	25 year	50 year	100 year
Basin A	73	130	176	238	290	342
Basin B	155	278	376	509	620	731
West Outlet	224	402	543	737	897	1059
Basin C	156	280	378	511	621	732
Basin D	140	250	337	455	553	651
East Outlet	289	516	695	941	1144	1348

Table 8-3 Pre-development condition peak flow rates

8.3 Post-development (Controlled) Hydrologic Model

Wet Stormwater management ponds are proposed to regulate the quantity and quality of the post-development discharge for the basins. The convoluted meandering overland flow regimes existing in the lot complicates the flow regime and be the reason for 2 separate detention ponds. The ponds were designed to accumulate and attenuate the flow generated from the developmental area to the pre-development flow regimes. The model has two fundamental criteria:

- Flow in the post-development scenario will be equal to or less than the existing flow rate.
- The time to peak in the post-development scenario must be the same or lower to the time in pre-development conditions.

The VO2 model used to replicate the post-development scenario with SWM Ponds were illustrated in Figure 8-2 and Figure 8-3.

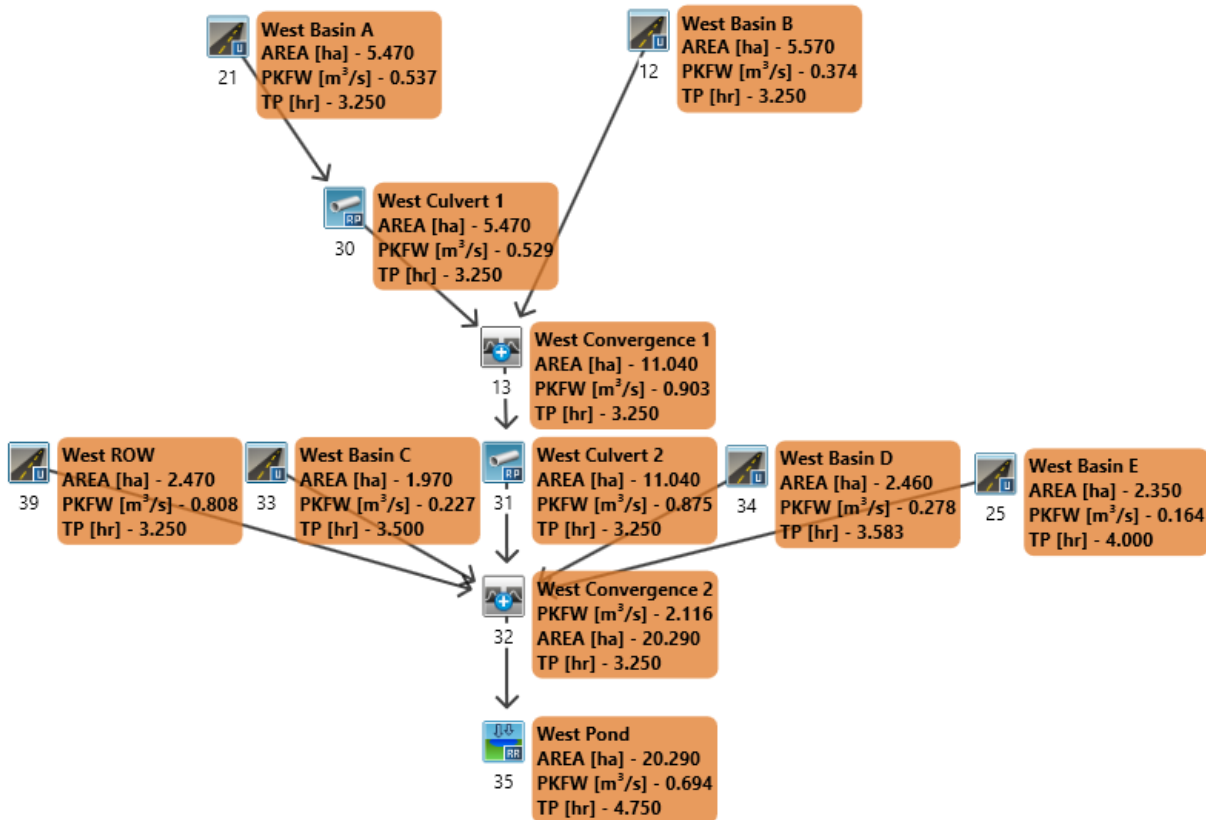


Figure 8-2 West Pond Post-development (controlled) VO2 Model

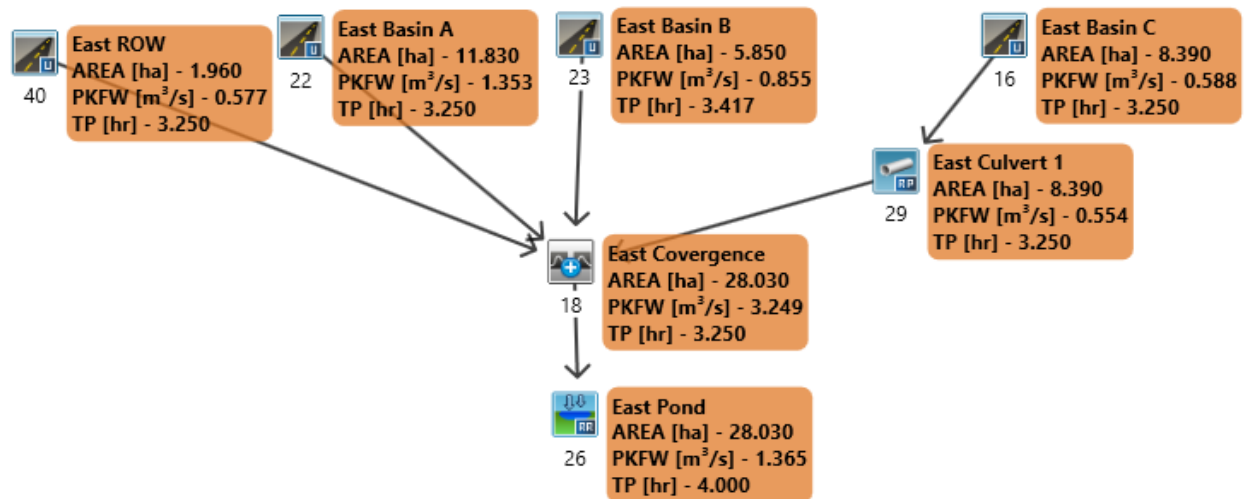


Figure 8-3 East Pond Post-development (controlled) VO2 Model

The SWM ponds were proposed for the basins which include the areas of interest with proposal development. Based on the observed flow regimes, following SWM designs are proposed for the respective basins.

- West Pond will service West Basin A, West Basin B, West Basin C, West Basin D, West Basin E and West ROW.
- East Pond will service East Basin A, East Basin B, East Basin C and East ROW.

The post-development basins are represented by the STANDHYD command because of their higher imperviousness ratios. The input parameters used in the VO2 model for this command can be found in Table 8-4 and Table 8-5, and the details for the determination of the parameters are presented in

Appendix C.

East Basin ID	Area (ha)	TIMP	XIMP	SLPP (%)	LGP (m)	MNP	DPSI (mm)	SLPI (%)	LGI
A	11.83	0.39	0.17	2.5	315	0.25	1.0	2.5	Auto
B	5.85	0.19	0.08	2.4	135	0.25	1.0	2.4	Auto
C	8.39	0.38	0.19	0.9	500	0.25	1.0	0.9	Auto
R.O.W.	1.96	0.82	0.82	1.5	514	0.25	1.0	1.5	Auto

Table 8-4 Post-development scenario East Basin (STANDHYD) VO2 input parameters

West Basin ID	Area (ha)	XIMP	TIMP	SLP P (%)	LGP (m)	MNP	DPSI (mm)	SLPI (%)	LGI
A	5.47	0.44	0.22	1.4	570	0.25	1.0	1.4	Auto
B	5.57	0.43	0.17	1.0	694	0.25	1.0	1.0	Auto
C	1.97	0.19	0.08	2.0	241	0.25	1.0	2.0	Auto
D	2.46	0.19	0.03	1.6	250	0.25	1.0	1.6	Auto
E	2.35	0.14	0.03	0.8	400	0.25	1.0	0.8	Auto
R.O.W.	2.47	0.93	0.93	0.6	1000	0.6	1.0	0.6	Auto

Table 8-5 Post-development scenario West Basin (STANDHYD) VO2 input parameters

East Basin ID	6-Hour SCS Type II Peak Flow (L/s)					
	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	392	598	772	1025	1196	1353
B	193	342	444	624	741	855
C	235	323	383	463	526	588
R.O.W.	258	343	400	471	525	577
East Pond	329	576	757	996	1184	1365

Table 8-6 Post-development scenario (uncontrolled) peak flow rates East Basin

West Basin ID	6-Hour SCS Type II Peak Flow (L/s)					
	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	202	280	336	409	472	537
B	150	206	245	295	335	374
C	45	85	116	156	190	227
D	57	104	139	191	234	278
E	35	62	83	111	137	164
R.O.W.	360	480	561	660	736	808
West Pond	132	258	345	483	589	694

Table 8-7 Post-development condition peak flow rates West Basin

9 Stormwater Management

The objective of the stormwater management plan is to provide quantity and quality control and to mitigate impacts to adjacent properties. Due to the increase of impervious areas in the post-development conditions, significant runoff is noted in the basins.

9.1 Quantity Control

The volume (quantity) of runoff during a storm event will increase with the storm event. Stormwater management controls are proposed to limit the volume of runoff to pre-development amounts. Following SWM controls were proposed:

- **SWM Ponds** – A large storm pond in the basin offers additional storage and treatment for major storm events and regulate the outflow from the basin.

9.1.1 SWM Ponds

Two potential SWM ponds are proposed for the catchment basins. The volume retention for the ponds was calculated using the VO2 model and checked with MTO guidelines to achieve the required T.S.S removal. Table 9-1 and 9-2 illustrates the peak storage volume required to attenuate the quantity in event of design storms. The quantity volumes for the proposed SWM ponds are attached in **Appendix C**.

SWM Pond	6-Hour SCS Type II Peak Storage (m ³)					
	2 year	5 year	10 year	25 year	50 year	100 year
East SWM Pond	1747	2353	2659	3019	3498	3747

Table 9-1 SWM Pond Storage requirements (VO2 Model)

WM Pond	6-Hour SCS Type II Peak Storage (m ³)					
	2 year	5 year	10 year	25 year	50 year	100 year
West SWM Pond	2456	3281	3572	4177	4814	5145

Table 9-2 SWM Pond Storage requirements (VO2 Model)

Table 9-1 and Table 9-2 indicates peak volume requirement for the SWM ponds. The locations of the ponds were estimated based on the available recent estate plot layout and the wetland delineations Figure 4. In case of storm events which exceeds the design intensities, a weir in SWM pond will be designed to convey the excess flow to the outfall.

The pond outlets should be designed to attenuate the flow to match/mimic the existing pre-development condition before it makes the outfall. It is suggested to design one or more orifice outlet controls and one weir outlet as overflow mechanism for the SWM ponds.

FILE PATH: P:\Belleville Project\Peterborough Jobs\2116814 - Subdivision Jeffery Homes Drawing\ANDERSON Predevelopment Catchment Area - Leo - IT_resolved\DWG\LOTTER: Isolah Todasco

PLOT SCALE: 1:1

DATE PLOTTED: 2022 / 12 / 22 @ 02:17 PM

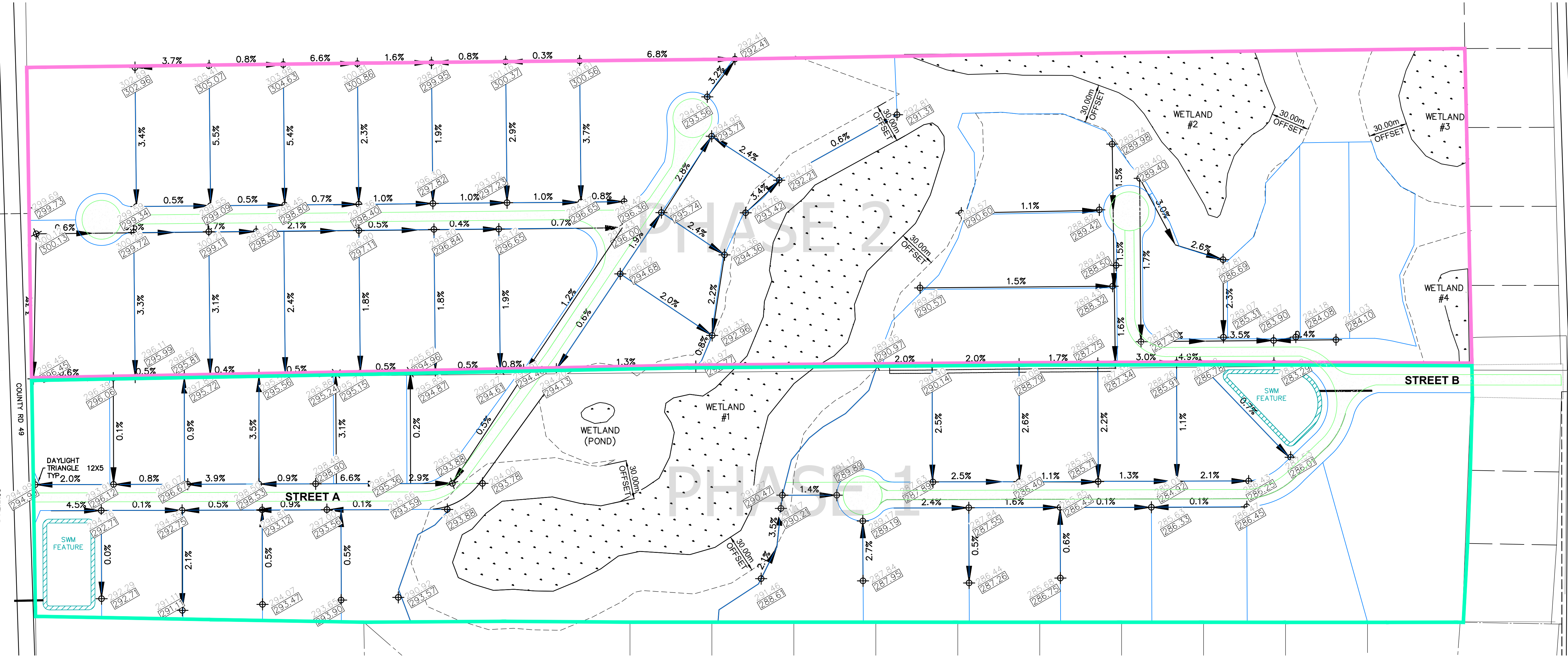
BORDER SIZE: ISO A1 (841mm x 594mm)

NOTE:

PROPERTY BOUNDARY AS INDICATED:

PHASE 1 BOUNDARY: —

PHASE 2 BOUNDARY: —





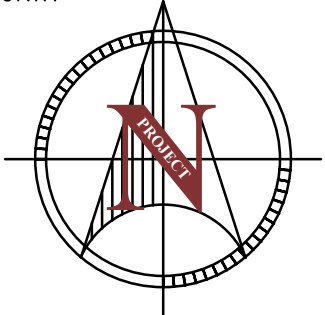
GREER GALLOWAY
CONSULTING ENGINEERS
PETERBOROUGH
BELLEVILLE
KINGSTON
1620 WALLBRIDGE LOYALIST ROAD
BELLEVILLE, ONTARIO, K8N 4Z5
PHONE: 613-966-3068
FAX: 613-966-3087

NOTES:

- ALL WORK SHALL BE IN ACCORDANCE WITH RELEVANT CODES AND GUIDELINES.
- ALL DRAWINGS AND ADDENDA ARE TO BE READ AS, AND IN CONJUNCTION WITH THE SPECIFICATIONS.
- ALL EQUIPMENT SHALL BE INSTALLED AS SPECIFIED OR APPROVED EQUIVALENT.
- CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH WORK AND BE RESPONSIBLE FOR SAME.
- CONTRACTOR MUST REPORT ANY DISCREPANCIES TO ENGINEER FOR RESOLUTION BEFORE COMMENCING THE WORK.
- ANY CHANGES MUST BE APPROVED BY THE ENGINEER.

A	A DETAIL NO.
B	B DRAWING NO. - WHERE DETAILED

LEGAL SURVEY SOURCE: PART OF LOT 19
CONCESSION 19, MUNICIPALITY OF TRENT LAKES
ELLIOT AND PARR (PETERBOROUGH) LTD. 20/4/9

01	-	YY/MM/DD
REVISION	DESCRIPTION	DATE
NORTH	STAMP	
		
PROJECT ANDERSON PREDEVELOPMENT CATCHMENT AREA TRENT LAKES, ONTARIO		
JEFFERY HOMES		
DRAWING TITLE FIGURE 4 POST DEVELOPMENT		
DESIGNED BY Y. CHOKSHI		
DRAWN BY I. TODESCO		
REVIEWED BY —		
APPROVED BY —		
PROJECT DATE 2022/04/26 (YY/MM/DD)		
PROJECT # 21-1-6814		
DRAWING # FIG4	DRAWING SCALE (ISO A1) HOR: 1:1750 VER: 1:1750	

The West Pond will outlet on County Road 49 and the East Pond will outlet on Moon Line Road via a ditch.

The size, dimensions and the location of the pond can be subject to modification in future development stages. The proposed location and the sizes of the ponds are illustrated in **Appendix B**.

Detailed calculations can be found in **Appendix C**.

9.2 9.2 Quality Control

Three (3) Best Management Practices (BMPs) can be incorporated into the design as follows:

- Source Control/Lot level control on Site - Minimized site grades have been provided where practical. Excavated sediment traps shall be installed at the upstream of each ditch inlet where upstream activities may be prone to produce higher amounts of sediment runoff. Isolating the developmental area from the undeveloped area will avoid the convolution of flows and possible contamination.
- Roof Leader— All roof leaders from the buildings shall be directed away from building toward the landscaped areas in order to promote infiltration.
- Conveyance Controls - The grassed swales will convey surface stormwater flows. Required sedimentation removal will be encouraged by maintaining the low velocities with vegetation in the channels.
- End-of-pipe Stormwater controls: SWM pond designed will provide the necessary quality control to achieve Enhanced 80% long-term S.S. removal as mentioned in Table 3.2 of MTO SWM Guidelines (Ministry of Environment, 2003).

The stormwater runoff quality will be controlled using a newly placed, minimum sloped, grass swale on the side of the subdivision roads, Street A and Street B.

The trapezoidal grass swale with varying depth and a constant bottom width of 1 m, side slopes of 3:1 and a channel slope from 0.5% to maximum 2% were proposed to achieve the quality control for the design 25mm 4hr Chicago storm event. The depth of the swale depends on the peak flow generated in the sub-basin for the design storm and the minimum design requirements like velocity of 0.5 m/s to achieve the quality control.

9.2.1 Additional Best Management Practices

Additional best management practices in the development could also be considered to reduce stormwater effects on the development further. Some of these best management practices include the following:

9.2.1.1 Decreasing the Impervious Ratio

- Use of porous pavement and gravel driveways rather than paved driveways
- Roof drainage to infiltration trenches rather than storm drains

9.2.1.2 Vegetative Buffers

- Vegetative buffers around the swales, bogs, and SWM ponds will provide stormwater treatment and reduce runoff rates. Nutrients in the runoff will be captured and utilized for vegetative growth improving the water quality.

9.2.2 Mitigation of Construction Impacts and Temporary Sediment Control Measures

Stormwater impacts such as sediment runoff during construction and development of the site is a potential impact. Best management practices to mitigate impacts during construction are as follows:

- Install silt fences around construction areas to trap sediment in runoff
- Add straw bales and rock check dam around high drainage areas to contain and treat stormwater runoff in these areas
- Sod and hydro-seed graded areas immediately after construction
- Mud-mats shall be constructed at all locations of access/egress to and from the site
- No construction activity or machinery shall intrude beyond the silt/snow fence or limit of construction area. All construction vehicles shall leave the site at designated locations.
- All materials and equipment used for the purpose of site preparation and project completion should be operated and stored in a manner that prevents any deleterious substance from leaving the site or entering the water.
- Stockpiles of soil shall be stored 15m away from any watercourse and stabilized against erosion as soon as possible.

Statement of Limitations

This report has been prepared by Greer Galloway Consulting engineers to provide a preliminary stormwater management report for the proposed development of 1919 Estate Subdivision in the county of Peterborough.

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

The report is applicable only for the project described in the text, constructed substantially by the conditions set out mentioned in the report. The purpose of this report is to provide the preliminary stormwater management for the proposed development. So, it is subject to changes in future depending on the availability of the updated data and conditions during later stages/executions.

Any use of this report by a third party other than the purpose of the stormwater management for the development mentioned above, makes this report void. Greer Galloway takes no responsibility for the damages incurred, as a result, from the decisions or actions made by those third parties using this report.

Prepared By,



Yash Chokshi, EIT.

Technical Review By,



Leonardo Sanchez, P.Eng.

10 References

City of Peterborough. (2016). *Engineering Design Standards-Utility services department*. Peterborough.
Retrieved from

<http://www.peterborough.ca/Assets/City+Assets/Engineering/Documents/2016+Engineering+Design+Standards.pdf>

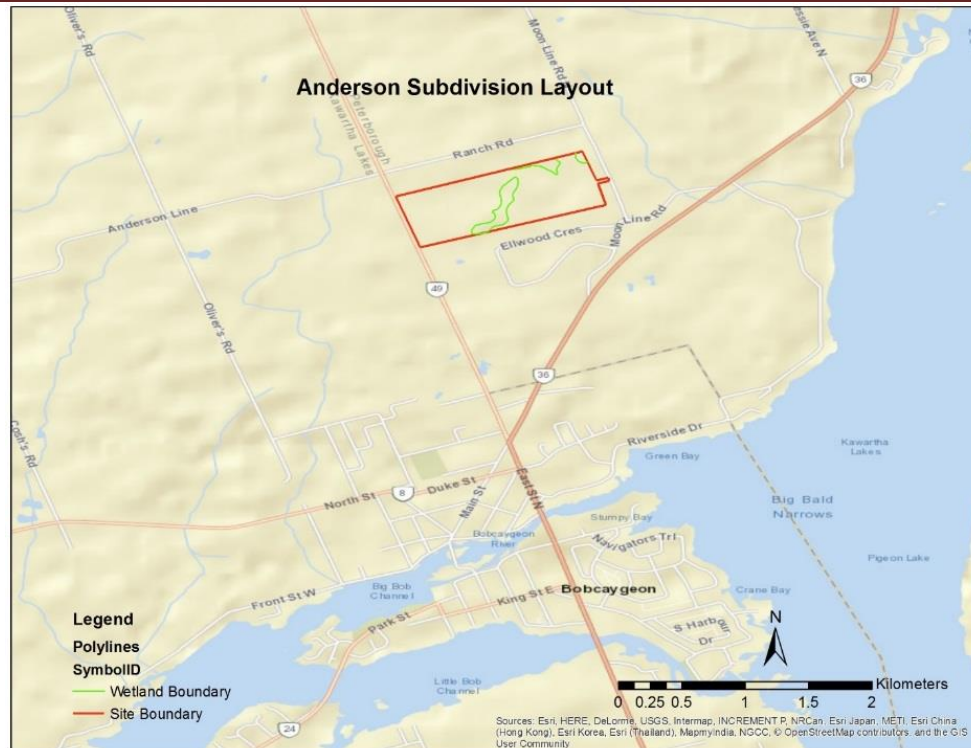
Greenland International Consulting Inc. (2002). *Visual Otthymo Version 2.0- Reference Manual*. Concord, Ontario. Retrieved from http://www.clarifica.com/release/Reference_Manual.pdf

Ministry of Environment. (2003). *Stormwater Management Planning and Design Manual*. Retrieved from <https://dr6j45jk9xcmk.cloudfront.net/documents/1757/195-stormwater-planning-and-design-en.pdf>

Ministry of Transportation Ontario. (2003). *MTO-Drainage Management Manual*.

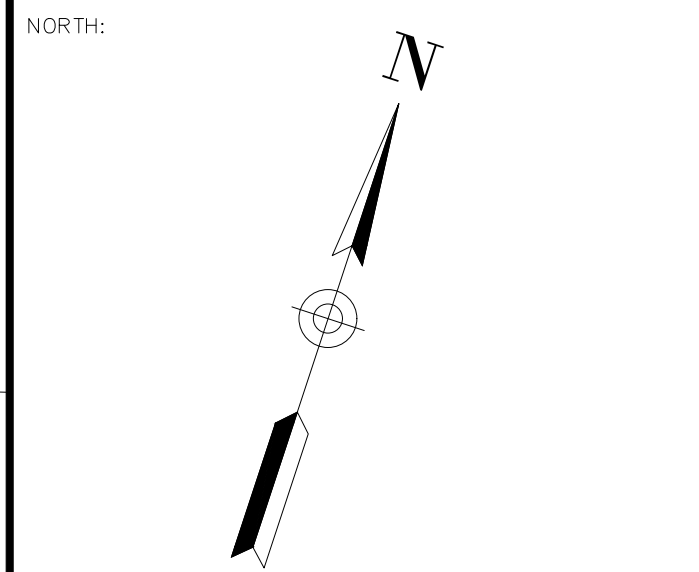
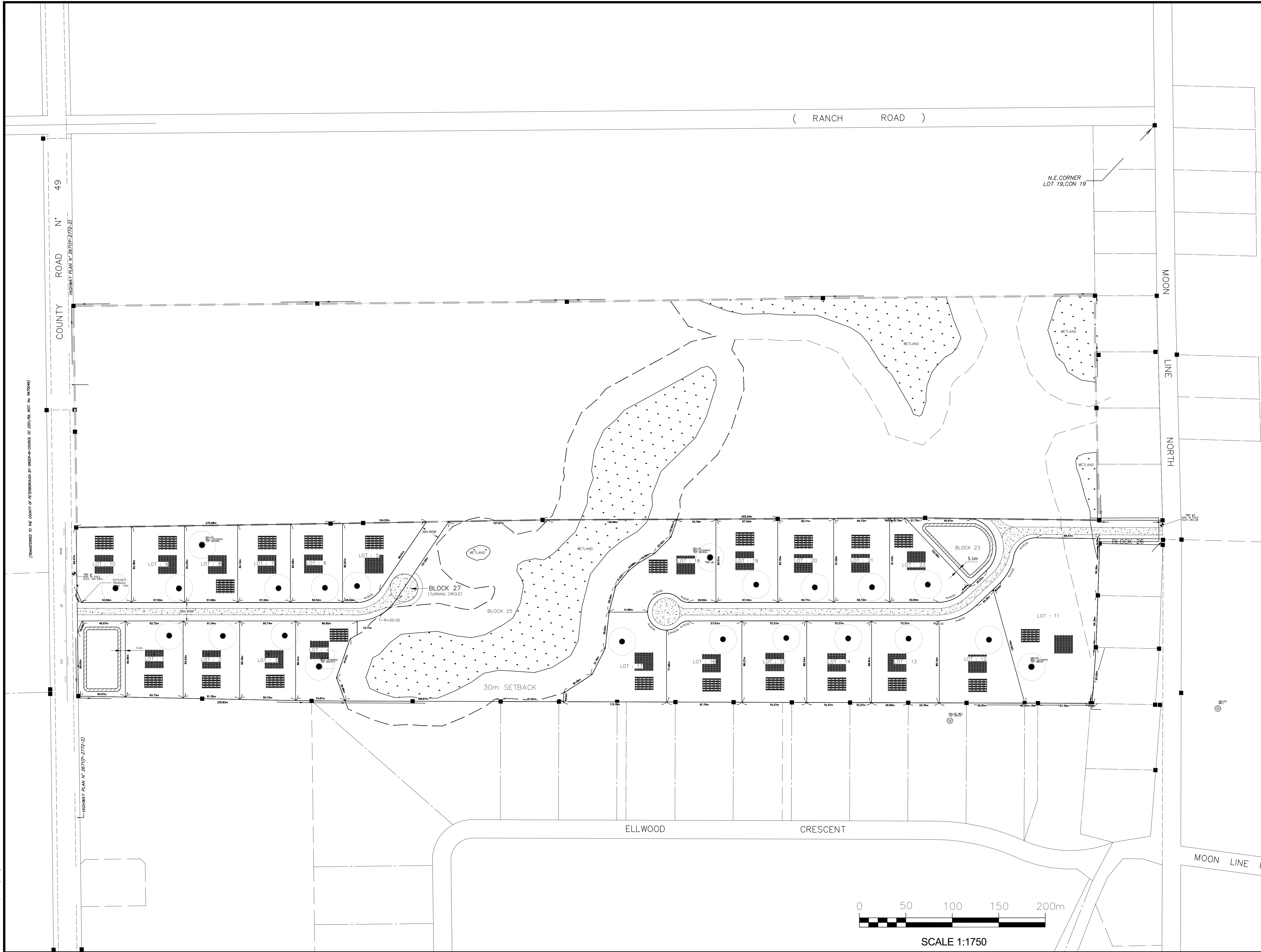
Appendix A – Figures

- Site location map



Appendix B – Draft Plan and Stormwater drawings

P:\Peterborough Project\6000\3116814 - Jeffery Homes\5.0 Drawings\Jeffery Homes Concept - Report Figures Dec 14.dwg (Well And Septic)
Dec 20, 2022-12:14pm By: jaylor



- LEGEND:
- ⊙ WELL (15M RADIUS)
 - PROPOSED PHASE 2
 - - - - - WETLAND SETBACK 30m
 - ROAD
 - PROPERTY LINE
 - ENVIRONMENTAL PROTECTION/ OPEN SPACE
 - STORM WATER MANAGEMENT
 - WETLAND AREA

DRAWING:

CONCEPTUAL HOME
PLACEMENT

1919 ESTATES
BOBCAYGEON

05		
04		
03		
02		
01	CONCEPTUAL DESIGN	2022
NO.	REVISION	DATE

DESIGNED BY
TL

DRAWN BY
TL

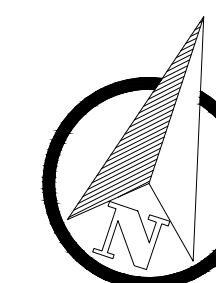
REVIEWED BY
SB

APPROVED BY
TL

PROJECT DATE DECEMBER 2022	SCALE SCALE 1:1750
-------------------------------	-----------------------

PROJECT NO. 21-1-6814

DRAWING NO.



LEGEND:



WELL (15M RADIUS)

PROPOSED PHASE 2

— — WETLAND SETBACK 30m

ROAD

— — — PROPERTY LINE

— ENVIRONMENTAL PROTECTION/
OPEN SPACE

== STORM WATER MANAGEMENT



WETLAND AREA

DRAWING

REVISED CONCEPT
PLAN

GENERAL PLAN

1919 ESTATES
JEFFERY HOMES

05		
04		
03		
02		
01	CONCEPTUAL DESIGN	2022
NO.	REVISION	DATE

DESIGNED BY
TL

DRAWN BY TL

REVIEWED BY
SE

APPROVED BY
TI

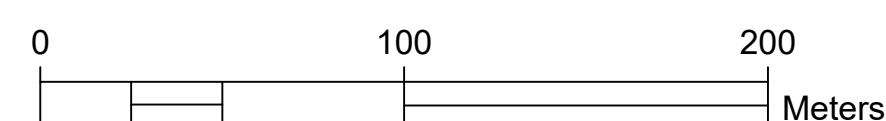
PROJECT DATE

DECEMBER 2022

SCALE
SCALE 1:2000

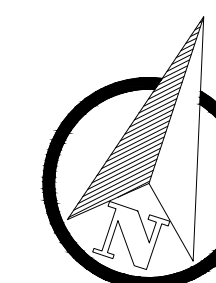
PROJECT NO. 21-1-6814

DRAWING NO.
SP - 1



\\Peterborough Project\6000\2116814 - Jeffery Homes\5.0 Drawings\Jeffery Homes Concept - Final Edits DEC - 14 2022-IL.dwg (General Plan)

METRIC SCALE - ALL DIMENSIONS IN METERS U.N.O.



LEGEND:



WELL (15M RADIUS)

PROPOSED PHASE 2

— — WETLAND SETBACK 30m

ROAD

— — — PROPERTY LINE

— ENVIRONMENTAL PROTECTION/
OPEN SPACE

— STORM WATER MANAGEMENT



WETLAND AREA

DRAWING

REVISÉD CONCEPT

TOPOGRAPHIC
PLAN

1919 ESTATES
JEFFERY HOMES

05		
04		
03		
02		
01	CONCEPTUAL DESIGN	2022
NO.	REVISION	DATE

DESIGNED BY
TL

DRAWN BY TL

REVIEWED BY
SE

APPROVED BY

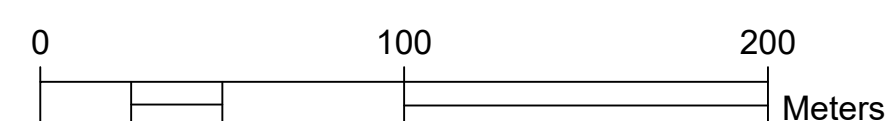
TI

PROJECT DATE	DECEMBER 2022
--------------	---------------

SCALE
SCALE 1:2000

PROJECT NO. 21-1-6814

DRAWING NO.
SP - 1

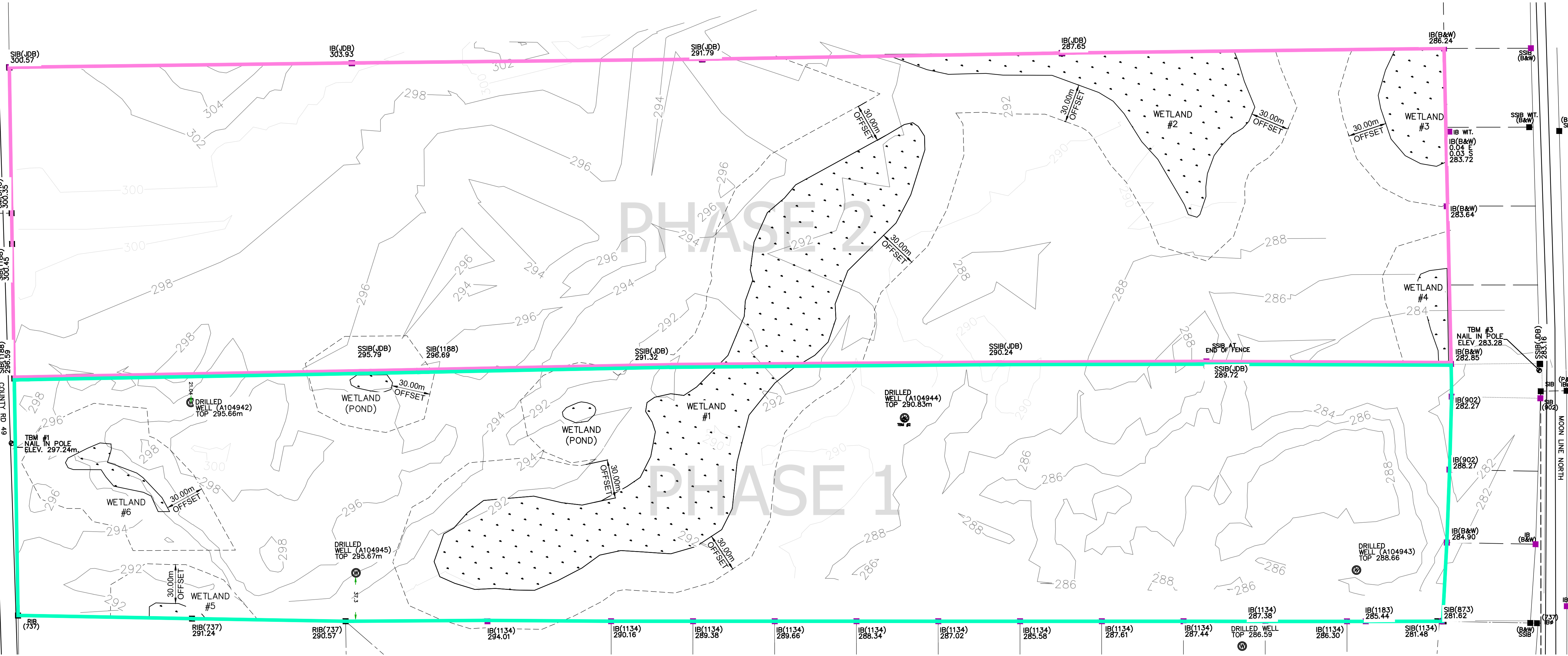


\\Peterborough Project\6000\2116814 - Jeffery Homes\5.0 Drawings\Jeffery Homes Concept - Final Edits DEC - 14 2022-TL.dwg (General Plan Topography)

METRIC SCALE - ALL DIMENSIONS IN METERS U.N.O.

FILE PATH: P:\Belleville Project\Peterborough Jobs\2116814 - Subdivision Jeffrey Homes\Drawing\Anderson Predevelopment Catchment Area - Leo - IT_reserve.dwg PLOTTER: Isolah Todasco
PLOT SCALE: 1:1
DATE PLOTTED: 2022 / 12 / 22 @ 02:16 PM
BORDER SIZE: ISO A1 (841mm x 594mm)

NOTE:
PROPERTY BOUNDARY AS INDICATED:
PHASE 1 BOUNDARY:
PHASE 2 BOUNDARY:



GREER GALLOWAY
CONSULTING ENGINEERS
PETERBOROUGH
BELLEVILLE
KINGSTON
1620 WALLBRIDGE LOYALIST ROAD
BELLEVILLE, ONTARIO, K8N 4Z5
PHONE: 613-966-3068
FAX: 613-966-3087

NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH RELEVANT CODES AND GUIDELINES.
2. ALL DRAWINGS AND ADDENDA ARE TO BE READ AS, AND IN CONJUNCTION WITH THE SPECIFICATIONS.
3. ALL EQUIPMENT SHALL BE INSTALLED AS SPECIFIED OR APPROVED EQUIVALENT.
4. CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH WORK AND BE RESPONSIBLE FOR SAME.
5. CONTRACTOR MUST REPORT ANY DISCREPANCIES TO ENGINEER FOR RESOLUTION BEFORE COMMENCING THE WORK.
6. ANY CHANGES MUST BE APPROVED BY THE ENGINEER.

A

B

A DETAIL NO.

B DRAWING NO. - WHERE DETAILED

LEGAL SURVEY SOURCE: PART OF LOT 19
CONCESSION 19, MUNICIPALITY OF TRENT LAKES
ELLIOT AND PARR (PETERBOROUGH) LTD. 20/4/9

01	-	YY/MM/DD
REVISION	DESCRIPTION	DATE
NORTH		

PROJECT
ANDERSON
PREDEVELOPMENT
CATCHMENT AREA
TRENT LAKES, ONTARIO

JEFFERY HOMES

DRAWING TITLE
FIGURE 1
PREDEVELOPMENT

DESIGNED BY
Y. CHOKSHI

DRAWN BY
I. TODESCO

REVIEWED BY
-

APPROVED BY
-

PROJECT DATE
2022/04/26
(YY/MM/DD)

PROJECT #
21-1-6814

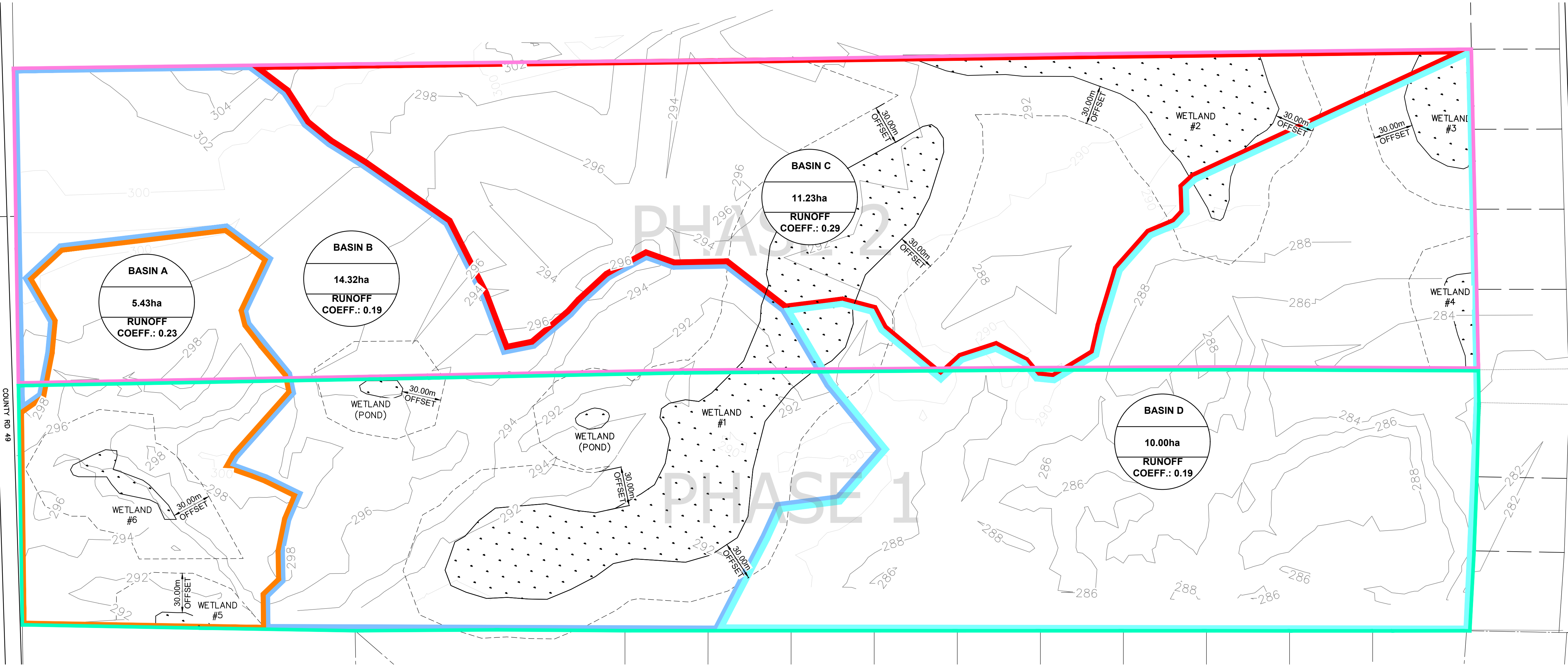
DRAWING #
FIG1

DRAWING SCALE (ISO A1)
HOR: 1:1750
VER: 1:1750

FILE PATH: P:\Belleville Project\Peterborough Jobs\2116814 - Subdivision Jeffery Homes\Drawing\ANDERSON Predevelopment Catchment Area - Leo - IT_resolved.dwg PLOTTER: Isidoh Todasco
PLOT SCALE: 1:1
DATE PLOTTED: 2022 / 12 / 22 @ 02:16 PM
BORDER SIZE: ISO A1 (841mm x 594mm)

NOTE:
PROPERTY BOUNDARY AS INDICATED:
PHASE 1 BOUNDARY: —
PHASE 2 BOUNDARY: —

NOTE:
BASIN BOUNDARY AS INDICATED:
BASIN A: —
BASIN B: —
BASIN C: —
BASIN D: —



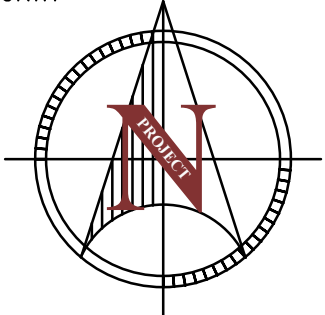


GREER GALLOWAY
CONSULTING ENGINEERS
PETERBOROUGH
BELLEVILLE
KINGSTON
1620 WALLBRIDGE LOYALIST ROAD
BELLEVILLE, ONTARIO, K8N 4Z5
PHONE: 613-966-3068
FAX: 613-966-3087

- NOTES:
1. ALL WORK SHALL BE IN ACCORDANCE WITH RELEVANT CODES AND GUIDELINES.
 2. ALL DRAWINGS AND ADDENDA ARE TO BE READ AS, AND IN CONJUNCTION WITH THE SPECIFICATIONS.
 3. ALL EQUIPMENT SHALL BE INSTALLED AS SPECIFIED OR APPROVED EQUIVALENT.
 4. CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH WORK AND BE RESPONSIBLE FOR SAME.
 5. CONTRACTOR MUST REPORT ANY DISCREPANCIES TO ENGINEER FOR RESOLUTION BEFORE COMMENCING THE WORK.
 6. ANY CHANGES MUST BE APPROVED BY THE ENGINEER.

A	A DETAIL NO.
B	B DRAWING NO. - WHERE DETAILED

LEGAL SURVEY SOURCE: PART OF LOT 19
CONCESSION 19, MUNICIPALITY OF TRENT LAKES
ELLIOT AND PARR (PETERBOROUGH) LTD. 20/4/9

01	-	YY/MM/DD
REVISION	DESCRIPTION	DATE
NORTH		STAMP
		

PROJECT
ANDERSON
PREDEVELOPMENT
CATCHMENT AREA
TRENT LAKES, ONTARIO

JEFFERY HOMES

DRAWING TITLE
FIGURE 2
PREDEVELOPMENT

DESIGNED BY
Y. CHOKSHI

DRAWN BY
I. TODESCO

REVIEWED BY
—

APPROVED BY
—

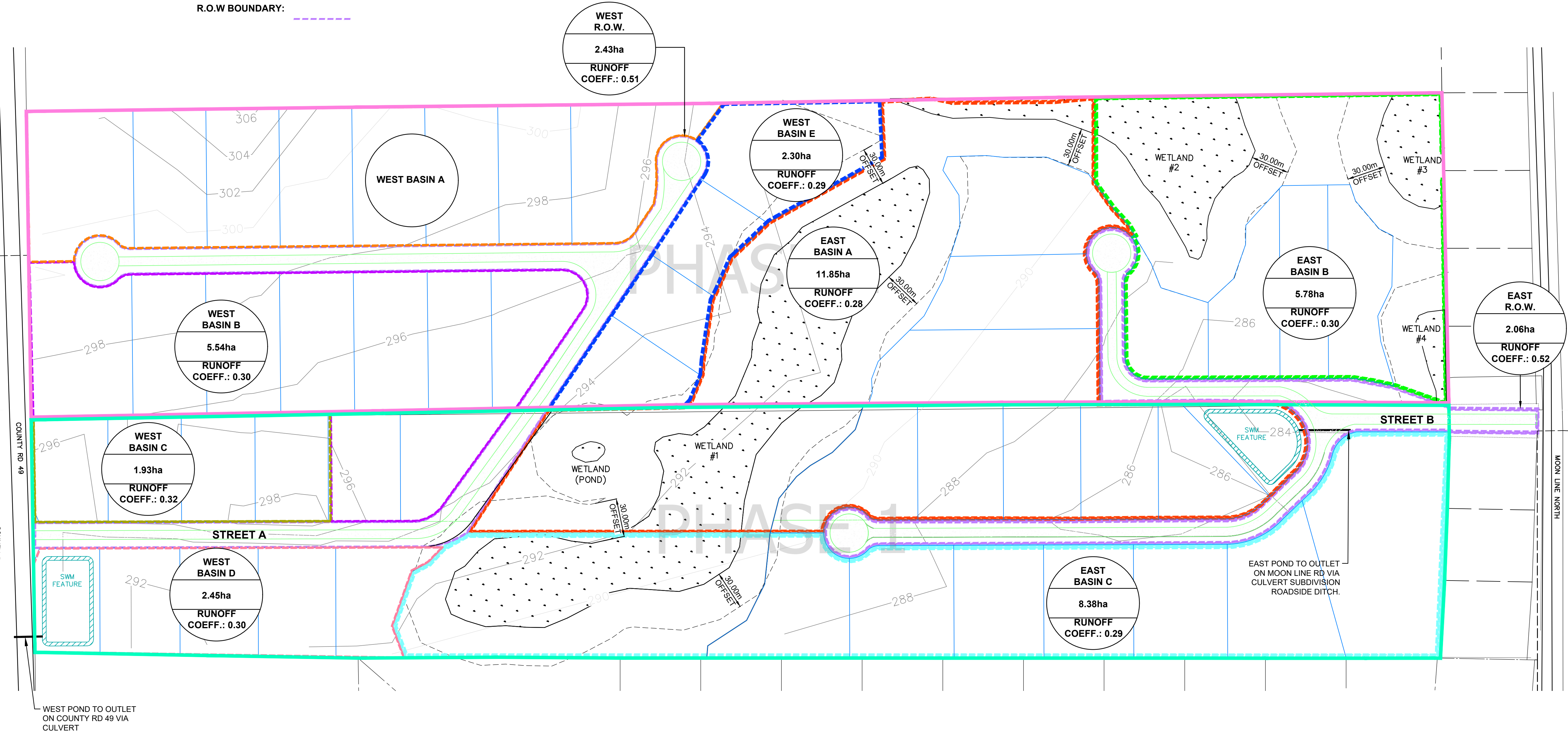
PROJECT DATE
2022/04/26
(YY/MM/DD)

PROJECT #
21-1-6814

DRAWING # FIG2	DRAWING SCALE (ISO A1) HOR: 1:1750 VER: 1:1750
-------------------	--

FILE PATH: P:\Belleville Project\Peterborough Jobs\2116814 - Subdivision Jeffery Homes\Drawing\Anderson Predevelopment Catchment Area - Leo - IT_resolved.dwg PLOTTER: Isidiah Todesco
PLOT SCALE: 1:1
DATE PLOTTED: 2022 / 12 / 22 @ 02:17 PM
BORDER SIZE: ISO A1 (841mm x 594mm)

- NOTE:
PROPERTY BOUNDARY AS INDICATED:
PHASE 1 BOUNDARY:
PHASE 2 BOUNDARY:
- NOTE:
BASIN BOUNDARY AS INDICATED:
WEST BASIN A:
WEST BASIN B:
WEST BASIN C:
WEST BASIN D:
WEST BASIN E:
EAST BASIN A:
EAST BASIN B:
EAST BASIN C:
R.O.W BOUNDARY:



GREER GALLOWAY
CONSULTING ENGINEERS
PETERBOROUGH
BELLEVILLE
KINGSTON
1620 WALLBRIDGE LOYALIST ROAD
BELLEVILLE, ONTARIO, K8N 4Z5
PHONE: 613-966-3068
FAX: 613-966-3087

NOTES:
1. ALL WORK SHALL BE IN ACCORDANCE WITH RELEVANT CODES AND GUIDELINES.
2. ALL DRAWINGS AND ADDENDA ARE TO BE READ AS, AND IN CONJUNCTION WITH THE SPECIFICATIONS.
3. ALL EQUIPMENT SHALL BE INSTALLED AS SPECIFIED OR APPROVED EQUIVALENT.
4. CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH WORK AND BE RESPONSIBLE FOR SAME.
5. CONTRACTOR MUST REPORT ANY DISCREPANCIES TO ENGINEER FOR RESOLUTION BEFORE COMMENCING THE WORK.
6. ANY CHANGES MUST BE APPROVED BY THE ENGINEER.

A
B

A DETAIL NO.
B DRAWING NO. - WHERE DETAILED

LEGAL SURVEY SOURCE: PART OF LOT 19
CONCESSION 19, MUNICIPALITY OF TRENT LAKES
ELLIOT AND PARR (PETERBOROUGH) LTD. 20/4/9

01	-	YY/MM/DD
REVISION	DESCRIPTION	DATE
NORTH		

PROJECT
ANDERSON
PREDEVELOPMENT
CATCHMENT AREA
TRENT LAKES, ONTARIO

JEFFERY HOMES

DRAWING TITLE
FIGURE 3
POST DEVELOPMENT

DESIGNED BY
Y. CHOKSHI

DRAWN BY
I. TODESCO

REVIEWED BY
-

APPROVED BY
-

PROJECT DATE
2022/04/26
(YY/MM/DD)

PROJECT #
21-1-6814

DRAWING #
FIG3

DRAWING SCALE (ISO A1)
HOR: 1:1750
VER: 1:1750

(METRIC SCALE - ALL DIMS IN METERS U.N.O.)

FILE PATH: P:\Belleville Project\Peterborough Jobs\2116814 - Subdivision Jeffery Homes Drawing\ANDERSON Predevelopment Catchment Area - Leo - IT_resolved\DWG\LOTTER: Isolah Todasco

PLOT SCALE: 1:1

DATE PLOTTED: 2022 / 12 / 22 @ 02:17 PM

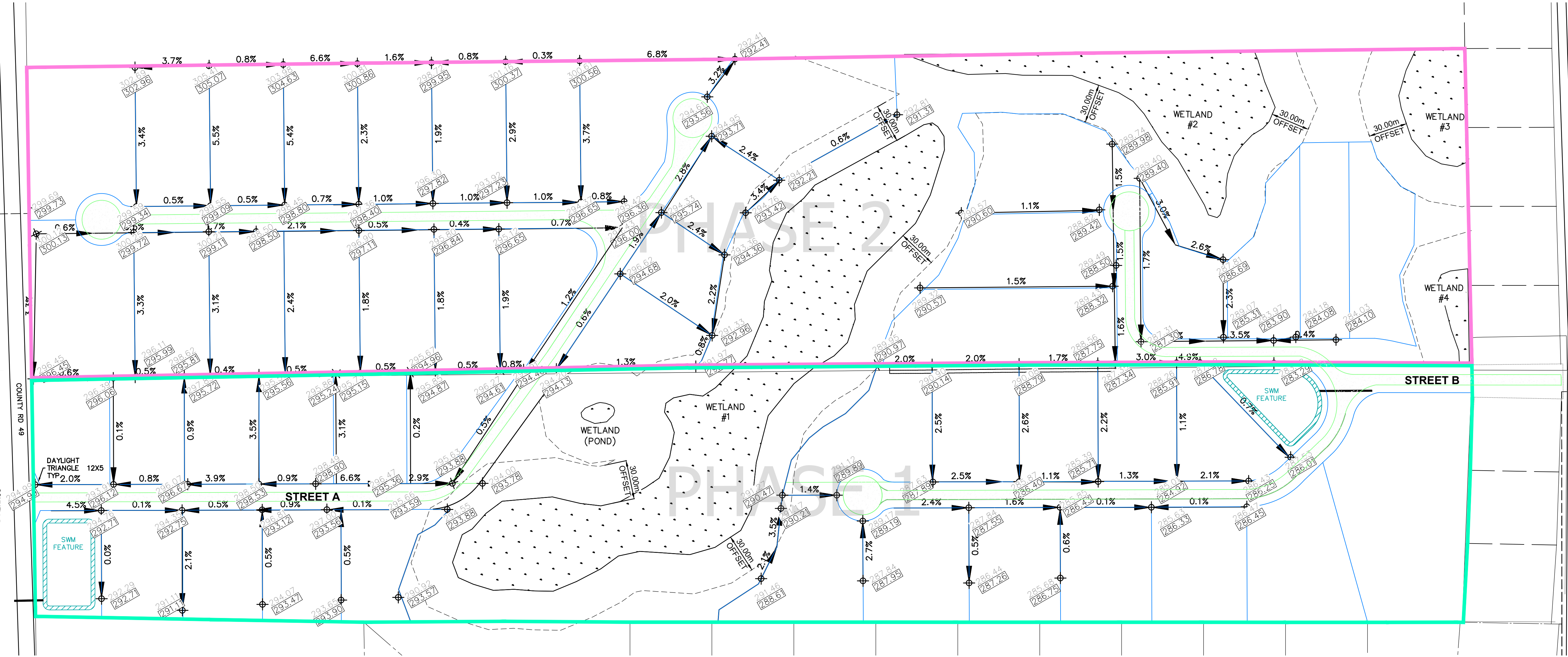
BORDER SIZE: ISO A1 (841mm x 594mm)

NOTE:

PROPERTY BOUNDARY AS INDICATED:

PHASE 1 BOUNDARY: —

PHASE 2 BOUNDARY: —





GREER GALLOWAY
CONSULTING ENGINEERS
PETERBOROUGH
BELLEVILLE
KINGSTON
1620 WALLBRIDGE LOYALIST ROAD
BELLEVILLE, ONTARIO, K8N 4Z5
PHONE: 613-966-3068
FAX: 613-966-3087

NOTES:

- ALL WORK SHALL BE IN ACCORDANCE WITH RELEVANT CODES AND GUIDELINES.
- ALL DRAWINGS AND ADDENDA ARE TO BE READ AS, AND IN CONJUNCTION WITH THE SPECIFICATIONS.
- ALL EQUIPMENT SHALL BE INSTALLED AS SPECIFIED OR APPROVED EQUIVALENT.
- CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS BEFORE PROCEEDING WITH WORK AND BE RESPONSIBLE FOR SAME.
- CONTRACTOR MUST REPORT ANY DISCREPANCIES TO ENGINEER FOR RESOLUTION BEFORE COMMENCING THE WORK.
- ANY CHANGES MUST BE APPROVED BY THE ENGINEER.

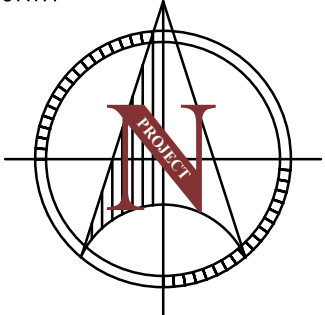
A

B

A DETAIL NO.
B DRAWING NO. - WHERE DETAILED

LEGAL SURVEY SOURCE: PART OF LOT 19
CONCESSION 19, MUNICIPALITY OF TRENT LAKES
ELLIOT AND PARR (PETERBOROUGH) LTD. 20/4/9

01	-	YY/MM/DD
REVISION	DESCRIPTION	DATE
NORTH		



PROJECT

ANDERSON
PREDEVELOPMENT
CATCHMENT AREA
TRENT LAKES, ONTARIO

DESIGNED BY

Y. CHOKSHI

DRAWN BY

I. TODESCO

REVIEWED BY

-

APPROVED BY

-

PROJECT DATE

2022/04/26

PROJECT #

21-1-6814

DRAWING #

FIG4

DRAWING SCALE (ISO A1)

HOR: 1:1750
VER: 1:1750

Appendix C – Hydrologic Calculations



Active coordinate

44° 33' 45" N, 78° 32' 14" W (44.562500,-78.537500)

Retrieved: Tue, 15 Feb 2022 15:01:09 GMT



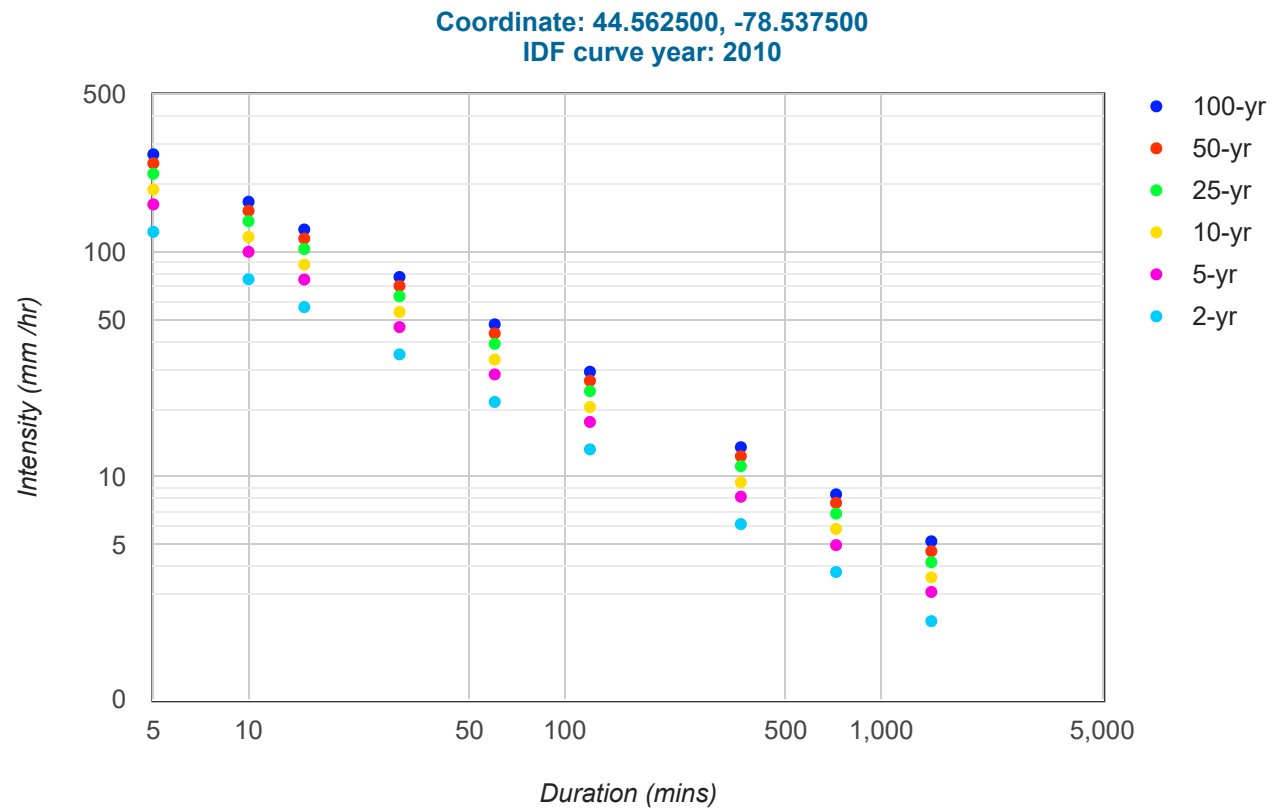
Location summary

These are the locations in the selection.

IDF Curve: 44° 33' 45" N, 78° 32' 14" W (44.562500,-78.537500)

Results

An IDF curve was found.



Coefficient summary**IDF Curve:** 44° 33' 45" N, 78° 32' 14" W (44.562500,-78.537500)

Retrieved: Tue, 15 Feb 2022 15:01:09 GMT

Data year: 2010**IDF curve year:** 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	21.6	28.6	33.3	39.1	43.5	47.7
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics**Rainfall intensity (mm hr⁻¹)**

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	122.7	75.6	56.9	35.1	21.6	13.3	6.2	3.8	2.3
5-yr	162.4	100.1	75.4	46.4	28.6	17.6	8.2	5.0	3.1
10-yr	189.1	116.5	87.8	54.1	33.3	20.5	9.5	5.9	3.6
25-yr	222.1	136.8	103.0	63.5	39.1	24.1	11.2	6.9	4.2
50-yr	247.1	152.2	114.6	70.6	43.5	26.8	12.4	7.7	4.7
100-yr	270.9	166.9	125.7	77.4	47.7	29.4	13.6	8.4	5.2

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	10.2	12.6	14.2	17.5	21.6	26.6	37.0	45.6	56.2
5-yr	13.5	16.7	18.8	23.2	28.6	35.2	49.0	60.4	74.4
10-yr	15.8	19.4	21.9	27.0	33.3	41.0	57.1	70.4	86.7
25-yr	18.5	22.8	25.8	31.7	39.1	48.2	67.1	82.6	101.8
50-yr	20.6	25.4	28.7	35.3	43.5	53.6	74.6	91.9	113.2
100-yr	22.6	27.8	31.4	38.7	47.7	58.8	81.8	100.8	124.2

Terms of UseYou agree to the [Terms of Use](#) of this site by reviewing, using, or interpreting these data.

[Ontario Ministry of Transportation](#) | [Terms and Conditions](#) | [About](#)
Last Modified: September 2016

Jeffery Homes Subdivision

Appendix 'C' - Stormwater Management Calculations

Pre Development Site Land-use

Drainage Area A

Drainage Area: 5.26 ha

Land Use	Area (Ha)	Runoff Coefficient	C x A	CN Value	CN x A
Gravel Area	0.00	0.70	0.00	85	0
Wetland Area	0.00	0.10	0.00	60	0
Woodland Area	0.00	0.30	0.00	70	0
Pasture Area	5.26	0.30	1.58	67	352
Total	5.26		1.58		352

Composite CN Value: 67

Composite Runoff Coefficient: 0.30

% Imperviousness: 0%

Watershed Length 250 m

Elevation - Top: 300.00 m

Elevation - Bottom: 294.00 m

Watershed Slope: 2.4%

Time of Concentration, T_c = 31 minutes (calculated using the Airport Method for $C < 0.4$)

Watershed Time to Peak, T_P = 21 minutes (2/3 of T_c)

Runoff Storage Coefficient, S = 125

Initial Abstraction, I_a = 9 mm (5mm maximum selected)

Drainage Area B

Drainage Area: 13.99 ha

Land Use	Area (Ha)	Runoff Coefficient	C x A	CN Value	CN x A
Gravel Area	0.00	0.70	0.00	85	0
Wetland Area	2.40	0.10	0.24	60	144
Woodland Area	2.14	0.30	0.64	70	150
Pasture Area	9.45	0.30	2.84	67	633
Total	13.99		3.72		927

Composite CN Value: 66

Composite Runoff Coefficient: 0.27

% Imperviousness: 17%

Watershed Length 525 m

Elevation - Top: 306.00 m

Elevation - Bottom: 290.00 m

Watershed Slope: 3.0%

Time of Concentration, T_c = 43 minutes (calculated using the Airport Method for $C < 0.4$)

Watershed Time to Peak, T_P = 29 minutes (2/3 of T_c)

Runoff Storage Coefficient, S = 129

Initial Abstraction, I_a = 10 mm (5mm maximum selected)

Drainage Area C

Drainage Area: 13.60 ha

Land Use	Area (Ha)	Runoff Coefficient	C x A	CN Value	CN x A
Gravel Area	0.00	0.90	0.00	98	0
Wetland Area	0.37	0.10	0.04	60	22
Woodland Area	2.05	0.30	0.62	70	144
Pasture Area	11.18	0.30	3.36	67	749
Total	13.60		4.01		915

Composite CN Value: 67

Composite Runoff Coefficient: 0.29

% Imperviousness: 3%

Watershed Length 560 m

Elevation - Top: 306.00 m

Elevation - Bottom: 290.00 m

Watershed Slope: 2.9%

Time of Concentration, T_c = 44 minutes (calculated using the Airport Method for $C < 0.4$)

Jeffery Homes Subdivision

Appendix 'C' - Stormwater Management Calculations

Watershed Time to Peak, T_p = 29 minutes (2/3 of T_c)

Runoff Storage Coefficient, S = 124
Initial Abstraction, I_a = 9 mm (5mm maximum selected)

Drainage Area D

Drainage Area: 15.47 ha

Land Use	Area (Ha)	Runoff Coefficient	C x A	CN Value	CN x A
Gravel Area	0.00	0.90	0.00	98	0
Wetland Area	1.94	0.10	0.19	60	116
Woodland Area	6.52	0.30	1.96	70	456
Pasture Area	7.01	0.25	1.75	67	470
Total	15.47		3.90		1042

Composite CN Value: 67
Composite Runoff Coefficient: 0.25
% Imperviousness: 13%

Watershed Length 825 m
Elevation - Top: 300.00 m
Elevation - Bottom: 282.00 m
Watershed Slope: 2.2%

Time of Concentration, T_c = 61 minutes (calculated using the Airport Method for $C < 0.4$)
Watershed Time to Peak, T_p = 41 minutes (2/3 of T_c)

Runoff Storage Coefficient, S = 123
Initial Abstraction, I_a = 9 mm (5mm maximum selected)

Jeffery Homes Subdivision

Appendix 'C' - Stormwater Management Calculations

East Basin - Post Development Site Land-use

East Basin A

Post-Development Peak Flows

Drainage Area: 11.83 ha

(MTO Design Chart 1.07)

Land Use	Area (Ha)	Runoff Coefficient	C x A	SCS Curve Number	CN x A
Pavement	0.17	0.90	0.15	98	17
Roofs	0.22	0.90	0.20	98	22
Wetland Areas	4.59	0.10	0.46	60	275
Landscaped Areas	6.85	0.25	1.71	58	397
Total	11.83		2.53		711

Composite CN Value: 60 Watershed Length: 315 m
Composite Runoff Coefficient: 0.21 Watershed Δ Elevation: 8.00 m
% Imperviousness: 3% Watershed Slope (%): 2.5%

Time of Concentration⁽¹⁾: 29.2 minutes

East Basin B

Post-Development Peak Flows

Drainage Area: 5.85 ha

(MTO Design Chart 1.07)

Land Use	Area (Ha)	Runoff Coefficient	C x A	SCS Curve Number	CN x A
Pavement	0.08	0.90	0.07	98	8
Roofs	0.11	0.90	0.10	98	11
Wetland Areas	2.56	0.10	0.26	60	154
Landscaped Areas	3.10	0.25	0.78	58	180
Total	5.85		1.20		352

Composite CN Value: 60 Watershed Length: 135 m
Composite Runoff Coefficient: 0.21 Watershed Δ Elevation: 3.30 m
% Imperviousness: 3% Watershed Slope (%): 2.4%

Time of Concentration⁽¹⁾: 13.5 minutes

East Basin C

Post-Development Peak Flows

Drainage Area: 8.39 ha

(MTO Design Chart 1.07)

Land Use	Area (Ha)	Runoff Coefficient	C x A	SCS Curve Number	CN x A
Pavement	0.19	0.90	0.17	98	18
Roofs	0.20	0.90	0.18	98	19
Wetland Areas	2.54	0.10	0.25	60	152
Landscaped Areas	5.47	0.25	1.37	58	317
Total	8.39		1.96		507

Composite CN Value: 60 Watershed Length: 500 m
Composite Runoff Coefficient: 0.23 Watershed Δ Elevation: 4.42 m
% Imperviousness: 5% Watershed Slope (%): 0.9%

Time of Concentration⁽¹⁾: 59.3 minutes

East R.O.W.

Post-Development Peak Flows

Drainage Area: 1.96 ha

1. Time of Concentration for urban watersheds based on the Bransby-Williams Formula: $T_c = 0.057 * L / (S_w^{0.2} * A^{0.1})$

Jeffery Homes Subdivision

Appendix 'C' - Stormwater Management Calculations

East Basin - Post Development Site Land-use

(MTO Design Chart 1.07)

Land Use	Area (Ha)	Runoff Coefficient	C x A	SCS Curve Number	CN x A
Pavement	0.82	0.90	0.74	98	80
Roofs	0.00	0.90	0.00	98	0
Wetland Areas	0.00	0.10	0.00	60	0
Landscaped Areas	1.14	0.25	0.29	58	66
Total	1.96		1.02		147

Composite CN Value:	75	Watershed Length:	514 m
Composite Runoff Coefficient:	0.52	Watershed Δ Elevation:	7.74 m
% Imperviousness:	42%	Watershed Slope (%):	1.5%
Time of Concentration ⁽¹⁾ :	63.4	minutes	

1. Time of Concentration for urban watersheds based on the Bransby-Williams Formula: $T_c = 0.057 * L / (S_w^{0.2} * A^{0.1})$

Loyalist Heights Subdivision

Appendix 'C' - Stormwater Management Calculations

East Basin - Pond Sizing Calculations

Sub-Catchment	Area	% Imperviousness
East Basin A	11.83	3%
East Basin B	5.85	3%
East Basin C	8.39	5%
East ROW	1.96	42%
Total	28.03	6%

Contributing Area	28.03 ha
% Imperviousness	6%
Storage Volume for Impervious Level ⁽¹⁾	135 m ³ /ha
Water Quality Storage Volume	3784.185 m ³
Extended Detention Volume	1121.24 m ³
Permanent Pool Volume	2662.945 m ³
Permanent Pool Depth	1 m

Step 1: Determine the width of the bottom of the pond (X in metres)

$$X = \frac{\sqrt{256h_p^4 - 12h_p \left(\frac{64}{3}hp^3 - PV \right) - 16h_p^2}}{6h_p} = 27.13 \text{ m}$$

~ 24 m

Where: h_p = the average depth of the permanent pool
 PV = the permanent pool volume (m³)

Step 2: Determine the depth of the extended detention in the wet pond (h_e in metres)

$$h_e = \frac{\sqrt{(X + 8h_p)^2(3X + 8h_p)^2 + 20(3X + 8h_p)EV}}{10(3X + 8h_p)} - \frac{X + 8h_p}{10} = 0.4115$$

~ 0.32

Where: EV = extended detention volume = 1121.24 m³

Step 3: Determine the area of land required for the wet pond (LA in m²)

$$LA = (X + 8h_p + 10h_e)(3X + 8h_p + 10h_e) = 3037.841 \text{ m}^2$$

~ 2922 m²

Step 4: Determine the extended detention drawdown time (t in hours)

$$t = \frac{2A_p}{CA_o(2g)^{0.5}} (h_1^{0.5} - h_2^{0.5}) = 24.29 \text{ hours}$$

~ 24 hours

Where: A_p = surface area of the pond 3037.84 m²
 $C^{(2)}$ = discharge coefficient 0.62
 A_o = 145mm orifice plate area 0.014 m²
 g = gravitational acceleration constant 9.81 m/s²
 h_1 = starting water elevation 0.32
 h_2 = ending water elevation 0

Therefore a 135mm diameter orifice plate will allow for a 24 hour extended detention drawdown time.

Jeffery Homes Subdivision

Appendix 'C' - Stormwater Management Calculations

East Basin - Active Storage Calculation

Side Slopes	4
Bottom Width	24
Bottom Length	72
Depth	1
Top Width Perm Pool	32
Bottom Width Perm Pool	80
Side Slopes	5

Depth	Area	Volume	
0	2560	0	0.000
0.05	2616.25	129.4063	0.013
0.1	2673	264.4625	0.026
0.15	2730.25	405.2438	0.041
0.2	2788	551.825	0.055
0.25	2846.25	704.2813	0.070
0.3	2905	862.6875	0.086
0.35	2964.25	1027.119	0.103
0.4	3024	1197.65	0.120
0.45	3084.25	1374.356	0.137
0.5	3145	1557.313	0.156
0.55	3206.25	1746.594	0.175
0.6	3268	1942.275	0.194
0.65	3330.25	2144.431	0.214
0.7	3393	2353.138	0.235
0.75	3456.25	2568.469	0.257
0.8	3520	2790.5	0.279
0.85	3584.25	3019.306	0.302
0.9	3649	3254.963	0.325
0.95	3714.25	3497.544	0.350
1	3780	3747.125	0.375
1.05	3846.25	4003.781	0.400
1.1	3913	4267.588	0.427
1.15	3980.25	4538.619	0.454
1.2	4048	4816.95	0.482
1.25	4116.25	5102.656	0.510
1.3	4185	5395.813	0.540
1.35	4254.25	5696.494	0.570
1.4	4324	6004.775	0.600
1.45	4394.25	6320.731	0.632
1.5	4465	6644.438	0.664

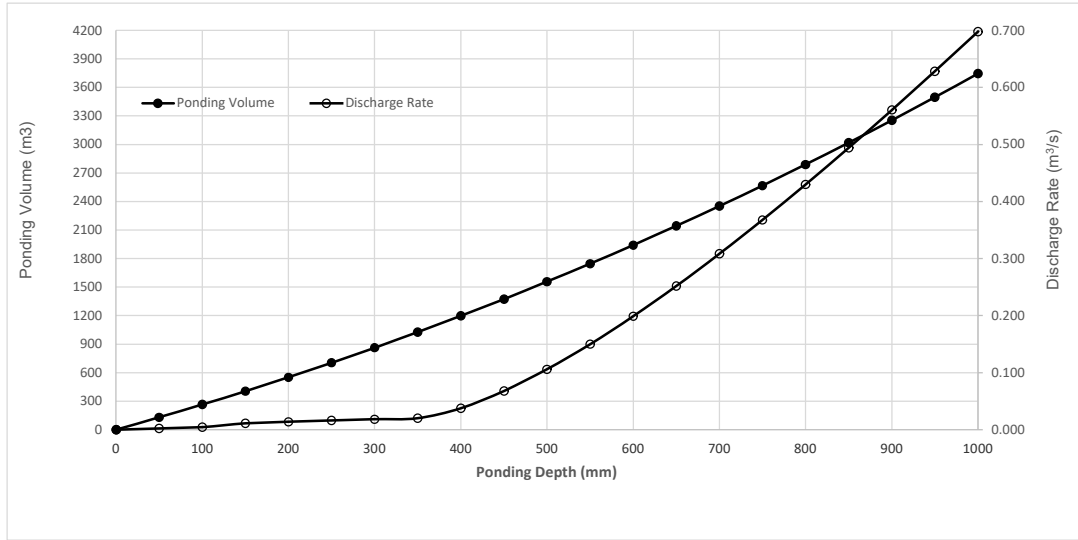
East Basin - Outlet Structure Rating Curve

Outlet Structure #1 Sizing:

Total Controlled Area:	28.03								
% Imperviousness	6%								
Max Ponding Elev.:	1 m								
Invert of Orifice:	293 m	Invert of Weir	293.35 m					Weir Length (ft)	
Diameter of Control Orifice:	135 mm	Weir Length	0.8 m					2.624	
Area of Control Orifice:	0.014 m ²								

Ponding Elevation (m)	Ponding Depth (mm)	Orifice Head (m)	Orifice Discharge l/sec	Weir Head (m)	Weir Discharge l/sec	Total Headwall Discharge m ³ /s	Average Ponding Area (m ²)	Ponding Volume (m ³)
293	0	0.00	0.0	0.00	0.0	0.000	2560.00	0.0
293.05	50	0.00	2.3	0.00	0.0	0.002	2616.25	129.4
293.1	100	0.03	4.5	0.00	0.0	0.005	2673.00	264.5
293.15	150	0.08	10.9	0.00	0.0	0.011	2730.25	405.2
293.2	200	0.13	13.8	0.00	0.0	0.014	2788.00	551.8
293.25	250	0.18	16.3	0.00	0.0	0.016	2846.25	704.3
293.3	300	0.23	18.3	0.00	0.0	0.018	2905.00	862.7
293.35	350	0.28	20.2	0.00	0.0	0.020	2964.25	1027.1
293.4	400	0.33	21.9	0.05	15.9	0.038	3024.00	1197.7
293.45	450	0.38	23.5	0.10	44.5	0.068	3084.25	1374.4
293.5	500	0.43	25.0	0.15	81.0	0.106	3145.00	1557.3
293.55	550	0.48	26.4	0.20	123.6	0.150	3206.25	1746.6
293.6	600	0.53	27.8	0.25	171.1	0.199	3268.00	1942.3
293.65	650	0.58	29.0	0.30	222.8	0.252	3330.25	2144.4
293.7	700	0.63	30.3	0.35	278.1	0.308	3393.00	2353.1
293.75	750	0.68	31.4	0.40	336.4	0.368	3456.25	2568.5
293.8	800	0.73	32.6	0.45	397.4	0.430	3520.00	2790.5
293.85	850	0.78	33.7	0.50	460.7	0.494	3584.25	3019.3
293.9	900	0.83	34.7	0.55	525.9	0.561	3649.00	3255.0
293.95	950	0.88	35.7	0.60	592.9	0.629	3714.25	3497.5
294	1000	0.93	36.7	0.65	661.2	0.698	3780.00	3747.1

		Weir Head (Ft)
0	0	0
0	0	0
0	0	0
1.09E-05	0.405244	0
0		0
0		0
1.83E-05	0.862688	0
0		0
6.8E-05	1.374356	0.164
		0.328
		0.492
2-year		0.656
		0.82
		0.984
5-year		1.148
10-year		1.312
		1.476
25-year		1.64
		1.804
50-year		1.968
100-year		2.132



Jeffery Homes Subdivision

Appendix 'C' - Stormwater Management Calculations

West Basin - Post Development Site Land-use

West Basin A

Post-Development Peak Flows

Drainage Area: 5.47 ha

(MTO Design Chart 1.07)

Land Use	Area (Ha)	Runoff Coefficient	C x A	SCS Curve Number	CN x A
Pavement	0.22	0.90	0.20	98	21
Roofs	0.22	0.90	0.20	98	22
Wetland Areas	0.00	0.20	0.00	70	0
Landscaped Areas	5.03	0.25	1.26	58	292
Total	5.47		1.66		335

Composite CN Value: 61 Watershed Length: 570 m
 Composite Runoff Coefficient: 0.30 Watershed Δ Elevation: 8.00 m
 % Imperviousness: 8% Watershed Slope (%): 1.4%
 Time of Concentration⁽¹⁾: 64.3 minutes

West Basin B

Post-Development Peak Flows

Drainage Area: 5.57 ha

(MTO Design Chart 1.07)

Land Use	Area (Ha)	Runoff Coefficient	C x A	SCS Curve Number	CN x A
Pavement	0.17	0.90	0.15	98	17
Roofs	0.25	0.90	0.23	98	25
Wetland Areas	0.00	0.20	0.00	70	0
Landscaped Areas	5.15	0.25	1.29	58	299
Total	5.57		1.67		340

Composite CN Value: 61 Watershed Length: 694 m
 Composite Runoff Coefficient: 0.30 Watershed Δ Elevation: 6.50 m
 % Imperviousness: 8% Watershed Slope (%): 0.9%
 Time of Concentration⁽¹⁾: 84.8 minutes

West Basin C

Post-Development Peak Flows

Drainage Area: 1.97 ha

(MTO Design Chart 1.07)

Land Use	Area (Ha)	Runoff Coefficient	C x A	SCS Curve Number	CN x A
Pavement	0.08	0.90	0.07	98	7
Roofs	0.11	0.90	0.10	98	11
Wetland Areas	0.00	0.20	0.00	70	0
Landscaped Areas	1.78	0.25	0.45	58	103
Total	1.97		0.61		122

Composite CN Value: 62 Watershed Length: 241 m
 Composite Runoff Coefficient: 0.31 Watershed Δ Elevation: 4.75 m
 % Imperviousness: 10% Watershed Slope (%): 2.0%
 Time of Concentration⁽¹⁾: 28.2 minutes

1. Time of Concentration for urban watersheds based on the Bransby-Williams Formula: $T_c = 0.057 * L / (S_w^{0.2} * A^{0.1})$

Jeffery Homes Subdivision

Appendix 'C' - Stormwater Management Calculations

West Basin - Post Development Site Land-use

West Basin D

Post-Development Peak Flows

Drainage Area: 2.46 ha

(MTO Design Chart 1.07)

Land Use	Area (Ha)	Runoff Coefficient	C x A	SCS Curve Number	CN x A
Pavement	0.08	0.90	0.07	98	7
Roofs	0.11	0.90	0.10	98	11
Wetland Areas	0.00	0.20	0.00	70	0
Landscaped Areas	2.27	0.25	0.57	58	132
Total	2.46		0.74		150

Composite CN Value: 61 Watershed Length: 250 m
Composite Runoff Coefficient: 0.30 Watershed Δ Elevation: 4.00 m
% Imperviousness: 8% Watershed Slope (%): 1.6%
Time of Concentration⁽¹⁾: 29.8 minutes

West Basin E

Post-Development Peak Flows

Drainage Area: 2.35 ha

(MTO Design Chart 1.07)

Land Use	Area (Ha)	Runoff Coefficient	C x A	SCS Curve Number	CN x A
Pavement	0.03	0.90	0.03	98	3
Roofs	0.11	0.90	0.10	98	11
Wetland Areas	0.00	0.20	0.00	70	0
Landscaped Areas	2.21	0.25	0.55	58	128
Total	2.35		0.68		142

Composite CN Value: 60 Watershed Length: 400 m
Composite Runoff Coefficient: 0.29 Watershed Δ Elevation: 3.00 m
% Imperviousness: 6% Watershed Slope (%): 0.8%
Time of Concentration⁽¹⁾: 55.7 minutes

West R.O.W.

Post-Development Peak Flows

Drainage Area: 2.47 ha

(MTO Design Chart 1.07)

Land Use	Area (Ha)	Runoff Coefficient	C x A	SCS Curve Number	CN x A
Pavement	0.93	0.90	0.83	98	91
Roofs	0.00	0.90	0.00	98	0
Wetland Areas	0.00	0.20	0.00	70	0
Landscaped Areas	1.54	0.25	0.39	58	90
Total	2.47		1.22		180

Composite CN Value: 73 Watershed Length: 1000 m
Composite Runoff Coefficient: 0.49 Watershed Δ Elevation: 5.50 m
% Imperviousness: 38% Watershed Slope (%): 0.6%
Time of Concentration⁽¹⁾: 147.4 minutes

1. Time of Concentration for urban watersheds based on the Bransby-Williams Formula: $T_c = 0.057 * L / (S_w^{0.2} * A^{0.1})$

Jeffery Homes Subdivision

Appendix 'C' - Stormwater Management Calculations

West Basin - Pond Sizing Calculations

Sub-Catchment	Area	% Imperviousness
West Basin A	5.47	8%
West Basin B	5.57	8%
West Basin C	1.97	10%
West Basin D	2.46	8%
West Basin E	2.35	6%
West ROW	2.47	38%
Total	20.29	11%

Contributing Area	20.29 ha
% Imperviousness	11%
Storage Volume for Impervious Level ⁽¹⁾	135 m ³ /ha
Water Quality Storage Volume	2739.15 m ³
Extended Detention Volume	811.6 m ³
Permanent Pool Volume	1927.55 m ³
Permanent Pool Depth	1 m

Step 1: Determine the width of the bottom of the pond (X in metres)

$$X = \frac{\sqrt{256h_p^4 - 12h_p \left(\frac{64}{3}hp^3 - PV \right) - 16h_p^2}}{6h_p} = \begin{matrix} 22.68 \text{ m} \\ \sim 23 \text{ m} \end{matrix}$$

Where: h_p = the average depth of the permanent pool
PV = the permanent pool volume (m3)

Step 2: Determine the depth of the extended detention in the wet pond (h_e in metres)

$$h_e = \frac{\sqrt{(X + 8h_p)^2(3X + 8h_p)^2 + 20(3X + 8h_p)EV}}{10(3X + 8h_p)} - \frac{X + 8h_p}{10} = \begin{matrix} 0.3232 \\ \sim 0.32 \end{matrix}$$

Where: EV = extended detention volume = 811.6 m³

Step 3: Determine the area if land required for the wet pond (LA in m²)

$$LA = (X + 8h_p + 10h_e)(3X + 8h_p + 10h_e) = \begin{matrix} 2746.461 \text{ m}^2 \\ \sim 2741 \text{ m}^2 \end{matrix}$$

Step 4: Determine the extended detention drawdown time (t in hours)

$$t = \frac{2A_p}{CA_o(2g)^{0.5}}(h_1^{0.5} - h_2^{0.5}) = \begin{matrix} 23.68 \text{ hours} \\ \sim 24 \text{ hours} \end{matrix}$$

Where: A_p = surface area of the pond 2746.46 m²
 $C^{(2)}$ = discharge coefficient 0.62
 A_o = 145mm orifice plate area 0.013 m²
g = gravitational acceleration constant 9.81 m/s²
 h_1 = starting water elevation 0.32
 h_2 = ending water elevation 0

Therefore a 130mm diameter orifice plate will allow for a 24 hour extended detention drawdown time.

Jeffery Homes Subdivision

Appendix 'C' - Stormwater Management Calculations

West Basin - Active Calculations

Side Slopes	4
Bottom Width	30
Bottom Length	90
Depth	1
Top Width Perm Pool	38
Bottom Width Perm Pool	98
Side Slopes	5

Depth	Area	Volume	
0	3724	0	0.000
0.05	3792.25	187.9063	0.019
0.1	3861	382.6625	0.038
0.15	3930.25	584.3438	0.058
0.2	4000	793.025	0.079
0.25	4070.25	1008.781	0.101
0.3	4141	1231.688	0.123
0.35	4212.25	1461.819	0.146
0.4	4284	1699.25	0.170
0.45	4356.25	1944.056	0.194
0.5	4429	2196.313	0.220
0.55	4502.25	2456.094	0.246
0.6	4576	2723.475	0.272
0.65	4650.25	2998.531	0.300
0.7	4725	3281.338	0.328
0.75	4800.25	3571.969	0.357
0.8	4876	3870.5	0.387
0.85	4952.25	4177.006	0.418
0.9	5029	4491.563	0.449
0.95	5106.25	4814.244	0.481
1	5184	5145.125	0.515
1.05	5262.25	5484.281	0.548
1.1	5341	5831.788	0.583
1.15	5420.25	6187.719	0.619
1.2	5500	6552.15	0.655
1.25	5580.25	6925.156	0.693
1.3	5661	7306.813	0.731
1.35	5742.25	7697.194	0.770
1.4	5824	8096.375	0.810
1.45	5906.25	8504.431	0.850
1.5	5989	8921.438	0.892

West Basin-Outlet Structure Rating Curve

Total Controlled Area:20.29
% Imperviousness:11%
Max Ponding Elev.:1 m
Invert of Orifice:293 m
Diameter of Control Orifice:130 mm
Area of Control Orifice:0.013 m²

Invert of Weir:293.35 m
Weir Length:0.8 m

Weir Length (ft):2.624

Ponding Elevation (m)	Ponding Depth (mm)	Orifice Head (m)	Orifice Discharge l/sec	Weir Head (m)	Weir Discharge l/sec	Total Headwall Discharge m ³ /s	Average Ponding Area (m ²)	Ponding Volume (m ³)
293	0	0.00	0.0	0.00	0.0	0.000	3724.00	0.0
293.05	50	0.00	2.1	0.00	0.0	0.002	3792.25	187.9
293.1	100	0.04	4.1	0.00	0.0	0.004	3861.00	382.7
293.15	150	0.09	10.3	0.00	0.0	0.010	3930.25	584.3
293.2	200	0.14	13.0	0.00	0.0	0.013	4000.00	793.0
293.25	250	0.19	15.2	0.00	0.0	0.015	4070.25	1008.8
293.3	300	0.24	17.1	0.00	0.0	0.017	4141.00	1231.7
293.35	350	0.29	18.8	0.00	0.0	0.019	4212.25	1461.8
293.4	400	0.34	20.4	0.05	15.9	0.036	4284.00	1699.3
293.45	450	0.39	21.9	0.10	44.5	0.066	4356.25	1944.1
293.5	500	0.44	23.3	0.15	81.0	0.104	4429.00	2196.3
293.55	550	0.49	24.6	0.20	123.6	0.148	4502.25	2456.1
293.6	600	0.54	25.8	0.25	171.1	0.197	4576.00	2723.5
293.65	650	0.59	27.0	0.30	222.8	0.250	4650.25	2998.5
293.7	700	0.64	28.1	0.35	278.1	0.306	4725.00	3281.3
293.75	750	0.69	29.2	0.40	336.4	0.366	4800.25	3572.0
293.8	800	0.74	30.2	0.45	397.4	0.428	4876.00	3870.5
293.85	850	0.79	31.3	0.50	460.7	0.492	4952.25	4177.0
293.9	900	0.84	32.2	0.55	525.9	0.558	5029.00	4491.6
293.95	950	0.89	33.2	0.60	592.9	0.626	5106.25	4814.2
294	1000	0.94	34.1	0.65	661.2	0.695	5184.00	5145.1

00

1.03E-050.584344

1.71E-051.231688

6.64E-051.944056

2-year

5-year

10-year

25-year

50-year

100-year

Weir Head (Ft)

0

0

0

0

0

0

0

0

0.164

0.328

0.492

0.656

0.82

0.984

1.148

1.312

1.476

1.64

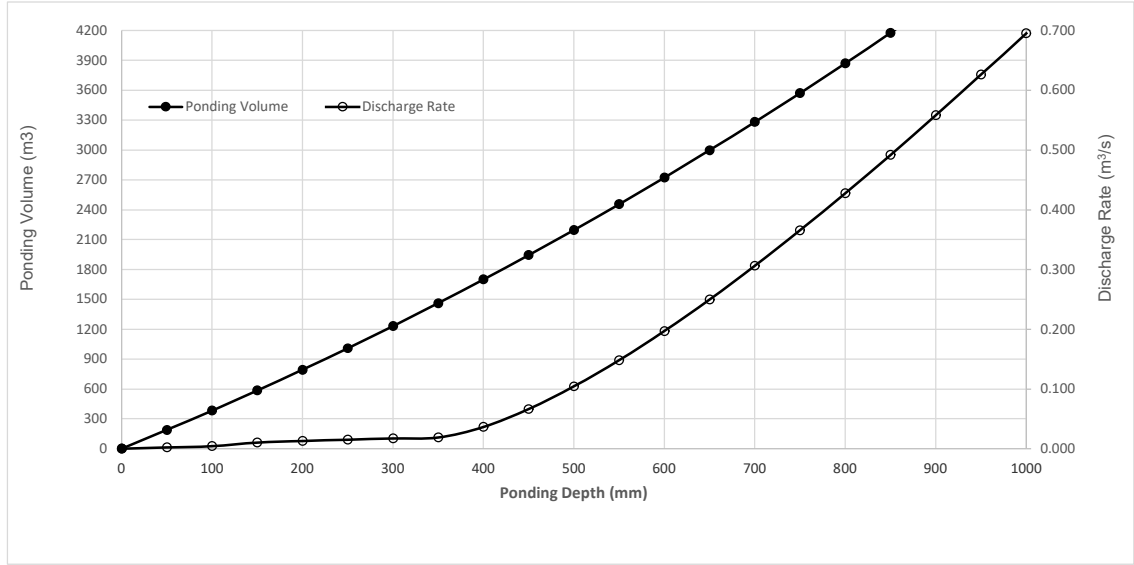
1.804

1.968

2.132

0

0



=====

V V I SSSSS U U A L (v 6.2.2006)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

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

Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.

***** 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\ychokshi\AppData\Local\Civica\VH5\6598cc33-0c00-4a48-9ce8-
27f4b695ed5c\858f95ac-3005-433d-9e96-e1d12a3afaf8\sce
Summary filename:
C:\Users\ychokshi\AppData\Local\Civica\VH5\6598cc33-0c00-4a48-9ce8-
27f4b695ed5c\858f95ac-3005-433d-9e96-e1d12a3afaf8\sce

DATE: 12/13/2022

TIME: 02:15:41

USER:

COMMENTS: _____

** SIMULATION : 100yr 6hr 15min SCS Type II (**

| READ STORM |
|

Filename: C:\Users\ychokshi\AppData\Local\Temp\

77847e42-c829-46c7-a63e-

Comments: 100yr 6hr 15min SCS Type II (MTO)

	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
RAIN	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr	0.25	0.00		2.00	8.18		3.75	18.00		5.50
3.27	0.50	3.27		2.25	8.18		4.00	8.18		5.75
3.27	0.75	3.27		2.50	9.82		4.25	8.18		6.00
3.27	1.00	4.91		2.75	9.82		4.50	6.54		6.25
3.27	1.25	4.91		3.00	49.08		4.75	6.54		
	1.50	4.91		3.25	127.61		5.00	4.91		
	1.75	4.91		3.50	18.00		5.25	4.91		

CALIB				
NASHYD (0020)		Area	(ha)= 5.26	Curve Number (CN)=
67.0				
ID= 1 DT= 5.0 min		Ia	(mm)= 5.00	# of Linear Res.(N)=
3.00				
-----		U.H. Tp	(hrs)= 0.37	

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

[illegible]

3.27	0.583	3.27	2.167	8.18	3.750	18.00	5.33
3.27	0.667	3.27	2.250	8.18	3.833	8.18	5.42
3.27	0.750	3.27	2.333	9.82	3.917	8.18	5.50
3.27	0.833	4.91	2.417	9.82	4.000	8.18	5.58
3.27	0.917	4.91	2.500	9.82	4.083	8.18	5.67
3.27	1.000	4.91	2.583	9.82	4.167	8.18	5.75
3.27	1.083	4.91	2.667	9.82	4.250	8.18	5.83
3.27	1.167	4.91	2.750	9.82	4.333	6.54	5.92
3.27	1.250	4.91	2.833	49.08	4.417	6.54	6.00
3.27	1.333	4.91	2.917	49.08	4.500	6.54	6.08
3.27	1.417	4.91	3.000	49.08	4.583	6.54	6.17
3.27	1.500	4.91	3.083	127.61	4.667	6.54	6.25
3.27	1.583	4.91	3.167	127.61	4.750	6.54	

Unit Hyd Qpeak (cms)= 0.543

PEAK FLOW (cms)= 0.342 (i)

TIME TO PEAK (hrs)= 3.500

RUNOFF VOLUME (mm)= 29.208

TOTAL RAINFALL (mm)= 81.800

RUNOFF COEFFICIENT = 0.357

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

```

-----
-----
-----
| CALIB |
| NASHYD ( 0021) | Area (ha)= 13.99 Curve Number (CN)=
66.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
----- U.H. Tp(hrs)= 0.48

```

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

```

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME

```

RAIN	hrs	mm/hr		hrs	mm/hr	'	hrs	mm/hr		hrs
mm/hr	0.083	0.00		1.667	4.91		3.250	127.61		4.83
4.91	0.167	0.00		1.750	4.91		3.333	18.00		4.92
4.91	0.250	0.00		1.833	8.18		3.417	18.00		5.00
4.91	0.333	3.27		1.917	8.18		3.500	18.00		5.08
4.91	0.417	3.27		2.000	8.18		3.583	18.00		5.17
4.91	0.500	3.27		2.083	8.18		3.667	18.00		5.25
4.91	0.583	3.27		2.167	8.18		3.750	18.00		5.33
3.27	0.667	3.27		2.250	8.18		3.833	8.18		5.42
3.27	0.750	3.27		2.333	9.82		3.917	8.18		5.50
3.27	0.833	4.91		2.417	9.82		4.000	8.18		5.58
3.27	0.917	4.91		2.500	9.82		4.083	8.18		5.67
3.27	1.000	4.91		2.583	9.82		4.167	8.18		5.75
3.27	1.083	4.91		2.667	9.82		4.250	8.18		5.83
3.27	1.167	4.91		2.750	9.82		4.333	6.54		5.92
3.27	1.250	4.91		2.833	49.08		4.417	6.54		6.00
3.27	1.333	4.91		2.917	49.08		4.500	6.54		6.08
3.27	1.417	4.91		3.000	49.08		4.583	6.54		6.17
3.27	1.500	4.91		3.083	127.61		4.667	6.54		6.25
3.27	1.583	4.91		3.167	127.61		4.750	6.54		

Unit Hyd Qpeak (cms)= 1.113

PEAK FLOW (cms)= 0.731 (i)
 TIME TO PEAK (hrs)= 3.667
 RUNOFF VOLUME (mm)= 28.403
 TOTAL RAINFALL (mm)= 81.800
 RUNOFF COEFFICIENT = 0.347

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

```

-----
| ADD HYD ( 0022) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0020):      5.26      0.342      3.50      29.21
+ ID2= 2 ( 0021):      13.99      0.731      3.67      28.40
=====
ID = 3 ( 0022):      19.25      1.059      3.58      28.62

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0023) | Area (ha)= 13.60 Curve Number (CN)=
67.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
-----
U.H. Tp(hrs)= 0.48

```

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

```

----- TRANSFORMED HYETOGRAPH -----
TIME      RAIN | TIME      RAIN |' TIME      RAIN | TIME
hrs      mm/hr | hrs      mm/hr |' hrs      mm/hr | hrs
mm/hr
0.083      0.00 | 1.667      4.91 | 3.250      127.61 | 4.83
4.91
0.167      0.00 | 1.750      4.91 | 3.333      18.00 | 4.92
4.91
0.250      0.00 | 1.833      8.18 | 3.417      18.00 | 5.00
4.91
0.333      3.27 | 1.917      8.18 | 3.500      18.00 | 5.08
4.91
0.417      3.27 | 2.000      8.18 | 3.583      18.00 | 5.17
4.91
0.500      3.27 | 2.083      8.18 | 3.667      18.00 | 5.25
4.91
0.583      3.27 | 2.167      8.18 | 3.750      18.00 | 5.33
3.27
0.667      3.27 | 2.250      8.18 | 3.833      8.18 | 5.42
3.27
0.750      3.27 | 2.333      9.82 | 3.917      8.18 | 5.50
3.27
0.833      4.91 | 2.417      9.82 | 4.000      8.18 | 5.58
3.27

```

	0.917	4.91		2.500	9.82		4.083	8.18		5.67
3.27										
	1.000	4.91		2.583	9.82		4.167	8.18		5.75
3.27										
	1.083	4.91		2.667	9.82		4.250	8.18		5.83
3.27										
	1.167	4.91		2.750	9.82		4.333	6.54		5.92
3.27										
	1.250	4.91		2.833	49.08		4.417	6.54		6.00
3.27										
	1.333	4.91		2.917	49.08		4.500	6.54		6.08
3.27										
	1.417	4.91		3.000	49.08		4.583	6.54		6.17
3.27										
	1.500	4.91		3.083	127.61		4.667	6.54		6.25
3.27										
	1.583	4.91		3.167	127.61		4.750	6.54		

Unit Hyd Qpeak (cms)= 1.082

PEAK FLOW (cms)= 0.732 (i)
 TIME TO PEAK (hrs)= 3.667
 RUNOFF VOLUME (mm)= 29.211
 TOTAL RAINFALL (mm)= 81.800
 RUNOFF COEFFICIENT = 0.357

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

```

-----
-----
| CALIB          |
| NASHYD ( 0024) | Area (ha)= 15.47 Curve Number (CN)=
67.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
----- U.H. Tp(hrs)= 0.68

```

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

```

----- TRANSFORMED HYETOGRAPH -----
TIME    RAIN | TIME    RAIN | ' TIME    RAIN | TIME
hrs     mm/hr | hrs     mm/hr | ' hrs     mm/hr | hrs
mm/hr
0.083   0.00 | 1.667   4.91 | ' 3.250 127.61 | 4.83
4.91
0.167   0.00 | 1.750   4.91 | ' 3.333  18.00 | 4.92
4.91
0.250   0.00 | 1.833   8.18 | ' 3.417  18.00 | 5.00

```

4.91							
	0.333	3.27		1.917	8.18		3.500 18.00 5.08
4.91							
	0.417	3.27		2.000	8.18		3.583 18.00 5.17
4.91							
	0.500	3.27		2.083	8.18		3.667 18.00 5.25
4.91							
	0.583	3.27		2.167	8.18		3.750 18.00 5.33
3.27							
	0.667	3.27		2.250	8.18		3.833 8.18 5.42
3.27							
	0.750	3.27		2.333	9.82		3.917 8.18 5.50
3.27							
	0.833	4.91		2.417	9.82		4.000 8.18 5.58
3.27							
	0.917	4.91		2.500	9.82		4.083 8.18 5.67
3.27							
	1.000	4.91		2.583	9.82		4.167 8.18 5.75
3.27							
	1.083	4.91		2.667	9.82		4.250 8.18 5.83
3.27							
	1.167	4.91		2.750	9.82		4.333 6.54 5.92
3.27							
	1.250	4.91		2.833	49.08		4.417 6.54 6.00
3.27							
	1.333	4.91		2.917	49.08		4.500 6.54 6.08
3.27							
	1.417	4.91		3.000	49.08		4.583 6.54 6.17
3.27							
	1.500	4.91		3.083	127.61		4.667 6.54 6.25
3.27							
	1.583	4.91		3.167	127.61		4.750 6.54

Unit Hyd Qpeak (cms)= 0.869

PEAK FLOW (cms)= 0.651 (i)

TIME TO PEAK (hrs)= 3.917

RUNOFF VOLUME (mm)= 29.212

TOTAL RAINFALL (mm)= 81.800

RUNOFF COEFFICIENT = 0.357

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

| ADD HYD (0025) |

| 1 + 2 = 3 |

ID1= 1 (0023):

AREA
(ha)

QPEAK
(cms)

TPEAK
(hrs)

R.V.
(mm)

13.60

0.732

3.67

29.21

```

+ ID2= 2 ( 0024):    15.47    0.651    3.92    29.21
=====
ID = 3 ( 0025):    29.07    1.348    3.75    29.21

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
-----
=====
=====

```

```

V   V   I   SSSSS U   U   A   L           (v 6.2.2006)
V   V   I   SS    U   U   A A  L
V   V   I   SS    U   U   AAAAA L
V   V   I   SS    U   U   A   A  L
VV      I   SSSSS UUUUU A   A  LLLLL

```

```

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

```

Developed and Distributed by Smart City Water Inc
 Copyright 2007 - 2021 Smart City Water Inc
 All rights reserved.

***** 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\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
27f4b695ed5c\3212932-4e9d-44a0-89d5-bea914efcee7\sce
Summary filename:
C:\Users\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
27f4b695ed5c\3212932-4e9d-44a0-89d5-bea914efcee7\sce

```

DATE: 12/13/2022

TIME: 02:15:41

USER:

COMMENTS: _____

```

-----
-----
*****

```

** SIMULATION : 10yr 6hr 15min SCS Type II (M **

```

-----
|   READ STORM   |   Filename: C:\Users\ychokshi\AppData
|               |   ata\Local\Temp\
|               |   77847e42-c829-46c7-a63e-
5572d19e02ad\ca8e086a
| Ptotal= 57.10 mm |   Comments: 10yr 6hr 15min SCS Type II (MTO)
-----

```

	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
RAIN	0.25	0.00	2.00	5.71	3.75	12.56	5.50
2.28	0.50	2.28	2.25	5.71	4.00	5.71	5.75
2.28	0.75	2.28	2.50	6.85	4.25	5.71	6.00
2.28	1.00	3.43	2.75	6.85	4.50	4.57	6.25
2.28	1.25	3.43	3.00	34.26	4.75	4.57	
	1.50	3.43	3.25	89.08	5.00	3.43	
	1.75	3.43	3.50	12.56	5.25	3.43	

```

-----
| CALIB         |
| NASHYD ( 0020) | Area (ha)= 5.26 Curve Number (CN)=
67.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
----- U.H. Tp(hrs)= 0.37

```

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

```

----- TRANSFORMED HYETOGRAPH -----

```

	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
RAIN	0.083	0.00	1.667	3.43	3.250	89.08	4.83
3.43	0.167	0.00	1.750	3.43	3.333	12.56	4.92
3.43	0.250	0.00	1.833	5.71	3.417	12.56	5.00

3.43	0.333	2.28		1.917	5.71		3.500	12.56		5.08
3.43	0.417	2.28		2.000	5.71		3.583	12.56		5.17
3.43	0.500	2.28		2.083	5.71		3.667	12.56		5.25
3.43	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28	1.583	3.43		3.167	89.08		4.750	4.57		

Unit Hyd Qpeak (cms)= 0.543

PEAK FLOW (cms)= 0.176 (i)

TIME TO PEAK (hrs)= 3.500

RUNOFF VOLUME (mm)= 15.315

TOTAL RAINFALL (mm)= 57.100

RUNOFF COEFFICIENT = 0.268

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

```

-----
-----
| CALIB |
| NASHYD ( 0021) | Area (ha)= 13.99 Curve Number (CN)=
66.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res. (N)=
3.00

```

----- U.H. Tp(hrs)= 0.48

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

	---- TRANSFORMED HYETOGRAPH ----									
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
3.43	0.083	0.00		1.667	3.43		3.250	89.08		4.83
3.43	0.167	0.00		1.750	3.43		3.333	12.56		4.92
3.43	0.250	0.00		1.833	5.71		3.417	12.56		5.00
3.43	0.333	2.28		1.917	5.71		3.500	12.56		5.08
3.43	0.417	2.28		2.000	5.71		3.583	12.56		5.17
3.43	0.500	2.28		2.083	5.71		3.667	12.56		5.25
2.28	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28	1.583	3.43		3.167	89.08		4.750	4.57		

Unit Hyd Qpeak (cms)= 1.113

PEAK FLOW (cms)= 0.376 (i)

TIME TO PEAK (hrs)= 3.667
 RUNOFF VOLUME (mm)= 14.836
 TOTAL RAINFALL (mm)= 57.100
 RUNOFF COEFFICIENT = 0.260

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


```

-----
| ADD HYD ( 0022) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0020):      5.26      0.176      3.50      15.32
+ ID2= 2 ( 0021):      13.99      0.376      3.67      14.84
=====
      ID = 3 ( 0022):      19.25      0.543      3.58      14.97
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```

-----
| CALIB |
| NASHYD ( 0023) | Area (ha)= 13.60 Curve Number (CN)=
67.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
-----
U.H. Tp(hrs)= 0.48
  
```

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

```

          ----- TRANSFORMED HYETOGRAPH -----
          TIME      RAIN | TIME      RAIN |' TIME      RAIN | TIME
          hrs      mm/hr | hrs      mm/hr |' hrs      mm/hr | hrs
RAIN
mm/hr
          0.083      0.00 | 1.667      3.43 | 3.250      89.08 | 4.83
3.43
          0.167      0.00 | 1.750      3.43 | 3.333      12.56 | 4.92
3.43
          0.250      0.00 | 1.833      5.71 | 3.417      12.56 | 5.00
3.43
          0.333      2.28 | 1.917      5.71 | 3.500      12.56 | 5.08
3.43
          0.417      2.28 | 2.000      5.71 | 3.583      12.56 | 5.17
3.43
          0.500      2.28 | 2.083      5.71 | 3.667      12.56 | 5.25
3.43
          0.583      2.28 | 2.167      5.71 | 3.750      12.56 | 5.33
  
```

2.28	0.667	2.28	2.250	5.71	3.833	5.71	5.42
2.28	0.750	2.28	2.333	6.85	3.917	5.71	5.50
2.28	0.833	3.43	2.417	6.85	4.000	5.71	5.58
2.28	0.917	3.43	2.500	6.85	4.083	5.71	5.67
2.28	1.000	3.43	2.583	6.85	4.167	5.71	5.75
2.28	1.083	3.43	2.667	6.85	4.250	5.71	5.83
2.28	1.167	3.43	2.750	6.85	4.333	4.57	5.92
2.28	1.250	3.43	2.833	34.26	4.417	4.57	6.00
2.28	1.333	3.43	2.917	34.26	4.500	4.57	6.08
2.28	1.417	3.43	3.000	34.26	4.583	4.57	6.17
2.28	1.500	3.43	3.083	89.08	4.667	4.57	6.25
2.28	1.583	3.43	3.167	89.08	4.750	4.57	

Unit Hyd Qpeak (cms)= 1.082

PEAK FLOW (cms)= 0.378 (i)
 TIME TO PEAK (hrs)= 3.667
 RUNOFF VOLUME (mm)= 15.317
 TOTAL RAINFALL (mm)= 57.100
 RUNOFF COEFFICIENT = 0.268

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

```

-----
-----
-----
| CALIB |
| NASHYD ( 0024) | Area (ha)= 15.47 Curve Number (CN)=
67.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
----- U.H. Tp(hrs)= 0.68

```

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

```

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME
RAIN

```

mm/hr	hrs	mm/hr		hrs	mm/hr	'	hrs	mm/hr		hrs
	0.083	0.00		1.667	3.43		3.250	89.08		4.83
3.43										
	0.167	0.00		1.750	3.43		3.333	12.56		4.92
3.43										
	0.250	0.00		1.833	5.71		3.417	12.56		5.00
3.43										
	0.333	2.28		1.917	5.71		3.500	12.56		5.08
3.43										
	0.417	2.28		2.000	5.71		3.583	12.56		5.17
3.43										
	0.500	2.28		2.083	5.71		3.667	12.56		5.25
3.43										
	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28										
	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28										
	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28										
	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28										
	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28										
	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28										
	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28										
	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28										
	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28										
	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28										
	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28										
	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28										
	1.583	3.43		3.167	89.08		4.750	4.57		

Unit Hyd Qpeak (cms)= 0.869

PEAK FLOW (cms)= 0.337 (i)

TIME TO PEAK (hrs)= 3.917

RUNOFF VOLUME (mm)= 15.318

TOTAL RAINFALL (mm)= 57.100

RUNOFF COEFFICIENT = 0.268

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

| ADD HYD (0025) |
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0023):	13.60	0.378	3.67	15.32
+ ID2= 2 (0024):	15.47	0.337	3.92	15.32
=====				
ID = 3 (0025):	29.07	0.695	3.75	15.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

=====

=====

=====

=====

V	V	I	SSSSS	U	U	A	L	(v 6.2.2006)
V	V	I	SS	U	U	A A	L	
V	V	I	SS	U	U	AAAAA	L	
V	V	I	SS	U	U	A A	L	
VV		I	SSSSS	UUUUU	A	A	LLLLL	

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

Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.

***** 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\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
27f4b695ed5c\0f97e79b-55e4-423f-895f-d79a02b70eb9\sce
Summary filename:
C:\Users\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
27f4b695ed5c\0f97e79b-55e4-423f-895f-d79a02b70eb9\sce

DATE: 12/13/2022

TIME: 02:15:41

USER:

COMMENTS: _____

** SIMULATION : 25yr 6hr 15min SCS Type II (M **

| READ STORM | Filename: C:\Users\ychokshi\AppData
| | ata\Local\Temp\
| | 77847e42-c829-46c7-a63e-
5572d19e02ad\b898394d
| Ptotal= 67.05 mm | Comments: 25yr 6hr 15min SCS Type II (MTO)

	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
RAIN										
mm/hr										
	0.25	0.00		2.00	6.70		3.75	14.75		5.50
2.68										
	0.50	2.68		2.25	6.70		4.00	6.70		5.75
2.68										
	0.75	2.68		2.50	8.05		4.25	6.70		6.00
2.68										
	1.00	4.02		2.75	8.05		4.50	5.36		6.25
2.68										
	1.25	4.02		3.00	40.23		4.75	5.36		
	1.50	4.02		3.25	104.60		5.00	4.02		
	1.75	4.02		3.50	14.75		5.25	4.02		

| CALIB |
| NASHYD (0020) | Area (ha)= 5.26 Curve Number (CN)=
67.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
----- U.H. Tp(hrs)= 0.37

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

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
4.02	0.083	0.00		1.667	4.02		3.250	104.60		4.83
4.02	0.167	0.00		1.750	4.02		3.333	14.75		4.92
4.02	0.250	0.00		1.833	6.70		3.417	14.75		5.00
4.02	0.333	2.68		1.917	6.70		3.500	14.75		5.08
4.02	0.417	2.68		2.000	6.71		3.583	14.75		5.17
4.02	0.500	2.68		2.083	6.70		3.667	14.75		5.25
2.68	0.583	2.68		2.167	6.70		3.750	14.75		5.33
2.68	0.667	2.68		2.250	6.70		3.833	6.71		5.42
2.68	0.750	2.68		2.333	8.05		3.917	6.70		5.50
2.68	0.833	4.02		2.417	8.05		4.000	6.70		5.58
2.68	0.917	4.02		2.500	8.05		4.083	6.70		5.67
2.68	1.000	4.02		2.583	8.05		4.167	6.70		5.75
2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00
2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68	1.500	4.02		3.083	104.60		4.667	5.36		6.25
	1.583	4.02		3.167	104.60		4.750	5.36		

Unit Hyd Qpeak (cms)= 0.543

PEAK FLOW (cms)= 0.238 (i)
 TIME TO PEAK (hrs)= 3.500
 RUNOFF VOLUME (mm)= 20.569
 TOTAL RAINFALL (mm)= 67.050
 RUNOFF COEFFICIENT = 0.307

CALIB			
NASHYD (0021)	Area (ha)=	13.99	Curve Number (CN)=
66.0			
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=
3.00			
-----	U.H. Tp(hrs)=	0.48	

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
4.02	0.083	0.00		1.667	4.02		3.250	104.60		4.83
4.02	0.167	0.00		1.750	4.02		3.333	14.75		4.92
4.02	0.250	0.00		1.833	6.70		3.417	14.75		5.00
4.02	0.333	2.68		1.917	6.70		3.500	14.75		5.08
4.02	0.417	2.68		2.000	6.71		3.583	14.75		5.17
4.02	0.500	2.68		2.083	6.70		3.667	14.75		5.25
2.68	0.583	2.68		2.167	6.70		3.750	14.75		5.33
2.68	0.667	2.68		2.250	6.70		3.833	6.71		5.42
2.68	0.750	2.68		2.333	8.05		3.917	6.70		5.50
2.68	0.833	4.02		2.417	8.05		4.000	6.70		5.58
2.68	0.917	4.02		2.500	8.05		4.083	6.70		5.67
2.68	1.000	4.02		2.583	8.05		4.167	6.70		5.75
2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00

2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68	1.500	4.02		3.083	104.60		4.667	5.36		6.25
2.68	1.583	4.02		3.167	104.60		4.750	5.36		

Unit Hyd Qpeak (cms)= 1.113

PEAK FLOW (cms)= 0.509 (i)
 TIME TO PEAK (hrs)= 3.667
 RUNOFF VOLUME (mm)= 19.958
 TOTAL RAINFALL (mm)= 67.050
 RUNOFF COEFFICIENT = 0.298

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

ADD HYD (0022)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0020):	5.26	0.238	3.50	20.57
+ ID2= 2 (0021):	13.99	0.509	3.67	19.96
=====				
ID = 3 (0022):	19.25	0.737	3.58	20.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0023)	Area (ha)=	13.60	Curve Number (CN)=
67.0			
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=
3.00			
-----		U.H. Tp(hrs)=	0.48

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

---- TRANSFORMED HYETOGRAPH ----							
RAIN	TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs
mm/hr							
4.02	0.083	0.00		1.667	4.02		3.250
							104.60
							4.83

4.02	0.167	0.00		1.750	4.02		3.333	14.75		4.92
4.02	0.250	0.00		1.833	6.70		3.417	14.75		5.00
4.02	0.333	2.68		1.917	6.70		3.500	14.75		5.08
4.02	0.417	2.68		2.000	6.71		3.583	14.75		5.17
4.02	0.500	2.68		2.083	6.70		3.667	14.75		5.25
2.68	0.583	2.68		2.167	6.70		3.750	14.75		5.33
2.68	0.667	2.68		2.250	6.70		3.833	6.71		5.42
2.68	0.750	2.68		2.333	8.05		3.917	6.70		5.50
2.68	0.833	4.02		2.417	8.05		4.000	6.70		5.58
2.68	0.917	4.02		2.500	8.05		4.083	6.70		5.67
2.68	1.000	4.02		2.583	8.05		4.167	6.70		5.75
2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00
2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68	1.500	4.02		3.083	104.60		4.667	5.36		6.25
2.68	1.583	4.02		3.167	104.60		4.750	5.36		

Unit Hyd Qpeak (cms)= 1.082

PEAK FLOW (cms)= 0.511 (i)

TIME TO PEAK (hrs)= 3.667

RUNOFF VOLUME (mm)= 20.571

TOTAL RAINFALL (mm)= 67.050

RUNOFF COEFFICIENT = 0.307

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

 | CALIB |
 | NASHYD (0024) | Area (ha)= 15.47 Curve Number (CN)=

67.0
 |ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
 3.00
 ----- U.H. Tp(hrs)= 0.68

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

	---- TRANSFORMED HYETOGRAPH ----									
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
4.02	0.083	0.00		1.667	4.02		3.250	104.60		4.83
4.02	0.167	0.00		1.750	4.02		3.333	14.75		4.92
4.02	0.250	0.00		1.833	6.70		3.417	14.75		5.00
4.02	0.333	2.68		1.917	6.70		3.500	14.75		5.08
4.02	0.417	2.68		2.000	6.71		3.583	14.75		5.17
4.02	0.500	2.68		2.083	6.70		3.667	14.75		5.25
2.68	0.583	2.68		2.167	6.70		3.750	14.75		5.33
2.68	0.667	2.68		2.250	6.70		3.833	6.71		5.42
2.68	0.750	2.68		2.333	8.05		3.917	6.70		5.50
2.68	0.833	4.02		2.417	8.05		4.000	6.70		5.58
2.68	0.917	4.02		2.500	8.05		4.083	6.70		5.67
2.68	1.000	4.02		2.583	8.05		4.167	6.70		5.75
2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00
2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68	1.500	4.02		3.083	104.60		4.667	5.36		6.25
2.68	1.583	4.02		3.167	104.60		4.750	5.36		

Unit Hyd Qpeak (cms)= 0.869

PEAK FLOW (cms)= 0.455 (i)
TIME TO PEAK (hrs)= 3.917
RUNOFF VOLUME (mm)= 20.572
TOTAL RAINFALL (mm)= 67.050
RUNOFF COEFFICIENT = 0.307

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

| ADD HYD (0025) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 (0023): 13.60 0.511 3.67 20.57
+ ID2= 2 (0024): 15.47 0.455 3.92 20.57
=====

ID = 3 (0025):	29.07	0.941	3.75	20.57
-----------------	-------	-------	------	-------

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

=====

V V I SSSSS U U A L (v 6.2.2006)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

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

Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.

***** 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\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
27f4b695ed5c\2d30ddfc-7394-40fd-9c92-e33df94dd243\sce

Summary filename:
C:\Users\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-27f4b695ed5c\2d30ddfc-7394-40fd-9c92-e33df94dd243\sce

DATE: 12/13/2022

TIME: 02:15:41

USER:

COMMENTS: _____

** SIMULATION : 2yr 6hr 15min SCS Type II (MT **

| READ STORM | Filename: C:\Users\ychokshi\AppData
| | ata\Local\Temp\
| | 77847e42-c829-46c7-a63e-
5572d19e02ad\773c2c46
| Ptotal= 37.04 mm | Comments: 2yr 6hr 15min SCS Type II (MTO)

RAIN TIME RAIN | TIME RAIN | TIME RAIN | TIME
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs
mm/hr
0.25 0.00 | 2.00 3.70 | 3.75 8.15 | 5.50
1.48
0.50 1.48 | 2.25 3.70 | 4.00 3.70 | 5.75
1.48
0.75 1.48 | 2.50 4.44 | 4.25 3.70 | 6.00
1.48
1.00 2.22 | 2.75 4.44 | 4.50 2.96 | 6.25
1.48
1.25 2.22 | 3.00 22.22 | 4.75 2.96 |
1.50 2.22 | 3.25 57.78 | 5.00 2.22 |
1.75 2.22 | 3.50 8.15 | 5.25 2.22 |

| CALIB |
| NASHYD (0020) | Area (ha)= 5.26 Curve Number (CN)=
67.0

|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
 3.00
 ----- U.H. Tp(hrs)= 0.37

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

	---- TRANSFORMED HYETOGRAPH ----									
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
2.22	0.083	0.00		1.667	2.22		3.250	57.78		4.83
2.22	0.167	0.00		1.750	2.22		3.333	8.15		4.92
2.22	0.250	0.00		1.833	3.70		3.417	8.15		5.00
2.22	0.333	1.48		1.917	3.70		3.500	8.15		5.08
2.22	0.417	1.48		2.000	3.70		3.583	8.15		5.17
2.22	0.500	1.48		2.083	3.70		3.667	8.15		5.25
1.48	0.583	1.48		2.167	3.70		3.750	8.15		5.33
1.48	0.667	1.48		2.250	3.70		3.833	3.70		5.42
1.48	0.750	1.48		2.333	4.44		3.917	3.70		5.50
1.48	0.833	2.22		2.417	4.44		4.000	3.70		5.58
1.48	0.917	2.22		2.500	4.44		4.083	3.70		5.67
1.48	1.000	2.22		2.583	4.44		4.167	3.70		5.75
1.48	1.083	2.22		2.667	4.44		4.250	3.70		5.83
1.48	1.167	2.22		2.750	4.44		4.333	2.96		5.92
1.48	1.250	2.22		2.833	22.22		4.417	2.96		6.00
1.48	1.333	2.22		2.917	22.22		4.500	2.96		6.08
1.48	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48	1.500	2.22		3.083	57.78		4.667	2.96		6.25
	1.583	2.22		3.167	57.78		4.750	2.96		

Unit Hyd Qpeak (cms)= 0.543

PEAK FLOW (cms)= 0.073 (i)
 TIME TO PEAK (hrs)= 3.500
 RUNOFF VOLUME (mm)= 6.531
 TOTAL RAINFALL (mm)= 37.040
 RUNOFF COEFFICIENT = 0.176

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

```

-----
-----
-----
| CALIB |
| NASHYD ( 0021) | Area (ha)= 13.99 Curve Number (CN)=
66.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
----- U.H. Tp(hrs)= 0.48
  
```

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

```

----- TRANSFORMED HYETOGRAPH -----
RAIN      TIME    RAIN | TIME    RAIN | TIME    RAIN | TIME
mm/hr      hrs   mm/hr | hrs   mm/hr | hrs   mm/hr | hrs
2.22      0.083   0.00 | 1.667   2.22 | 3.250   57.78 | 4.83
2.22      0.167   0.00 | 1.750   2.22 | 3.333    8.15 | 4.92
2.22      0.250   0.00 | 1.833   3.70 | 3.417    8.15 | 5.00
2.22      0.333   1.48 | 1.917   3.70 | 3.500    8.15 | 5.08
2.22      0.417   1.48 | 2.000   3.70 | 3.583    8.15 | 5.17
2.22      0.500   1.48 | 2.083   3.70 | 3.667    8.15 | 5.25
2.22      0.583   1.48 | 2.167   3.70 | 3.750    8.15 | 5.33
1.48      0.667   1.48 | 2.250   3.70 | 3.833    3.70 | 5.42
1.48      0.750   1.48 | 2.333   4.44 | 3.917    3.70 | 5.50
1.48      0.833   2.22 | 2.417   4.44 | 4.000    3.70 | 5.58
1.48      0.917   2.22 | 2.500   4.44 | 4.083    3.70 | 5.67
1.48      1.000   2.22 | 2.583   4.44 | 4.167    3.70 | 5.75
1.48
  
```

1.48	1.083	2.22		2.667	4.44		4.250	3.70		5.83
1.48	1.167	2.22		2.750	4.44		4.333	2.96		5.92
1.48	1.250	2.22		2.833	22.22		4.417	2.96		6.00
1.48	1.333	2.22		2.917	22.22		4.500	2.96		6.08
1.48	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48	1.500	2.22		3.083	57.78		4.667	2.96		6.25
1.48	1.583	2.22		3.167	57.78		4.750	2.96		

Unit Hyd Qpeak (cms)= 1.113

PEAK FLOW (cms)= 0.155 (i)
 TIME TO PEAK (hrs)= 3.667
 RUNOFF VOLUME (mm)= 6.302
 TOTAL RAINFALL (mm)= 37.040
 RUNOFF COEFFICIENT = 0.170

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

ADD HYD (0022)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
-----	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0020):	5.26	0.073	3.50	6.53
+ ID2= 2 (0021):	13.99	0.155	3.67	6.30
=====				
ID = 3 (0022):	19.25	0.224	3.67	6.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0023)	Area	(ha)= 13.60	Curve Number (CN)=
67.0			
ID= 1 DT= 5.0 min	Ia	(mm)= 5.00	# of Linear Res. (N)=
3.00			
-----	U.H. Tp(hrs)=	0.48	

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

---- TRANSFORMED HYETOGRAPH ----

	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
RAIN	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr	0.083	0.00		1.667	2.22		3.250	57.78		4.83
2.22	0.167	0.00		1.750	2.22		3.333	8.15		4.92
2.22	0.250	0.00		1.833	3.70		3.417	8.15		5.00
2.22	0.333	1.48		1.917	3.70		3.500	8.15		5.08
2.22	0.417	1.48		2.000	3.70		3.583	8.15		5.17
2.22	0.500	1.48		2.083	3.70		3.667	8.15		5.25
2.22	0.583	1.48		2.167	3.70		3.750	8.15		5.33
1.48	0.667	1.48		2.250	3.70		3.833	3.70		5.42
1.48	0.750	1.48		2.333	4.44		3.917	3.70		5.50
1.48	0.833	2.22		2.417	4.44		4.000	3.70		5.58
1.48	0.917	2.22		2.500	4.44		4.083	3.70		5.67
1.48	1.000	2.22		2.583	4.44		4.167	3.70		5.75
1.48	1.083	2.22		2.667	4.44		4.250	3.70		5.83
1.48	1.167	2.22		2.750	4.44		4.333	2.96		5.92
1.48	1.250	2.22		2.833	22.22		4.417	2.96		6.00
1.48	1.333	2.22		2.917	22.22		4.500	2.96		6.08
1.48	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48	1.500	2.22		3.083	57.78		4.667	2.96		6.25
1.48	1.583	2.22		3.167	57.78		4.750	2.96		

Unit Hyd Qpeak (cms)= 1.082

PEAK FLOW (cms)= 0.156 (i)
 TIME TO PEAK (hrs)= 3.667
 RUNOFF VOLUME (mm)= 6.532
 TOTAL RAINFALL (mm)= 37.040
 RUNOFF COEFFICIENT = 0.176

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

```

-----
-----
| CALIB          |
| NASHYD    ( 0024) | Area      (ha)= 15.47   Curve Number    (CN)=
67.0
| ID= 1 DT= 5.0 min | Ia        (mm)=  5.00   # of Linear Res.(N)=
3.00
----- U.H. Tp(hrs)=  0.68

```

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

```

          ----- TRANSFORMED HYETOGRAPH -----
TIME      RAIN | TIME      RAIN | ' TIME      RAIN | TIME
hrs      mm/hr | hrs      mm/hr | ' hrs      mm/hr | hrs
mm/hr
0.083     0.00 | 1.667     2.22 | 3.250     57.78 | 4.83
2.22
0.167     0.00 | 1.750     2.22 | 3.333      8.15 | 4.92
2.22
0.250     0.00 | 1.833     3.70 | 3.417      8.15 | 5.00
2.22
0.333     1.48 | 1.917     3.70 | 3.500      8.15 | 5.08
2.22
0.417     1.48 | 2.000     3.70 | 3.583      8.15 | 5.17
2.22
0.500     1.48 | 2.083     3.70 | 3.667      8.15 | 5.25
2.22
0.583     1.48 | 2.167     3.70 | 3.750      8.15 | 5.33
1.48
0.667     1.48 | 2.250     3.70 | 3.833      3.70 | 5.42
1.48
0.750     1.48 | 2.333     4.44 | 3.917      3.70 | 5.50
1.48
0.833     2.22 | 2.417     4.44 | 4.000      3.70 | 5.58
1.48
0.917     2.22 | 2.500     4.44 | 4.083      3.70 | 5.67
1.48
1.000     2.22 | 2.583     4.44 | 4.167      3.70 | 5.75
1.48
1.083     2.22 | 2.667     4.44 | 4.250      3.70 | 5.83
1.48
1.167     2.22 | 2.750     4.44 | 4.333      2.96 | 5.92
1.48
1.250     2.22 | 2.833     22.22 | 4.417      2.96 | 6.00
1.48
1.333     2.22 | 2.917     22.22 | 4.500      2.96 | 6.08
1.48

```

1.48	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48	1.500	2.22		3.083	57.78		4.667	2.96		6.25
	1.583	2.22		3.167	57.78		4.750	2.96		

Unit Hyd Qpeak (cms)= 0.869

PEAK FLOW (cms)= 0.140 (i)
 TIME TO PEAK (hrs)= 3.917
 RUNOFF VOLUME (mm)= 6.532
 TOTAL RAINFALL (mm)= 37.040
 RUNOFF COEFFICIENT = 0.176

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

ADD HYD (0025)					
1 + 2 = 3					
		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1=	1 (0023):	13.60	0.156	3.67	6.53
+ ID2=	2 (0024):	15.47	0.140	3.92	6.53
=====					
ID =	3 (0025):	29.07	0.289	3.83	6.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 =====
 =====

V	V	I	SSSSS	U	U	A	L					(v 6.2.2006)
V	V	I	SS	U	U	A	A	L				
V	V	I	SS	U	U	A	A	A	A	A	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
 Copyright 2007 - 2021 Smart City Water Inc
 All rights reserved.

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

| CALIB |
| NASHYD (0020) | Area (ha)= 5.26 Curve Number (CN)=
67.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
----- U.H. Tp(hrs)= 0.37

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

----- TRANSFORMED HYETOGRAPH -----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
mm/hr	0.083	0.00	1.667	4.48	3.250	116.38	4.83
4.48	0.167	0.00	1.750	4.48	3.333	16.41	4.92
4.48	0.250	0.00	1.833	7.46	3.417	16.41	5.00
4.48	0.333	2.98	1.917	7.46	3.500	16.41	5.08
4.48	0.417	2.98	2.000	7.46	3.583	16.41	5.17
4.48	0.500	2.98	2.083	7.46	3.667	16.41	5.25
4.48	0.583	2.98	2.167	7.46	3.750	16.41	5.33
2.98	0.667	2.98	2.250	7.46	3.833	7.46	5.42
2.98	0.750	2.98	2.333	8.95	3.917	7.46	5.50
2.98	0.833	4.48	2.417	8.95	4.000	7.46	5.58
2.98	0.917	4.48	2.500	8.95	4.083	7.46	5.67
2.98	1.000	4.48	2.583	8.95	4.167	7.46	5.75
2.98	1.083	4.48	2.667	8.95	4.250	7.46	5.83
2.98	1.167	4.48	2.750	8.95	4.333	5.97	5.92
2.98	1.250	4.48	2.833	44.76	4.417	5.97	6.00
2.98	1.333	4.48	2.917	44.76	4.500	5.97	6.08
2.98	1.417	4.48	3.000	44.76	4.583	5.97	6.17

2.98
1.500 4.48 | 3.083 116.38 | 4.667 5.97 | 6.25
2.98
1.583 4.48 | 3.167 116.38 | 4.750 5.97 |

Unit Hyd Qpeak (cms)= 0.543

PEAK FLOW (cms)= 0.290 (i)
TIME TO PEAK (hrs)= 3.500
RUNOFF VOLUME (mm)= 24.875
TOTAL RAINFALL (mm)= 74.600
RUNOFF COEFFICIENT = 0.333

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

| CALIB |
| NASHYD (0021) | Area (ha)= 13.99 Curve Number (CN)=
66.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
----- U.H. Tp(hrs)= 0.48

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | ' TIME RAIN | TIME
RAIN
hrs mm/hr | hrs mm/hr | ' hrs mm/hr | hrs
mm/hr
0.083 0.00 | 1.667 4.48 | 3.250 116.38 | 4.83
4.48
0.167 0.00 | 1.750 4.48 | 3.333 16.41 | 4.92
4.48
0.250 0.00 | 1.833 7.46 | 3.417 16.41 | 5.00
4.48
0.333 2.98 | 1.917 7.46 | 3.500 16.41 | 5.08
4.48
0.417 2.98 | 2.000 7.46 | 3.583 16.41 | 5.17
4.48
0.500 2.98 | 2.083 7.46 | 3.667 16.41 | 5.25
4.48
0.583 2.98 | 2.167 7.46 | 3.750 16.41 | 5.33
2.98
0.667 2.98 | 2.250 7.46 | 3.833 7.46 | 5.42
2.98
0.750 2.98 | 2.333 8.95 | 3.917 7.46 | 5.50
2.98

2.98	0.833	4.48		2.417	8.95		4.000	7.46		5.58
2.98	0.917	4.48		2.500	8.95		4.083	7.46		5.67
2.98	1.000	4.48		2.583	8.95		4.167	7.46		5.75
2.98	1.083	4.48		2.667	8.95		4.250	7.46		5.83
2.98	1.167	4.48		2.750	8.95		4.333	5.97		5.92
2.98	1.250	4.48		2.833	44.76		4.417	5.97		6.00
2.98	1.333	4.48		2.917	44.76		4.500	5.97		6.08
2.98	1.417	4.48		3.000	44.76		4.583	5.97		6.17
2.98	1.500	4.48		3.083	116.38		4.667	5.97		6.25
2.98	1.583	4.48		3.167	116.38		4.750	5.97		

Unit Hyd Qpeak (cms)= 1.113

PEAK FLOW (cms)= 0.620 (i)

TIME TO PEAK (hrs)= 3.667

RUNOFF VOLUME (mm)= 24.165

TOTAL RAINFALL (mm)= 74.600

RUNOFF COEFFICIENT = 0.324

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

ADD HYD (0022)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0020):		5.26	0.290	3.50	24.88
+ ID2= 2 (0021):		13.99	0.620	3.67	24.17
=====					
ID = 3 (0022):		19.25	0.897	3.58	24.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0023)		Area	(ha)=	13.60	Curve Number (CN)=
					67.0
ID= 1 DT= 5.0 min		Ia	(mm)=	5.00	# of Linear Res. (N)=
					3.00

----- U.H. Tp(hrs)= 0.48

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

	---- TRANSFORMED HYETOGRAPH ----									
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
	0.083	0.00		1.667	4.48		3.250	116.38		4.83
4.48	0.167	0.00		1.750	4.48		3.333	16.41		4.92
4.48	0.250	0.00		1.833	7.46		3.417	16.41		5.00
4.48	0.333	2.98		1.917	7.46		3.500	16.41		5.08
4.48	0.417	2.98		2.000	7.46		3.583	16.41		5.17
4.48	0.500	2.98		2.083	7.46		3.667	16.41		5.25
4.48	0.583	2.98		2.167	7.46		3.750	16.41		5.33
2.98	0.667	2.98		2.250	7.46		3.833	7.46		5.42
2.98	0.750	2.98		2.333	8.95		3.917	7.46		5.50
2.98	0.833	4.48		2.417	8.95		4.000	7.46		5.58
2.98	0.917	4.48		2.500	8.95		4.083	7.46		5.67
2.98	1.000	4.48		2.583	8.95		4.167	7.46		5.75
2.98	1.083	4.48		2.667	8.95		4.250	7.46		5.83
2.98	1.167	4.48		2.750	8.95		4.333	5.97		5.92
2.98	1.250	4.48		2.833	44.76		4.417	5.97		6.00
2.98	1.333	4.48		2.917	44.76		4.500	5.97		6.08
2.98	1.417	4.48		3.000	44.76		4.583	5.97		6.17
2.98	1.500	4.48		3.083	116.38		4.667	5.97		6.25
2.98	1.583	4.48		3.167	116.38		4.750	5.97		

Unit Hyd Qpeak (cms)= 1.082

PEAK FLOW (cms)= 0.621 (i)

TIME TO PEAK (hrs)= 3.667
 RUNOFF VOLUME (mm)= 24.878
 TOTAL RAINFALL (mm)= 74.600
 RUNOFF COEFFICIENT = 0.333

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

```

-----
-----
| CALIB          |
| NASHYD ( 0024) | Area (ha)= 15.47 Curve Number (CN)=
67.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)=
3.00
----- U.H. Tp(hrs)= 0.68
  
```

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

```

          ----- TRANSFORMED HYETOGRAPH -----
TIME      RAIN | TIME      RAIN | ' TIME      RAIN | TIME
hrs      mm/hr | hrs      mm/hr | ' hrs      mm/hr | hrs
mm/hr
0.083     0.00 | 1.667     4.48 | 3.250    116.38 | 4.83
4.48
0.167     0.00 | 1.750     4.48 | 3.333     16.41 | 4.92
4.48
0.250     0.00 | 1.833     7.46 | 3.417     16.41 | 5.00
4.48
0.333     2.98 | 1.917     7.46 | 3.500     16.41 | 5.08
4.48
0.417     2.98 | 2.000     7.46 | 3.583     16.41 | 5.17
4.48
0.500     2.98 | 2.083     7.46 | 3.667     16.41 | 5.25
4.48
0.583     2.98 | 2.167     7.46 | 3.750     16.41 | 5.33
2.98
0.667     2.98 | 2.250     7.46 | 3.833     7.46 | 5.42
2.98
0.750     2.98 | 2.333     8.95 | 3.917     7.46 | 5.50
2.98
0.833     4.48 | 2.417     8.95 | 4.000     7.46 | 5.58
2.98
0.917     4.48 | 2.500     8.95 | 4.083     7.46 | 5.67
2.98
1.000     4.48 | 2.583     8.95 | 4.167     7.46 | 5.75
2.98
1.083     4.48 | 2.667     8.95 | 4.250     7.46 | 5.83
2.98
  
```

2.98	1.167	4.48		2.750	8.95		4.333	5.97		5.92
2.98	1.250	4.48		2.833	44.76		4.417	5.97		6.00
2.98	1.333	4.48		2.917	44.76		4.500	5.97		6.08
2.98	1.417	4.48		3.000	44.76		4.583	5.97		6.17
2.98	1.500	4.48		3.083	116.38		4.667	5.97		6.25
2.98	1.583	4.48		3.167	116.38		4.750	5.97		

Unit Hyd Qpeak (cms)= 0.869

PEAK FLOW (cms)= 0.553 (i)
 TIME TO PEAK (hrs)= 3.917
 RUNOFF VOLUME (mm)= 24.879
 TOTAL RAINFALL (mm)= 74.600
 RUNOFF COEFFICIENT = 0.333

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

ADD HYD (0025)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0023):	13.60	0.621	3.67	24.88
+ ID2= 2 (0024):	15.47	0.553	3.92	24.88
=====				
ID = 3 (0025):	29.07	1.144	3.75	24.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

=====

V V I SSSSS U U A L (v 6.2.2006)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

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

Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.

***** 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\ychokshi\AppData\Local\Civica\VH5\6598cc33-0c00-4a48-9ce8-
27f4b695ed5c\858f95ac-3005-433d-9e96-e1d12a3afaf8\sce
Summary filename:
C:\Users\ychokshi\AppData\Local\Civica\VH5\6598cc33-0c00-4a48-9ce8-
27f4b695ed5c\858f95ac-3005-433d-9e96-e1d12a3afaf8\sce

DATE: 12/13/2022

TIME: 04:44:27

USER:

COMMENTS: _____

** SIMULATION : 100yr 6hr 15min SCS Type II (**

| READ STORM | Filename: C:\Users\ychokshi\AppData\Local\Temp\
|

|
825ce2009420\ab27b123
| Ptotal= 81.80 mm |

8ccd28ef-3410-4b01-9b0c-

Comments: 100yr 6hr 15min SCS Type II (MTO)

	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
RAIN	0.25	0.00	2.00	8.18	3.75	18.00	5.50
3.27	0.50	3.27	2.25	8.18	4.00	8.18	5.75
3.27	0.75	3.27	2.50	9.82	4.25	8.18	6.00
3.27	1.00	4.91	2.75	9.82	4.50	6.54	6.25
3.27	1.25	4.91	3.00	49.08	4.75	6.54	
	1.50	4.91	3.25	127.61	5.00	4.91	
	1.75	4.91	3.50	18.00	5.25	4.91	

| CALIB
| STANDHYD (0016)
| ID= 1 DT= 5.0 min |

Area (ha)= 8.39
Total Imp(%)= 38.22 Dir. Conn.(%)= 18.62

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.21	5.18
Dep. Storage (mm)=	1.00	3.00
Average Slope (%)=	0.90	0.90
Length (m)=	236.50	500.00
Mannings n =	0.020	0.250

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

---- TRANSFORMED HYETOGRAPH ----

	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
RAIN	0.083	0.00	1.667	4.91	3.250	127.61	4.83
4.91	0.167	0.00	1.750	4.91	3.333	18.00	4.92
4.91	0.250	0.00	1.833	8.18	3.417	18.00	5.00
4.91	0.333	3.27	1.917	8.18	3.500	18.00	5.08
4.91							

4.91	0.417	3.27		2.000	8.18		3.583	18.00		5.17
4.91	0.500	3.27		2.083	8.18		3.667	18.00		5.25
3.27	0.583	3.27		2.167	8.18		3.750	18.00		5.33
3.27	0.667	3.27		2.250	8.18		3.833	8.18		5.42
3.27	0.750	3.27		2.333	9.82		3.917	8.18		5.50
3.27	0.833	4.91		2.417	9.82		4.000	8.18		5.58
3.27	0.917	4.91		2.500	9.82		4.083	8.18		5.67
3.27	1.000	4.91		2.583	9.82		4.167	8.18		5.75
3.27	1.083	4.91		2.667	9.82		4.250	8.18		5.83
3.27	1.167	4.91		2.750	9.82		4.333	6.54		5.92
3.27	1.250	4.91		2.833	49.08		4.417	6.54		6.00
3.27	1.333	4.91		2.917	49.08		4.500	6.54		6.08
3.27	1.417	4.91		3.000	49.08		4.583	6.54		6.17
3.27	1.500	4.91		3.083	127.61		4.667	6.54		6.25
3.27	1.583	4.91		3.167	127.61		4.750	6.54		

Max.Eff.Inten. (mm/hr)=	127.61	34.72
over (min)	5.00	70.00
Storage Coeff. (min)=	5.19 (ii)	67.51 (ii)
Unit Hyd. Tpeak (min)=	5.00	70.00
Unit Hyd. peak (cms)=	0.21	0.02

				TOTALS
(iii) PEAK FLOW	(cms)=	0.53	0.27	0.588
TIME TO PEAK	(hrs)=	3.25	4.33	3.25
RUNOFF VOLUME	(mm)=	80.80	37.10	45.23
TOTAL RAINFALL	(mm)=	81.80	81.80	81.80
RUNOFF COEFFICIENT	=	0.99	0.45	0.55

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 67.9 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.

```

-----
| ROUTEPIPE( 0029) | PIPE Number      = 1.00
| IN= 2---> OUT= 1 | Diameter (mm)=1650.00
| DT= 5.0 min      | Length (m)= 500.00
-----
|                     | Slope (m/m)= 0.005
|                     | Manning n    = 0.013

```

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0016)	8.39	0.59	3.25	45.23	0.34
1.86					
OUTFLOW: ID= 1 (0029)	8.39	0.55	3.25	45.23	0.32
1.82					

```

-----
| CALIB |
| STANDHYD ( 0022) | Area (ha)= 11.83
| ID= 1 DT= 5.0 min | Total Imp(%)= 39.45 Dir. Conn.(%)= 17.05

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha) =	4.67	7.16
Dep. Storage	(mm) =	1.00	1.50
Average Slope	(%) =	2.50	2.50
Length	(m) =	280.83	315.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr
mm/hr								
	0.083	0.00		1.667	4.91		3.250	127.61
4.91								
	0.167	0.00		1.750	4.91		3.333	18.00
4.91								
	0.250	0.00		1.833	8.18		3.417	18.00
4.91								
	0.333	3.27		1.917	8.18		3.500	18.00
4.91								
	0.417	3.27		2.000	8.18		3.583	18.00
4.91								
	0.500	3.27		2.083	8.18		3.667	18.00
4.91								
	0.583	3.27		2.167	8.18		3.750	18.00
3.27								
	0.667	3.27		2.250	8.18		3.833	8.18
3.27								
	0.750	3.27		2.333	9.82		3.917	8.18
3.27								
	0.833	4.91		2.417	9.82		4.000	8.18
3.27								
	0.917	4.91		2.500	9.82		4.083	8.18
3.27								
	1.000	4.91		2.583	9.82		4.167	8.18
3.27								
	1.083	4.91		2.667	9.82		4.250	8.18
3.27								
	1.167	4.91		2.750	9.82		4.333	6.54
3.27								
	1.250	4.91		2.833	49.08		4.417	6.54
3.27								
	1.333	4.91		2.917	49.08		4.500	6.54
3.27								
	1.417	4.91		3.000	49.08		4.583	6.54
3.27								
	1.500	4.91		3.083	127.61		4.667	6.54

3.27

1.583 4.91 | 3.167 127.61 | 4.750 6.54 |

Max.Eff.Inten. (mm/hr)=	127.61	101.65	
over (min)	5.00	30.00	
Storage Coeff. (min)=	3.27 (ii)	25.89 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.27	0.04	
			TOTALS
PEAK FLOW (cms)=	0.71	1.20	1.353
(iii) TIME TO PEAK (hrs)=	3.25	3.58	3.25
RUNOFF VOLUME (mm)=	80.80	57.42	61.41
TOTAL RAINFALL (mm)=	81.80	81.80	81.80
RUNOFF COEFFICIENT =	0.99	0.70	0.75

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD (0023)		Area (ha)=	5.85	
ID= 1 DT= 5.0 min		Total Imp(%)=	19.00	Dir. Conn.(%)= 7.80

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.11	4.74
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.40	2.40
Length	(m)=	197.48	135.00
Mannings n	=	0.013	0.250

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

	---- TRANSFORMED HYETOGRAPH ----									
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr										
4.91	0.083	0.00		1.667	4.91		3.250	127.61		4.83
	0.167	0.00		1.750	4.91		3.333	18.00		4.92

4.91							
	0.250	0.00	1.833	8.18	3.417	18.00	5.00
4.91							
	0.333	3.27	1.917	8.18	3.500	18.00	5.08
4.91							
	0.417	3.27	2.000	8.18	3.583	18.00	5.17
4.91							
	0.500	3.27	2.083	8.18	3.667	18.00	5.25
4.91							
	0.583	3.27	2.167	8.18	3.750	18.00	5.33
3.27							
	0.667	3.27	2.250	8.18	3.833	8.18	5.42
3.27							
	0.750	3.27	2.333	9.82	3.917	8.18	5.50
3.27							
	0.833	4.91	2.417	9.82	4.000	8.18	5.58
3.27							
	0.917	4.91	2.500	9.82	4.083	8.18	5.67
3.27							
	1.000	4.91	2.583	9.82	4.167	8.18	5.75
3.27							
	1.083	4.91	2.667	9.82	4.250	8.18	5.83
3.27							
	1.167	4.91	2.750	9.82	4.333	6.54	5.92
3.27							
	1.250	4.91	2.833	49.08	4.417	6.54	6.00
3.27							
	1.333	4.91	2.917	49.08	4.500	6.54	6.08
3.27							
	1.417	4.91	3.000	49.08	4.583	6.54	6.17
3.27							
	1.500	4.91	3.083	127.61	4.667	6.54	6.25
3.27							
	1.583	4.91	3.167	127.61	4.750	6.54	

Max.Eff.Inten. (mm/hr)=		127.61	110.28	
over (min)		5.00	20.00	
Storage Coeff. (min)=		2.68 (ii)	16.01 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		0.29	0.06	
TOTALS				
PEAK FLOW (cms)=		0.16	0.83	0.855
(iii)				
TIME TO PEAK (hrs)=		3.25	3.42	3.42
RUNOFF VOLUME (mm)=		80.80	54.04	56.13
TOTAL RAINFALL (mm)=		81.80	81.80	81.80
RUNOFF COEFFICIENT =		0.99	0.66	0.69

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

-
-

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

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
4.91	0.083	0.00		1.667	4.91		3.250	127.61		4.83
4.91	0.167	0.00		1.750	4.91		3.333	18.00		4.92
4.91	0.250	0.00		1.833	8.18		3.417	18.00		5.00
4.91	0.333	3.27		1.917	8.18		3.500	18.00		5.08
4.91	0.417	3.27		2.000	8.18		3.583	18.00		5.17
4.91	0.500	3.27		2.083	8.18		3.667	18.00		5.25
3.27	0.583	3.27		2.167	8.18		3.750	18.00		5.33
3.27	0.667	3.27		2.250	8.18		3.833	8.18		5.42
3.27	0.750	3.27		2.333	9.82		3.917	8.18		5.50
3.27	0.833	4.91		2.417	9.82		4.000	8.18		5.58
3.27	0.917	4.91		2.500	9.82		4.083	8.18		5.67

	1.000	4.91		2.583	9.82		4.167	8.18		5.75
3.27										
	1.083	4.91		2.667	9.82		4.250	8.18		5.83
3.27										
	1.167	4.91		2.750	9.82		4.333	6.54		5.92
3.27										
	1.250	4.91		2.833	49.08		4.417	6.54		6.00
3.27										
	1.333	4.91		2.917	49.08		4.500	6.54		6.08
3.27										
	1.417	4.91		3.000	49.08		4.583	6.54		6.17
3.27										
	1.500	4.91		3.083	127.61		4.667	6.54		6.25
3.27										
	1.583	4.91		3.167	127.61		4.750	6.54		

Max.Eff.Inten. (mm/hr)=	127.61	38.96	
over (min)	5.00	55.00	
Storage Coeff. (min)=	2.22 (ii)	54.13 (ii)	
Unit Hyd. Tpeak (min)=	5.00	55.00	
Unit Hyd. peak (cms)=	0.30	0.02	

TOTALS

PEAK FLOW	(cms)=	0.57	0.02	0.577
(iii)				
TIME TO PEAK	(hrs)=	3.25	4.00	3.25
RUNOFF VOLUME	(mm)=	80.80	51.53	75.55
TOTAL RAINFALL	(mm)=	81.80	81.80	81.80
RUNOFF COEFFICIENT	=	0.99	0.63	0.92

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0018)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0022):	11.83	1.353	3.25	61.41
+ ID2= 2 (0023):	5.85	0.855	3.42	56.13
=====				
ID = 3 (0018):	17.68	2.118	3.25	59.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0018) |
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0018):  17.68  2.118  3.25  59.66
+ ID2= 2 ( 0029):   8.39  0.554  3.25  45.23
=====
ID = 1 ( 0018):  26.07  2.672  3.25  55.02
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0018) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0018):  26.07  2.672  3.25  55.02
+ ID2= 2 ( 0040):   1.96  0.577  3.25  75.55
=====
ID = 3 ( 0018):  28.03  3.249  3.25  56.45
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 0026) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
          OUTFLOW      STORAGE      OUTFLOW      STORAGE
          (cms)      (ha.m.)      (cms)      (ha.m.)
**** WARNING : FIRST OUTFLOW IS NOT ZERO.
          0.0020      0.0130      0.1500      0.1750
          0.0050      0.0260      0.1990      0.1940
          0.0110      0.0410      0.2520      0.2140
          0.0140      0.0550      0.3080      0.2350
          0.0160      0.0700      0.3680      0.2570
          0.0180      0.0860      0.4300      0.2790
          0.0200      0.1030      0.4940      0.3020
          0.0380      0.1200      0.5610      0.3250
          0.0680      0.1370      0.6290      0.3500
          0.1060      0.1560      0.6980      0.3750
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	28.030	3.249	3.25	56.45
OUTFLOW: ID= 1 (0026)	28.030	1.365	4.00	56.39

PEAK FLOW REDUCTION [Qout/Qin] (%) = 42.03
TIME SHIFT OF PEAK FLOW (min) = 45.00

MAXIMUM STORAGE USED (ha.m.)= 0.6172

| CALIB |
| STANDHYD (0012) | Area (ha)= 5.57
| ID= 1 DT= 5.0 min | Total Imp(%)= 42.66 Dir. Conn.(%)= 17.46

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.38	3.19
Dep. Storage	(mm)=	1.00	3.00
Average Slope	(%)=	1.00	0.90
Length	(m)=	192.70	694.00
Mannings n	=	0.020	0.250

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

----- TRANSFORMED HYETOGRAPH -----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
mm/hr	0.083	0.00	1.667	4.91	3.250	127.61	4.83
4.91	0.167	0.00	1.750	4.91	3.333	18.00	4.92
4.91	0.250	0.00	1.833	8.18	3.417	18.00	5.00
4.91	0.333	3.27	1.917	8.18	3.500	18.00	5.08
4.91	0.417	3.27	2.000	8.18	3.583	18.00	5.17
4.91	0.500	3.27	2.083	8.18	3.667	18.00	5.25
4.91	0.583	3.27	2.167	8.18	3.750	18.00	5.33
3.27	0.667	3.27	2.250	8.18	3.833	8.18	5.42
3.27	0.750	3.27	2.333	9.82	3.917	8.18	5.50
3.27	0.833	4.91	2.417	9.82	4.000	8.18	5.58
3.27	0.917	4.91	2.500	9.82	4.083	8.18	5.67
3.27	1.000	4.91	2.583	9.82	4.167	8.18	5.75
3.27	1.083	4.91	2.667	9.82	4.250	8.18	5.83
3.27	1.167	4.91	2.750	9.82	4.333	6.54	5.92

3.27	1.250	4.91		2.833	49.08		4.417	6.54		6.00
3.27	1.333	4.91		2.917	49.08		4.500	6.54		6.08
3.27	1.417	4.91		3.000	49.08		4.583	6.54		6.17
3.27	1.500	4.91		3.083	127.61		4.667	6.54		6.25
3.27	1.583	4.91		3.167	127.61		4.750	6.54		

Max.Eff.Inten. (mm/hr)=	127.61	42.93	
over (min)	5.00	75.00	
Storage Coeff. (min)=	4.45 (ii)	74.14 (ii)	
Unit Hyd. Tpeak (min)=	5.00	75.00	
Unit Hyd. peak (cms)=	0.23	0.02	
			TOTALS
PEAK FLOW (cms)=	0.34	0.19	0.374
(iii) TIME TO PEAK (hrs)=	3.25	4.42	3.25
RUNOFF VOLUME (mm)=	80.80	41.78	48.58
TOTAL RAINFALL (mm)=	81.80	81.80	81.80
RUNOFF COEFFICIENT =	0.99	0.51	0.59

***** 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* = 70.9 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0021)	Area (ha)=	5.47	
ID= 1 DT= 5.0 min	Total Imp(%)=	44.25	Dir. Conn.(%)= 21.85

		IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.42	3.05	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	1.40	1.40	
Length (m)=	190.96	570.00	
Mannings n =	0.013	0.250	

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

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr										
4.91	0.083	0.00		1.667	4.91		3.250	127.61		4.83
4.91	0.167	0.00		1.750	4.91		3.333	18.00		4.92
4.91	0.250	0.00		1.833	8.18		3.417	18.00		5.00
4.91	0.333	3.27		1.917	8.18		3.500	18.00		5.08
4.91	0.417	3.27		2.000	8.18		3.583	18.00		5.17
4.91	0.500	3.27		2.083	8.18		3.667	18.00		5.25
3.27	0.583	3.27		2.167	8.18		3.750	18.00		5.33
3.27	0.667	3.27		2.250	8.18		3.833	8.18		5.42
3.27	0.750	3.27		2.333	9.82		3.917	8.18		5.50
3.27	0.833	4.91		2.417	9.82		4.000	8.18		5.58
3.27	0.917	4.91		2.500	9.82		4.083	8.18		5.67
3.27	1.000	4.91		2.583	9.82		4.167	8.18		5.75
3.27	1.083	4.91		2.667	9.82		4.250	8.18		5.83
3.27	1.167	4.91		2.750	9.82		4.333	6.54		5.92
3.27	1.250	4.91		2.833	49.08		4.417	6.54		6.00
3.27	1.333	4.91		2.917	49.08		4.500	6.54		6.08
3.27	1.417	4.91		3.000	49.08		4.583	6.54		6.17
3.27	1.500	4.91		3.083	127.61		4.667	6.54		6.25
	1.583	4.91		3.167	127.61		4.750	6.54		

Max.Eff.Inten. (mm/hr)=	127.61	69.92
over (min)	5.00	50.00
Storage Coeff. (min)=	3.09 (ii)	47.71 (ii)
Unit Hyd. Tpeak (min)=	5.00	50.00
Unit Hyd. peak (cms)=	0.27	0.02
PEAK FLOW (cms)=	0.42	0.35
(iii)		

TOTALS
0.537

TIME TO PEAK	(hrs)=	3.25	3.92	3.25
RUNOFF VOLUME	(mm)=	80.80	57.83	62.84
TOTAL RAINFALL	(mm)=	81.80	81.80	81.80
RUNOFF COEFFICIENT	=	0.99	0.71	0.77

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
| ROUTEPIPE( 0030) | PIPE Number      = 1.00
| IN= 2---> OUT= 1 | Diameter      (mm)= 500.00
| DT= 5.0 min      | Length        (m)= 26.00
-----          | Slope          (m/m)= 0.005
                   | Manning n      = 0.013

```

**** WARNING: MINIMUM PIPE SIZE REQUIRED = 649.90 (mm) FOR
FREE FLOW.

THIS SIZE WAS USED IN THE ROUTING.
THE CAPACITY OF THIS PIPE = 0.54 (cms)

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.03	.174E+00	0.0	0.43	1.01
0.07	.484E+00	0.0	0.67	0.65
0.10	.874E+00	0.0	0.86	0.50
0.14	.132E+01	0.1	1.03	0.42
0.17	.181E+01	0.1	1.17	0.37
0.21	.234E+01	0.1	1.29	0.34
0.24	.288E+01	0.2	1.40	0.31
0.27	.345E+01	0.2	1.50	0.29
0.31	.402E+01	0.2	1.58	0.27
0.34	.460E+01	0.3	1.66	0.26
0.38	.518E+01	0.3	1.72	0.25
0.41	.574E+01	0.4	1.77	0.25
0.44	.629E+01	0.4	1.81	0.24
0.48	.681E+01	0.5	1.83	0.24
0.51	.730E+01	0.5	1.85	0.23
0.55	.775E+01	0.6	1.85	0.23
0.58	.814E+01	0.6	1.83	0.24
0.62	.845E+01	0.6	1.78	0.24
0.65	.863E+01	0.5	1.62	0.27

channel-> <---- hydrograph ----> <-pipe /

MAX VEL	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
(m/s)	(ha)	(cms)	(hrs)	(mm)	(m)
INFLOW : ID= 2 (0021)	5.47	0.54	3.25	62.84	0.53
1.85					
OUTFLOW: ID= 1 (0030)	5.47	0.53	3.25	62.84	0.53
1.85					

**** WARNING: COMPUTATIONS FAILED TO CONVERGE.

ADD HYD (0013)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):	5.57	0.374	3.25	48.58
+ ID2= 2 (0030):	5.47	0.529	3.25	62.84
=====				
ID = 3 (0013):	11.04	0.903	3.25	55.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTEPIPE(0031)	PIPE Number	= 1.00
IN= 2---> OUT= 1	Diameter (mm)	=1650.00
DT= 5.0 min	Length (m)	= 500.00
	Slope (m/m)	= 0.005
	Manning n	= 0.013

<----- TRAVEL TIME TABLE ----->

DEPTH	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(cu.m.)	(cms)	(m/s)	min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44

1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0013)	11.04	0.90	3.25	55.65	0.42
2.11					
OUTFLOW: ID= 1 (0031)	11.04	0.87	3.25	55.65	0.41
2.09					

```

-----
-----
| CALIB |
| STANDHYD ( 0025) | Area (ha)= 2.35
| ID= 1 DT= 5.0 min | Total Imp(%)= 14.40 Dir. Conn.(%)= 3.20
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.34	2.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.80	0.80
Length	(m)=	125.17	400.00
Mannings n	=	0.013	0.250

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

```

----- TRANSFORMED HYETOGRAPH -----

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
4.91	0.083	0.00	1.667	4.91	3.250	127.61	4.83
4.91	0.167	0.00	1.750	4.91	3.333	18.00	4.92
4.91	0.250	0.00	1.833	8.18	3.417	18.00	5.00
4.91	0.333	3.27	1.917	8.18	3.500	18.00	5.08
4.91	0.417	3.27	2.000	8.18	3.583	18.00	5.17
4.91	0.500	3.27	2.083	8.18	3.667	18.00	5.25

4.91	0.583	3.27		2.167	8.18		3.750	18.00		5.33
3.27	0.667	3.27		2.250	8.18		3.833	8.18		5.42
3.27	0.750	3.27		2.333	9.82		3.917	8.18		5.50
3.27	0.833	4.91		2.417	9.82		4.000	8.18		5.58
3.27	0.917	4.91		2.500	9.82		4.083	8.18		5.67
3.27	1.000	4.91		2.583	9.82		4.167	8.18		5.75
3.27	1.083	4.91		2.667	9.82		4.250	8.18		5.83
3.27	1.167	4.91		2.750	9.82		4.333	6.54		5.92
3.27	1.250	4.91		2.833	49.08		4.417	6.54		6.00
3.27	1.333	4.91		2.917	49.08		4.500	6.54		6.08
3.27	1.417	4.91		3.000	49.08		4.583	6.54		6.17
3.27	1.500	4.91		3.083	127.61		4.667	6.54		6.25
3.27	1.583	4.91		3.167	127.61		4.750	6.54		

Max.Eff.Inten. (mm/hr)=	127.61	48.99	
over (min)	5.00	55.00	
Storage Coeff. (min)=	2.84 (ii)	52.04 (ii)	
Unit Hyd. Tpeak (min)=	5.00	55.00	
Unit Hyd. peak (cms)=	0.28	0.02	
			TOTALS
PEAK FLOW (cms)=	0.03	0.16	0.164
(iii)			
TIME TO PEAK (hrs)=	3.25	4.00	4.00
RUNOFF VOLUME (mm)=	80.80	53.92	54.76
TOTAL RAINFALL (mm)=	81.80	81.80	81.80
RUNOFF COEFFICIENT =	0.99	0.66	0.67

***** 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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0033) | Area (ha)= 1.97
| ID= 1 DT= 5.0 min | Total Imp(%)= 18.80 Dir. Conn.(%)= 7.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.37	1.60
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	114.60	241.00
Mannings n	=	0.013	0.250

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

	---- TRANSFORMED HYETOGRAPH ----							
RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	
mm/hr	0.083	0.00	1.667	4.91	3.250	127.61	4.83	
4.91	0.167	0.00	1.750	4.91	3.333	18.00	4.92	
4.91	0.250	0.00	1.833	8.18	3.417	18.00	5.00	
4.91	0.333	3.27	1.917	8.18	3.500	18.00	5.08	
4.91	0.417	3.27	2.000	8.18	3.583	18.00	5.17	
4.91	0.500	3.27	2.083	8.18	3.667	18.00	5.25	
4.91	0.583	3.27	2.167	8.18	3.750	18.00	5.33	
3.27	0.667	3.27	2.250	8.18	3.833	8.18	5.42	
3.27	0.750	3.27	2.333	9.82	3.917	8.18	5.50	
3.27	0.833	4.91	2.417	9.82	4.000	8.18	5.58	
3.27	0.917	4.91	2.500	9.82	4.083	8.18	5.67	
3.27	1.000	4.91	2.583	9.82	4.167	8.18	5.75	
3.27	1.083	4.91	2.667	9.82	4.250	8.18	5.83	
3.27	1.167	4.91	2.750	9.82	4.333	6.54	5.92	
3.27	1.250	4.91	2.833	49.08	4.417	6.54	6.00	
3.27								

3.27	1.333	4.91		2.917	49.08		4.500	6.54		6.08
3.27	1.417	4.91		3.000	49.08		4.583	6.54		6.17
3.27	1.500	4.91		3.083	127.61		4.667	6.54		6.25
3.27	1.583	4.91		3.167	127.61		4.750	6.54		

Max.Eff.Inten. (mm/hr)=	127.61	79.36	
over (min)	5.00	25.00	
Storage Coeff. (min)=	2.04 (ii)	24.78 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.31	0.05	
			TOTALS
PEAK FLOW (cms)=	0.05	0.22	0.227
(iii) TIME TO PEAK (hrs)=	3.25	3.50	3.50
RUNOFF VOLUME (mm)=	80.80	54.04	56.06
TOTAL RAINFALL (mm)=	81.80	81.80	81.80
RUNOFF COEFFICIENT =	0.99	0.66	0.69

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
| CALIB |
| STANDHYD ( 0034) | Area (ha)= 2.46
| ID= 1 DT= 5.0 min | Total Imp(%)= 18.80 Dir. Conn.(%)= 3.20
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.46	2.00
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.60	1.60
Length	(m)=	128.06	250.00
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
RAIN

```

	hrs	mm/hr		hrs	mm/hr	'	hrs	mm/hr		hrs
mm/hr	0.083	0.00		1.667	4.91		3.250	127.61		4.83
4.91	0.167	0.00		1.750	4.91		3.333	18.00		4.92
4.91	0.250	0.00		1.833	8.18		3.417	18.00		5.00
4.91	0.333	3.27		1.917	8.18		3.500	18.00		5.08
4.91	0.417	3.27		2.000	8.18		3.583	18.00		5.17
4.91	0.500	3.27		2.083	8.18		3.667	18.00		5.25
4.91	0.583	3.27		2.167	8.18		3.750	18.00		5.33
3.27	0.667	3.27		2.250	8.18		3.833	8.18		5.42
3.27	0.750	3.27		2.333	9.82		3.917	8.18		5.50
3.27	0.833	4.91		2.417	9.82		4.000	8.18		5.58
3.27	0.917	4.91		2.500	9.82		4.083	8.18		5.67
3.27	1.000	4.91		2.583	9.82		4.167	8.18		5.75
3.27	1.083	4.91		2.667	9.82		4.250	8.18		5.83
3.27	1.167	4.91		2.750	9.82		4.333	6.54		5.92
3.27	1.250	4.91		2.833	49.08		4.417	6.54		6.00
3.27	1.333	4.91		2.917	49.08		4.500	6.54		6.08
3.27	1.417	4.91		3.000	49.08		4.583	6.54		6.17
3.27	1.500	4.91		3.083	127.61		4.667	6.54		6.25
3.27	1.583	4.91		3.167	127.61		4.750	6.54		

Max.Eff.Inten. (mm/hr)= 127.61 84.52
 over (min) 5.00 30.00
 Storage Coeff. (min)= 2.33 (ii) 26.57 (ii)
 Unit Hyd. Tpeak (min)= 5.00 30.00
 Unit Hyd. peak (cms)= 0.30 0.04

TOTALS

(iii) PEAK FLOW (cms)= 0.03 0.27 0.278
 TIME TO PEAK (hrs)= 3.25 3.58 3.58
 RUNOFF VOLUME (mm)= 80.80 54.91 55.73
 TOTAL RAINFALL (mm)= 81.80 81.80 81.80

RUNOFF COEFFICIENT = 0.99 0.67 0.68

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0039) | Area (ha)= 2.47
| ID= 1 DT= 5.0 min | Total Imp(%)= 92.64 Dir. Conn.(%)= 92.64

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.29	0.18
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.60	0.60
Length	(m)=	128.32	1000.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
4.91	0.083	0.00	1.667	4.91	3.250	127.61	4.83
4.91	0.167	0.00	1.750	4.91	3.333	18.00	4.92
4.91	0.250	0.00	1.833	8.18	3.417	18.00	5.00
4.91	0.333	3.27	1.917	8.18	3.500	18.00	5.08
4.91	0.417	3.27	2.000	8.18	3.583	18.00	5.17
4.91	0.500	3.27	2.083	8.18	3.667	18.00	5.25
4.91	0.583	3.27	2.167	8.18	3.750	18.00	5.33
3.27	0.667	3.27	2.250	8.18	3.833	8.18	5.42
3.27	0.750	3.27	2.333	9.82	3.917	8.18	5.50

3.27	0.833	4.91		2.417	9.82		4.000	8.18		5.58
3.27	0.917	4.91		2.500	9.82		4.083	8.18		5.67
3.27	1.000	4.91		2.583	9.82		4.167	8.18		5.75
3.27	1.083	4.91		2.667	9.82		4.250	8.18		5.83
3.27	1.167	4.91		2.750	9.82		4.333	6.54		5.92
3.27	1.250	4.91		2.833	49.08		4.417	6.54		6.00
3.27	1.333	4.91		2.917	49.08		4.500	6.54		6.08
3.27	1.417	4.91		3.000	49.08		4.583	6.54		6.17
3.27	1.500	4.91		3.083	127.61		4.667	6.54		6.25
3.27	1.583	4.91		3.167	127.61		4.750	6.54		

Max.Eff.Inten. (mm/hr)=	127.61	36.97	
over (min)	5.00	110.00	
Storage Coeff. (min)=	3.14 (ii)	107.16 (ii)	
Unit Hyd. Tpeak (min)=	5.00	110.00	
Unit Hyd. peak (cms)=	0.27	0.01	
			TOTALS
PEAK FLOW (cms)=	0.81	0.01	0.808
(iii) TIME TO PEAK (hrs)=	3.25	5.00	3.25
RUNOFF VOLUME (mm)=	80.80	51.53	78.62
TOTAL RAINFALL (mm)=	81.80	81.80	81.80
RUNOFF COEFFICIENT =	0.99	0.63	0.96

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0032)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
-----	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0025):	2.35	0.164	4.00	54.76
+ ID2= 2 (0031):	11.04	0.875	3.25	55.65

```
=====
ID = 3 ( 0032):      13.39    0.949      3.25    55.49
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0032) |
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0032):      13.39    0.949      3.25    55.49
+ ID2= 2 ( 0033):      1.97    0.227      3.50    56.06
=====
ID = 1 ( 0032):      15.36    1.136      3.25    55.57
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0032) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0032):      15.36    1.136      3.25    55.57
+ ID2= 2 ( 0034):      2.46    0.278      3.58    55.73
=====
ID = 3 ( 0032):      17.82    1.308      3.25    55.59
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0032) |
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0032):      17.82    1.308      3.25    55.59
+ ID2= 2 ( 0039):      2.47    0.808      3.25    78.62
=====
ID = 1 ( 0032):      20.29    2.116      3.25    58.39
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 0035) |      OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
          OUTFLOW      STORAGE      |      OUTFLOW      STORAGE
          (cms)      (ha.m.)      |      (cms)      (ha.m.)
          0.0000      0.0190      |      0.1040      0.2460
```

0.0020	0.0380		0.1480	0.2720
0.0040	0.0580		0.1970	0.3000
0.0100	0.0790		0.2500	0.3280
0.0130	0.1010		0.3060	0.3570
0.0150	0.1230		0.3660	0.3870
0.0170	0.1460		0.4280	0.4180
0.0190	0.1700		0.4920	0.4490
0.0360	0.1940		0.5580	0.4810
0.0660	0.2200		0.6260	0.5150

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0032)	20.290	2.116	3.25	58.39
OUTFLOW: ID= 1 (0035)	20.290	0.694	4.75	57.34

PEAK FLOW REDUCTION [Qout/Qin] (%) = 32.79
 TIME SHIFT OF PEAK FLOW (min) = 90.00
 MAXIMUM STORAGE USED (ha.m.) = 0.5491

```

-----
-----
=====
=====
  
```

```

V   V   I   SSSSS U   U   A   L           (v 6.2.2006)
V   V   I   SS    U   U   A A  L
V   V   I   SS    U   U   AAAAA L
V   V   I   SS    U   U   A   A  L
VV      I   SSSSS UUUUU A   A  LLLLL
  
```

```

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

Developed and Distributed by Smart City Water Inc
 Copyright 2007 - 2021 Smart City Water Inc
 All rights reserved.

***** 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\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
 27f4b695ed5c\c3212932-4e9d-44a0-89d5-bea914efcee7\sce
 Summary filename:
 C:\Users\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
 27f4b695ed5c\c3212932-4e9d-44a0-89d5-bea914efcee7\sce

DATE: 12/13/2022

TIME: 04:44:27

USER:

COMMENTS: _____

** SIMULATION : 10yr 6hr 15min SCS Type II (M **

| READ STORM | Filename: C:\Users\ychokshi\AppData
| | ata\Local\Temp\
| | 8ccd28ef-3410-4b01-9b0c-
825ce2009420\ca8e086a
| Ptotal= 57.10 mm | Comments: 10yr 6hr 15min SCS Type II (MTO)

TIME RAIN | TIME RAIN | TIME RAIN | TIME
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs
mm/hr
0.25 0.00 | 2.00 5.71 | 3.75 12.56 | 5.50
2.28
0.50 2.28 | 2.25 5.71 | 4.00 5.71 | 5.75
2.28
0.75 2.28 | 2.50 6.85 | 4.25 5.71 | 6.00
2.28
1.00 3.43 | 2.75 6.85 | 4.50 4.57 | 6.25
2.28
1.25 3.43 | 3.00 34.26 | 4.75 4.57 |
1.50 3.43 | 3.25 89.08 | 5.00 3.43 |
1.75 3.43 | 3.50 12.56 | 5.25 3.43 |

| CALIB |
| STANDHYD (0016) | Area (ha)= 8.39
| ID= 1 DT= 5.0 min | Total Imp(%)= 38.22 Dir. Conn.(%)= 18.62

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.21	5.18
Dep. Storage (mm)=	1.00	3.00

Average Slope	(%)=	0.90	0.90
Length	(m)=	236.50	500.00
Mannings n	=	0.020	0.250

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

----- TRANSFORMED HYETOGRAPH -----										
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr										
	0.083	0.00		1.667	3.43		3.250	89.08		4.83
3.43										
	0.167	0.00		1.750	3.43		3.333	12.56		4.92
3.43										
	0.250	0.00		1.833	5.71		3.417	12.56		5.00
3.43										
	0.333	2.28		1.917	5.71		3.500	12.56		5.08
3.43										
	0.417	2.28		2.000	5.71		3.583	12.56		5.17
3.43										
	0.500	2.28		2.083	5.71		3.667	12.56		5.25
3.43										
	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28										
	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28										
	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28										
	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28										
	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28										
	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28										
	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28										
	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28										
	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28										
	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28										
	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28										
	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28										
	1.583	3.43		3.167	89.08		4.750	4.57		

Max.Eff.Inten. (mm/hr)=	89.08	19.15
-------------------------	-------	-------

	over (min)	5.00	90.00	
Storage Coeff.	(min)=	5.99 (ii)	85.06 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	90.00	
Unit Hyd. peak	(cms)=	0.19	0.01	
				TOTALS
PEAK FLOW	(cms)=	0.37	0.13	0.383
(iii)				
TIME TO PEAK	(hrs)=	3.25	4.67	3.25
RUNOFF VOLUME	(mm)=	56.10	20.62	27.22
TOTAL RAINFALL	(mm)=	57.10	57.10	57.10
RUNOFF COEFFICIENT	=	0.98	0.36	0.48

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 67.9 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.

```

-----
-----
| ROUTEPIPE( 0029) | PIPE Number      = 1.00
| IN= 2---> OUT= 1 | Diameter (mm)=1650.00
| DT= 5.0 min      | Length (m)= 500.00
|                   | Slope (m/m)= 0.005
|                   | Manning n    = 0.013
-----

```

<----- TRAVEL TIME TABLE ----->

DEPTH	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(cu.m.)	(cms)	(m/s)	min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52

1.65 .107E+04 6.5 3.02 2.76
 <---- hydrograph ----> <-pipe /
 channel->
 AREA QPEAK TPEAK R.V. MAX DEPTH
 MAX VEL
 (m/s)
 INFLOW : ID= 2 (0016) 8.39 0.38 3.25 27.22 0.27
 1.64
 OUTFLOW: ID= 1 (0029) 8.39 0.36 3.25 27.22 0.26
 1.61

 | CALIB |
 | STANDHYD (0022) | Area (ha)= 11.83
 | ID= 1 DT= 5.0 min | Total Imp(%)= 39.45 Dir. Conn.(%)= 17.05

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.67	7.16
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.50	2.50
Length	(m)=	280.83	315.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.43	0.083	0.00	1.667	3.43	3.250	89.08	4.83
3.43	0.167	0.00	1.750	3.43	3.333	12.56	4.92
3.43	0.250	0.00	1.833	5.71	3.417	12.56	5.00
3.43	0.333	2.28	1.917	5.71	3.500	12.56	5.08
3.43	0.417	2.28	2.000	5.71	3.583	12.56	5.17
3.43	0.500	2.28	2.083	5.71	3.667	12.56	5.25
3.43	0.583	2.28	2.167	5.71	3.750	12.56	5.33
2.28	0.667	2.28	2.250	5.71	3.833	5.71	5.42

2.28	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28	1.583	3.43		3.167	89.08		4.750	4.57		

Max.Eff.Inten. (mm/hr)=	89.08	55.43
over (min)	5.00	35.00
Storage Coeff. (min)=	3.78 (ii)	32.61 (ii)
Unit Hyd. Tpeak (min)=	5.00	35.00
Unit Hyd. peak (cms)=	0.25	0.03

TOTALS

PEAK FLOW (cms)=	0.49	0.64	0.772
(iii) TIME TO PEAK (hrs)=	3.25	3.67	3.25
RUNOFF VOLUME (mm)=	56.10	35.35	38.89
TOTAL RAINFALL (mm)=	57.10	57.10	57.10
RUNOFF COEFFICIENT =	0.98	0.62	0.68

***** 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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 | CALIB |
 | STANDHYD (0023) | Area (ha)= 5.85

ID= 1	DT= 5.0 min	Total Imp(%)= 19.00	Dir. Conn.(%)= 7.80
-------	-------------	---------------------	---------------------

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha) =	1.11	4.74
Dep. Storage	(mm) =	1.00	1.50
Average Slope	(%) =	2.40	2.40
Length	(m) =	197.48	135.00
Mannings n	=	0.013	0.250

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

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr										
3.43	0.083	0.00		1.667	3.43		3.250	89.08		4.83
3.43	0.167	0.00		1.750	3.43		3.333	12.56		4.92
3.43	0.250	0.00		1.833	5.71		3.417	12.56		5.00
3.43	0.333	2.28		1.917	5.71		3.500	12.56		5.08
3.43	0.417	2.28		2.000	5.71		3.583	12.56		5.17
3.43	0.500	2.28		2.083	5.71		3.667	12.56		5.25
2.28	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28	1.417	3.43		3.000	34.26		4.583	4.57		6.17

3.43	0.167	0.00		1.750	3.43		3.333	12.56		4.92
3.43	0.250	0.00		1.833	5.71		3.417	12.56		5.00
3.43	0.333	2.28		1.917	5.71		3.500	12.56		5.08
3.43	0.417	2.28		2.000	5.71		3.583	12.56		5.17
3.43	0.500	2.28		2.083	5.71		3.667	12.56		5.25
2.28	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28	1.583	3.43		3.167	89.08		4.750	4.57		

Max.Eff.Inten. (mm/hr)=	89.08	22.04	
over (min)	5.00	70.00	
Storage Coeff. (min)=	2.57 (ii)	67.77 (ii)	
Unit Hyd. Tpeak (min)=	5.00	70.00	
Unit Hyd. peak (cms)=	0.29	0.02	
			TOTALS
PEAK FLOW (cms)=	0.40	0.01	0.400
(iii)			
TIME TO PEAK (hrs)=	3.25	4.33	3.25
RUNOFF VOLUME (mm)=	56.10	30.78	51.55
TOTAL RAINFALL (mm)=	57.10	57.10	57.10
RUNOFF COEFFICIENT =	0.98	0.54	0.90

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD  ( 0018) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0022):    11.83    0.772    3.25    38.89
+ ID2= 2 ( 0023):     5.85    0.444    3.50    34.52
=====
ID = 3 ( 0018):    17.68    1.140    3.25    37.44

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD  ( 0018) |
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0018):    17.68    1.140    3.25    37.44
+ ID2= 2 ( 0029):     8.39    0.355    3.25    27.22
=====
ID = 1 ( 0018):    26.07    1.495    3.25    34.15

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD  ( 0018) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0018):    26.07    1.495    3.25    34.15
+ ID2= 2 ( 0040):     1.96    0.400    3.25    51.55
=====
ID = 3 ( 0018):    28.03    1.895    3.25    35.37

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0026) |      OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min      |      OUTFLOW      STORAGE      |      OUTFLOW      STORAGE

```

```

-----
              (cms)      (ha.m.) |      (cms)      (ha.m.)
**** WARNING : FIRST OUTFLOW IS NOT ZERO.
              0.0020      0.0130 |      0.1500      0.1750
              0.0050      0.0260 |      0.1990      0.1940
              0.0110      0.0410 |      0.2520      0.2140
              0.0140      0.0550 |      0.3080      0.2350
              0.0160      0.0700 |      0.3680      0.2570
              0.0180      0.0860 |      0.4300      0.2790
              0.0200      0.1030 |      0.4940      0.3020
              0.0380      0.1200 |      0.5610      0.3250
              0.0680      0.1370 |      0.6290      0.3500
              0.1060      0.1560 |      0.6980      0.3750

```

```

              AREA      QPEAK      TPEAK      R.V.
              (ha)      (cms)      (hrs)      (mm)
INFLOW : ID= 2 ( 0018) 28.030      1.895      3.25      35.37
OUTFLOW: ID= 1 ( 0026) 28.030      0.757      4.17      35.31

```

```

PEAK FLOW REDUCTION [Qout/Qin] (%) = 39.96
TIME SHIFT OF PEAK FLOW (min) = 55.00
MAXIMUM STORAGE USED (ha.m.) = 0.3965

```

```

-----
-----
| CALIB |
| STANDHYD ( 0012) | Area (ha) = 5.57
| ID= 1 DT= 5.0 min | Total Imp (%) = 42.66 Dir. Conn. (%) = 17.46
-----

```

```

              IMPERVIOUS      PERVIOUS (i)
Surface Area (ha) = 2.38      3.19
Dep. Storage (mm) = 1.00      3.00
Average Slope (%) = 1.00      0.90
Length (m) = 192.70      694.00
Mannings n = 0.020      0.250

```

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

```

              ----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | ' TIME RAIN | TIME
RAIN
      hrs mm/hr | hrs mm/hr | ' hrs mm/hr | hrs
mm/hr
0.083 0.00 | 1.667 3.43 | 3.250 89.08 | 4.83
3.43 0.167 0.00 | 1.750 3.43 | 3.333 12.56 | 4.92
3.43 0.250 0.00 | 1.833 5.71 | 3.417 12.56 | 5.00
3.43 0.333 2.28 | 1.917 5.71 | 3.500 12.56 | 5.08

```

3.43							
	0.417	2.28		2.000	5.71		3.583
3.43							
	0.500	2.28		2.083	5.71		3.667
3.43							
	0.583	2.28		2.167	5.71		3.750
2.28							
	0.667	2.28		2.250	5.71		3.833
2.28							
	0.750	2.28		2.333	6.85		3.917
2.28							
	0.833	3.43		2.417	6.85		4.000
2.28							
	0.917	3.43		2.500	6.85		4.083
2.28							
	1.000	3.43		2.583	6.85		4.167
2.28							
	1.083	3.43		2.667	6.85		4.250
2.28							
	1.167	3.43		2.750	6.85		4.333
2.28							
	1.250	3.43		2.833	34.26		4.417
2.28							
	1.333	3.43		2.917	34.26		4.500
2.28							
	1.417	3.43		3.000	34.26		4.583
2.28							
	1.500	3.43		3.083	89.08		4.667
2.28							
	1.583	3.43		3.167	89.08		4.750

Max.Eff.Inten. (mm/hr)=	89.08	24.26	
over (min)	5.00	95.00	
Storage Coeff. (min)=	5.14 (ii)	92.70 (ii)	
Unit Hyd. Tpeak (min)=	5.00	95.00	
Unit Hyd. peak (cms)=	0.21	0.01	

TOTALS

PEAK FLOW (cms)=	0.23	0.09	0.245
(iii)			
TIME TO PEAK (hrs)=	3.25	4.75	3.25
RUNOFF VOLUME (mm)=	56.10	23.76	29.39
TOTAL RAINFALL (mm)=	57.10	57.10	57.10
RUNOFF COEFFICIENT =	0.98	0.42	0.51

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.9 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

```

-----
-----
| CALIB |
| STANDHYD ( 0021) | Area (ha)= 5.47
| ID= 1 DT= 5.0 min | Total Imp(%)= 44.25 Dir. Conn.(%)= 21.85
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.42	3.05
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.40	1.40
Length	(m)=	190.96	570.00
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
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
RAIN										
mm/hr										
	0.083	0.00		1.667	3.43		3.250	89.08		4.83
3.43	0.167	0.00		1.750	3.43		3.333	12.56		4.92
3.43	0.250	0.00		1.833	5.71		3.417	12.56		5.00
3.43	0.333	2.28		1.917	5.71		3.500	12.56		5.08
3.43	0.417	2.28		2.000	5.71		3.583	12.56		5.17
3.43	0.500	2.28		2.083	5.71		3.667	12.56		5.25
3.43	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28	1.167	3.43		2.750	6.85		4.333	4.57		5.92

2.28	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28	1.583	3.43		3.167	89.08		4.750	4.57		

Max.Eff.Inten. (mm/hr)=	89.08	35.87	
over (min)	5.00	65.00	
Storage Coeff. (min)=	3.57 (ii)	61.84 (ii)	
Unit Hyd. Tpeak (min)=	5.00	65.00	
Unit Hyd. peak (cms)=	0.26	0.02	
			TOTALS
PEAK FLOW (cms)=	0.29	0.18	0.336
(iii) TIME TO PEAK (hrs)=	3.25	4.17	3.25
RUNOFF VOLUME (mm)=	56.10	35.67	40.13
TOTAL RAINFALL (mm)=	57.10	57.10	57.10
RUNOFF COEFFICIENT =	0.98	0.62	0.70

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| ROUTEPIPE( 0030) | PIPE Number      = 1.00
| IN= 2---> OUT= 1 | Diameter      (mm)= 500.00
| DT= 5.0 min      | Length        (m)= 26.00
|                   | Slope         (m/m)= 0.005
|                   | Manning n     = 0.013
-----

```

**** WARNING: MINIMUM PIPE SIZE REQUIRED = 545.02 (mm) FOR
 FREE FLOW.

THIS SIZE WAS USED IN THE ROUTING.
 THE CAPACITY OF THIS PIPE = 0.34 (cms)

<----- TRAVEL TIME TABLE ----->				
DEPTH	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(cu.m.)	(cms)	(m/s)	min
0.03	.122E+00	0.0	0.38	1.13
0.06	.340E+00	0.0	0.60	0.73

0.09	.615E+00	0.0	0.77	0.56
0.11	.929E+00	0.0	0.91	0.47
0.14	.127E+01	0.1	1.04	0.42
0.17	.164E+01	0.1	1.15	0.38
0.20	.203E+01	0.1	1.25	0.35
0.23	.243E+01	0.1	1.33	0.33
0.26	.283E+01	0.2	1.41	0.31
0.29	.324E+01	0.2	1.47	0.29
0.32	.364E+01	0.2	1.53	0.28
0.34	.404E+01	0.2	1.57	0.28
0.37	.442E+01	0.3	1.61	0.27
0.40	.479E+01	0.3	1.63	0.27
0.43	.514E+01	0.3	1.64	0.26
0.46	.545E+01	0.3	1.64	0.26
0.49	.573E+01	0.4	1.62	0.27
0.52	.594E+01	0.4	1.58	0.27
0.55	.607E+01	0.3	1.44	0.30

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0021)	5.47	0.34	3.25	40.13	0.45
1.64					
OUTFLOW: ID= 1 (0030)	5.47	0.33	3.25	40.13	0.45
1.64					

**** WARNING: COMPUTATIONS FAILED TO CONVERGE.

```

-----
| ADD HYD ( 0013) |
| 1 + 2 = 3 |
-----
ID1= 1 ( 0012): 5.57 0.245 3.25 29.39
+ ID2= 2 ( 0030): 5.47 0.330 3.25 40.13
=====
ID = 3 ( 0013): 11.04 0.575 3.25 34.71

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTEPIPE( 0031) | PIPE Number = 1.00
| IN= 2--> OUT= 1 | Diameter (mm)=1650.00
| DT= 5.0 min | Length (m)= 500.00
| | Slope (m/m)= 0.005
-----

```

Manning n = 0.013

<----- TRAVEL TIME TABLE ----->

DEPTH	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(cu.m.)	(cms)	(m/s)	min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0013)	11.04	0.58	3.25	34.71	0.33
1.85					
OUTFLOW: ID= 1 (0031)	11.04	0.55	3.25	34.71	0.32
1.82					

CALIB					
STANDHYD (0025)		Area	(ha)=	2.35	
ID= 1 DT= 5.0 min		Total Imp(%)=	14.40	Dir. Conn.(%)=	3.20

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.34	2.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.80	0.80
Length	(m)=	125.17	400.00
Mannings n	=	0.013	0.250

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

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
0.083	0.00		1.667	3.43		3.250	89.08		4.83	
3.43	0.167	0.00		1.750	3.43		3.333	12.56		4.92
3.43	0.250	0.00		1.833	5.71		3.417	12.56		5.00
3.43	0.333	2.28		1.917	5.71		3.500	12.56		5.08
3.43	0.417	2.28		2.000	5.71		3.583	12.56		5.17
3.43	0.500	2.28		2.083	5.71		3.667	12.56		5.25
3.43	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28	1.583	3.43		3.167	89.08		4.750	4.57		

Max.Eff.Inten. (mm/hr)=	89.08	26.42
over (min)	5.00	70.00
Storage Coeff. (min)=	3.27 (ii)	66.26 (ii)
Unit Hyd. Tpeak (min)=	5.00	70.00
Unit Hyd. peak (cms)=	0.27	0.02

	PEAK FLOW	(cms)=	0.02	0.08	*TOTALS*
(iii)					0.083
	TIME TO PEAK	(hrs)=	3.25	4.25	4.25
	RUNOFF VOLUME	(mm)=	56.10	32.60	33.34
	TOTAL RAINFALL	(mm)=	57.10	57.10	57.10
	RUNOFF COEFFICIENT	=	0.98	0.57	0.58

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0033) | Area (ha)= 1.97
| ID= 1 DT= 5.0 min | Total Imp(%)= 18.80 Dir. Conn.(%)= 7.60
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.37	1.60
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	114.60	241.00
Mannings n	=	0.013	0.250

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

```

----- TRANSFORMED HYETOGRAPH -----

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.43	0.083	0.00	1.667	3.43	3.250	89.08	4.83
3.43	0.167	0.00	1.750	3.43	3.333	12.56	4.92
3.43	0.250	0.00	1.833	5.71	3.417	12.56	5.00
3.43	0.333	2.28	1.917	5.71	3.500	12.56	5.08
3.43	0.417	2.28	2.000	5.71	3.583	12.56	5.17
3.43	0.500	2.28	2.083	5.71	3.667	12.56	5.25

3.43	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28	1.583	3.43		3.167	89.08		4.750	4.57		

Max.Eff.Inten. (mm/hr)=	89.08	42.27	
over (min)	5.00	35.00	
Storage Coeff. (min)=	2.36 (ii)	31.62 (ii)	
Unit Hyd. Tpeak (min)=	5.00	35.00	
Unit Hyd. peak (cms)=	0.30	0.03	
			TOTALS
PEAK FLOW (cms)=	0.04	0.11	0.116
(iii)			
TIME TO PEAK (hrs)=	3.25	3.67	3.67
RUNOFF VOLUME (mm)=	56.10	32.69	34.46
TOTAL RAINFALL (mm)=	57.10	57.10	57.10
RUNOFF COEFFICIENT =	0.98	0.57	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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB |
| STANDHYD ( 0034) |
| ID= 1 DT= 5.0 min |
```

Area (ha) = 2.46
Total Imp (%) = 18.80 Dir. Conn. (%) = 3.20

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha) =	0.46	2.00
Dep. Storage	(mm) =	1.00	1.50
Average Slope	(%) =	1.60	1.60
Length	(m) =	128.06	250.00
Mannings n	=	0.013	0.250

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

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr										
3.43	0.083	0.00		1.667	3.43		3.250	89.08		4.83
3.43	0.167	0.00		1.750	3.43		3.333	12.56		4.92
3.43	0.250	0.00		1.833	5.71		3.417	12.56		5.00
3.43	0.333	2.28		1.917	5.71		3.500	12.56		5.08
3.43	0.417	2.28		2.000	5.71		3.583	12.56		5.17
3.43	0.500	2.28		2.083	5.71		3.667	12.56		5.25
2.28	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28	1.250	3.43		2.833	34.26		4.417	4.57		6.00

	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28										
	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28										
	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28										
	1.583	3.43		3.167	89.08		4.750	4.57		

Max.Eff.Inten. (mm/hr)=	89.08	40.47	
over (min)	5.00	40.00	
Storage Coeff. (min)=	2.70 (ii)	35.24 (ii)	
Unit Hyd. Tpeak (min)=	5.00	40.00	
Unit Hyd. peak (cms)=	0.29	0.03	
			TOTALS
PEAK FLOW (cms)=	0.02	0.14	0.139
(iii)			
TIME TO PEAK (hrs)=	3.25	3.75	3.75
RUNOFF VOLUME (mm)=	56.10	33.37	34.09
TOTAL RAINFALL (mm)=	57.10	57.10	57.10
RUNOFF COEFFICIENT =	0.98	0.58	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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
| CALIB |
| STANDHYD ( 0039) | Area (ha)= 2.47
| ID= 1 DT= 5.0 min | Total Imp(%)= 92.64 Dir. Conn.(%)= 92.64
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.29	0.18
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.60	0.60
Length	(m)=	128.32	1000.00
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

```

mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
3.43	0.083	0.00		1.667	3.43		3.250	89.08		4.83
3.43	0.167	0.00		1.750	3.43		3.333	12.56		4.92
3.43	0.250	0.00		1.833	5.71		3.417	12.56		5.00
3.43	0.333	2.28		1.917	5.71		3.500	12.56		5.08
3.43	0.417	2.28		2.000	5.71		3.583	12.56		5.17
3.43	0.500	2.28		2.083	5.71		3.667	12.56		5.25
2.28	0.583	2.28		2.167	5.71		3.750	12.56		5.33
2.28	0.667	2.28		2.250	5.71		3.833	5.71		5.42
2.28	0.750	2.28		2.333	6.85		3.917	5.71		5.50
2.28	0.833	3.43		2.417	6.85		4.000	5.71		5.58
2.28	0.917	3.43		2.500	6.85		4.083	5.71		5.67
2.28	1.000	3.43		2.583	6.85		4.167	5.71		5.75
2.28	1.083	3.43		2.667	6.85		4.250	5.71		5.83
2.28	1.167	3.43		2.750	6.85		4.333	4.57		5.92
2.28	1.250	3.43		2.833	34.26		4.417	4.57		6.00
2.28	1.333	3.43		2.917	34.26		4.500	4.57		6.08
2.28	1.417	3.43		3.000	34.26		4.583	4.57		6.17
2.28	1.500	3.43		3.083	89.08		4.667	4.57		6.25
2.28	1.583	3.43		3.167	89.08		4.750	4.57		

Max.Eff.Inten. (mm/hr)=	89.08	22.04
over (min)	5.00	135.00
Storage Coeff. (min)=	3.62 (ii)	131.57 (ii)
Unit Hyd. Tpeak (min)=	5.00	135.00
Unit Hyd. peak (cms)=	0.25	0.01

TOTALS

PEAK FLOW (cms)=	0.56	0.00	0.561
TIME TO PEAK (hrs)=	3.25	5.42	3.25
RUNOFF VOLUME (mm)=	56.10	30.78	54.21
TOTAL RAINFALL (mm)=	57.10	57.10	57.10

RUNOFF COEFFICIENT = 0.98 0.54 0.95

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0032) |
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0025): 2.35 0.083 4.25 33.34
+ ID2= 2 (0031): 11.04 0.553 3.25 34.71
=====

ID = 3 (0032): 13.39 0.589 3.25 34.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0032) |
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (0032): 13.39 0.589 3.25 34.47
+ ID2= 2 (0033): 1.97 0.116 3.67 34.46
=====

ID = 1 (0032): 15.36 0.673 3.25 34.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0032) |
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0032): 15.36 0.673 3.25 34.47
+ ID2= 2 (0034): 2.46 0.139 3.75 34.09
=====

ID = 3 (0032): 17.82 0.744 3.25 34.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```

-----
| ADD HYD ( 0032) |
| 3 + 2 = 1 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0032):  17.82    0.744      3.25      34.42
+ ID2= 2 ( 0039):  2.47    0.561      3.25      54.21
=====
ID = 1 ( 0032):  20.29    1.305      3.25      36.83

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0035) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min      |
-----
                OUTFLOW      STORAGE      | OUTFLOW      STORAGE
                (cms)      (ha.m.)      | (cms)      (ha.m.)
0.0000          0.0190      | 0.1040      0.2460
0.0020          0.0380      | 0.1480      0.2720
0.0040          0.0580      | 0.1970      0.3000
0.0100          0.0790      | 0.2500      0.3280
0.0130          0.1010      | 0.3060      0.3570
0.0150          0.1230      | 0.3660      0.3870
0.0170          0.1460      | 0.4280      0.4180
0.0190          0.1700      | 0.4920      0.4490
0.0360          0.1940      | 0.5580      0.4810
0.0660          0.2200      | 0.6260      0.5150

```

```

                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
INFLOW : ID= 2 ( 0032)  20.290      1.305      3.25      36.83
OUTFLOW: ID= 1 ( 0035)  20.290      0.354      5.25      35.77

```

```

PEAK FLOW REDUCTION [Qout/Qin] (%) = 27.13
TIME SHIFT OF PEAK FLOW (min) = 120.00
MAXIMUM STORAGE USED (ha.m.) = 0.3811

```

FINISH

```

=====
=====
=====
=====
V      V      I      SSSSS  U      U      A      L      (v 6.2.2006)
V      V      I      SS      U      U      A A      L
V      V      I      SS      U      U      AAAAA  L

```

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

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

DATE: 12/13/2022 TIME: 04:44:27

COMMENTS: _____

-----		Filename: C:\Users\ychokshi\AppData	
READ STORM		ata\Local\Temp\	
		8ccd28ef-3410-4b01-9b0c-	
		825ce2009420\b898394d	
Ptotal= 67.05 mm		Comments: 25yr 6hr 15min SCS Type II (MTO)	

	TIME	RAIN	TIME RAIN TIME RAIN TIME
RAIN			

2.68	0.667	2.68		2.250	6.70		3.833	6.71		5.42
2.68	0.750	2.68		2.333	8.05		3.917	6.70		5.50
2.68	0.833	4.02		2.417	8.05		4.000	6.70		5.58
2.68	0.917	4.02		2.500	8.05		4.083	6.70		5.67
2.68	1.000	4.02		2.583	8.05		4.167	6.70		5.75
2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00
2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68	1.500	4.02		3.083	104.60		4.667	5.36		6.25
2.68	1.583	4.02		3.167	104.60		4.750	5.36		

Max.Eff.Inten. (mm/hr)=	104.60	25.11	
over (min)	5.00	80.00	
Storage Coeff. (min)=	5.62 (ii)	76.56 (ii)	
Unit Hyd. Tpeak (min)=	5.00	80.00	
Unit Hyd. peak (cms)=	0.20	0.01	

TOTALS

PEAK FLOW (cms)=	0.43	0.18	0.463
(iii) TIME TO PEAK (hrs)=	3.25	4.50	3.25
RUNOFF VOLUME (mm)=	66.05	26.94	34.22
TOTAL RAINFALL (mm)=	67.05	67.05	67.05
RUNOFF COEFFICIENT =	0.99	0.40	0.51

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 67.9 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.

| ROUTEPIPE(0029) | PIPE Number = 1.00
| IN= 2---> OUT= 1 | Diameter (mm)=1650.00

DT= 5.0 min	Length (m)= 500.00
-----	Slope (m/m)= 0.005
	Manning n = 0.013

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL					
(m/s)	(ha)	(cms)	(hrs)	(mm)	(m)
INFLOW : ID= 2 (0016)	8.39	0.46	3.25	34.22	0.30
1.72					
OUTFLOW: ID= 1 (0029)	8.39	0.43	3.25	34.22	0.29
1.68					

CALIB	
STANDHYD (0022)	Area (ha)= 11.83
ID= 1 DT= 5.0 min	Total Imp(%)= 39.45 Dir. Conn.(%)= 17.05

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.67	7.16
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	2.50	2.50
Length (m)=	280.83	315.00

Mannings n = 0.013 0.250

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

----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN
mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr
4.02	0.083	0.00		1.667	4.02		3.250	104.60
4.02	0.167	0.00		1.750	4.02		3.333	14.75
4.02	0.250	0.00		1.833	6.70		3.417	14.75
4.02	0.333	2.68		1.917	6.70		3.500	14.75
4.02	0.417	2.68		2.000	6.71		3.583	14.75
4.02	0.500	2.68		2.083	6.70		3.667	14.75
2.68	0.583	2.68		2.167	6.70		3.750	14.75
2.68	0.667	2.68		2.250	6.70		3.833	6.71
2.68	0.750	2.68		2.333	8.05		3.917	6.70
2.68	0.833	4.02		2.417	8.05		4.000	6.70
2.68	0.917	4.02		2.500	8.05		4.083	6.70
2.68	1.000	4.02		2.583	8.05		4.167	6.70
2.68	1.083	4.02		2.667	8.05		4.250	6.70
2.68	1.167	4.02		2.750	8.05		4.333	5.36
2.68	1.250	4.02		2.833	40.23		4.417	5.36
2.68	1.333	4.02		2.917	40.23		4.500	5.36
2.68	1.417	4.02		3.000	40.23		4.583	5.36
2.68	1.500	4.02		3.083	104.60		4.667	5.36
2.68	1.583	4.02		3.167	104.60		4.750	5.36

Max.Eff.Inten. (mm/hr)= 104.60 69.49
over (min) 5.00 30.00
Storage Coeff. (min)= 3.54 (ii) 29.88 (ii)

Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.26	0.04	
			TOTALS
PEAK FLOW (cms)=	0.58	0.85	1.025
(iii) TIME TO PEAK (hrs)=	3.25	3.58	3.25
RUNOFF VOLUME (mm)=	66.05	44.08	47.83
TOTAL RAINFALL (mm)=	67.05	67.05	67.05
RUNOFF COEFFICIENT =	0.99	0.66	0.71

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| CALIB |
| STANDHYD ( 0023) | Area (ha)= 5.85
| ID= 1 DT= 5.0 min | Total Imp(%)= 19.00 Dir. Conn.(%)= 7.80
-----
  
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.11	4.74
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.40	2.40
Length	(m)=	197.48	135.00
Mannings n	=	0.013	0.250

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

```

          ----- TRANSFORMED HYETOGRAPH -----
TIME      RAIN | TIME      RAIN | ' TIME      RAIN | TIME
RAIN
hrs      mm/hr | hrs      mm/hr | ' hrs      mm/hr | hrs
mm/hr
0.083     0.00 | 1.667     4.02 | 3.250    104.60 | 4.83
4.02
0.167     0.00 | 1.750     4.02 | 3.333     14.75 | 4.92
4.02
0.250     0.00 | 1.833     6.70 | 3.417     14.75 | 5.00
4.02
0.333     2.68 | 1.917     6.70 | 3.500     14.75 | 5.08
4.02
0.417     2.68 | 2.000     6.71 | 3.583     14.75 | 5.17
  
```

4.02							
	0.500	2.68		2.083	6.70		3.667
4.02							
	0.583	2.68		2.167	6.70		3.750
2.68							
	0.667	2.68		2.250	6.70		3.833
2.68							
	0.750	2.68		2.333	8.05		3.917
2.68							
	0.833	4.02		2.417	8.05		4.000
2.68							
	0.917	4.02		2.500	8.05		4.083
2.68							
	1.000	4.02		2.583	8.05		4.167
2.68							
	1.083	4.02		2.667	8.05		4.250
2.68							
	1.167	4.02		2.750	8.05		4.333
2.68							
	1.250	4.02		2.833	40.23		4.417
2.68							
	1.333	4.02		2.917	40.23		4.500
2.68							
	1.417	4.02		3.000	40.23		4.583
2.68							
	1.500	4.02		3.083	104.60		4.667
2.68							
	1.583	4.02		3.167	104.60		4.750

Max.Eff.Inten. (mm/hr)=	104.60	84.19
over (min)	5.00	20.00
Storage Coeff. (min)=	2.90 (ii)	17.75 (ii)
Unit Hyd. Tpeak (min)=	5.00	20.00
Unit Hyd. peak (cms)=	0.28	0.06

			TOTALS
PEAK FLOW (cms)=	0.13	0.60	0.624
(iii)			
TIME TO PEAK (hrs)=	3.25	3.42	3.42
RUNOFF VOLUME (mm)=	66.05	41.11	43.05
TOTAL RAINFALL (mm)=	67.05	67.05	67.05
RUNOFF COEFFICIENT =	0.99	0.61	0.64

***** 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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0040) | Area (ha)= 1.96
| ID= 1 DT= 5.0 min | Total Imp(%)= 82.10 Dir. Conn.(%)= 82.10
-----

```

```

                IMPERVIOUS      PERVIOUS (i)
Surface Area    (ha)=          1.61          0.35
Dep. Storage    (mm)=          1.00          1.50
Average Slope    (%)=          1.50          1.50
Length          (m)=         114.31         514.00
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
                hrs      mm/hr | hrs      mm/hr | ' hrs      mm/hr | hrs
RAIN
mm/hr
0.083      0.00 | 1.667      4.02 | 3.250     104.60 | 4.83
4.02
0.167      0.00 | 1.750      4.02 | 3.333      14.75 | 4.92
4.02
0.250      0.00 | 1.833      6.70 | 3.417      14.75 | 5.00
4.02
0.333      2.68 | 1.917      6.70 | 3.500      14.75 | 5.08
4.02
0.417      2.68 | 2.000      6.71 | 3.583      14.75 | 5.17
4.02
0.500      2.68 | 2.083      6.70 | 3.667      14.75 | 5.25
4.02
0.583      2.68 | 2.167      6.70 | 3.750      14.75 | 5.33
2.68
0.667      2.68 | 2.250      6.70 | 3.833      6.71 | 5.42
2.68
0.750      2.68 | 2.333      8.05 | 3.917      6.70 | 5.50
2.68
0.833      4.02 | 2.417      8.05 | 4.000      6.70 | 5.58
2.68
0.917      4.02 | 2.500      8.05 | 4.083      6.70 | 5.67
2.68
1.000      4.02 | 2.583      8.05 | 4.167      6.70 | 5.75
2.68
1.083      4.02 | 2.667      8.05 | 4.250      6.70 | 5.83
2.68
1.167      4.02 | 2.750      8.05 | 4.333      5.36 | 5.92
2.68

```

	1.250	4.02		2.833	40.23		4.417	5.36		6.00
2.68										
	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68										
	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68										
	1.500	4.02		3.083	104.60		4.667	5.36		6.25
2.68										
	1.583	4.02		3.167	104.60		4.750	5.36		

Max.Eff.Inten. (mm/hr)=	104.60	27.91	
over (min)	5.00	65.00	
Storage Coeff. (min)=	2.41 (ii)	61.73 (ii)	
Unit Hyd. Tpeak (min)=	5.00	65.00	
Unit Hyd. peak (cms)=	0.30	0.02	
			TOTALS
PEAK FLOW (cms)=	0.47	0.02	0.471
(iii)			
TIME TO PEAK (hrs)=	3.25	4.17	3.25
RUNOFF VOLUME (mm)=	66.05	38.93	61.18
TOTAL RAINFALL (mm)=	67.05	67.05	67.05
RUNOFF COEFFICIENT =	0.99	0.58	0.91

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0018)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
-----	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0022):	11.83	1.025	3.25	47.83
+ ID2= 2 (0023):	5.85	0.624	3.42	43.05
=====				
ID = 3 (0018):	17.68	1.586	3.25	46.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018)				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
-----	(ha)	(cms)	(hrs)	(mm)

ID1= 3 (0018):	17.68	1.586	3.25	46.25
+ ID2= 2 (0029):	8.39	0.430	3.25	34.22
=====				
ID = 1 (0018):	26.07	2.016	3.25	42.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0018) |
| 1 + 2 = 3 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0018):	26.07	2.016	3.25	42.38
+ ID2= 2 (0040):	1.96	0.471	3.25	61.18
=====				
ID = 3 (0018):	28.03	2.487	3.25	43.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0026) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----

```

OVERFLOW IS OFF

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
***** WARNING : FIRST OUTFLOW IS NOT ZERO.				
	0.0020	0.0130	0.1500	0.1750
	0.0050	0.0260	0.1990	0.1940
	0.0110	0.0410	0.2520	0.2140
	0.0140	0.0550	0.3080	0.2350
	0.0160	0.0700	0.3680	0.2570
	0.0180	0.0860	0.4300	0.2790
	0.0200	0.1030	0.4940	0.3020
	0.0380	0.1200	0.5610	0.3250
	0.0680	0.1370	0.6290	0.3500
	0.1060	0.1560	0.6980	0.3750

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	28.030	2.487	3.25	43.69
OUTFLOW: ID= 1 (0026)	28.030	0.996	4.08	43.63

PEAK FLOW REDUCTION [Qout/Qin] (%)= 40.04
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 0.4832

```

-----
| CALIB |

```

| STANDHYD (0012) | Area (ha)= 5.57
 | ID= 1 DT= 5.0 min | Total Imp(%)= 42.66 Dir. Conn.(%)= 17.46

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.38	3.19
Dep. Storage	(mm)=	1.00	3.00
Average Slope	(%)=	1.00	0.90
Length	(m)=	192.70	694.00
Mannings n	=	0.020	0.250

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

		---- TRANSFORMED HYETOGRAPH ----									
RAIN		TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
mm/hr		hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
4.02	0.083	0.00		1.667	4.02		3.250	104.60		4.83	
4.02	0.167	0.00		1.750	4.02		3.333	14.75		4.92	
4.02	0.250	0.00		1.833	6.70		3.417	14.75		5.00	
4.02	0.333	2.68		1.917	6.70		3.500	14.75		5.08	
4.02	0.417	2.68		2.000	6.71		3.583	14.75		5.17	
4.02	0.500	2.68		2.083	6.70		3.667	14.75		5.25	
4.02	0.583	2.68		2.167	6.70		3.750	14.75		5.33	
2.68	0.667	2.68		2.250	6.70		3.833	6.71		5.42	
2.68	0.750	2.68		2.333	8.05		3.917	6.70		5.50	
2.68	0.833	4.02		2.417	8.05		4.000	6.70		5.58	
2.68	0.917	4.02		2.500	8.05		4.083	6.70		5.67	
2.68	1.000	4.02		2.583	8.05		4.167	6.70		5.75	
2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83	
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92	
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00	
2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08	
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17	

2.68
1.500 4.02 | 3.083 104.60 | 4.667 5.36 | 6.25
2.68
1.583 4.02 | 3.167 104.60 | 4.750 5.36 |

Max.Eff.Inten. (mm/hr)=	104.60	31.47	
over (min)	5.00	85.00	
Storage Coeff. (min)=	4.82 (ii)	83.72 (ii)	
Unit Hyd. Tpeak (min)=	5.00	85.00	
Unit Hyd. peak (cms)=	0.22	0.01	
			TOTALS
PEAK FLOW (cms)=	0.27	0.13	0.295
(iii)			
TIME TO PEAK (hrs)=	3.25	4.58	3.25
RUNOFF VOLUME (mm)=	66.05	30.73	36.89
TOTAL RAINFALL (mm)=	67.05	67.05	67.05
RUNOFF COEFFICIENT =	0.99	0.46	0.55

***** 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* = 70.9 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD (0021)		Area (ha)=	5.47	
ID= 1 DT= 5.0 min		Total Imp(%)=	44.25	Dir. Conn.(%)= 21.85

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.42	3.05
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.40	1.40
Length	(m)=	190.96	570.00
Mannings n	=	0.013	0.250

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

		---- TRANSFORMED HYETOGRAPH ----			
RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs
mm/hr	0.083	0.00	1.667	4.02	3.250 104.60 4.83

4.02	0.167	0.00		1.750	4.02		3.333	14.75		4.92
4.02	0.250	0.00		1.833	6.70		3.417	14.75		5.00
4.02	0.333	2.68		1.917	6.70		3.500	14.75		5.08
4.02	0.417	2.68		2.000	6.71		3.583	14.75		5.17
4.02	0.500	2.68		2.083	6.70		3.667	14.75		5.25
4.02	0.583	2.68		2.167	6.70		3.750	14.75		5.33
2.68	0.667	2.68		2.250	6.70		3.833	6.71		5.42
2.68	0.750	2.68		2.333	8.05		3.917	6.70		5.50
2.68	0.833	4.02		2.417	8.05		4.000	6.70		5.58
2.68	0.917	4.02		2.500	8.05		4.083	6.70		5.67
2.68	1.000	4.02		2.583	8.05		4.167	6.70		5.75
2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00
2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68	1.500	4.02		3.083	104.60		4.667	5.36		6.25
2.68	1.583	4.02		3.167	104.60		4.750	5.36		

Max.Eff.Inten. (mm/hr)=	104.60	47.12	
over (min)	5.00	60.00	
Storage Coeff. (min)=	3.34 (ii)	55.60 (ii)	
Unit Hyd. Tpeak (min)=	5.00	60.00	
Unit Hyd. peak (cms)=	0.26	0.02	
			TOTALS
PEAK FLOW (cms)=	0.34	0.24	0.409
(iii)			
TIME TO PEAK (hrs)=	3.25	4.08	3.25
RUNOFF VOLUME (mm)=	66.05	44.44	49.16
TOTAL RAINFALL (mm)=	67.05	67.05	67.05
RUNOFF COEFFICIENT =	0.99	0.66	0.73

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| ROUTEPIPE( 0030) |    PIPE Number      =    1.00
| IN= 2---> OUT= 1 |    Diameter      (mm)= 500.00
| DT=  5.0 min      |    Length        (m)= 26.00
-----
|                   |    Slope          (m/m)= 0.005
|                   |    Manning n      =    0.013

```

**** WARNING: MINIMUM PIPE SIZE REQUIRED = 586.94 (mm) FOR
FREE FLOW.

THIS SIZE WAS USED IN THE ROUTING.
THE CAPACITY OF THIS PIPE = 0.41 (cms)

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.03	.142E+00	0.0	0.40	1.08
0.06	.395E+00	0.0	0.63	0.69
0.09	.713E+00	0.0	0.81	0.54
0.12	.108E+01	0.0	0.96	0.45
0.15	.148E+01	0.1	1.09	0.40
0.19	.191E+01	0.1	1.21	0.36
0.22	.235E+01	0.1	1.31	0.33
0.25	.281E+01	0.2	1.40	0.31
0.28	.328E+01	0.2	1.48	0.29
0.31	.375E+01	0.2	1.55	0.28
0.34	.422E+01	0.3	1.60	0.27
0.37	.468E+01	0.3	1.65	0.26
0.40	.513E+01	0.3	1.69	0.26
0.43	.556E+01	0.4	1.71	0.25
0.46	.596E+01	0.4	1.72	0.25
0.49	.632E+01	0.4	1.72	0.25
0.53	.664E+01	0.4	1.71	0.25
0.56	.689E+01	0.4	1.66	0.26
0.59	.703E+01	0.4	1.51	0.29

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0021)	5.47	0.41	3.25	49.16	0.48
1.72					

OUTFLOW: ID= 1 (0030) 5.47 0.40 3.25 49.16 0.48
1.72

**** WARNING: COMPUTATIONS FAILED TO CONVERGE.

```
-----  
-----  
-----  
| ADD HYD ( 0013) |  
| 1 + 2 = 3 |  
-----  
ID1= 1 ( 0012): AREA QPEAK TPEAK R.V.  
+ ID2= 2 ( 0030): (ha) (cms) (hrs) (mm)  
=====
```

ID = 3 (0013):	11.04	0.698	3.25	42.97
-----------------	-------	-------	------	-------

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----  
-----  
| ROUTEPIPE( 0031) | PIPE Number = 1.00  
| IN= 2--> OUT= 1 | Diameter (mm)=1650.00  
| DT= 5.0 min | Length (m)= 500.00  
-----  
Slope (m/m)= 0.005  
Manning n = 0.013
```

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0013)	11.04	0.70	3.25	42.97	0.37
1.96					
OUTFLOW: ID= 1 (0031)	11.04	0.67	3.25	42.97	0.36
1.94					

| CALIB |
| STANDHYD (0025) | Area (ha)= 2.35
| ID= 1 DT= 5.0 min | Total Imp(%)= 14.40 Dir. Conn.(%)= 3.20

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.34	2.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.80	0.80
Length	(m)=	125.17	400.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
mm/hr							
4.02	0.083	0.00	1.667	4.02	3.250	104.60	4.83
4.02	0.167	0.00	1.750	4.02	3.333	14.75	4.92
4.02	0.250	0.00	1.833	6.70	3.417	14.75	5.00
4.02	0.333	2.68	1.917	6.70	3.500	14.75	5.08
4.02	0.417	2.68	2.000	6.71	3.583	14.75	5.17
4.02	0.500	2.68	2.083	6.70	3.667	14.75	5.25
4.02	0.583	2.68	2.167	6.70	3.750	14.75	5.33
2.68	0.667	2.68	2.250	6.70	3.833	6.71	5.42
2.68	0.750	2.68	2.333	8.05	3.917	6.70	5.50

2.68	0.833	4.02		2.417	8.05		4.000	6.70		5.58
2.68	0.917	4.02		2.500	8.05		4.083	6.70		5.67
2.68	1.000	4.02		2.583	8.05		4.167	6.70		5.75
2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00
2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68	1.500	4.02		3.083	104.60		4.667	5.36		6.25
2.68	1.583	4.02		3.167	104.60		4.750	5.36		

Max.Eff.Inten. (mm/hr)=	104.60	33.26	
over (min)	5.00	65.00	
Storage Coeff. (min)=	3.07 (ii)	60.52 (ii)	
Unit Hyd. Tpeak (min)=	5.00	65.00	
Unit Hyd. peak (cms)=	0.27	0.02	
			TOTALS
PEAK FLOW (cms)=	0.02	0.11	0.111
(iii) TIME TO PEAK (hrs)=	3.25	4.17	4.17
RUNOFF VOLUME (mm)=	66.05	41.00	41.79
TOTAL RAINFALL (mm)=	67.05	67.05	67.05
RUNOFF COEFFICIENT =	0.99	0.61	0.62

***** 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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
| CALIB |
| STANDHYD ( 0033) | Area (ha)= 1.97
| ID= 1 DT= 5.0 min | Total Imp(%)= 18.80 Dir. Conn.(%)= 7.60
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha) =	0.37	1.60
Dep. Storage	(mm) =	1.00	1.50
Average Slope	(%) =	2.00	2.00
Length	(m) =	114.60	241.00
Mannings n	=	0.013	0.250

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

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
4.02	0.083	0.00		1.667	4.02		3.250	104.60		4.83
4.02	0.167	0.00		1.750	4.02		3.333	14.75		4.92
4.02	0.250	0.00		1.833	6.70		3.417	14.75		5.00
4.02	0.333	2.68		1.917	6.70		3.500	14.75		5.08
4.02	0.417	2.68		2.000	6.71		3.583	14.75		5.17
4.02	0.500	2.68		2.083	6.70		3.667	14.75		5.25
2.68	0.583	2.68		2.167	6.70		3.750	14.75		5.33
2.68	0.667	2.68		2.250	6.70		3.833	6.71		5.42
2.68	0.750	2.68		2.333	8.05		3.917	6.70		5.50
2.68	0.833	4.02		2.417	8.05		4.000	6.70		5.58
2.68	0.917	4.02		2.500	8.05		4.083	6.70		5.67
2.68	1.000	4.02		2.583	8.05		4.167	6.70		5.75
2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00
2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68	1.500	4.02		3.083	104.60		4.667	5.36		6.25

1.583 4.02 | 3.167 104.60 | 4.750 5.36 |

Max.Eff.Inten. (mm/hr)=	104.60	53.49	
over (min)	5.00	30.00	
Storage Coeff. (min)=	2.21 (ii)	28.84 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.30	0.04	
			TOTALS
PEAK FLOW (cms)=	0.04	0.15	0.156
(iii)			
TIME TO PEAK (hrs)=	3.25	3.58	3.58
RUNOFF VOLUME (mm)=	66.05	41.10	42.99
TOTAL RAINFALL (mm)=	67.05	67.05	67.05
RUNOFF COEFFICIENT =	0.99	0.61	0.64

***** 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* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0034) | Area (ha)= 2.46
| ID= 1 DT= 5.0 min | Total Imp(%)= 18.80 Dir. Conn.(%)= 3.20

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.46	2.00
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.60	1.60
Length	(m)=	128.06	250.00
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
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
RAIN										
mm/hr										
4.02	0.083	0.00		1.667	4.02		3.250	104.60		4.83
4.02	0.167	0.00		1.750	4.02		3.333	14.75		4.92

4.02	0.250	0.00		1.833	6.70		3.417	14.75		5.00
4.02	0.333	2.68		1.917	6.70		3.500	14.75		5.08
4.02	0.417	2.68		2.000	6.71		3.583	14.75		5.17
4.02	0.500	2.68		2.083	6.70		3.667	14.75		5.25
2.68	0.583	2.68		2.167	6.70		3.750	14.75		5.33
2.68	0.667	2.68		2.250	6.70		3.833	6.71		5.42
2.68	0.750	2.68		2.333	8.05		3.917	6.70		5.50
2.68	0.833	4.02		2.417	8.05		4.000	6.70		5.58
2.68	0.917	4.02		2.500	8.05		4.083	6.70		5.67
2.68	1.000	4.02		2.583	8.05		4.167	6.70		5.75
2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00
2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68	1.500	4.02		3.083	104.60		4.667	5.36		6.25
2.68	1.583	4.02		3.167	104.60		4.750	5.36		

Max.Eff.Inten. (mm/hr)=	104.60	57.17	
over (min)	5.00	35.00	
Storage Coeff. (min)=	2.53 (ii)	30.87 (ii)	
Unit Hyd. Tpeak (min)=	5.00	35.00	
Unit Hyd. peak (cms)=	0.29	0.04	
			TOTALS
PEAK FLOW (cms)=	0.02	0.19	0.191
(iii)			
TIME TO PEAK (hrs)=	3.25	3.67	3.67
RUNOFF VOLUME (mm)=	66.05	41.87	42.63
TOTAL RAINFALL (mm)=	67.05	67.05	67.05
RUNOFF COEFFICIENT =	0.99	0.62	0.64

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
| CALIB          |
| STANDHYD ( 0039) | Area (ha)= 2.47
| ID= 1 DT= 5.0 min | Total Imp(%)= 92.64 Dir. Conn.(%)= 92.64
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.29	0.18
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.60	0.60
Length	(m)=	128.32	1000.00
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
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
RAIN										
mm/hr										
	0.083	0.00		1.667	4.02		3.250	104.60		4.83
4.02										
	0.167	0.00		1.750	4.02		3.333	14.75		4.92
4.02										
	0.250	0.00		1.833	6.70		3.417	14.75		5.00
4.02										
	0.333	2.68		1.917	6.70		3.500	14.75		5.08
4.02										
	0.417	2.68		2.000	6.71		3.583	14.75		5.17
4.02										
	0.500	2.68		2.083	6.70		3.667	14.75		5.25
4.02										
	0.583	2.68		2.167	6.70		3.750	14.75		5.33
2.68										
	0.667	2.68		2.250	6.70		3.833	6.71		5.42
2.68										
	0.750	2.68		2.333	8.05		3.917	6.70		5.50
2.68										
	0.833	4.02		2.417	8.05		4.000	6.70		5.58
2.68										
	0.917	4.02		2.500	8.05		4.083	6.70		5.67
2.68										
	1.000	4.02		2.583	8.05		4.167	6.70		5.75

2.68	1.083	4.02		2.667	8.05		4.250	6.70		5.83
2.68	1.167	4.02		2.750	8.05		4.333	5.36		5.92
2.68	1.250	4.02		2.833	40.23		4.417	5.36		6.00
2.68	1.333	4.02		2.917	40.23		4.500	5.36		6.08
2.68	1.417	4.02		3.000	40.23		4.583	5.36		6.17
2.68	1.500	4.02		3.083	104.60		4.667	5.36		6.25
2.68	1.583	4.02		3.167	104.60		4.750	5.36		

Max.Eff.Inten. (mm/hr)=	104.60	27.91
over (min)	5.00	120.00
Storage Coeff. (min)=	3.40 (ii)	119.81 (ii)
Unit Hyd. Tpeak (min)=	5.00	120.00
Unit Hyd. peak (cms)=	0.26	0.01

TOTALS

PEAK FLOW	(cms)=	0.66	0.01	0.660
(iii)				
TIME TO PEAK	(hrs)=	3.25	5.17	3.25
RUNOFF VOLUME	(mm)=	66.05	38.93	64.03
TOTAL RAINFALL	(mm)=	67.05	67.05	67.05
RUNOFF COEFFICIENT	=	0.99	0.58	0.95

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0032)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0025):	2.35	0.111	4.17	41.79
+ ID2= 2 (0031):	11.04	0.675	3.25	42.97
=====				
ID = 3 (0032):	13.39	0.723	3.25	42.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```

-----
| ADD HYD  ( 0032) |
| 3 + 2 = 1 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0032):  13.39    0.723     3.25     42.76
+ ID2= 2 ( 0033):  1.97    0.156     3.58     42.99
=====
ID = 1 ( 0032):  15.36    0.843     3.25     42.79

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD  ( 0032) |
| 1 + 2 = 3 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0032):  15.36    0.843     3.25     42.79
+ ID2= 2 ( 0034):  2.46    0.191     3.67     42.63
=====
ID = 3 ( 0032):  17.82    0.949     3.25     42.77

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD  ( 0032) |
| 3 + 2 = 1 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0032):  17.82    0.949     3.25     42.77
+ ID2= 2 ( 0039):  2.47    0.660     3.25     64.03
=====
ID = 1 ( 0032):  20.29    1.609     3.25     45.35

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0035) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
OVERFLOW IS OFF

```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0190	0.1040	0.2460
0.0020	0.0380	0.1480	0.2720
0.0040	0.0580	0.1970	0.3000
0.0100	0.0790	0.2500	0.3280
0.0130	0.1010	0.3060	0.3570
0.0150	0.1230	0.3660	0.3870
0.0170	0.1460	0.4280	0.4180

0.0190	0.1700		0.4920	0.4490
0.0360	0.1940		0.5580	0.4810
0.0660	0.2200		0.6260	0.5150

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0032)	20.290	1.609	3.25	45.35
OUTFLOW: ID= 1 (0035)	20.290	0.483	5.00	44.30

PEAK FLOW REDUCTION [Qout/Qin] (%) = 30.03
 TIME SHIFT OF PEAK FLOW (min) = 105.00
 MAXIMUM STORAGE USED (ha.m.) = 0.4448

```

-----
-----
=====
=====
  
```

```

V   V   I   SSSSS U   U   A   L           (v 6.2.2006)
V   V   I   SS    U   U   A A   L
V   V   I   SS    U   U   AAAAA L
V   V   I   SS    U   U   A   A   L
VV      I   SSSSS UUUUU A   A   LLLLL
  
```

```

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

Developed and Distributed by Smart City Water Inc
 Copyright 2007 - 2021 Smart City Water Inc
 All rights reserved.

***** 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\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
 27f4b695ed5c\2d30ddfc-7394-40fd-9c92-e33df94dd243\sce
 Summary filename:
 C:\Users\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
 27f4b695ed5c\2d30ddfc-7394-40fd-9c92-e33df94dd243\sce

DATE: 12/13/2022

TIME: 04:44:27

USER:

COMMENTS: _____

** SIMULATION : 2yr 6hr 15min SCS Type II (MT **

| READ STORM | Filename: C:\Users\ychokshi\AppData
| | ata\Local\Temp\
| | 8ccd28ef-3410-4b01-9b0c-
825ce2009420\773c2c46
| Ptotal= 37.04 mm | Comments: 2yr 6hr 15min SCS Type II (MTO)

	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
RAIN	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr										
1.48	0.25	0.00		2.00	3.70		3.75	8.15		5.50
1.48	0.50	1.48		2.25	3.70		4.00	3.70		5.75
1.48	0.75	1.48		2.50	4.44		4.25	3.70		6.00
1.48	1.00	2.22		2.75	4.44		4.50	2.96		6.25
1.48	1.25	2.22		3.00	22.22		4.75	2.96		
	1.50	2.22		3.25	57.78		5.00	2.22		
	1.75	2.22		3.50	8.15		5.25	2.22		

| CALIB |
| STANDHYD (0016) | Area (ha)= 8.39
| ID= 1 DT= 5.0 min | Total Imp(%)= 38.22 Dir. Conn.(%)= 18.62

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.21	5.18
Dep. Storage	(mm)=	1.00	3.00
Average Slope	(%)=	0.90	0.90
Length	(m)=	236.50	500.00
Mannings n	=	0.020	0.250

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

----- TRANSFORMED HYETOGRAPH -----										
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
2.22	0.083	0.00		1.667	2.22		3.250	57.78		4.83
2.22	0.167	0.00		1.750	2.22		3.333	8.15		4.92
2.22	0.250	0.00		1.833	3.70		3.417	8.15		5.00
2.22	0.333	1.48		1.917	3.70		3.500	8.15		5.08
2.22	0.417	1.48		2.000	3.70		3.583	8.15		5.17
2.22	0.500	1.48		2.083	3.70		3.667	8.15		5.25
1.48	0.583	1.48		2.167	3.70		3.750	8.15		5.33
1.48	0.667	1.48		2.250	3.70		3.833	3.70		5.42
1.48	0.750	1.48		2.333	4.44		3.917	3.70		5.50
1.48	0.833	2.22		2.417	4.44		4.000	3.70		5.58
1.48	0.917	2.22		2.500	4.44		4.083	3.70		5.67
1.48	1.000	2.22		2.583	4.44		4.167	3.70		5.75
1.48	1.083	2.22		2.667	4.44		4.250	3.70		5.83
1.48	1.167	2.22		2.750	4.44		4.333	2.96		5.92
1.48	1.250	2.22		2.833	22.22		4.417	2.96		6.00
1.48	1.333	2.22		2.917	22.22		4.500	2.96		6.08
1.48	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48	1.500	2.22		3.083	57.78		4.667	2.96		6.25
	1.583	2.22		3.167	57.78		4.750	2.96		

Max.Eff.Inten. (mm/hr)=	57.78	8.83
over (min)	5.00	115.00
Storage Coeff. (min)=	7.13 (ii)	114.88 (ii)
Unit Hyd. Tpeak (min)=	5.00	115.00
Unit Hyd. peak (cms)=	0.17	0.01

TOTALS

PEAK FLOW	(cms)=	0.23	0.05	0.235
(iii)				
TIME TO PEAK	(hrs)=	3.25	5.08	3.25
RUNOFF VOLUME	(mm)=	36.04	9.61	14.53
TOTAL RAINFALL	(mm)=	37.04	37.04	37.04
RUNOFF COEFFICIENT	=	0.97	0.26	0.39

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 67.9 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.

```

-----
| ROUTEPIPE( 0029) | PIPE Number      = 1.00
| IN= 2---> OUT= 1 | Diameter      (mm)=1650.00
| DT= 5.0 min      | Length        (m)= 500.00
|                   | Slope          (m/m)= 0.005
|                   | Manning n      = 0.013
-----

```

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

channel-> <---- hydrograph ----> <-pipe /

AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL				

	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0016)	8.39	0.23	3.25	14.53	0.21
1.38					
OUTFLOW: ID= 1 (0029)	8.39	0.21	3.25	14.52	0.20
1.34					

```

-----
| CALIB |
| STANDHYD ( 0022) | Area (ha)= 11.83
| ID= 1 DT= 5.0 min | Total Imp(%)= 39.45 Dir. Conn.(%)= 17.05
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.67	7.16
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.50	2.50
Length	(m)=	280.83	315.00
Mannings n	=	0.013	0.250

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

```

----- TRANSFORMED HYETOGRAPH -----

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
mm/hr							
	0.083	0.00	1.667	2.22	3.250	57.78	4.83
2.22							
	0.167	0.00	1.750	2.22	3.333	8.15	4.92
2.22							
	0.250	0.00	1.833	3.70	3.417	8.15	5.00
2.22							
	0.333	1.48	1.917	3.70	3.500	8.15	5.08
2.22							
	0.417	1.48	2.000	3.70	3.583	8.15	5.17
2.22							
	0.500	1.48	2.083	3.70	3.667	8.15	5.25
2.22							
	0.583	1.48	2.167	3.70	3.750	8.15	5.33
1.48							
	0.667	1.48	2.250	3.70	3.833	3.70	5.42
1.48							
	0.750	1.48	2.333	4.44	3.917	3.70	5.50
1.48							
	0.833	2.22	2.417	4.44	4.000	3.70	5.58
1.48							

1.48	0.917	2.22		2.500	4.44		4.083	3.70		5.67
1.48	1.000	2.22		2.583	4.44		4.167	3.70		5.75
1.48	1.083	2.22		2.667	4.44		4.250	3.70		5.83
1.48	1.167	2.22		2.750	4.44		4.333	2.96		5.92
1.48	1.250	2.22		2.833	22.22		4.417	2.96		6.00
1.48	1.333	2.22		2.917	22.22		4.500	2.96		6.08
1.48	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48	1.500	2.22		3.083	57.78		4.667	2.96		6.25
1.48	1.583	2.22		3.167	57.78		4.750	2.96		

Max.Eff.Inten. (mm/hr)=	57.78	21.89
over (min)	5.00	50.00
Storage Coeff. (min)=	4.49 (ii)	46.30 (ii)
Unit Hyd. Tpeak (min)=	5.00	50.00
Unit Hyd. peak (cms)=	0.23	0.02

TOTALS

PEAK FLOW (cms)=	0.32	0.26	0.392
(iii) TIME TO PEAK (hrs)=	3.25	3.92	3.25
RUNOFF VOLUME (mm)=	36.04	18.82	21.75
TOTAL RAINFALL (mm)=	37.04	37.04	37.04
RUNOFF COEFFICIENT =	0.97	0.51	0.59

***** 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* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0023)	Area (ha)=	5.85	
ID= 1 DT= 5.0 min	Total Imp(%)=	19.00	Dir. Conn.(%)= 7.80

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.11	4.74
Dep. Storage	(mm)=	1.00	1.50

Average Slope	(%) =	2.40	2.40
Length	(m) =	197.48	135.00
Mannings n	=	0.013	0.250

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

		---- TRANSFORMED HYETOGRAPH ----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr										
	0.083	0.00		1.667	2.22		3.250	57.78		4.83
2.22										
	0.167	0.00		1.750	2.22		3.333	8.15		4.92
2.22										
	0.250	0.00		1.833	3.70		3.417	8.15		5.00
2.22										
	0.333	1.48		1.917	3.70		3.500	8.15		5.08
2.22										
	0.417	1.48		2.000	3.70		3.583	8.15		5.17
2.22										
	0.500	1.48		2.083	3.70		3.667	8.15		5.25
2.22										
	0.583	1.48		2.167	3.70		3.750	8.15		5.33
1.48										
	0.667	1.48		2.250	3.70		3.833	3.70		5.42
1.48										
	0.750	1.48		2.333	4.44		3.917	3.70		5.50
1.48										
	0.833	2.22		2.417	4.44		4.000	3.70		5.58
1.48										
	0.917	2.22		2.500	4.44		4.083	3.70		5.67
1.48										
	1.000	2.22		2.583	4.44		4.167	3.70		5.75
1.48										
	1.083	2.22		2.667	4.44		4.250	3.70		5.83
1.48										
	1.167	2.22		2.750	4.44		4.333	2.96		5.92
1.48										
	1.250	2.22		2.833	22.22		4.417	2.96		6.00
1.48										
	1.333	2.22		2.917	22.22		4.500	2.96		6.08
1.48										
	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48										
	1.500	2.22		3.083	57.78		4.667	2.96		6.25
1.48										
	1.583	2.22		3.167	57.78		4.750	2.96		

Max.Eff.Inten. (mm/hr) =	57.78	24.43
--------------------------	-------	-------

	over (min)	5.00	30.00	
Storage Coeff.	(min)=	3.68 (ii)	28.04 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	30.00	
Unit Hyd. peak	(cms)=	0.25	0.04	
				TOTALS
PEAK FLOW	(cms)=	0.07	0.18	0.193
(iii)				
TIME TO PEAK	(hrs)=	3.25	3.58	3.58
RUNOFF VOLUME	(mm)=	36.04	16.99	18.47
TOTAL RAINFALL	(mm)=	37.04	37.04	37.04
RUNOFF COEFFICIENT	=	0.97	0.46	0.50

***** 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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| CALIB |
| STANDHYD ( 0040) | Area (ha)= 1.96
| ID= 1 DT= 5.0 min | Total Imp(%)= 82.10 Dir. Conn.(%)= 82.10
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.61	0.35
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.50	1.50
Length	(m)=	114.31	514.00
Mannings n	=	0.013	0.250

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

```

----- TRANSFORMED HYETOGRAPH -----

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
mm/hr	0.083	0.00	1.667	2.22	3.250	57.78	4.83
2.22	0.167	0.00	1.750	2.22	3.333	8.15	4.92
2.22	0.250	0.00	1.833	3.70	3.417	8.15	5.00
2.22	0.333	1.48	1.917	3.70	3.500	8.15	5.08

2.22							
	0.417	1.48		2.000	3.70		3.583
2.22							
	0.500	1.48		2.083	3.70		3.667
2.22							
	0.583	1.48		2.167	3.70		3.750
1.48							
	0.667	1.48		2.250	3.70		3.833
1.48							
	0.750	1.48		2.333	4.44		3.917
1.48							
	0.833	2.22		2.417	4.44		4.000
1.48							
	0.917	2.22		2.500	4.44		4.083
1.48							
	1.000	2.22		2.583	4.44		4.167
1.48							
	1.083	2.22		2.667	4.44		4.250
1.48							
	1.167	2.22		2.750	4.44		4.333
1.48							
	1.250	2.22		2.833	22.22		4.417
1.48							
	1.333	2.22		2.917	22.22		4.500
1.48							
	1.417	2.22		3.000	22.22		4.583
1.48							
	1.500	2.22		3.083	57.78		4.667
1.48							
	1.583	2.22		3.167	57.78		4.750

Max.Eff.Inten. (mm/hr)=		57.78	11.17	
over (min)		5.00	90.00	
Storage Coeff. (min)=		3.05 (ii)	88.60 (ii)	
Unit Hyd. Tpeak (min)=		5.00	90.00	
Unit Hyd. peak (cms)=		0.27	0.01	
TOTALS				
PEAK FLOW (cms)=		0.26	0.00	0.258
(iii)	TIME TO PEAK (hrs)=	3.25	4.67	3.25
	RUNOFF VOLUME (mm)=	36.04	15.72	32.38
	TOTAL RAINFALL (mm)=	37.04	37.04	37.04
	RUNOFF COEFFICIENT =	0.97	0.42	0.87

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (0018) |
1 + 2 = 3
ID1= 1 (0022): AREA 11.83 QPEAK 0.392 TPEAK 3.25 R.V. 21.75
+ ID2= 2 (0023): (ha) (cms) (hrs) (mm)
5.85 0.193 3.58 18.47
=====

ID = 3 (0018): 17.68 0.551 3.25 20.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0018) |
3 + 2 = 1
ID1= 3 (0018): AREA 17.68 QPEAK 0.551 TPEAK 3.25 R.V. 20.67
+ ID2= 2 (0029): (ha) (cms) (hrs) (mm)
8.39 0.210 3.25 14.52
=====

ID = 1 (0018): 26.07 0.761 3.25 18.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0018) |
1 + 2 = 3
ID1= 1 (0018): AREA 26.07 QPEAK 0.761 TPEAK 3.25 R.V. 18.69
+ ID2= 2 (0040): (ha) (cms) (hrs) (mm)
1.96 0.258 3.25 32.38
=====

ID = 3 (0018): 28.03 1.019 3.25 19.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(0026) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
DT= 5.0 min
***** WARNING : FIRST OUTFLOW IS NOT ZERO.
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
0.0020 0.0130 | 0.1500 0.1750
0.0050 0.0260 | 0.1990 0.1940
0.0110 0.0410 | 0.2520 0.2140

0.0140	0.0550		0.3080	0.2350
0.0160	0.0700		0.3680	0.2570
0.0180	0.0860		0.4300	0.2790
0.0200	0.1030		0.4940	0.3020
0.0380	0.1200		0.5610	0.3250
0.0680	0.1370		0.6290	0.3500
0.1060	0.1560		0.6980	0.3750

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	28.030	1.019	3.25	19.65
OUTFLOW: ID= 1 (0026)	28.030	0.329	4.58	19.59

PEAK FLOW REDUCTION [Qout/Qin] (%) = 32.29
 TIME SHIFT OF PEAK FLOW (min) = 80.00
 MAXIMUM STORAGE USED (ha.m.) = 0.2428

```

-----
-----
| CALIB |
| STANDHYD ( 0012) |
| ID= 1 DT= 5.0 min |
-----

```

Area (ha) =	5.57		
Total Imp (%) =	42.66	Dir. Conn. (%) =	17.46

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha) =	2.38	3.19
Dep. Storage	(mm) =	1.00	3.00
Average Slope	(%) =	1.00	0.90
Length	(m) =	192.70	694.00
Mannings n	=	0.020	0.250

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

```

----- TRANSFORMED HYETOGRAPH -----

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
2.22	0.083	0.00	1.667	2.22	3.250	57.78	4.83
2.22	0.167	0.00	1.750	2.22	3.333	8.15	4.92
2.22	0.250	0.00	1.833	3.70	3.417	8.15	5.00
2.22	0.333	1.48	1.917	3.70	3.500	8.15	5.08
2.22	0.417	1.48	2.000	3.70	3.583	8.15	5.17
2.22	0.500	1.48	2.083	3.70	3.667	8.15	5.25

1.48	0.583	1.48		2.167	3.70		3.750	8.15		5.33
1.48	0.667	1.48		2.250	3.70		3.833	3.70		5.42
1.48	0.750	1.48		2.333	4.44		3.917	3.70		5.50
1.48	0.833	2.22		2.417	4.44		4.000	3.70		5.58
1.48	0.917	2.22		2.500	4.44		4.083	3.70		5.67
1.48	1.000	2.22		2.583	4.44		4.167	3.70		5.75
1.48	1.083	2.22		2.667	4.44		4.250	3.70		5.83
1.48	1.167	2.22		2.750	4.44		4.333	2.96		5.92
1.48	1.250	2.22		2.833	22.22		4.417	2.96		6.00
1.48	1.333	2.22		2.917	22.22		4.500	2.96		6.08
1.48	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48	1.500	2.22		3.083	57.78		4.667	2.96		6.25
1.48	1.583	2.22		3.167	57.78		4.750	2.96		

Max.Eff.Inten. (mm/hr)=	57.78	11.50
over (min)	5.00	125.00
Storage Coeff. (min)=	6.11 (ii)	124.12 (ii)
Unit Hyd. Tpeak (min)=	5.00	125.00
Unit Hyd. peak (cms)=	0.19	0.01

			TOTALS
PEAK FLOW (cms)=	0.15	0.04	0.150
(iii)			
TIME TO PEAK (hrs)=	3.25	5.25	3.25
RUNOFF VOLUME (mm)=	36.04	11.38	15.68
TOTAL RAINFALL (mm)=	37.04	37.04	37.04
RUNOFF COEFFICIENT =	0.97	0.31	0.42

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.9 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.

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

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
2.22	0.083	0.00		1.667	2.22		3.250	57.78		4.83
2.22	0.167	0.00		1.750	2.22		3.333	8.15		4.92
2.22	0.250	0.00		1.833	3.70		3.417	8.15		5.00
2.22	0.333	1.48		1.917	3.70		3.500	8.15		5.08
2.22	0.417	1.48		2.000	3.70		3.583	8.15		5.17
2.22	0.500	1.48		2.083	3.70		3.667	8.15		5.25
1.48	0.583	1.48		2.167	3.70		3.750	8.15		5.33
1.48	0.667	1.48		2.250	3.70		3.833	3.70		5.42
1.48	0.750	1.48		2.333	4.44		3.917	3.70		5.50
1.48	0.833	2.22		2.417	4.44		4.000	3.70		5.58
1.48	0.917	2.22		2.500	4.44		4.083	3.70		5.67
1.48	1.000	2.22		2.583	4.44		4.167	3.70		5.75
1.48	1.083	2.22		2.667	4.44		4.250	3.70		5.83
1.48	1.167	2.22		2.750	4.44		4.333	2.96		5.92
1.48	1.250	2.22		2.833	22.22		4.417	2.96		6.00
1.48	1.333	2.22		2.917	22.22		4.500	2.96		6.08

1.48	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48	1.500	2.22		3.083	57.78		4.667	2.96		6.25
	1.583	2.22		3.167	57.78		4.750	2.96		

Max.Eff.Inten. (mm/hr)=	57.78	19.09	
over (min)	5.00	80.00	
Storage Coeff. (min)=	4.24 (ii)	79.25 (ii)	
Unit Hyd. Tpeak (min)=	5.00	80.00	
Unit Hyd. peak (cms)=	0.24	0.01	
			TOTALS
PEAK FLOW (cms)=	0.19	0.08	0.202
(iii) TIME TO PEAK (hrs)=	3.25	4.50	3.25
RUNOFF VOLUME (mm)=	36.04	19.04	22.75
TOTAL RAINFALL (mm)=	37.04	37.04	37.04
RUNOFF COEFFICIENT =	0.97	0.51	0.61

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ROUTEPIPE( 0030) | PIPE Number      = 1.00
| IN= 2---> OUT= 1 | Diameter      (mm)= 500.00
| DT= 5.0 min      | Length       (m)= 26.00
|                   | Slope        (m/m)= 0.005
|                   | Manning n    = 0.013
-----

```

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.03	.103E+00	0.0	0.36	1.20
0.05	.286E+00	0.0	0.56	0.77
0.08	.517E+00	0.0	0.73	0.60
0.11	.782E+00	0.0	0.86	0.50
0.13	.107E+01	0.0	0.98	0.44
0.16	.138E+01	0.1	1.09	0.40
0.18	.171E+01	0.1	1.18	0.37
0.21	.204E+01	0.1	1.26	0.34
0.24	.238E+01	0.1	1.33	0.33
0.26	.272E+01	0.1	1.39	0.31
0.29	.306E+01	0.2	1.44	0.30
0.32	.340E+01	0.2	1.48	0.29

0.34	.372E+01	0.2	1.52	0.29
0.37	.403E+01	0.2	1.54	0.28
0.39	.432E+01	0.3	1.55	0.28
0.42	.459E+01	0.3	1.55	0.28
0.45	.482E+01	0.3	1.53	0.28
0.47	.500E+01	0.3	1.49	0.29
0.50	.511E+01	0.3	1.36	0.32

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0021)	5.47	0.20	3.25	22.75	0.33
1.50					
OUTFLOW: ID= 1 (0030)	5.47	0.20	3.25	22.75	0.32
1.49					

ADD HYD (0013)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0012):	5.57	0.150	3.25	15.68	
+ ID2= 2 (0030):	5.47	0.199	3.25	22.75	
=====					
ID = 3 (0013):	11.04	0.349	3.25	19.18	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTEPIPE(0031)	PIPE Number	= 1.00
IN= 2---> OUT= 1	Diameter (mm)	=1650.00
DT= 5.0 min	Length (m)	= 500.00
	Slope (m/m)	= 0.005
	Manning n	= 0.013

<----- TRAVEL TIME TABLE ----->

DEPTH	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(cu.m.)	(cms)	(m/s)	min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46

0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0013)	11.04	0.35	3.25	19.18	0.26
1.61					
OUTFLOW: ID= 1 (0031)	11.04	0.33	3.25	19.18	0.25
1.56					

CALIB					
STANDHYD (0025)	Area	(ha)=	2.35		
ID= 1 DT= 5.0 min	Total Imp(%)=	14.40	Dir. Conn.(%)=	3.20	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.34	2.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.80	0.80
Length	(m)=	125.17	400.00
Mannings n	=	0.013	0.250

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

	---- TRANSFORMED HYETOGRAPH ----									
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
2.22	0.083	0.00		1.667	2.22		3.250	57.78		4.83
	0.167	0.00		1.750	2.22		3.333	8.15		4.92

2.22							
	0.250	0.00	1.833	3.70	3.417	8.15	5.00
2.22							
	0.333	1.48	1.917	3.70	3.500	8.15	5.08
2.22							
	0.417	1.48	2.000	3.70	3.583	8.15	5.17
2.22							
	0.500	1.48	2.083	3.70	3.667	8.15	5.25
2.22							
	0.583	1.48	2.167	3.70	3.750	8.15	5.33
1.48							
	0.667	1.48	2.250	3.70	3.833	3.70	5.42
1.48							
	0.750	1.48	2.333	4.44	3.917	3.70	5.50
1.48							
	0.833	2.22	2.417	4.44	4.000	3.70	5.58
1.48							
	0.917	2.22	2.500	4.44	4.083	3.70	5.67
1.48							
	1.000	2.22	2.583	4.44	4.167	3.70	5.75
1.48							
	1.083	2.22	2.667	4.44	4.250	3.70	5.83
1.48							
	1.167	2.22	2.750	4.44	4.333	2.96	5.92
1.48							
	1.250	2.22	2.833	22.22	4.417	2.96	6.00
1.48							
	1.333	2.22	2.917	22.22	4.500	2.96	6.08
1.48							
	1.417	2.22	3.000	22.22	4.583	2.96	6.17
1.48							
	1.500	2.22	3.083	57.78	4.667	2.96	6.25
1.48							
	1.583	2.22	3.167	57.78	4.750	2.96	

Max.Eff.Inten. (mm/hr)=		57.78	13.64	
over (min)		5.00	90.00	
Storage Coeff. (min)=		3.89 (ii)	85.95 (ii)	
Unit Hyd. Tpeak (min)=		5.00	90.00	
Unit Hyd. peak (cms)=		0.25	0.01	
TOTALS				
PEAK FLOW (cms)=		0.01	0.03	0.035
(iii)				
TIME TO PEAK (hrs)=		3.25	4.67	4.67
RUNOFF VOLUME (mm)=		36.04	16.93	17.52
TOTAL RAINFALL (mm)=		37.04	37.04	37.04
RUNOFF COEFFICIENT =		0.97	0.46	0.47

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

-
-

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.37	1.60
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	114.60	241.00
Mannings n	=	0.013	0.250

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
2.22	0.083	0.00		1.667	2.22		3.250	57.78		4.83
2.22	0.167	0.00		1.750	2.22		3.333	8.15		4.92
2.22	0.250	0.00		1.833	3.70		3.417	8.15		5.00
2.22	0.333	1.48		1.917	3.70		3.500	8.15		5.08
2.22	0.417	1.48		2.000	3.70		3.583	8.15		5.17
2.22	0.500	1.48		2.083	3.70		3.667	8.15		5.25
1.48	0.583	1.48		2.167	3.70		3.750	8.15		5.33
1.48	0.667	1.48		2.250	3.70		3.833	3.70		5.42
1.48	0.750	1.48		2.333	4.44		3.917	3.70		5.50
1.48	0.833	2.22		2.417	4.44		4.000	3.70		5.58
1.48	0.917	2.22		2.500	4.44		4.083	3.70		5.67

1.48	1.000	2.22		2.583	4.44		4.167	3.70		5.75
1.48	1.083	2.22		2.667	4.44		4.250	3.70		5.83
1.48	1.167	2.22		2.750	4.44		4.333	2.96		5.92
1.48	1.250	2.22		2.833	22.22		4.417	2.96		6.00
1.48	1.333	2.22		2.917	22.22		4.500	2.96		6.08
1.48	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48	1.500	2.22		3.083	57.78		4.667	2.96		6.25
1.48	1.583	2.22		3.167	57.78		4.750	2.96		

Max.Eff.Inten. (mm/hr)=	57.78	16.31
over (min)	5.00	50.00
Storage Coeff. (min)=	2.80 (ii)	45.63 (ii)
Unit Hyd. Tpeak (min)=	5.00	50.00
Unit Hyd. peak (cms)=	0.28	0.02

TOTALS

(iii) PEAK FLOW (cms)=	0.02	0.04	0.045
TIME TO PEAK (hrs)=	3.25	3.92	3.92
RUNOFF VOLUME (mm)=	36.04	16.99	18.42
TOTAL RAINFALL (mm)=	37.04	37.04	37.04
RUNOFF COEFFICIENT =	0.97	0.46	0.50

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0034) | Area (ha)= 2.46
| ID= 1 DT= 5.0 min | Total Imp(%)= 18.80 Dir. Conn.(%)= 3.20
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.46	2.00
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.60	1.60
Length	(m)=	128.06	250.00

Mannings n = 0.013 0.250

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

----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN
mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr
2.22	0.083	0.00		1.667	2.22		3.250	57.78
2.22	0.167	0.00		1.750	2.22		3.333	8.15
2.22	0.250	0.00		1.833	3.70		3.417	8.15
2.22	0.333	1.48		1.917	3.70		3.500	8.15
2.22	0.417	1.48		2.000	3.70		3.583	8.15
2.22	0.500	1.48		2.083	3.70		3.667	8.15
1.48	0.583	1.48		2.167	3.70		3.750	8.15
1.48	0.667	1.48		2.250	3.70		3.833	3.70
1.48	0.750	1.48		2.333	4.44		3.917	3.70
1.48	0.833	2.22		2.417	4.44		4.000	3.70
1.48	0.917	2.22		2.500	4.44		4.083	3.70
1.48	1.000	2.22		2.583	4.44		4.167	3.70
1.48	1.083	2.22		2.667	4.44		4.250	3.70
1.48	1.167	2.22		2.750	4.44		4.333	2.96
1.48	1.250	2.22		2.833	22.22		4.417	2.96
1.48	1.333	2.22		2.917	22.22		4.500	2.96
1.48	1.417	2.22		3.000	22.22		4.583	2.96
1.48	1.500	2.22		3.083	57.78		4.667	2.96
	1.583	2.22		3.167	57.78		4.750	2.96

Max.Eff.Inten. (mm/hr)= 57.78 16.47
over (min) 5.00 50.00
Storage Coeff. (min)= 3.21 (ii) 49.82 (ii)

Unit Hyd. Tpeak (min)=	5.00	50.00	
Unit Hyd. peak (cms)=	0.27	0.02	
			TOTALS
PEAK FLOW (cms)=	0.01	0.06	0.057
(iii) TIME TO PEAK (hrs)=	3.25	4.00	4.00
RUNOFF VOLUME (mm)=	36.04	17.45	18.03
TOTAL RAINFALL (mm)=	37.04	37.04	37.04
RUNOFF COEFFICIENT =	0.97	0.47	0.49

***** 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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0039)		Area (ha)= 2.47	
ID= 1 DT= 5.0 min		Total Imp(%)= 92.64	Dir. Conn.(%)= 92.64

		IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.29	0.18	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	0.60	0.60	
Length (m)=	128.32	1000.00	
Mannings n =	0.013	0.250	

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

	---- TRANSFORMED HYETOGRAPH ----									
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr										
	0.083	0.00		1.667	2.22		3.250	57.78		4.83
2.22	0.167	0.00		1.750	2.22		3.333	8.15		4.92
2.22	0.250	0.00		1.833	3.70		3.417	8.15		5.00
2.22	0.333	1.48		1.917	3.70		3.500	8.15		5.08
2.22	0.417	1.48		2.000	3.70		3.583	8.15		5.17

2.22	0.500	1.48		2.083	3.70		3.667	8.15		5.25
2.22	0.583	1.48		2.167	3.70		3.750	8.15		5.33
1.48	0.667	1.48		2.250	3.70		3.833	3.70		5.42
1.48	0.750	1.48		2.333	4.44		3.917	3.70		5.50
1.48	0.833	2.22		2.417	4.44		4.000	3.70		5.58
1.48	0.917	2.22		2.500	4.44		4.083	3.70		5.67
1.48	1.000	2.22		2.583	4.44		4.167	3.70		5.75
1.48	1.083	2.22		2.667	4.44		4.250	3.70		5.83
1.48	1.167	2.22		2.750	4.44		4.333	2.96		5.92
1.48	1.250	2.22		2.833	22.22		4.417	2.96		6.00
1.48	1.333	2.22		2.917	22.22		4.500	2.96		6.08
1.48	1.417	2.22		3.000	22.22		4.583	2.96		6.17
1.48	1.500	2.22		3.083	57.78		4.667	2.96		6.25
1.48	1.583	2.22		3.167	57.78		4.750	2.96		

Max.Eff.Inten. (mm/hr)=	57.78	11.17	
over (min)	5.00	175.00	
Storage Coeff. (min)=	4.31	(ii)	172.20 (ii)
Unit Hyd. Tpeak (min)=	5.00		175.00
Unit Hyd. peak (cms)=	0.23		0.01
			TOTALS
PEAK FLOW (cms)=	0.36	0.00	0.360
(iii)			
TIME TO PEAK (hrs)=	3.25	6.08	3.25
RUNOFF VOLUME (mm)=	36.04	15.72	34.50
TOTAL RAINFALL (mm)=	37.04	37.04	37.04
RUNOFF COEFFICIENT =	0.97	0.42	0.93

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| ADD HYD  ( 0032) |
| 1 + 2 = 3      |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
          ID1= 1 ( 0025):      2.35      0.035      4.67      17.52
          + ID2= 2 ( 0031):      11.04      0.329      3.25      19.18
          =====
          ID = 3 ( 0032):      13.39      0.346      3.25      18.89
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD  ( 0032) |
| 3 + 2 = 1      |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
          ID1= 3 ( 0032):      13.39      0.346      3.25      18.89
          + ID2= 2 ( 0033):      1.97      0.045      3.92      18.42
          =====
          ID = 1 ( 0032):      15.36      0.383      3.25      18.83
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD  ( 0032) |
| 1 + 2 = 3      |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
          ID1= 1 ( 0032):      15.36      0.383      3.25      18.83
          + ID2= 2 ( 0034):      2.46      0.057      4.00      18.03
          =====
          ID = 3 ( 0032):      17.82      0.411      3.25      18.72
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD  ( 0032) |
| 3 + 2 = 1      |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
          ID1= 3 ( 0032):      17.82      0.411      3.25      18.72
          + ID2= 2 ( 0039):      2.47      0.360      3.25      34.50
          =====
          ID = 1 ( 0032):      20.29      0.771      3.25      20.64
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0035) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min      |
-----

```

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0190	0.1040	0.2460
0.0020	0.0380	0.1480	0.2720
0.0040	0.0580	0.1970	0.3000
0.0100	0.0790	0.2500	0.3280
0.0130	0.1010	0.3060	0.3570
0.0150	0.1230	0.3660	0.3870
0.0170	0.1460	0.4280	0.4180
0.0190	0.1700	0.4920	0.4490
0.0360	0.1940	0.5580	0.4810
0.0660	0.2200	0.6260	0.5150

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0032)	20.290	0.771	3.25	20.64
OUTFLOW: ID= 1 (0035)	20.290	0.132	6.25	19.58

PEAK FLOW REDUCTION [Qout/Qin] (%) = 17.16
 TIME SHIFT OF PEAK FLOW (min) = 180.00
 MAXIMUM STORAGE USED (ha.m.) = 0.2627

```

-----
=====
=====
V   V   I   SSSSS U   U   A   L           (v 6.2.2006)
V   V   I   SS    U   U   A A  L
V   V   I   SS    U   U   AAAAA L
V   V   I   SS    U   U   A   A  L
VV      I   SSSSS UUUUU A   A  LLLLL

```

```

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

```

Developed and Distributed by Smart City Water Inc
 Copyright 2007 - 2021 Smart City Water Inc
 All rights reserved.

***** 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\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-27f4b695ed5c\84a5b157-dc3a-4af7-b484-42aal8ae86e\sce

Summary filename:

C:\Users\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-27f4b695ed5c\84a5b157-dc3a-4af7-b484-42aal8ae86e\sce

DATE: 12/13/2022

TIME: 04:44:27

USER:

COMMENTS: _____

** SIMULATION : 50yr 6hr 15min SCS Type II (M **

READ STORM	Filename: C:\Users\ychokshi\AppData\Local\Temp\
	8ccd28ef-3410-4b01-9b0c-
	825ce2009420\40c96b0c
Ptotal= 74.60 mm	Comments: 50yr 6hr 15min SCS Type II (MTO)

	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
RAIN	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr	0.25	0.00		2.00	7.46		3.75	16.41		5.50
2.98	0.50	2.98		2.25	7.46		4.00	7.46		5.75
2.98	0.75	2.98		2.50	8.95		4.25	7.46		6.00
2.98	1.00	4.48		2.75	8.95		4.50	5.97		6.25
2.98	1.25	4.48		3.00	44.76		4.75	5.97		
	1.50	4.48		3.25	116.38		5.00	4.48		
	1.75	4.48		3.50	16.41		5.25	4.48		


```

-----
| CALIB |
| STANDHYD ( 0016) | Area (ha)= 8.39
| ID= 1 DT= 5.0 min | Total Imp(%)= 38.22 Dir. Conn.(%)= 18.62
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.21	5.18
Dep. Storage	(mm)=	1.00	3.00
Average Slope	(%)=	0.90	0.90
Length	(m)=	236.50	500.00
Mannings n	=	0.020	0.250

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

```

----- TRANSFORMED HYETOGRAPH -----

```

	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
RAIN							
mm/hr							
	0.083	0.00	1.667	4.48	3.250	116.38	4.83
4.48	0.167	0.00	1.750	4.48	3.333	16.41	4.92
4.48	0.250	0.00	1.833	7.46	3.417	16.41	5.00
4.48	0.333	2.98	1.917	7.46	3.500	16.41	5.08
4.48	0.417	2.98	2.000	7.46	3.583	16.41	5.17
4.48	0.500	2.98	2.083	7.46	3.667	16.41	5.25
4.48	0.583	2.98	2.167	7.46	3.750	16.41	5.33
2.98	0.667	2.98	2.250	7.46	3.833	7.46	5.42
2.98	0.750	2.98	2.333	8.95	3.917	7.46	5.50
2.98	0.833	4.48	2.417	8.95	4.000	7.46	5.58
2.98	0.917	4.48	2.500	8.95	4.083	7.46	5.67
2.98	1.000	4.48	2.583	8.95	4.167	7.46	5.75
2.98	1.083	4.48	2.667	8.95	4.250	7.46	5.83
2.98	1.167	4.48	2.750	8.95	4.333	5.97	5.92
2.98	1.250	4.48	2.833	44.76	4.417	5.97	6.00
2.98	1.333	4.48	2.917	44.76	4.500	5.97	6.08

2.98	1.417	4.48		3.000	44.76		4.583	5.97		6.17
2.98	1.500	4.48		3.083	116.38		4.667	5.97		6.25
2.98	1.583	4.48		3.167	116.38		4.750	5.97		

Max.Eff.Inten.(mm/hr)=	116.38	29.93	
over (min)	5.00	75.00	
Storage Coeff. (min)=	5.39 (ii)	71.52 (ii)	
Unit Hyd. Tpeak (min)=	5.00	75.00	
Unit Hyd. peak (cms)=	0.21	0.02	
			TOTALS
PEAK FLOW (cms)=	0.49	0.22	0.526
(iii)			
TIME TO PEAK (hrs)=	3.25	4.42	3.25
RUNOFF VOLUME (mm)=	73.60	32.04	39.77
TOTAL RAINFALL (mm)=	74.60	74.60	74.60
RUNOFF COEFFICIENT =	0.99	0.43	0.53

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 67.9 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.

```

-----
-----
| ROUTEPIPE( 0029) | PIPE Number      = 1.00
| IN= 2---> OUT= 1 | Diameter (mm)=1650.00
| DT= 5.0 min      | Length (m)= 500.00
|                   | Slope (m/m)= 0.005
|                   | Manning n      = 0.013
-----

```

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70

0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0016)	8.39	0.53	3.25	39.77	0.32
1.79					
OUTFLOW: ID= 1 (0029)	8.39	0.49	3.25	39.77	0.30
1.75					

CALIB				
STANDHYD (0022)	Area	(ha)=	11.83	
ID= 1 DT= 5.0 min	Total Imp(%)=	39.45	Dir. Conn.(%)=	17.05

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.67	7.16
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.50	2.50
Length	(m)=	280.83	315.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
mm/hr	0.083	0.00	1.667	4.48	3.250	116.38	4.83
4.48	0.167	0.00	1.750	4.48	3.333	16.41	4.92
4.48	0.250	0.00	1.833	7.46	3.417	16.41	5.00
4.48	0.333	2.98	1.917	7.46	3.500	16.41	5.08

4.48							
	0.417	2.98		2.000	7.46		3.583
4.48							
	0.500	2.98		2.083	7.46		3.667
4.48							
	0.583	2.98		2.167	7.46		3.750
2.98							
	0.667	2.98		2.250	7.46		3.833
2.98							
	0.750	2.98		2.333	8.95		3.917
2.98							
	0.833	4.48		2.417	8.95		4.000
2.98							
	0.917	4.48		2.500	8.95		4.083
2.98							
	1.000	4.48		2.583	8.95		4.167
2.98							
	1.083	4.48		2.667	8.95		4.250
2.98							
	1.167	4.48		2.750	8.95		4.333
2.98							
	1.250	4.48		2.833	44.76		4.417
2.98							
	1.333	4.48		2.917	44.76		4.500
2.98							
	1.417	4.48		3.000	44.76		4.583
2.98							
	1.500	4.48		3.083	116.38		4.667
2.98							
	1.583	4.48		3.167	116.38		4.750

Max.Eff.Inten. (mm/hr)=	116.38	90.01
over (min)	5.00	30.00
Storage Coeff. (min)=	3.39 (ii)	27.14 (ii)
Unit Hyd. Tpeak (min)=	5.00	30.00
Unit Hyd. peak (cms)=	0.26	0.04

TOTALS

PEAK FLOW (cms)=	0.65	1.04	1.196
(iii)			
TIME TO PEAK (hrs)=	3.25	3.58	3.25
RUNOFF VOLUME (mm)=	73.60	50.86	54.74
TOTAL RAINFALL (mm)=	74.60	74.60	74.60
RUNOFF COEFFICIENT =	0.99	0.68	0.73

***** 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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| CALIB |
| STANDHYD ( 0023) | Area (ha)= 5.85
| ID= 1 DT= 5.0 min | Total Imp(%)= 19.00 Dir. Conn.(%)= 7.80
-----
  
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.11	4.74
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.40	2.40
Length	(m)=	197.48	135.00
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
mm/hr
hrs      mm/hr | hrs      mm/hr | ' hrs      mm/hr | hrs
0.083    0.00 | 1.667    4.48 | 3.250   116.38 | 4.83
4.48
0.167    0.00 | 1.750    4.48 | 3.333    16.41 | 4.92
4.48
0.250    0.00 | 1.833    7.46 | 3.417    16.41 | 5.00
4.48
0.333    2.98 | 1.917    7.46 | 3.500    16.41 | 5.08
4.48
0.417    2.98 | 2.000    7.46 | 3.583    16.41 | 5.17
4.48
0.500    2.98 | 2.083    7.46 | 3.667    16.41 | 5.25
4.48
0.583    2.98 | 2.167    7.46 | 3.750    16.41 | 5.33
2.98
0.667    2.98 | 2.250    7.46 | 3.833     7.46 | 5.42
2.98
0.750    2.98 | 2.333    8.95 | 3.917     7.46 | 5.50
2.98
0.833    4.48 | 2.417    8.95 | 4.000     7.46 | 5.58
2.98
0.917    4.48 | 2.500    8.95 | 4.083     7.46 | 5.67
2.98
1.000    4.48 | 2.583    8.95 | 4.167     7.46 | 5.75
2.98
1.083    4.48 | 2.667    8.95 | 4.250     7.46 | 5.83
2.98
  
```

	1.167	4.48		2.750	8.95		4.333	5.97		5.92
2.98										
	1.250	4.48		2.833	44.76		4.417	5.97		6.00
2.98										
	1.333	4.48		2.917	44.76		4.500	5.97		6.08
2.98										
	1.417	4.48		3.000	44.76		4.583	5.97		6.17
2.98										
	1.500	4.48		3.083	116.38		4.667	5.97		6.25
2.98										
	1.583	4.48		3.167	116.38		4.750	5.97		

Max.Eff.Inten. (mm/hr)=	116.38	97.46
over (min)	5.00	20.00
Storage Coeff. (min)=	2.78 (ii)	16.79 (ii)
Unit Hyd. Tpeak (min)=	5.00	20.00
Unit Hyd. peak (cms)=	0.28	0.06

TOTALS

(iii) PEAK FLOW	(cms)=	0.15	0.72	0.741
TIME TO PEAK	(hrs)=	3.25	3.42	3.42
RUNOFF VOLUME	(mm)=	73.60	47.67	49.69
TOTAL RAINFALL	(mm)=	74.60	74.60	74.60
RUNOFF COEFFICIENT	=	0.99	0.64	0.67

***** 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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0040)	Area	(ha)=	1.96
ID= 1 DT= 5.0 min	Total Imp(%)=	82.10	Dir. Conn.(%)= 82.10

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.61	0.35
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.50	1.50
Length	(m)=	114.31	514.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	
4.48	0.083	0.00	1.667	4.48	3.250	116.38	4.83	
4.48	0.167	0.00	1.750	4.48	3.333	16.41	4.92	
4.48	0.250	0.00	1.833	7.46	3.417	16.41	5.00	
4.48	0.333	2.98	1.917	7.46	3.500	16.41	5.08	
4.48	0.417	2.98	2.000	7.46	3.583	16.41	5.17	
4.48	0.500	2.98	2.083	7.46	3.667	16.41	5.25	
2.98	0.583	2.98	2.167	7.46	3.750	16.41	5.33	
2.98	0.667	2.98	2.250	7.46	3.833	7.46	5.42	
2.98	0.750	2.98	2.333	8.95	3.917	7.46	5.50	
2.98	0.833	4.48	2.417	8.95	4.000	7.46	5.58	
2.98	0.917	4.48	2.500	8.95	4.083	7.46	5.67	
2.98	1.000	4.48	2.583	8.95	4.167	7.46	5.75	
2.98	1.083	4.48	2.667	8.95	4.250	7.46	5.83	
2.98	1.167	4.48	2.750	8.95	4.333	5.97	5.92	
2.98	1.250	4.48	2.833	44.76	4.417	5.97	6.00	
2.98	1.333	4.48	2.917	44.76	4.500	5.97	6.08	
2.98	1.417	4.48	3.000	44.76	4.583	5.97	6.17	
2.98	1.500	4.48	3.083	116.38	4.667	5.97	6.25	
	1.583	4.48	3.167	116.38	4.750	5.97		

Max.Eff.Inten. (mm/hr)= 116.38 34.24
 over (min) 5.00 60.00
 Storage Coeff. (min)= 2.31 (ii) 56.97 (ii)
 Unit Hyd. Tpeak (min)= 5.00 60.00
 Unit Hyd. peak (cms)= 0.30 0.02

PEAK FLOW (cms)= 0.52 0.02 *TOTALS*
0.525

(iii)

TIME TO PEAK	(hrs)=	3.25	4.08	3.25
RUNOFF VOLUME	(mm)=	73.60	45.31	68.52
TOTAL RAINFALL	(mm)=	74.60	74.60	74.60
RUNOFF COEFFICIENT	=	0.99	0.61	0.92

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.


```
-----
| ADD HYD  ( 0018) |
|  1 +  2 =  3    |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0022):  11.83    1.196     3.25     54.74
+ ID2= 2 ( 0023):   5.85    0.741     3.42     49.69
=====
ID = 3 ( 0018):  17.68    1.859     3.25     53.07
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```
-----
| ADD HYD  ( 0018) |
|  3 +  2 =  1    |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0018):  17.68    1.859     3.25     53.07
+ ID2= 2 ( 0029):   8.39    0.492     3.25     39.77
=====
ID = 1 ( 0018):  26.07    2.351     3.25     48.79
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```
-----
| ADD HYD  ( 0018) |
|  1 +  2 =  3    |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0018):  26.07    2.351     3.25     48.79
+ ID2= 2 ( 0040):   1.96    0.525     3.25     68.52
=====
ID = 3 ( 0018):  28.03    2.876     3.25     50.17
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(0026) | OVERFLOW IS OFF

| IN= 2--> OUT= 1 |

| DT= 5.0 min |

**** WARNING : FIRST OUTFLOW IS NOT ZERO.

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0020	0.0130	0.1500	0.1750
0.0050	0.0260	0.1990	0.1940
0.0110	0.0410	0.2520	0.2140
0.0140	0.0550	0.3080	0.2350
0.0160	0.0700	0.3680	0.2570
0.0180	0.0860	0.4300	0.2790
0.0200	0.1030	0.4940	0.3020
0.0380	0.1200	0.5610	0.3250
0.0680	0.1370	0.6290	0.3500
0.1060	0.1560	0.6980	0.3750

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	28.030	2.876	3.25	50.17
OUTFLOW: ID= 1 (0026)	28.030	1.184	4.00	50.11

PEAK FLOW REDUCTION [Qout/Qin] (%) = 41.18
TIME SHIFT OF PEAK FLOW (min) = 45.00
MAXIMUM STORAGE USED (ha.m.) = 0.5517

| CALIB |

| STANDHYD (0012) |

| ID= 1 DT= 5.0 min |

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha) =	2.38	3.19
Dep. Storage (mm) =	1.00	3.00
Average Slope (%) =	1.00	0.90
Length (m) =	192.70	694.00
Mannings n =	0.020	0.250

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

----- TRANSFORMED HYETOGRAPH -----

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

mm/hr	0.083	0.00		1.667	4.48		3.250	116.38		4.83
4.48	0.167	0.00		1.750	4.48		3.333	16.41		4.92
4.48	0.250	0.00		1.833	7.46		3.417	16.41		5.00
4.48	0.333	2.98		1.917	7.46		3.500	16.41		5.08
4.48	0.417	2.98		2.000	7.46		3.583	16.41		5.17
4.48	0.500	2.98		2.083	7.46		3.667	16.41		5.25
4.48	0.583	2.98		2.167	7.46		3.750	16.41		5.33
2.98	0.667	2.98		2.250	7.46		3.833	7.46		5.42
2.98	0.750	2.98		2.333	8.95		3.917	7.46		5.50
2.98	0.833	4.48		2.417	8.95		4.000	7.46		5.58
2.98	0.917	4.48		2.500	8.95		4.083	7.46		5.67
2.98	1.000	4.48		2.583	8.95		4.167	7.46		5.75
2.98	1.083	4.48		2.667	8.95		4.250	7.46		5.83
2.98	1.167	4.48		2.750	8.95		4.333	5.97		5.92
2.98	1.250	4.48		2.833	44.76		4.417	5.97		6.00
2.98	1.333	4.48		2.917	44.76		4.500	5.97		6.08
2.98	1.417	4.48		3.000	44.76		4.583	5.97		6.17
2.98	1.500	4.48		3.083	116.38		4.667	5.97		6.25
2.98	1.583	4.48		3.167	116.38		4.750	5.97		

Max.Eff.Inten. (mm/hr)=	116.38	37.24	
over (min)	5.00	80.00	
Storage Coeff. (min)=	4.62 (ii)	78.39 (ii)	
Unit Hyd. Tpeak (min)=	5.00	80.00	
Unit Hyd. peak (cms)=	0.22	0.01	
			TOTALS
PEAK FLOW (cms)=	0.31	0.16	0.335
(iii)			
TIME TO PEAK (hrs)=	3.25	4.50	3.25
RUNOFF VOLUME (mm)=	73.60	36.29	42.80
TOTAL RAINFALL (mm)=	74.60	74.60	74.60
RUNOFF COEFFICIENT =	0.99	0.49	0.57

***** 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* = 70.9 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
-----
-----
| CALIB |
| STANDHYD ( 0021) | Area (ha)= 5.47
| ID= 1 DT= 5.0 min | Total Imp(%)= 44.25 Dir. Conn.(%)= 21.85
-----
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.42	3.05
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.40	1.40
Length	(m)=	190.96	570.00
Mannings n	=	0.013	0.250

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

```

              ----- TRANSFORMED HYETOGRAPH -----
TIME    RAIN | TIME    RAIN | TIME    RAIN | TIME
RAIN
      hrs  mm/hr | hrs  mm/hr | hrs  mm/hr | hrs
mm/hr
0.083   0.00 | 1.667   4.48 | 3.250  116.38 | 4.83
4.48
0.167   0.00 | 1.750   4.48 | 3.333   16.41 | 4.92
4.48
0.250   0.00 | 1.833   7.46 | 3.417   16.41 | 5.00
4.48
0.333   2.98 | 1.917   7.46 | 3.500   16.41 | 5.08
4.48
0.417   2.98 | 2.000   7.46 | 3.583   16.41 | 5.17
4.48
0.500   2.98 | 2.083   7.46 | 3.667   16.41 | 5.25
4.48
0.583   2.98 | 2.167   7.46 | 3.750   16.41 | 5.33
2.98
0.667   2.98 | 2.250   7.46 | 3.833   7.46 | 5.42
2.98
0.750   2.98 | 2.333   8.95 | 3.917   7.46 | 5.50
2.98

```

2.98	0.833	4.48		2.417	8.95		4.000	7.46		5.58
2.98	0.917	4.48		2.500	8.95		4.083	7.46		5.67
2.98	1.000	4.48		2.583	8.95		4.167	7.46		5.75
2.98	1.083	4.48		2.667	8.95		4.250	7.46		5.83
2.98	1.167	4.48		2.750	8.95		4.333	5.97		5.92
2.98	1.250	4.48		2.833	44.76		4.417	5.97		6.00
2.98	1.333	4.48		2.917	44.76		4.500	5.97		6.08
2.98	1.417	4.48		3.000	44.76		4.583	5.97		6.17
2.98	1.500	4.48		3.083	116.38		4.667	5.97		6.25
2.98	1.583	4.48		3.167	116.38		4.750	5.97		

Max.Eff.Inten.(mm/hr)=	116.38	57.75
over (min)	5.00	55.00
Storage Coeff. (min)=	3.20 (ii)	51.38 (ii)
Unit Hyd. Tpeak (min)=	5.00	55.00
Unit Hyd. peak (cms)=	0.27	0.02

TOTALS

PEAK FLOW (cms)=	0.38	0.29	0.472
(iii) TIME TO PEAK (hrs)=	3.25	4.00	3.25
RUNOFF VOLUME (mm)=	73.60	51.24	56.12
TOTAL RAINFALL (mm)=	74.60	74.60	74.60
RUNOFF COEFFICIENT =	0.99	0.69	0.75

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| ROUTEPIPE( 0030) | PIPE Number      = 1.00
| IN= 2---> OUT= 1 | Diameter (mm)= 500.00
| DT= 5.0 min      | Length (m)= 26.00
-----| Slope (m/m)= 0.005
Manning n          = 0.013

```

**** WARNING: MINIMUM PIPE SIZE REQUIRED = 618.88 (mm) FOR

FREE FLOW.

THIS SIZE WAS USED IN THE ROUTING.

THE CAPACITY OF THIS PIPE = 0.47 (cms)

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.03	.158E+00	0.0	0.42	1.04
0.07	.439E+00	0.0	0.65	0.67
0.10	.792E+00	0.0	0.84	0.52
0.13	.120E+01	0.0	0.99	0.44
0.16	.164E+01	0.1	1.13	0.38
0.20	.212E+01	0.1	1.25	0.35
0.23	.262E+01	0.1	1.36	0.32
0.26	.313E+01	0.2	1.45	0.30
0.29	.365E+01	0.2	1.53	0.28
0.33	.417E+01	0.3	1.60	0.27
0.36	.469E+01	0.3	1.66	0.26
0.39	.521E+01	0.3	1.71	0.25
0.42	.570E+01	0.4	1.75	0.25
0.46	.618E+01	0.4	1.77	0.24
0.49	.662E+01	0.5	1.79	0.24
0.52	.703E+01	0.5	1.79	0.24
0.55	.738E+01	0.5	1.77	0.25
0.59	.766E+01	0.5	1.72	0.25
0.62	.782E+01	0.5	1.57	0.28

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0021)	5.47	0.47	3.25	56.12	0.51
1.79					
OUTFLOW: ID= 1 (0030)	5.47	0.46	3.25	56.12	0.51
1.79					

**** WARNING: COMPUTATIONS FAILED TO CONVERGE.

ADD HYD (0013)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):		5.57	0.335	3.25	42.80
+ ID2= 2 (0030):		5.47	0.464	3.25	56.12
=====					
ID = 3 (0013):		11.04	0.799	3.25	49.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTEPIPE( 0031) | PIPE Number      = 1.00
| IN= 2---> OUT= 1 | Diameter (mm)=1650.00
| DT= 5.0 min      | Length (m)= 500.00
|                  | Slope (m/m)= 0.005
|                  | Manning n      = 0.013
-----
```

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

```
channel->
<----- hydrograph -----> <-pipe /
AREA      QPEAK    TPEAK    R.V.    MAX DEPTH
(ha)      (cms)    (hrs)    (mm)    (m)
(m/s)
INFLOW : ID= 2 ( 0013) 11.04    0.80    3.25  49.40    0.39
2.03
OUTFLOW: ID= 1 ( 0031) 11.04    0.77    3.25  49.40    0.38
2.01
```

```
-----
| CALIB                      |
| STANDHYD ( 0025) | Area (ha)= 2.35
-----
```

|ID= 1 DT= 5.0 min | Total Imp(%)= 14.40 Dir. Conn.(%)= 3.20

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.34	2.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.80	0.80
Length	(m)=	125.17	400.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
mm/hr								
4.48	0.083	0.00	1.667	4.48	3.250	116.38	4.83	
4.48	0.167	0.00	1.750	4.48	3.333	16.41	4.92	
4.48	0.250	0.00	1.833	7.46	3.417	16.41	5.00	
4.48	0.333	2.98	1.917	7.46	3.500	16.41	5.08	
4.48	0.417	2.98	2.000	7.46	3.583	16.41	5.17	
4.48	0.500	2.98	2.083	7.46	3.667	16.41	5.25	
4.48	0.583	2.98	2.167	7.46	3.750	16.41	5.33	
2.98	0.667	2.98	2.250	7.46	3.833	7.46	5.42	
2.98	0.750	2.98	2.333	8.95	3.917	7.46	5.50	
2.98	0.833	4.48	2.417	8.95	4.000	7.46	5.58	
2.98	0.917	4.48	2.500	8.95	4.083	7.46	5.67	
2.98	1.000	4.48	2.583	8.95	4.167	7.46	5.75	
2.98	1.083	4.48	2.667	8.95	4.250	7.46	5.83	
2.98	1.167	4.48	2.750	8.95	4.333	5.97	5.92	
2.98	1.250	4.48	2.833	44.76	4.417	5.97	6.00	
2.98	1.333	4.48	2.917	44.76	4.500	5.97	6.08	
2.98	1.417	4.48	3.000	44.76	4.583	5.97	6.17	
2.98								

2.98

(iii)

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

RAIN
mm/hr

4.48

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN		TIME	RAIN		TIME	RAIN
hrs	mm/hr		hrs	mm/hr		hrs	mm/hr
0.083	0.00		1.667	4.48		3.250	116.38
						4.83	

4.48	0.167	0.00		1.750	4.48		3.333	16.41		4.92
4.48	0.250	0.00		1.833	7.46		3.417	16.41		5.00
4.48	0.333	2.98		1.917	7.46		3.500	16.41		5.08
4.48	0.417	2.98		2.000	7.46		3.583	16.41		5.17
4.48	0.500	2.98		2.083	7.46		3.667	16.41		5.25
4.48	0.583	2.98		2.167	7.46		3.750	16.41		5.33
2.98	0.667	2.98		2.250	7.46		3.833	7.46		5.42
2.98	0.750	2.98		2.333	8.95		3.917	7.46		5.50
2.98	0.833	4.48		2.417	8.95		4.000	7.46		5.58
2.98	0.917	4.48		2.500	8.95		4.083	7.46		5.67
2.98	1.000	4.48		2.583	8.95		4.167	7.46		5.75
2.98	1.083	4.48		2.667	8.95		4.250	7.46		5.83
2.98	1.167	4.48		2.750	8.95		4.333	5.97		5.92
2.98	1.250	4.48		2.833	44.76		4.417	5.97		6.00
2.98	1.333	4.48		2.917	44.76		4.500	5.97		6.08
2.98	1.417	4.48		3.000	44.76		4.583	5.97		6.17
2.98	1.500	4.48		3.083	116.38		4.667	5.97		6.25
2.98	1.583	4.48		3.167	116.38		4.750	5.97		

Max.Eff.Inten. (mm/hr)=	116.38	69.92	
over (min)	5.00	30.00	
Storage Coeff. (min)=	2.12 (ii)	26.04 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.31	0.04	
			TOTALS
PEAK FLOW (cms)=	0.05	0.18	0.190
(iii)			
TIME TO PEAK (hrs)=	3.25	3.58	3.58
RUNOFF VOLUME (mm)=	73.60	47.66	49.63
TOTAL RAINFALL (mm)=	74.60	74.60	74.60
RUNOFF COEFFICIENT =	0.99	0.64	0.67

***** 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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| CALIB          |
| STANDHYD ( 0034) | Area (ha)= 2.46
| ID= 1 DT= 5.0 min | Total Imp(%)= 18.80 Dir. Conn.(%)= 3.20
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.46	2.00
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.60	1.60
Length	(m)=	128.06	250.00
Mannings n	=	0.013	0.250

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

```

----- TRANSFORMED HYETOGRAPH -----

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
	0.083	0.00	1.667	4.48	3.250	116.38	4.83
4.48	0.167	0.00	1.750	4.48	3.333	16.41	4.92
4.48	0.250	0.00	1.833	7.46	3.417	16.41	5.00
4.48	0.333	2.98	1.917	7.46	3.500	16.41	5.08
4.48	0.417	2.98	2.000	7.46	3.583	16.41	5.17
4.48	0.500	2.98	2.083	7.46	3.667	16.41	5.25
4.48	0.583	2.98	2.167	7.46	3.750	16.41	5.33
2.98	0.667	2.98	2.250	7.46	3.833	7.46	5.42
2.98	0.750	2.98	2.333	8.95	3.917	7.46	5.50
2.98	0.833	4.48	2.417	8.95	4.000	7.46	5.58
2.98	0.917	4.48	2.500	8.95	4.083	7.46	5.67

2.98	1.000	4.48		2.583	8.95		4.167	7.46		5.75
2.98	1.083	4.48		2.667	8.95		4.250	7.46		5.83
2.98	1.167	4.48		2.750	8.95		4.333	5.97		5.92
2.98	1.250	4.48		2.833	44.76		4.417	5.97		6.00
2.98	1.333	4.48		2.917	44.76		4.500	5.97		6.08
2.98	1.417	4.48		3.000	44.76		4.583	5.97		6.17
2.98	1.500	4.48		3.083	116.38		4.667	5.97		6.25
2.98	1.583	4.48		3.167	116.38		4.750	5.97		

Max.Eff.Inten. (mm/hr)=	116.38	66.44
over (min)	5.00	30.00
Storage Coeff. (min)=	2.42 (ii)	29.11 (ii)
Unit Hyd. Tpeak (min)=	5.00	30.00
Unit Hyd. peak (cms)=	0.30	0.04

TOTALS

PEAK FLOW (cms)=	0.03	0.23	0.234
(iii) TIME TO PEAK (hrs)=	3.25	3.58	3.58
RUNOFF VOLUME (mm)=	73.60	48.48	49.28
TOTAL RAINFALL (mm)=	74.60	74.60	74.60
RUNOFF COEFFICIENT =	0.99	0.65	0.66

***** 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* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| CALIB |
| STANDHYD ( 0039) | Area (ha)= 2.47
| ID= 1 DT= 5.0 min | Total Imp(%)= 92.64 Dir. Conn.(%)= 92.64
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.29	0.18
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.60	0.60

Length	(m) =	128.32	1000.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----							
RAIN	TIME	RAIN		TIME	RAIN		TIME
mm/hr	hrs	mm/hr		hrs	mm/hr		hrs
4.48	0.083	0.00		1.667	4.48		3.250
4.48	0.167	0.00		1.750	4.48		3.333
4.48	0.250	0.00		1.833	7.46		3.417
4.48	0.333	2.98		1.917	7.46		3.500
4.48	0.417	2.98		2.000	7.46		3.583
4.48	0.500	2.98		2.083	7.46		3.667
2.98	0.583	2.98		2.167	7.46		3.750
2.98	0.667	2.98		2.250	7.46		3.833
2.98	0.750	2.98		2.333	8.95		3.917
2.98	0.833	4.48		2.417	8.95		4.000
2.98	0.917	4.48		2.500	8.95		4.083
2.98	1.000	4.48		2.583	8.95		4.167
2.98	1.083	4.48		2.667	8.95		4.250
2.98	1.167	4.48		2.750	8.95		4.333
2.98	1.250	4.48		2.833	44.76		4.417
2.98	1.333	4.48		2.917	44.76		4.500
2.98	1.417	4.48		3.000	44.76		4.583
2.98	1.500	4.48		3.083	116.38		4.667
	1.583	4.48		3.167	116.38		4.750

Max.Eff.Inten. (mm/hr)=	116.38	32.50
over (min)	5.00	115.00

Storage Coeff. (min)=	3.25 (ii)	112.78 (ii)	
Unit Hyd. Tpeak (min)=	5.00	115.00	
Unit Hyd. peak (cms)=	0.27	0.01	
			TOTALS
PEAK FLOW (cms)=	0.74	0.01	0.736

(iii)

TIME TO PEAK (hrs)=	3.25	5.08	3.25
RUNOFF VOLUME (mm)=	73.60	45.31	71.49
TOTAL RAINFALL (mm)=	74.60	74.60	74.60
RUNOFF COEFFICIENT =	0.99	0.61	0.96

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0032) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0025):    2.35    0.137    4.08    48.37
+ ID2= 2 ( 0031):   11.04    0.773    3.25    49.40
=====
ID = 3 ( 0032):   13.39    0.833    3.25    49.22

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0032) |
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0032):   13.39    0.833    3.25    49.22
+ ID2= 2 ( 0033):    1.97    0.190    3.58    49.63
=====
ID = 1 ( 0032):   15.36    0.977    3.25    49.27

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0032) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.

```

```

-----
              (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0032):  15.36  0.977    3.25    49.27
+ ID2= 2 ( 0034):   2.46  0.234    3.58    49.28
=====
ID = 3 ( 0032):  17.82  1.122    3.25    49.27

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0032) |
| 3 + 2 = 1 |
-----
              AREA      QPEAK      TPEAK      R.V.
              (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0032):  17.82  1.122    3.25    49.27
+ ID2= 2 ( 0039):   2.47  0.736    3.25    71.49
=====
ID = 1 ( 0032):  20.29  1.858    3.25    51.98

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0035) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
OUTFLOW      STORAGE      | OUTFLOW      STORAGE
(cms)        (ha.m.)      | (cms)        (ha.m.)
0.0000       0.0190      | 0.1040       0.2460
0.0020       0.0380      | 0.1480       0.2720
0.0040       0.0580      | 0.1970       0.3000
0.0100       0.0790      | 0.2500       0.3280
0.0130       0.1010      | 0.3060       0.3570
0.0150       0.1230      | 0.3660       0.3870
0.0170       0.1460      | 0.4280       0.4180
0.0190       0.1700      | 0.4920       0.4490
0.0360       0.1940      | 0.5580       0.4810
0.0660       0.2200      | 0.6260       0.5150

```

```

              AREA      QPEAK      TPEAK      R.V.
              (ha)      (cms)      (hrs)      (mm)
INFLOW : ID= 2 ( 0032)  20.290    1.858    3.25    51.98
OUTFLOW: ID= 1 ( 0035)  20.290    0.589    4.83    50.92

```

```

PEAK FLOW REDUCTION [Qout/Qin] (%)= 31.71
TIME SHIFT OF PEAK FLOW (min)= 95.00
MAXIMUM STORAGE USED (ha.m.)= 0.4966

```

```

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

```

```

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

```

Developed and Distributed by Smart City Water Inc
 Copyright 2007 - 2021 Smart City Water Inc
 All rights reserved.

***** 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\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
 27f4b695ed5c\0ebe3b02-551c-4f6d-aedc-elbc860852f7\sce
 Summary filename:
 C:\Users\ychokshi\AppData\Local\Civica\XH5\6598cc33-0c00-4a48-9ce8-
 27f4b695ed5c\0ebe3b02-551c-4f6d-aedc-elbc860852f7\sce

DATE: 12/13/2022

TIME: 04:44:26

USER:

COMMENTS: _____


```

*****
** SIMULATION : 5yr 6hr 15min SCS Type II (MT **
*****

```

```

-----
|      READ STORM      |      Filename: C:\Users\ychokshi\AppData
|                        |                      ata\Local\Temp\
|                        |                      8ccd28ef-3410-4b01-9b0c-
825ce2009420\b0a0bb84

```

| Ptotal= 49.04 mm | Comments: 5yr 6hr 15min SCS Type II (MTO)

	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
RAIN							
mm/hr							
1.96	0.25	0.00	2.00	4.90	3.75	10.79	5.50
1.96	0.50	1.96	2.25	4.90	4.00	4.90	5.75
1.96	0.75	1.96	2.50	5.88	4.25	4.90	6.00
1.96	1.00	2.94	2.75	5.88	4.50	3.92	6.25
1.96	1.25	2.94	3.00	29.42	4.75	3.92	
	1.50	2.94	3.25	76.50	5.00	2.94	
	1.75	2.94	3.50	10.79	5.25	2.94	

CALIB			
STANDHYD (0016)	Area	(ha)=	8.39
ID= 1 DT= 5.0 min	Total Imp(%)=	38.22	Dir. Conn.(%)= 18.62

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.21	5.18
Dep. Storage	(mm)=	1.00	3.00
Average Slope	(%)=	0.90	0.90
Length	(m)=	236.50	500.00
Mannings n	=	0.020	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
RAIN							
mm/hr							
2.94	0.083	0.00	1.667	2.94	3.250	76.50	4.83
2.94	0.167	0.00	1.750	2.94	3.333	10.79	4.92
2.94	0.250	0.00	1.833	4.90	3.417	10.79	5.00
2.94	0.333	1.96	1.917	4.90	3.500	10.79	5.08
2.94	0.417	1.96	2.000	4.90	3.583	10.79	5.17

2.94	0.500	1.96		2.083	4.90		3.667	10.79		5.25
1.96	0.583	1.96		2.167	4.90		3.750	10.79		5.33
1.96	0.667	1.96		2.250	4.90		3.833	4.90		5.42
1.96	0.750	1.96		2.333	5.88		3.917	4.90		5.50
1.96	0.833	2.94		2.417	5.88		4.000	4.90		5.58
1.96	0.917	2.94		2.500	5.88		4.083	4.90		5.67
1.96	1.000	2.94		2.583	5.88		4.167	4.90		5.75
1.96	1.083	2.94		2.667	5.88		4.250	4.90		5.83
1.96	1.167	2.94		2.750	5.88		4.333	3.92		5.92
1.96	1.250	2.94		2.833	29.42		4.417	3.92		6.00
1.96	1.333	2.94		2.917	29.42		4.500	3.92		6.08
1.96	1.417	2.94		3.000	29.42		4.583	3.92		6.17
1.96	1.500	2.94		3.083	76.50		4.667	3.92		6.25
1.96	1.583	2.94		3.167	76.50		4.750	3.92		

Max.Eff.Inten. (mm/hr)= 76.50 14.70
 over (min) 5.00 95.00
 Storage Coeff. (min)= 6.37 (ii) 94.27 (ii)
 Unit Hyd. Tpeak (min)= 5.00 95.00
 Unit Hyd. peak (cms)= 0.18 0.01

(iii) PEAK FLOW (cms)= 0.31 0.09 *TOTALS*
 0.323
 TIME TO PEAK (hrs)= 3.25 4.75 3.25
 RUNOFF VOLUME (mm)= 48.04 15.88 21.86
 TOTAL RAINFALL (mm)= 49.04 49.04 49.04
 RUNOFF COEFFICIENT = 0.98 0.32 0.45

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 67.9 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.

 | ROUTEPIPE(0029) |
 | IN= 2---> OUT= 1 |
DT= 5.0 min

PIPE Number = 1.00
 Diameter (mm)=1650.00
 Length (m)= 500.00
 Slope (m/m)= 0.005
 Manning n = 0.013

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0016)	8.39	0.32	3.25	21.86	0.25
1.55					
OUTFLOW: ID= 1 (0029)	8.39	0.29	3.25	21.86	0.24
1.49					

 | CALIB |
 | STANDHYD (0022) |
ID= 1 DT= 5.0 min

Area (ha)= 11.83
 Total Imp(%)= 39.45 Dir. Conn.(%)= 17.05

IMPERVIOUS PERVIOUS (i)

Surface Area	(ha)=	4.67	7.16
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.50	2.50
Length	(m)=	280.83	315.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----										
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr										
2.94	0.083	0.00		1.667	2.94		3.250	76.50		4.83
2.94	0.167	0.00		1.750	2.94		3.333	10.79		4.92
2.94	0.250	0.00		1.833	4.90		3.417	10.79		5.00
2.94	0.333	1.96		1.917	4.90		3.500	10.79		5.08
2.94	0.417	1.96		2.000	4.90		3.583	10.79		5.17
2.94	0.500	1.96		2.083	4.90		3.667	10.79		5.25
2.94	0.583	1.96		2.167	4.90		3.750	10.79		5.33
1.96	0.667	1.96		2.250	4.90		3.833	4.90		5.42
1.96	0.750	1.96		2.333	5.88		3.917	4.90		5.50
1.96	0.833	2.94		2.417	5.88		4.000	4.90		5.58
1.96	0.917	2.94		2.500	5.88		4.083	4.90		5.67
1.96	1.000	2.94		2.583	5.88		4.167	4.90		5.75
1.96	1.083	2.94		2.667	5.88		4.250	4.90		5.83
1.96	1.167	2.94		2.750	5.88		4.333	3.92		5.92
1.96	1.250	2.94		2.833	29.42		4.417	3.92		6.00
1.96	1.333	2.94		2.917	29.42		4.500	3.92		6.08
1.96	1.417	2.94		3.000	29.42		4.583	3.92		6.17
1.96	1.500	2.94		3.083	76.50		4.667	3.92		6.25
1.96	1.583	2.94		3.167	76.50		4.750	3.92		

Max.Eff.Inten. (mm/hr)=	76.50	39.69	
over (min)	5.00	40.00	
Storage Coeff. (min)=	4.01 (ii)	36.96 (ii)	
Unit Hyd. Tpeak (min)=	5.00	40.00	
Unit Hyd. peak (cms)=	0.24	0.03	
			TOTALS
PEAK FLOW (cms)=	0.42	0.47	0.598
(iii)			
TIME TO PEAK (hrs)=	3.25	3.75	3.25
RUNOFF VOLUME (mm)=	48.04	28.50	31.83
TOTAL RAINFALL (mm)=	49.04	49.04	49.04
RUNOFF COEFFICIENT =	0.98	0.58	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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
-----
| CALIB |
| STANDHYD ( 0023) | Area (ha)= 5.85
| ID= 1 DT= 5.0 min | Total Imp(%)= 19.00 Dir. Conn.(%)= 7.80
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.11	4.74
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.40	2.40
Length	(m)=	197.48	135.00
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
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
RAIN										
mm/hr										
	0.083	0.00		1.667	2.94		3.250	76.50		4.83
2.94										
	0.167	0.00		1.750	2.94		3.333	10.79		4.92
2.94										
	0.250	0.00		1.833	4.90		3.417	10.79		5.00

2.94							
	0.333	1.96		1.917	4.90		3.500
2.94							
	0.417	1.96		2.000	4.90		3.583
2.94							
	0.500	1.96		2.083	4.90		3.667
2.94							
	0.583	1.96		2.167	4.90		3.750
1.96							
	0.667	1.96		2.250	4.90		3.833
1.96							
	0.750	1.96		2.333	5.88		3.917
1.96							
	0.833	2.94		2.417	5.88		4.000
1.96							
	0.917	2.94		2.500	5.88		4.083
1.96							
	1.000	2.94		2.583	5.88		4.167
1.96							
	1.083	2.94		2.667	5.88		4.250
1.96							
	1.167	2.94		2.750	5.88		4.333
1.96							
	1.250	2.94		2.833	29.42		4.417
1.96							
	1.333	2.94		2.917	29.42		4.500
1.96							
	1.417	2.94		3.000	29.42		4.583
1.96							
	1.500	2.94		3.083	76.50		4.667
1.96							
	1.583	2.94		3.167	76.50		4.750

Max.Eff.Inten. (mm/hr)=		76.50	44.09	
over (min)		5.00	25.00	
Storage Coeff. (min)=		3.29 (ii)	22.53 (ii)	
Unit Hyd. Tpeak (min)=		5.00	25.00	
Unit Hyd. peak (cms)=		0.27	0.05	
				TOTALS
PEAK FLOW (cms)=		0.10	0.33	0.342
(iii)				
TIME TO PEAK (hrs)=		3.25	3.50	3.50
RUNOFF VOLUME (mm)=		48.04	26.15	27.85
TOTAL RAINFALL (mm)=		49.04	49.04	49.04
RUNOFF COEFFICIENT =		0.98	0.53	0.57

***** 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:

CALIB			
STANDHYD (0040)		Area (ha)=	1.96
ID= 1 DT= 5.0 min		Total Imp(%)=	82.10 Dir. Conn.(%)= 82.10

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

		----- TRANSFORMED HYETOGRAPH -----								
RAIN	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
2.94	0.083	0.00		1.667	2.94		3.250	76.50		4.83
2.94	0.167	0.00		1.750	2.94		3.333	10.79		4.92
2.94	0.250	0.00		1.833	4.90		3.417	10.79		5.00
2.94	0.333	1.96		1.917	4.90		3.500	10.79		5.08
2.94	0.417	1.96		2.000	4.90		3.583	10.79		5.17
2.94	0.500	1.96		2.083	4.90		3.667	10.79		5.25
1.96	0.583	1.96		2.167	4.90		3.750	10.79		5.33
1.96	0.667	1.96		2.250	4.90		3.833	4.90		5.42
1.96	0.750	1.96		2.333	5.88		3.917	4.90		5.50
1.96	0.833	2.94		2.417	5.88		4.000	4.90		5.58
1.96	0.917	2.94		2.500	5.88		4.083	4.90		5.67
1.96	1.000	2.94		2.583	5.88		4.167	4.90		5.75

1.96	1.083	2.94		2.667	5.88		4.250	4.90		5.83
1.96	1.167	2.94		2.750	5.88		4.333	3.92		5.92
1.96	1.250	2.94		2.833	29.42		4.417	3.92		6.00
1.96	1.333	2.94		2.917	29.42		4.500	3.92		6.08
1.96	1.417	2.94		3.000	29.42		4.583	3.92		6.17
1.96	1.500	2.94		3.083	76.50		4.667	3.92		6.25
1.96	1.583	2.94		3.167	76.50		4.750	3.92		

Max.Eff.Inten. (mm/hr)=	76.50	17.48
over (min)	5.00	75.00
Storage Coeff. (min)=	2.73 (ii)	74.25 (ii)
Unit Hyd. Tpeak (min)=	5.00	75.00
Unit Hyd. peak (cms)=	0.29	0.02

			TOTALS
PEAK FLOW (cms)=	0.34	0.01	0.343
(iii)			
TIME TO PEAK (hrs)=	3.25	4.42	3.25
RUNOFF VOLUME (mm)=	48.04	24.47	43.80
TOTAL RAINFALL (mm)=	49.04	49.04	49.04
RUNOFF COEFFICIENT =	0.98	0.50	0.89

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0018)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0022):	11.83	0.598	3.25	31.83
+ ID2= 2 (0023):	5.85	0.342	3.50	27.85
=====				
ID = 3 (0018):	17.68	0.885	3.25	30.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```

-----
| ADD HYD  ( 0018) |
| 3 + 2 = 1 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
      ID1= 3 ( 0018):    17.68    0.885      3.25    30.51
+ ID2= 2 ( 0029):      8.39    0.294      3.25    21.86
=====
      ID = 1 ( 0018):    26.07    1.179      3.25    27.73

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD  ( 0018) |
| 1 + 2 = 3 |
-----
                AREA      QPEAK      TPEAK      R.V.
                (ha)      (cms)      (hrs)      (mm)
      ID1= 1 ( 0018):    26.07    1.179      3.25    27.73
+ ID2= 2 ( 0040):      1.96    0.343      3.25    43.80
=====
      ID = 3 ( 0018):    28.03    1.522      3.25    28.85

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0026) |      OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
                OUTFLOW      STORAGE      OUTFLOW      STORAGE
                (cms)      (ha.m.)      (cms)      (ha.m.)
**** WARNING : FIRST OUTFLOW IS NOT ZERO.
      0.0020      0.0130      0.1500      0.1750
      0.0050      0.0260      0.1990      0.1940
      0.0110      0.0410      0.2520      0.2140
      0.0140      0.0550      0.3080      0.2350
      0.0160      0.0700      0.3680      0.2570
      0.0180      0.0860      0.4300      0.2790
      0.0200      0.1030      0.4940      0.3020
      0.0380      0.1200      0.5610      0.3250
      0.0680      0.1370      0.6290      0.3500
      0.1060      0.1560      0.6980      0.3750

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0018)	28.030	1.522	3.25	28.85
OUTFLOW: ID= 1 (0026)	28.030	0.576	4.25	28.79

PEAK FLOW REDUCTION [Qout/Qin] (%) = 37.88
 TIME SHIFT OF PEAK FLOW (min) = 60.00
 MAXIMUM STORAGE USED (ha.m.) = 0.3309

```

-----
| CALIB |
| STANDHYD ( 0012) | Area (ha)= 5.57
| ID= 1 DT= 5.0 min | Total Imp(%)= 42.66 Dir. Conn.(%)= 17.46
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.38	3.19
Dep. Storage	(mm)=	1.00	3.00
Average Slope	(%)=	1.00	0.90
Length	(m)=	192.70	694.00
Mannings n	=	0.020	0.250

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

```

----- TRANSFORMED HYETOGRAPH -----

```

	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
RAIN							
mm/hr							
2.94	0.083	0.00	1.667	2.94	3.250	76.50	4.83
2.94	0.167	0.00	1.750	2.94	3.333	10.79	4.92
2.94	0.250	0.00	1.833	4.90	3.417	10.79	5.00
2.94	0.333	1.96	1.917	4.90	3.500	10.79	5.08
2.94	0.417	1.96	2.000	4.90	3.583	10.79	5.17
2.94	0.500	1.96	2.083	4.90	3.667	10.79	5.25
1.96	0.583	1.96	2.167	4.90	3.750	10.79	5.33
1.96	0.667	1.96	2.250	4.90	3.833	4.90	5.42
1.96	0.750	1.96	2.333	5.88	3.917	4.90	5.50
1.96	0.833	2.94	2.417	5.88	4.000	4.90	5.58
1.96	0.917	2.94	2.500	5.88	4.083	4.90	5.67
1.96	1.000	2.94	2.583	5.88	4.167	4.90	5.75
1.96	1.083	2.94	2.667	5.88	4.250	4.90	5.83
1.96	1.167	2.94	2.750	5.88	4.333	3.92	5.92
1.96	1.250	2.94	2.833	29.42	4.417	3.92	6.00

1.96	1.333	2.94		2.917	29.42		4.500	3.92		6.08
1.96	1.417	2.94		3.000	29.42		4.583	3.92		6.17
1.96	1.500	2.94		3.083	76.50		4.667	3.92		6.25
1.96	1.583	2.94		3.167	76.50		4.750	3.92		

Max.Eff.Inten. (mm/hr)=	76.50	18.80	
over (min)	5.00	105.00	
Storage Coeff. (min)=	5.46 (ii)	102.42 (ii)	
Unit Hyd. Tpeak (min)=	5.00	105.00	
Unit Hyd. peak (cms)=	0.20	0.01	
			TOTALS
PEAK FLOW (cms)=	0.20	0.07	0.206
(iii) TIME TO PEAK (hrs)=	3.25	4.92	3.25
RUNOFF VOLUME (mm)=	48.04	18.47	23.63
TOTAL RAINFALL (mm)=	49.04	49.04	49.04
RUNOFF COEFFICIENT =	0.98	0.38	0.48

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.9 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| CALIB |
| STANDHYD ( 0021) | Area (ha)= 5.47
| ID= 1 DT= 5.0 min | Total Imp(%)= 44.25 Dir. Conn.(%)= 21.85
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.42	3.05
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.40	1.40
Length	(m)=	190.96	570.00
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
RAIN

```

mm/hr	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
	0.083	0.00		1.667	2.94		3.250	76.50		4.83
2.94										
	0.167	0.00		1.750	2.94		3.333	10.79		4.92
2.94										
	0.250	0.00		1.833	4.90		3.417	10.79		5.00
2.94										
	0.333	1.96		1.917	4.90		3.500	10.79		5.08
2.94										
	0.417	1.96		2.000	4.90		3.583	10.79		5.17
2.94										
	0.500	1.96		2.083	4.90		3.667	10.79		5.25
2.94										
	0.583	1.96		2.167	4.90		3.750	10.79		5.33
1.96										
	0.667	1.96		2.250	4.90		3.833	4.90		5.42
1.96										
	0.750	1.96		2.333	5.88		3.917	4.90		5.50
1.96										
	0.833	2.94		2.417	5.88		4.000	4.90		5.58
1.96										
	0.917	2.94		2.500	5.88		4.083	4.90		5.67
1.96										
	1.000	2.94		2.583	5.88		4.167	4.90		5.75
1.96										
	1.083	2.94		2.667	5.88		4.250	4.90		5.83
1.96										
	1.167	2.94		2.750	5.88		4.333	3.92		5.92
1.96										
	1.250	2.94		2.833	29.42		4.417	3.92		6.00
1.96										
	1.333	2.94		2.917	29.42		4.500	3.92		6.08
1.96										
	1.417	2.94		3.000	29.42		4.583	3.92		6.17
1.96										
	1.500	2.94		3.083	76.50		4.667	3.92		6.25
1.96										
	1.583	2.94		3.167	76.50		4.750	3.92		

Max.Eff.Inten. (mm/hr)=	76.50	28.93	
over (min)	5.00	70.00	
Storage Coeff. (min)=	3.79 (ii)	67.31 (ii)	
Unit Hyd. Tpeak (min)=	5.00	70.00	
Unit Hyd. peak (cms)=	0.25	0.02	
			TOTALS
PEAK FLOW (cms)=	0.25	0.13	0.280
(iii)			
TIME TO PEAK (hrs)=	3.25	4.25	3.25
RUNOFF VOLUME (mm)=	48.04	28.78	32.98
TOTAL RAINFALL (mm)=	49.04	49.04	49.04

RUNOFF COEFFICIENT = 0.98 0.59 0.67

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----  
-----  
-----  
| ROUTEPIPE( 0030) | PIPE Number = 1.00  
| IN= 2--> OUT= 1 | Diameter (mm)= 500.00  
| DT= 5.0 min | Length (m)= 26.00  
-----  
Slope (m/m)= 0.005  
Manning n = 0.013
```

**** WARNING: MINIMUM PIPE SIZE REQUIRED = 509.14 (mm) FOR
FREE FLOW.

THIS SIZE WAS USED IN THE ROUTING.
THE CAPACITY OF THIS PIPE = 0.28 (cms)

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.03	.107E+00	0.0	0.37	1.18
0.05	.297E+00	0.0	0.57	0.76
0.08	.536E+00	0.0	0.73	0.59
0.11	.811E+00	0.0	0.87	0.50
0.13	.111E+01	0.0	0.99	0.44
0.16	.143E+01	0.1	1.10	0.39
0.19	.177E+01	0.1	1.19	0.36
0.21	.212E+01	0.1	1.27	0.34
0.24	.247E+01	0.1	1.35	0.32
0.27	.282E+01	0.2	1.41	0.31
0.29	.318E+01	0.2	1.46	0.30
0.32	.352E+01	0.2	1.50	0.29
0.35	.386E+01	0.2	1.53	0.28
0.38	.418E+01	0.3	1.56	0.28
0.40	.448E+01	0.3	1.57	0.28
0.43	.476E+01	0.3	1.57	0.28
0.46	.500E+01	0.3	1.55	0.28
0.48	.519E+01	0.3	1.51	0.29
0.51	.529E+01	0.3	1.38	0.31

channel-> <---- hydrograph ----> <-pipe /
MAX VEL AREA QPEAK TPEAK R.V. MAX DEPTH
(ha) (cms) (hrs) (mm) (m)

(m/s)
 INFLOW : ID= 2 (0021) 5.47 0.28 3.25 32.98 0.42
 1.57
 OUTFLOW: ID= 1 (0030) 5.47 0.28 3.25 32.98 0.42
 1.57

**** WARNING: COMPUTATIONS FAILED TO CONVERGE.

 | ADD HYD (0013) |
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 ----- (ha) (cms) (hrs) (mm)
 ID1= 1 (0012): 5.57 0.206 3.25 23.63
 + ID2= 2 (0030): 5.47 0.275 3.25 32.98
 =====
 ID = 3 (0013): 11.04 0.481 3.25 28.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTEPIPE(0031) | PIPE Number = 1.00
 | IN= 2---> OUT= 1 | Diameter (mm)=1650.00
 | DT= 5.0 min | Length (m)= 500.00
 ----- Slope (m/m)= 0.005
 Manning n = 0.013

<----- TRAVEL TIME TABLE ----->

DEPTH	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(cu.m.)	(cms)	(m/s)	min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45

1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

<---- hydrograph ----> <-pipe /

channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
MAX VEL					
	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 2 (0013)	11.04	0.48	3.25	28.26	0.30
1.74					
OUTFLOW: ID= 1 (0031)	11.04	0.46	3.25	28.26	0.29
1.71					

CALIB				
STANDHYD (0025)		Area	(ha)=	2.35
ID= 1 DT= 5.0 min		Total Imp(%)=	14.40	Dir. Conn.(%)= 3.20

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.34	2.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.80	0.80
Length	(m)=	125.17	400.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

	TIME	RAIN		TIME	RAIN		TIME	RAIN		TIME
RAIN	hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
mm/hr										
	0.083	0.00		1.667	2.94		3.250	76.50		4.83
2.94										
	0.167	0.00		1.750	2.94		3.333	10.79		4.92
2.94										
	0.250	0.00		1.833	4.90		3.417	10.79		5.00
2.94										
	0.333	1.96		1.917	4.90		3.500	10.79		5.08
2.94										
	0.417	1.96		2.000	4.90		3.583	10.79		5.17
2.94										
	0.500	1.96		2.083	4.90		3.667	10.79		5.25
2.94										
	0.583	1.96		2.167	4.90		3.750	10.79		5.33
1.96										

1.96	0.667	1.96		2.250	4.90		3.833	4.90		5.42
1.96	0.750	1.96		2.333	5.88		3.917	4.90		5.50
1.96	0.833	2.94		2.417	5.88		4.000	4.90		5.58
1.96	0.917	2.94		2.500	5.88		4.083	4.90		5.67
1.96	1.000	2.94		2.583	5.88		4.167	4.90		5.75
1.96	1.083	2.94		2.667	5.88		4.250	4.90		5.83
1.96	1.167	2.94		2.750	5.88		4.333	3.92		5.92
1.96	1.250	2.94		2.833	29.42		4.417	3.92		6.00
1.96	1.333	2.94		2.917	29.42		4.500	3.92		6.08
1.96	1.417	2.94		3.000	29.42		4.583	3.92		6.17
1.96	1.500	2.94		3.083	76.50		4.667	3.92		6.25
1.96	1.583	2.94		3.167	76.50		4.750	3.92		

Max.Eff.Inten. (mm/hr)=	76.50	21.09
over (min)	5.00	75.00
Storage Coeff. (min)=	3.48 (ii)	72.41 (ii)
Unit Hyd. Tpeak (min)=	5.00	75.00
Unit Hyd. peak (cms)=	0.26	0.02

TOTALS

PEAK FLOW (cms)=	0.02	0.06	0.062
(iii) TIME TO PEAK (hrs)=	3.25	4.42	4.42
RUNOFF VOLUME (mm)=	48.04	26.06	26.75
TOTAL RAINFALL (mm)=	49.04	49.04	49.04
RUNOFF COEFFICIENT =	0.98	0.53	0.55

***** 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* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 | CALIB |

| STANDHYD (0033) | Area (ha)= 1.97
 | ID= 1 DT= 5.0 min | Total Imp(%)= 18.80 Dir. Conn.(%)= 7.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.37	1.60
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	114.60	241.00
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
		hrs	mm/hr		hrs	mm/hr		hrs	mm/hr		hrs
RAIN											
	mm/hr										
	2.94	0.083	0.00		1.667	2.94		3.250	76.50		4.83
	2.94	0.167	0.00		1.750	2.94		3.333	10.79		4.92
	2.94	0.250	0.00		1.833	4.90		3.417	10.79		5.00
	2.94	0.333	1.96		1.917	4.90		3.500	10.79		5.08
	2.94	0.417	1.96		2.000	4.90		3.583	10.79		5.17
	2.94	0.500	1.96		2.083	4.90		3.667	10.79		5.25
	2.94	0.583	1.96		2.167	4.90		3.750	10.79		5.33
	1.96	0.667	1.96		2.250	4.90		3.833	4.90		5.42
	1.96	0.750	1.96		2.333	5.88		3.917	4.90		5.50
	1.96	0.833	2.94		2.417	5.88		4.000	4.90		5.58
	1.96	0.917	2.94		2.500	5.88		4.083	4.90		5.67
	1.96	1.000	2.94		2.583	5.88		4.167	4.90		5.75
	1.96	1.083	2.94		2.667	5.88		4.250	4.90		5.83
	1.96	1.167	2.94		2.750	5.88		4.333	3.92		5.92
	1.96	1.250	2.94		2.833	29.42		4.417	3.92		6.00
	1.96	1.333	2.94		2.917	29.42		4.500	3.92		6.08
	1.96	1.417	2.94		3.000	29.42		4.583	3.92		6.17

1.96
1.500 2.94 | 3.083 76.50 | 4.667 3.92 | 6.25
1.96
1.583 2.94 | 3.167 76.50 | 4.750 3.92 |

Max.Eff.Inten.(mm/hr)= 76.50 30.02
over (min) 5.00 40.00
Storage Coeff. (min)= 2.51 (ii) 36.05 (ii)
Unit Hyd. Tpeak (min)= 5.00 40.00
Unit Hyd. peak (cms)= 0.29 0.03
TOTALS
PEAK FLOW (cms)= 0.03 0.08 0.085
(iii)
TIME TO PEAK (hrs)= 3.25 3.75 3.75
RUNOFF VOLUME (mm)= 48.04 26.14 27.80
TOTAL RAINFALL (mm)= 49.04 49.04 49.04
RUNOFF COEFFICIENT = 0.98 0.53 0.57

***** 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* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0034) | Area (ha)= 2.46
| ID= 1 DT= 5.0 min | Total Imp(%)= 18.80 Dir. Conn.(%)= 3.20

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.46	2.00
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.60	1.60
Length	(m)=	128.06	250.00
Mannings n	=	0.013	0.250

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN |' TIME RAIN | TIME
RAIN hrs mm/hr | hrs mm/hr |' hrs mm/hr | hrs
mm/hr
0.083 0.00 | 1.667 2.94 | 3.250 76.50 | 4.83

2.94							
	0.167	0.00		1.750	2.94		3.333
2.94							
	0.250	0.00		1.833	4.90		3.417
2.94							
	0.333	1.96		1.917	4.90		3.500
2.94							
	0.417	1.96		2.000	4.90		3.583
2.94							
	0.500	1.96		2.083	4.90		3.667
2.94							
	0.583	1.96		2.167	4.90		3.750
1.96							
	0.667	1.96		2.250	4.90		3.833
1.96							
	0.750	1.96		2.333	5.88		3.917
1.96							
	0.833	2.94		2.417	5.88		4.000
1.96							
	0.917	2.94		2.500	5.88		4.083
1.96							
	1.000	2.94		2.583	5.88		4.167
1.96							
	1.083	2.94		2.667	5.88		4.250
1.96							
	1.167	2.94		2.750	5.88		4.333
1.96							
	1.250	2.94		2.833	29.42		4.417
1.96							
	1.333	2.94		2.917	29.42		4.500
1.96							
	1.417	2.94		3.000	29.42		4.583
1.96							
	1.500	2.94		3.083	76.50		4.667
1.96							
	1.583	2.94		3.167	76.50		4.750

Max.Eff.Inten. (mm/hr)=		76.50	29.39	
over (min)		5.00	40.00	
Storage Coeff. (min)=		2.86 (ii)	39.85 (ii)	
Unit Hyd. Tpeak (min)=		5.00	40.00	
Unit Hyd. peak (cms)=		0.28	0.03	
TOTALS				
PEAK FLOW (cms)=		0.02	0.10	0.104
(iii)	TIME TO PEAK (hrs)=	3.25	3.75	3.75
	RUNOFF VOLUME (mm)=	48.04	26.74	27.41
	TOTAL RAINFALL (mm)=	49.04	49.04	49.04
	RUNOFF COEFFICIENT =	0.98	0.55	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* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.


```

| CALIB |
| STANDHYD ( 0039) | Area (ha)= 2.47
| ID= 1 DT= 5.0 min | Total Imp(%)= 92.64 Dir. Conn.(%)= 92.64
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.29	0.18
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	0.60	0.60
Length	(m)=	128.32	1000.00
Mannings n	=	0.013	0.250

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

```

              ----- TRANSFORMED HYETOGRAPH -----
              TIME      RAIN | TIME      RAIN |' TIME      RAIN | TIME
RAIN
              hrs      mm/hr | hrs      mm/hr |' hrs      mm/hr | hrs
mm/hr
              0.083      0.00 | 1.667      2.94 | 3.250      76.50 | 4.83
2.94
              0.167      0.00 | 1.750      2.94 | 3.333      10.79 | 4.92
2.94
              0.250      0.00 | 1.833      4.90 | 3.417      10.79 | 5.00
2.94
              0.333      1.96 | 1.917      4.90 | 3.500      10.79 | 5.08
2.94
              0.417      1.96 | 2.000      4.90 | 3.583      10.79 | 5.17
2.94
              0.500      1.96 | 2.083      4.90 | 3.667      10.79 | 5.25
2.94
              0.583      1.96 | 2.167      4.90 | 3.750      10.79 | 5.33
1.96
              0.667      1.96 | 2.250      4.90 | 3.833      4.90 | 5.42
1.96
              0.750      1.96 | 2.333      5.88 | 3.917      4.90 | 5.50
1.96
              0.833      2.94 | 2.417      5.88 | 4.000      4.90 | 5.58
1.96

```

	0.917	2.94		2.500	5.88		4.083	4.90		5.67
1.96										
	1.000	2.94		2.583	5.88		4.167	4.90		5.75
1.96										
	1.083	2.94		2.667	5.88		4.250	4.90		5.83
1.96										
	1.167	2.94		2.750	5.88		4.333	3.92		5.92
1.96										
	1.250	2.94		2.833	29.42		4.417	3.92		6.00
1.96										
	1.333	2.94		2.917	29.42		4.500	3.92		6.08
1.96										
	1.417	2.94		3.000	29.42		4.583	3.92		6.17
1.96										
	1.500	2.94		3.083	76.50		4.667	3.92		6.25
1.96										
	1.583	2.94		3.167	76.50		4.750	3.92		

Max.Eff.Inten. (mm/hr)=	76.50	17.48	
over (min)	5.00	145.00	
Storage Coeff. (min)=	3.85 (ii)	144.22 (ii)	
Unit Hyd. Tpeak (min)=	5.00	145.00	
Unit Hyd. peak (cms)=	0.25	0.01	

TOTALS

PEAK FLOW	(cms)=	0.48	0.00	0.480
(iii)				
TIME TO PEAK	(hrs)=	3.25	5.58	3.25
RUNOFF VOLUME	(mm)=	48.04	24.47	46.27
TOTAL RAINFALL	(mm)=	49.04	49.04	49.04
RUNOFF COEFFICIENT	=	0.98	0.50	0.94

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0032)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0025):	2.35	0.062	4.42	26.75
+ ID2= 2 (0031):	11.04	0.458	3.25	28.26
=====				
ID = 3 (0032):	13.39	0.486	3.25	28.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```
-----
| ADD HYD  ( 0032) |
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0032):    13.39    0.486    3.25    28.00
+ ID2= 2 ( 0033):    1.97    0.085    3.75    27.80
=====
ID = 1 ( 0032):    15.36    0.547    3.25    27.97
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```
-----
| ADD HYD  ( 0032) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0032):    15.36    0.547    3.25    27.97
+ ID2= 2 ( 0034):    2.46    0.104    3.75    27.41
=====
ID = 3 ( 0032):    17.82    0.601    3.25    27.89
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```
-----
| ADD HYD  ( 0032) |
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0032):    17.82    0.601    3.25    27.89
+ ID2= 2 ( 0039):    2.47    0.480    3.25    46.27
=====
ID = 1 ( 0032):    20.29    1.081    3.25    30.13
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```
-----
| RESERVOIR( 0035) |
| IN= 2--> OUT= 1 |
| DT= 5.0 min |
-----
          OVERFLOW IS OFF
          OUTFLOW      STORAGE      |      OUTFLOW      STORAGE
          (cms)      (ha.m.)      |      (cms)      (ha.m.)
          0.0000      0.0190      |      0.1040      0.2460
          0.0020      0.0380      |      0.1480      0.2720
          0.0040      0.0580      |      0.1970      0.3000
          0.0100      0.0790      |      0.2500      0.3280
```

0.0130	0.1010		0.3060	0.3570
0.0150	0.1230		0.3660	0.3870
0.0170	0.1460		0.4280	0.4180
0.0190	0.1700		0.4920	0.4490
0.0360	0.1940		0.5580	0.4810
0.0660	0.2200		0.6260	0.5150

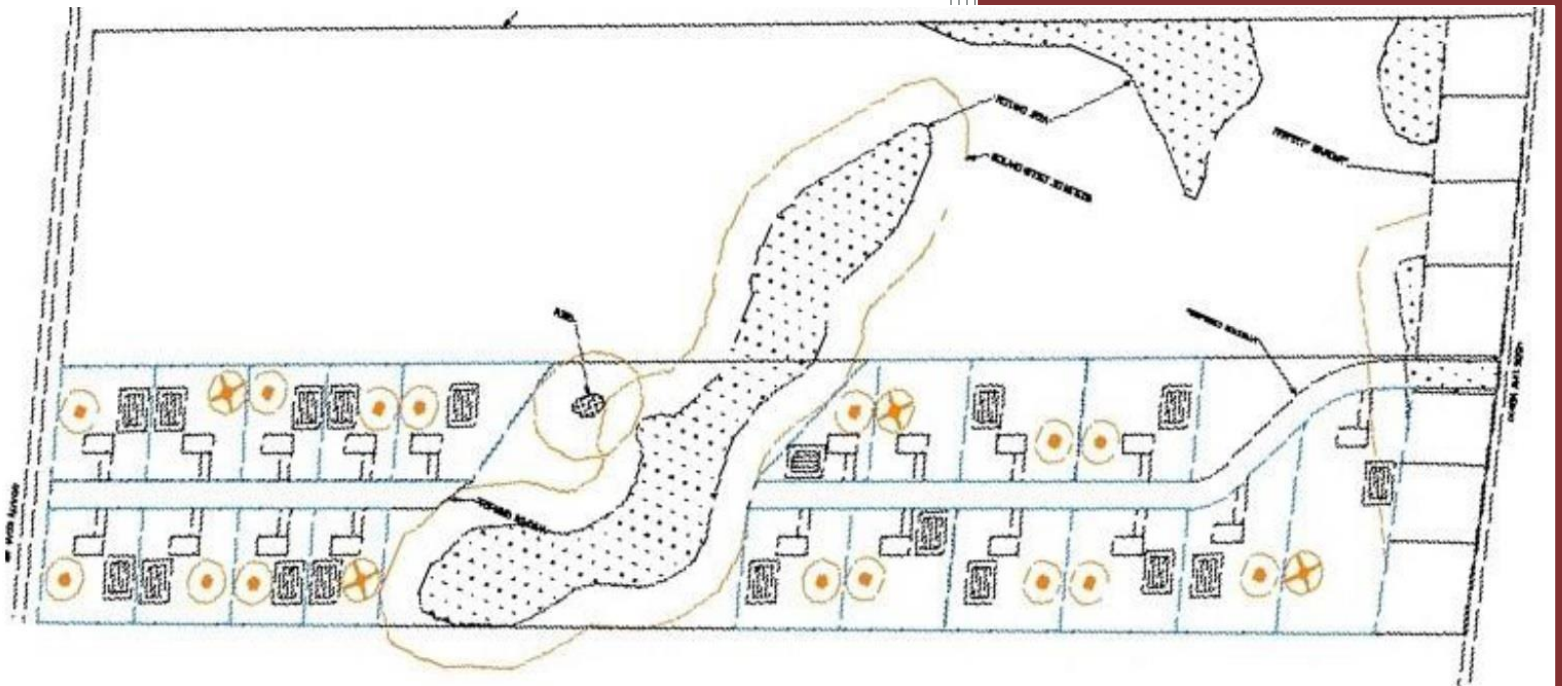
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0032)	20.290	1.081	3.25	30.13
OUTFLOW: ID= 1 (0035)	20.290	0.258	5.50	29.08

PEAK FLOW REDUCTION [Qout/Qin] (%) = 23.85
 TIME SHIFT OF PEAK FLOW (min) = 135.00
 MAXIMUM STORAGE USED (ha.m.) = 0.3322

Appendix D – Geotechnical Report

1919 Estates

Geotechnical Report



Terraspec Engineering Inc.
Geotechnical Engineers
973 Crawford Drive
Peterborough, Ontario
K9J 3X1

TABLE OF CONTENTS

	Page
Introductory Comments.....	1
General Site Data.....	1
Investigation.....	2
Soil Conditions.....	2
OHSA Soil Types.....	2
Lab Analysis.....	2
Recommendations.....	3
Cut and Fill Options.....	3
Permeability and Erosion.....	3
New House Foundations.....	3
Dewatering.....	4
Seismic Parameters.....	4
Geotechnical Parameters.....	4
Subdrains.....	5
Concrete.....	5
Re-Use of Subsoils.....	5
Floor Slabs.....	5
Pipe Installation.....	6
Pavement Design.....	6
Compaction Requirements.....	7
Statement of Limitations.....	8

APPENDICES

Test Hole Data
Laboratory Test Data
Site Plan

terraspec engineering inc.

geotechnical engineers and materials testing

**973 Crawford Drive
Peterborough, ON
K9J 3X1**

**Telephone (705) 743-7880
Fax (705) 743-9592**

December 06, 2021

To: Greer Galloway
Consulting Engineers
973 Crawford Drive
Peterborough, ON, K9J 3X1

**Re: Geotechnical Report,
Proposed Residential Subdivision, 1919 Estates
Location: Bobcaygeon, Ontario
Project Reference 21-1-6814**

Introductory Comments

Please accept this Report as a follow-up to the Geotechnical Report previously issued on this property under date of December 18, 2017.

The property has undergone a change of ownership, effective April 2021, from Andrew Anderson to Jeffery Homes.

The Andrew Anderson ownership had envisioned a 19 lot residential subdivision development on the south half of the property whereas the Jeffery Homes ownership proposes a 48 lot residential subdivision development on the entire property.

i.e. - 22 lots on the south part of the property, referenced hereafter as 1919 Estates, Phase 1, and 26 lots on the north part of the property, referenced as 1919 Estates, Phase 2.

The previous Geotechnical Report issued to Andrew Anderson pursuant to the south part of the property can be fully accepted as a Geotechnical Report for the Jeffery Homes proposal to develop 22 lots on the south part of the property as 1919 Estates, Phase 1. The former report is hereby edited and adjusted, as and where required, to support the Jeffery Homes Phase 1 proposal.

General Site Data

The project is located at 168 County Road 49, at (or near) Bobcaygeon, Ontario. The site consists mainly of undeveloped land and is still being proposed for a residential subdivision. A

Site Plan illustrating the extent and location of the property, and the proposed two phased development proposal is appended to this report.

Investigation

This soils investigation and resultant data pertains to only the south half of the property because that was the extent of the proposed development by the previous property owner in 2017 when this soils investigation was authorized. All of that site investigative activity and resultant data is now offered as relative information pursuant to the Jeffery Homes proposal for Phase 1 of its newly suggested 1919 Estates subdivision proposal. Ten (10) exploratory test holes were placed on site in 2017 using a track mounted excavator. All test holes are properly located and noted on the appended Site Plan.

Soil Conditions

The on-site soil layers are as follows:

A silty topsoil, with typical thicknesses of 200mm to 300mm, overlying a silty sand layer containing gravel traces, which is typically compact and 600mm thick, overlying a silty sand and gravel/cobble till, in a dense condition.

Groundwater was encountered at the west end of the project at depths of 1.0m to 1.5m below the existing ground surface.

Bedrock was also encountered at the same west end of the project, at typical depths of 2.5m below the existing ground surface.

OHSA Soil Types

The on-site subsoils can be classified as Type 3 soils. Type 3 soils should be treated as Type 4 soils if future construction activity is required below the groundwater table.

Laboratory Analysis

Atterberg Limits Testing indicated all native soils are typically non-plastic.

The soil physiography at this site can be defined as till moraines, with exposed limestone plains at the northeast corner. The predominant soil type is a gravelly loam till, very stoney. The Soil Group is Brown Forest. The encountered bedrock is limestone of the Trenton Group.

Recommendations

1. Cut and Fill Options

The total site elevation could be cut down (lowered) if necessary. The underlying till soils are ideal for new home building foundations, but cutting the site down will bring the foundations closer to the groundwater table which could be problematic if full basements are being proposed in the new houses.

The total site elevation could also be raised by as much as 2.0m if preferred. This is not deemed to be a necessity, but the topsoil layer is thick and would require complete removal prior to raising the site. Clean fill should be utilized to raise the site if that becomes a requirement.

The native silty sand and gravel/cobble till subsoils on site can be re-used as acceptable subgrade fill material. Any imported fill materials meeting OPSS 1010 SSM specifications, such as sand or silty sand, are also suitable fill materials.

2. Permeability and Erosion

The drainage of the native subsoils can be classified as medium.

The hydraulic permeability is estimated as follows:

silty sand and gravel/cobble till $k = 10^{-5}$ cm/sec. T time = 15 min/cm.

The erodibility of the native soils is rated low to moderate, with a Wischmeier K value in the range of 0.30.

The site is generally covered with short grass and bushes.

The existing vegetation should be maintained in its undisturbed state as much as possible to provide continued resistance to ground surface erosion during the construction activities.

A standard application of rip rap placed over a Type 2 non-woven geotextile cloth can be utilized for areas requiring erosion protection measures. i.e.- pipe culvert outlets.

3. New House Foundations

Shallow depth footings for new houses should have minimum soil cover of 1.5m for frost protection.

Spread or strip footings can be placed on the undisturbed native soils as listed below.

Assuming a finished footing embedment depth of 1.5m, native soil bearing capacities will typically be available at the base of the new footings as follows:

silty sand and gravel/cobble till:

Factored ULS bearing capacity of 300 kPa

SLS allowable bearing capacity of 200 kPa

All new footing areas should be inspected by a licensed P.Eng. prior to placement to ensure the native subsoils are undisturbed and that minimum bearing capacities as noted above are obtained. The noted bearing capacities will be reduced where footings are being placed onto wet subgrade soils.

The licensed P.Eng. should also be consulted to set all new basement floor elevations.

4. Dewatering

Extensive dewatering operations during construction are not expected to be required if the footings are placed onto the silty sand and gravel/cobble till areas.

A pumping operation with standard sump pump equipment is anticipated to be sufficient for dewatering.

Care should be taken to prevent ponding and the presence of excessive rainfall during the construction operations and to control excess run-off that could lead to surface erosion problems.

The construction contract should also stipulate that the integrity of all native soil surfaces and soil bearing capacities must be preserved at all times.

Excessive on-site construction traffic will distort and soften (or weaken) the surface subgrade. Accordingly, all on-site traffic operations should be supported by creating internal traffic lanes by placing a 100mm depth of 4inch minus rock fill base material.

5. Seismic Parameters

The following seismic design parameters may be utilized:

Site Class C Soil Shear Wave Average Velocity (m/s) = $360 < V_s < 760$

The peak ground acceleration value for the Bobcaygeon area as per the OBC is
PGA = 0.087.

6. Geotechnical Parameters

When calculating vertical and lateral earth pressures or other geotechnical parameters, the following unfactored coefficients may be utilized:

Native Silty Sand and Gravel/Cobble Till

$\phi = 35^\circ$

$K_a = 0.27$; $K_o = 0.43$; $K_p = 3.69$.

Moist unit weight = 22.0 kN/m³

Coefficient of friction for the concrete/till interface = 0.55

Typical Imported Sandy Granular B Type 1 Backfill

$\phi = 32^\circ$

$K_a = 0.31$; $K_o = 0.47$; $K_p = 3.25$.

Moist unit weight = 22.3 kN/m³

Typical Imported Gravelly Granular B Type 1 Backfill

$\phi = 35^\circ$

$K_a = 0.27$; $K_o = 0.43$; $K_p = 3.69$.

Moist unit weight = 23.0 kN/m³

7. Subdrains

New houses having basement floor levels should be provided with subdrains consisting of perforated geotextile-wrapped pipes placed at the footing depth along the outside perimeter of the footings. The pipes should be 150mm diameter, and graded to positive outlets away from the foundation.

Backfilling operations to subdrain trenches should be completed with OPSS 1004 clear stone. Free-draining granular materials should be placed as backfill to all new foundation walls.

8. Concrete

The frost penetration depth at this site is 1.5m. All concrete placed within the frost penetration depth or exposed to outside extreme temperatures should consist of a 32MPa concrete mix, with 7% air entrainment.

General use (Type 10) concrete cement is suitable for this project.

9. Re-Use of Subsoils

The native subsoils found on site cannot be used as fill beneath structures. Any new fill required beneath new structures must be an engineered granular fill such as OPSS 1010 Granular B, Type 1.

10. Floor Slabs

The following minimum thickness requirements are recommended for standard slab-on-grade floors:

Concrete Slabs	127mm; (25MPa compressive strength)
OPSS 1010 Granular Base	150mm
OPSS 1010 Granular B Type 1 subbase	200mm
Over compact native subgrade soil	

The subgrade soil surface must be proof-rolled to ensure acceptability for placement of the base and subbase materials. All deleterious soil or organics such as roots or branches must be removed from beneath the new floor area. Deleterious soils may be replaced by an acceptable subgrade fill material, or OPSS 1010 SSM.

11. Pipe Installation

New underground piping should follow OPSD Standards, as follows:

Soil Subgrade

OPSD 802.010 Flexible Pipe - Type 3 Earth Excavation

OPSD 802.031 Rigid Pipe - Type 3 Earth Excavation, Class B

Granular bedding and cover depth should be as per OPSD standards.

For normal subgrade conditions, OPSS Granular A may be utilized for pipe embedment and pipe cover material for new piping.

For wet subgrade conditions, a crushed rock should be utilized for pipe bedding and coverings, such as OPSS 1010 Granular B Type 2 with 100% passing the 50mm sieve, or Clear Stone.

Frost protection for underground piping should be utilized as per OPSD standards, with a frost treatment depth of $k = 1.5\text{m}$:

OPSD 803.030 Frost Penetration Line Below Bedding Grade

OPSD 803.031 Frost Penetration Line Above Bedding Grade

12. Pavement Design

At all new roadway locations, all organic soils must be removed from the subgrade materials. Earth grading and crossfall must comply with OPSD 200.01 to prevent ponding of water on the soil subgrade, and to provide effective drainage of the new pavement structure.

Proof-rolling of the subgrade soil must be undertaken to ensure it is acceptable for placement of the new granular subbase and base materials.

The following minimum pavement design as per OPSS 1150 specification is recommended for new pavement:

HL3 Surface Course	40mm
HL8 Binder Course	50mm
OPSS 1010 Granular A base	150mm
OPSS 1010 Granular B Type 1	300mm

SuperPave hot mix as per OPSS 1151 can be substituted for OPSS 1150, if desired.

The hot mix substrates should be tack coated with asphalt cement having a minimum rating of PGAC 58 -34 prior to placing the surface course as per OPSS.PROV 308.

The construction contract should stipulate that all hot mix paving operations must be carried

out in accordance with OPSS 310 specifications, and that the surface course should be delayed until the new house construction program is complete. This will provide for a better finished product, and allows time to repair any defects in the Binder Course caused by the house construction program.

13. Compaction Requirements

All native soil and granular fill compaction requirements for the project should conform with OPSS 501, Subsection 501.08.02 - Method A, utilizing soil placement in maximum 300mm lifts and a compaction standard of 100% of Standard Proctor Maximum Dry Density.

Statement of Limitations

This report is intended for the guidance of the project design team.

From a construction viewpoint, contractors must make their own assessment of the soil and groundwater conditions, and how those issues might affect their proposed construction operations, techniques, and schedules.

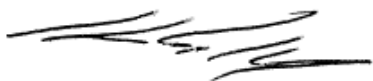
The recommendations in this report are based on information and data acquired at the test holes and from the laboratory analysis. Soils and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole locations and conditions may become apparent during construction that could not be detected or anticipated at the time of the soils investigation. If that occurs and appears to be detrimental to the construction program, a Terraspec representative should be contacted and recalled to the site for further consultation, testing, and analysis.

Terraspec should also be retained during the construction program to ensure that all subgrade preparation requirements are met, and to confirm that the soil conditions do not deviate materially from those encountered in test holes. In cases where any of our recommendations are not followed, the company's responsibility is limited to interpreting the information from the test hole data.

This report is applicable only to this project, being constructed substantially in accordance with the details of alignment and elevations as quoted in the report.

~ ~ ~

TERRASPEC ENGINEERING INC. GEOTECHNICAL ENGINEERS



Shane Galloway, B.A.
Manager



N.A. MacKinnon, P.Eng.
Senior Engineer

Test Hole Data

1919 Estates Phase 1

Notes

1. Soil types, strata, and groundwater conditions have been established only at test hole locations.
2. Soils are described according to the MTO Soils Classification System and OPSD 100.06.
3. Dimensions are in millimetres up to 1 metre, then in metres thereafter.

Abbreviations

asph	-	asphalt	&	-	and
blds	-	boulders	w	-	with
blk	-	black	so	-	some
br	-	brown	tr	-	trace
BR	-	bedrock			
cl	-	clay(ey)	S	-	soil sample
cob	-	cobbles	Su	-	vane shear strength (kPa)
conc	-	concrete			
cr	-	crushed			
f	-	fine			
gr	-	gravel(ly)			
gry	-	grey			
med	-	medium			
NFP	-	no further progress			
org	-	organics			
RF	-	rock fill			
sa	-	sand(y)			
si	-	silt(y)			
tps	-	topsoil			

TH #1

0 - 150 br si tps
150 - 600 br si sa & gr -moist, compact
600 - 3.10 lt br si sa & gr/cob -wet, compact
-perched water at 910mm
-water accumulated to a 2.44m depth in the test hole

TH #2

0 - 240 br si tps
240 - 610 br si sa tr gr -moist, compact
610 - 2.30 lt br si sa & gr/cob -moist, compact S1 at 1.3m
2.30 - NFP, flat limestone BR, sound
-perched water at 1.6m

TH #3

0 - 200 br si tps
200 - 560 br si sa tr gr -moist, compact
560 - 1.71 lt br si sa & gr tr cob -moist, compact S2 at 1.6m
1.71 - 2.10 flat shale/limestone fragments -dry, dense
2.10 - 2.50 gry gr & sa -moist, very dense
2.50 NFP, flat limestone BR, sound
-slight perched water at 1.1

TH #4

0 - 180 br si tps
180 - 530 br si sa tr gr -dry, compact
530 - 2.10 lt br si sa & gr/cob -moist, dense
2.10 - 3.66 lt br si sa & gr/cob w limestone fragments -moist, dense S3 at 2.1m
-limestone fragments up to 350mm diameter
-water not encountered

TH #5

0 - 110 br si tps
110 - 3.66 lt br si sa & gr/cob -moist, dense S4 at 610mm
-some boulders after 650mm
3.66 NFP, dense boulders
-water not encountered

TH #6

0	-	300	br si tps	
300	-	800	br si sa tr gr -moist, compact	
800	-	1.80	lt br si cl sa & gr/cob -moist, dense	
1.80	-	3.20	gry si sa & gr -moist, very dense	S5 at 1.9m

-water not encountered

TH #7

0	-	280	br si tps	
280	-	610	br si sa tr gr -moist, compact	
610	-	3.66	gry/br si sa & gr/cob -moist, dense	

-some limestone fragments after 3m
-water not encountered

TH #8

0	-	280	br si tps	
280	-	760	br si sa -moist, compact	S6 at 600mm
760	-	3.35	gry/br si sa & gr/cob so blds -moist, dense	
3.35			NFP, dense boulders	

-water not encountered

TH #9

0	-	270	br si tps	
270	-	630	br si sa -moist, compact	
630	-	3.66	gry/br si sa & gr/cob tr blds -moist, dense	S7 at 1.5m

-water not encountered

TH #10

0	-	200	br si tps	
200	-	3.66	br si sa & gr/cob so blds -moist, dense	

-frequent limestone boulders after 1.8m
-water not encountered

Laboratory Test Data
1919 Estates, Phase 1

<u>Soil Sample</u> <u>Sieve</u>	<u>1</u> <u>% Passing</u>	<u>2</u>	<u>3</u>	<u>4</u>	
37.5mm	100	100	100	100	grain size
26.5mm	85.4	90.9	84.2	94.1	
19.0mm	73.2	79.2	80.7	92.1	
13.2mm	64.4	72.9	71.5	81.4	
9.50mm	55.3	65.3	61.2	70.0	
4.75mm	46.5	52.8	48.3	52.0	
2.36mm	41.9	45.2	42.4	47.0	
1.18mm	37.7	38.0	35.8	40.3	
600um	34.1	31.4	30.4	34.8	
300um	30.3	25.5	25.7	29.8	
150um	25.5	19.7	20.8	24.0	
75um	21.9	15.8	17.2	19.7	
%gravel	53.5	47.2	51.7	48.0	
%sand	24.6	37.0	31.1	32.3	
ASTM	GM	GM	GM	GM	soil classification
frost rating	Low	Low	Low	Low	
LL	34.0	17.1	21.0	27.0	
PL	21.7	16.3	18.8	18.1	
PI	12.3	0.8	2.2	8.9	
W	38.4	11.7	9.2	13.3	

<u>Soil Sample</u> <u>Sieve</u>	<u>5</u> <u>% Passing</u>	<u>6</u>	<u>7</u>	
53.0mm	100	100	100	grain size
37.5mm	92.7	100	97.5	
26.5mm	89.7	100	89.4	
19.0mm	69.2	100	83.1	
13.2mm	55.3	100	72.6	
9.50mm	44.5	100	65.2	
4.75mm	35.8	100	49.4	
2.36mm	31.2	99.2	42.2	
1.18mm	26.0	95.8	34.4	
600um	21.8	89.0	27.8	
300um	18.4	79.0	22.5	
150um	15.3	66.8	17.6	
75um	13.1	58.0	14.4	
%gravel	64.2	0.0	50.6	soil classification
%sand	22.7	42.0	35.0	
ASTM	GM	ML	GM	
frost rating	Low	Med	Low	
LL	20.0	15.4	22.8	
PL	15.1	14.9	20.8	
PI	4.9	0.5	2.0	
W	9.5	30.3	10.2	

TEST HOLE LOG DATA

PROJECT No.: 21-1-6814
CLIENT: Greer Galloway
PROJECT: 1919 Estates, Phase 1
DATE: November 14, 2017

SOIL DATA
METHOD: Excavator
s = sample

▼ encountered water elevation

LEGEND

- silty topsoil
- silty sand trace gravel
- silty clay sand & gravel/cobble
- silty sand & gravel/cobble
- gravel & sand
- silty sand & gravel
- shale/limestone fragments
- bedrock

Terraspec



CONTACT
714/997-1000

 BELL

16-1-6801

