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UCC File: 21132

### FUNCTIONAL SERVICING REPORT

# Northland Estates City of Port Colborne Revised June 2024

#### **INTRODUCTION**

Upper Canada Consultants has been retained to undertake and provide a Functional Servicing Report to address the servicing needs and requirements for the proposed residential development known as Northland Estates as part of the Red Line of Draft Plan of Subdivision application process for the City of Port Colborne.

The project site is located in the City of Port Colborne as part of Lot 31 and Concession 2 and is situated north of Coronation Drive North, east of Minor Road, south of Barrick Road and west of West Side Road (Regional Road 58) with site entrances on Northland Avenue. The site is bound by a Locally Significant Wetland at the west limits of the site, and the development area has historically been agricultural/vacant land.

The development site is approximately 16.67 hectares and has been previously Draft Approved to accommodate 120 single family dwellings, 46 townhouse units, and a mixed commercial/residential block with 50 residential units for a total unit count of 216 units. The proposed Red-Line Draft Plan submission has revised the previous design to now incorporate 44 single family dwellings and 189 townhouse units with the commercial residential block remaining unchanged for a new total unit count of 287. The site shall include associated asphalt road, concrete curb, catch basins, storm sewers, sanitary sewers, and watermain.

The objectives of this study are as follows:

- 1. Identify domestic and fire protection water service needs for the site;
- 2. Identify sanitary servicing needs for the site; and,
- 3. Identify stormwater management needs for the site.

#### WATER SERVICING

There is an existing municipal 300mm diameter Ductile Iron watermain located on the north side of Northland Avenue as well as a municipal 400mm diameter PVC watermain on the west side of West Side Road (Regional Road 58). Two connections will be made to the Northland Avenue watermain to provide an internal loop within the development to provide both domestic water



supply and fire protection. Four single family dwellings are to be constructed fronting West Side Road and will be provided service via the 400mm diameter watermain fronting the units.

The sizes and locations of the proposed internal watermain will be finalized as part of the future detailed design. At this time, a preliminary internal watermain design can be found in Appendix A. The proposed development will continue the 300mm diameter watermain westerly from its' current limit on Northland Avenue to Street 'E'. A second watermain connection to the existing West Main Street 400mm diameter watermain will be made through the access path between #339 and #335 West Main Street. As well a 200mm diameter watermain will be constructed on Street 'A' from Northland Avenue to the northerly limit with the intention of eventually connecting to the existing 300mm diameter watermain on Barrick Road through future development. Watermains constructed on Streets 'B' and 'E' will both be 200mm diameter and watermains constructed on Streets 'D' and 'C' are expected to be 150mm in diameter.

Fire protection will be provided to the proposed development with municipal fire hydrants within the subdivision and private fire hydrants within the mixed-use condominium block. The spacing and location shall be identified as part future detailed design. Fire protection will be provided to the four proposed units fronting West Side Road via an existing hydrant fronting #339 West Side Road.

Upper Canada Consultants has undertaken a watermain analysis using the EPANET software to model flows and pressures within the existing and proposed system as a result of the proposed development under various conditions. The software was used to model the conditions utilizing average day, maximum day, and peak unit consumption rates per MECP standards. The model has been calibrated utilizing hydrant test flow data provided by the municipality from tests conducted in May/June of this year and have ensured supportable conclusions for this development.

The EPANET model has utilized flow test data from four hydrants located at the following locations:

- 1. Fronting #341 West Side Road
- 2. Fronting #311 West Side Road
- 3. North-west corner of West Side Road and Northland Avenue
- 4. South-east corner of West Side Road and Northland Avenue

The results of the conducted modelling have been included in Appendix A along with images depicting the existing and proposed conditions utilized for this model. The existing testing outlines the existing watermain system having static pressures within the preferred system pressure range of 50-80 PSI and above the minimum pressures of 40 PSI. The modelled static pressures and residual pressures were within 5% (typical) of the results when compared to existing conditions provided by the hydrant flow tests. The existing hydrant fronting #341 West Side Road has the lowest theoretical flow rate of 3069 GPM under fire flow conditions (at 20 PSI). This flow rate would be attributed a BLUE rating (>1499GPM) and has ample flow to provide both domestic and fire flow protection to the surrounding residential properties.



Overall, mainly due to the elevation difference between the north and south ends of the site, the existing hydrant fronting #341 West Side Road as well as the most north-easterly proposed hydrant experience the lowest pressures (and therefore flow rates) through the modelling. However, even under peak daily conditions (720 LPCD), both noted hydrants will experience almost identical pressures with an approximate drop of 0.7% under future conditions. All hydrants will maintain static pressures of approximately 50PSI under future developed conditions. Therefore, it is expected that the existing municipal watermain system will have adequate capacity to provide both domestic and fire water supply for the proposed development.

Unfortunately, due to the complicated nature of this model, theoretical flows calculated by the model are not comparable to theoretical flows modelled during the municipal hydrant flow tests. Therefore, the model has been utilized to model the difference between pressures observed in the system. It should be noted that the pressures and flow rates observed by this model are purely theoretical, attempting to replicate information provided by the City's hydrant flow test data for hydrants within the immediate vicinity of the proposed development site. Without a complete model of the city's entire water system, a highly accurate model providing reliable flow rate data for the future development is unobtainable.

#### SANITARY SERVICING

There is an existing 200mm diameter municipal sanitary sewer on the west side of West Side Road (Regional Road 58) as well as a 200mm diameter sanitary sewer on Northland Avenue. The three proposed single-family dwellings fronting West Side Road will be provided service via the existing 200mm diameter sewer on West Side Road, with the remaining majority of the development block discharging sanitary flows to the existing sanitary sewer on Northland Avenue. All sanitary sewers will convey flows via gravity to their respective outlets.

An overall sanitary analysis has been conducted and included in Appendix B for the municipal sanitary sewer system downstream of the proposed development site from the site connection to the Regional Sanitary Sewer at the Steele Street Sanitary Pumping Station (SPS). The analysis utilizes a flow rate of 28 m<sup>3</sup>/ha/day for commercial and institutional land uses as well a residential flow rate of 255 L/person/day as per the 2021 Niagara Regional Wastewater Master Servicing Plan (MSP) Update. An infiltration rate of 0.28 L/s/ha has been used for residential land uses as well as drainage areas consisting of solely commercial/institutional land uses (containing a reduced sewer system with a highly reduced number of infiltration points). Per Plan and Profile information provided by the municipality, sanitary flows from the Oxford Boulevard Pumping Station and north od Steele Street on Barrick Road have been removed from the revised analysis as it has been determined sanitary flows continue flowing east on Barrick Road.

Three separate analyses have been completed and included in Appendix B:

- 1. Municipal Sanitary System under existing conditions with current Northland Estates Draft Plan.
- 2. Municipal Sanitary System with the proposed Red-Lined Draft Plan



3. Municipal Sanitary System with the proposed Red-Lined Draft Plan and potential future development north east of the site.

The analysis has concluded that the existing downstream municipal sanitary sewer system will theoretically reach capacities of approximately 83% on Northland Avenue, east of the proposed development, under currently approved Northland Estates Draft Plan. The development will produce a dry weather flow of 6.32L/s and total peak wet weather flow of 9.01L/s to the municipal system. The downstream sanitary sewers will experience a maximum capacity of 83.2% at the east end of Northland Avenue and will discharge a peak wet weather flow of 24.08L/s to the Steele Street SPS.

Under future conditions proposed by the Red-Lined Draft Plan, the development will discharge an increased dry weather flow of 8.16L/s and wet weather flow of 10.84L/s to the downstream sanitary sewer system. This will increase peak wet weather flow capacities experienced within the downstream sanitary sewer system to approximately 90.6% at the east end of Northland Avenue and will discharge a peak wet weather flow of 25.84L/s to the Steele Street SPS.

The analysis concludes that the existing downstream municipal sanitary sewer system from the proposed development to the Steele Street SPS will have adequate capacity for the proposed Northland Estates Subdivision development. The analysis also concludes that the existing municipal system would have capacity to accommodate sanitary flows from an additional 23 residential dwellings - shown as part of Drainage Area 'NEX' immediately north-west of the proposed development. The proposed internal sanitary sewer system for this development will be design to include capacity for future development in this area. It should be noted that any additional development occurring upstream of the existing 200mm diameter sanitary sewer system on Northland Avenue, east of West Side Road, may result in further capacity issues and would require upgrades to the existing sanitary sewer system.

The proposed development will discharge sanitary flows to the existing municipal sanitary sewer system ultimately conveying flows to the Regional Steele Street Pumping Station. Per the Water and Wastewater Master Servicing Plan Update (2021), the capacities and performance of the Steele Street SPS are included in the following table:

Steele Street Pumping Station Characteristics							
Criteria	Flow (L/s)						
Operational Firm Capacity	25.2						
ECA Firm Capacity	35.0						
2021 Existing 5-Yr Peak Wet Weather Flow	48.8						
2051 Design 5-Yr Peak Wet Weather Flow	53.0						
Forcemain Capacity @ 2.5m/s	78.5						



According to the MSP Update and values included in the previous table, the existing Steele Street SPS does not have the capacity to accommodate existing flows from its' drainage area under the current Operational Firm Capacity. With the additional sanitary flows from the proposed development, the Steele Street SPS will be inadequate in providing the necessary sanitary infrastructure required for the population in this area. Upgrades to the Regional Steel Street Sanitary Pumping Station will be required in order to provide the adequate downstream infrastructure required for this development.

#### STORMWATER MANAGEMENT PLAN

As part of the site development, the following is a summary of the stormwater management plan for the proposed residential development.

The criteria provided by the City of Port Colborne and Region of Niagara for this development includes the requirement to control peak stormwater flows from the proposed development area up to and including the 100 year design storm event and improve stormwater quality levels to MECP Normal (70% TSS removal) Protection levels prior to discharge from the development.

To limit future stormwater flows to allowable levels, and improve stormwater quality to the required TSS removal levels, a stormwater management wetpond facility will provide the necessary controls for this development. Stormwater quality levels will be provided to a Normal Standard before outletting from the development site. A channel will be created to convey stormwater flows from the proposed stormwater management facility and surrounding lands to the Eagle Marsh Drain. Roadway overland flows will be directed to the stormwater management facility at the south end of the site. A Stormwater Management Plan for this development has been created and can be found in Appendix C.



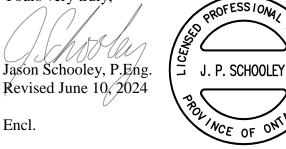
### **CONCLUSIONS AND RECOMMENDATIONS**

Therefore, based on the above comments and design calculations provided for this site, the following summarizes the servicing for this site.

- 1. The existing municipal watermain system will have sufficient capacity to provide both domestic and fire protection water supply.
- 2. The existing municipal sanitary sewer system downstream of the site will have adequate capacity for the proposed residential development. Upgrades may be required to the Steele Street Sanitary Pumping Station.
- 3. Stormwater quality controls are being provided to Normal Protection (70% TSS removal) levels by a stormwater wetpond facility before outletting to the Eagle Marsh Drain.
- 4. Stormwater quantity controls are being provided by a stormwater management wetpond facility up to the 100-year design storm event prior to discharging from the site.
- 5. The site stormwater overland route from the road system is to the proposed stormwater management facility before outletting to the Eagle Marsh Drain.
- 6. A channel will be created as an extension to the Eagle Marsh Drain to convey stormwater flows from the proposed stormwater management facility and surrounding lands to the Eagle Marsh Drain.

Based on the above and the accompanying Stormwater Management Brief, there exists adequate municipal servicing for this development. We trust the above comments and enclosed calculations are satisfactory for approval. If you have any questions or require additional information, please do not hesitate to contact our office.

Yours very truly,





# APPENDICES



# APPENDIX A

EPANET Analysis – Existing Conditions Imagery EPANET Analysis Calculations EPANET Analysis Northland Estates Subdivision Existing Conditions



# WATERMAIN ANALYSIS

Software Utilized: EP	Software Utilized: EPANET								
Upper Canada Consultants									
Project Name:	Northland Estates								
Project Number:	21132								
Date:	June 10, 2024								

### Provided Hydrant Test Data

			Modelled	Test	Modelled	
		Test Static	Static	Residual	Residual	Actual
Model	Physical	Pressure	Pressures	Pressures	Pressures	Flow Rate
Node No.	Location	(PSI)	(PSI)	(PSI)	(PSI)	(GPM)
4	Fronting #341	50	50.2	43	43.2	1350
5	Fronting #311	53	51.9	45	44.7	1390
6	NW Corner	54	53.1	46	45.6	1432
7	SE Corner	53	53.5	43	44.7	1390

Hydrant with Lowest Modelled Pressures:

Node #20

	Table 1	L. Modelled Ave	erage Day Pre	essures and	Flow Rates								
Hydrant Node Number	Number of Units	Population	Average Daily Load (LPM)	Existing Static Pressures (PSI)	Future Static Pressures (PSI)	% Change							
Existing Hydrants													
4	10	24	4.0	50.2	50.1	0.20%							
5	3	7	1.2	51.9	51.8	0.19%							
6	0	0	0.0	53.1	53.0	0.16%							
7	19	46	7.6	53.5	53.4	0.19%							
		Northlan	ds Estates Su	ubdivision									
18	82	197	32.8	-	51.5	-							
19	54	130	21.6	-	51.1	-							
20	47	113	18.8	-	50.1	-							
21	38	91	15.2	-	51.2	-							
22	41	98	16.4	-	51.5	-							
23	22	53	8.8	-	51.8	-							
Note: Ave	rage Daily L	Init Consuption	Rate of 240	LPCD Utilize	d per 2021 M	SPU							

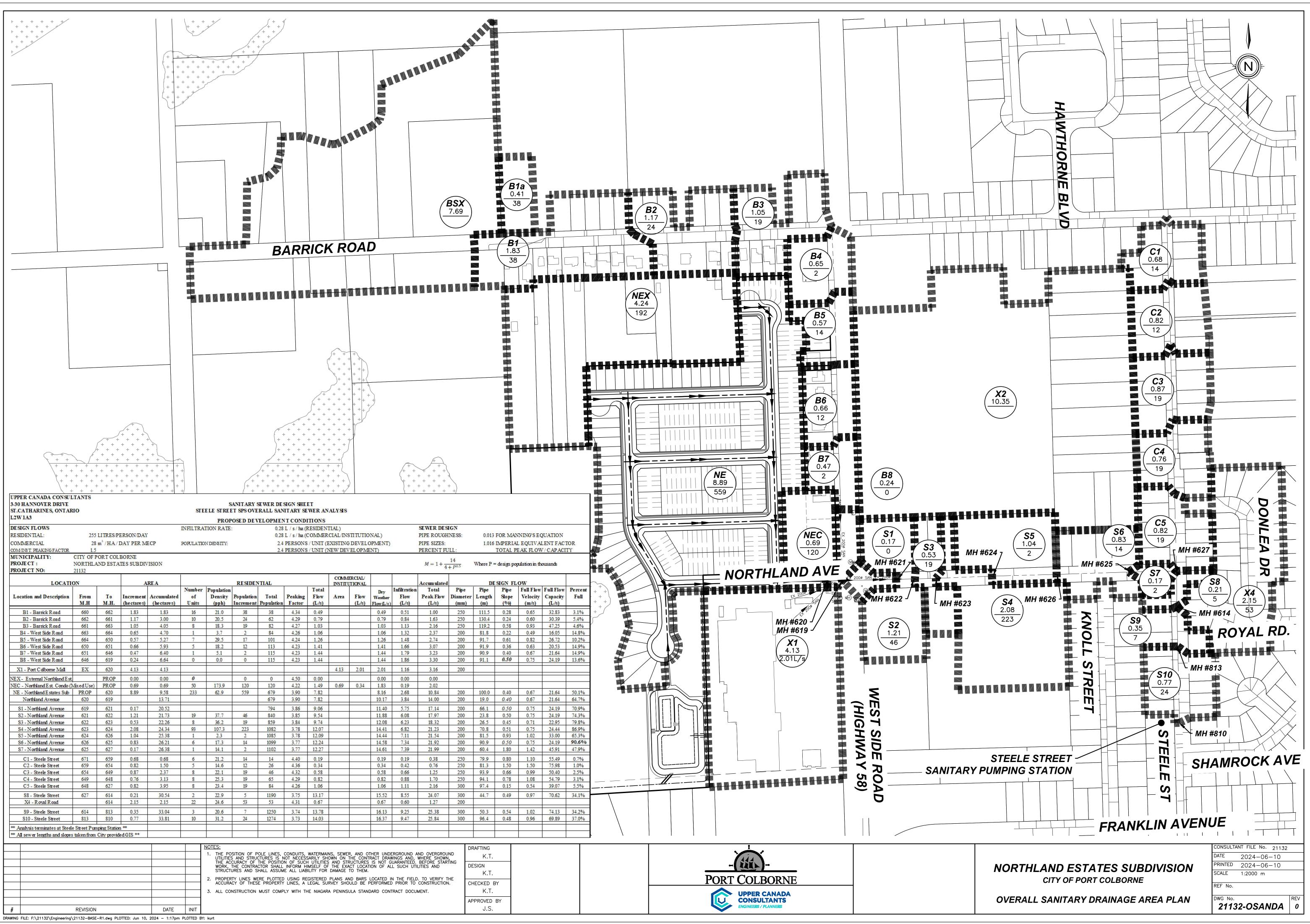
	Table 2	Modelled Max	imum Day Pi	ressures and	Flow Rates							
Hydrant Node Number	Number of Units	Population	Average Daily Load (LPM)	Existing Static Pressures (PSI)	Future Static Pressures (PSI)	% Change						
Existing Hydrants												
4	10	24	7.6	50.2	50.0	0.40%						
5	3	7	2.3	51.9	51.7	0.36%						
6	0	0	0.0	53.0	52.9	0.35%						
7	19	46	14.4	53.5	53.3	0.35%						
		Northlan	ds Estates Su	ubdivision								
18	82	197	62.3	-	51.4	-						
19	54	130	41.0	-	51.0	-						
20	47	113	35.7	-	50.0	-						
21	38	91	28.9	-	51.1	-						
22	41	98	31.2	-	51.4	-						
23	22	53	16.7	-	51.7	-						
	-	Unit Consuptio	on Rate of 45	6 LPCD Utili	zed based on	peaking						
factor of 1	.9 (MECP P	eaking Factor)										

	Ta	ble 3. Modelled	Peak Pressu	res and Flow	v Rates								
Hydrant Node Number	Number of Units	Population	Average Daily Load (LPM)	Existing Static Pressures (PSI)	Future Static Pressures (PSI)	% Change							
Existing Hydrants													
4	10	24	12.0	50.2	49.9	0.60%							
5	3	7	3.6	51.9	51.6	0.60%							
6	0	0	0.0	53.0	52.7	0.56%							
7	19	46	22.8	53.5	53.2	0.56%							
		Northlan	ds Estates Sı	ubdivision									
18	82	197	98.4	-	51.3	-							
19	54	130	64.8	-	50.9	-							
20	47	113	56.4	-	49.9	-							
21	38	91	45.6	-	50.9	-							
22	41	98	49.2	-	51.3	-							
23	22	53	26.4	-	51.6	-							
Note: Peal	۲ Hourly Un	it Consuption R	ate of 720 LF	PCD Utilized	based on pea	king factor							
of 3.0 (202	1 MSPU)												



# **APPENDIX B**

Overall Sanitary Drainage Area Plan – Proposed Conditions Overall Sanitary Calculations – Existing Conditions Overall Sanitary Calculations – Proposed Conditions with Additional Development



#### **3-30 HANNOVER DRIVE** SANITARY SEWER DESIGN SHEET ST.CATHARINES, ONTARIO STEELE STREET SPS OVERALL SANITARY SEWER ANALYSIS L2W 1A3 **EXISTING CONDITIONS WITH CURRENT NORTHLAND ESTATES DRAFT APPROVED SUBDIVISION** DESIGN FLOWS INFILTRATION RATE: 0.28 L/s/ha (RESIDENTIAL) SEWER DESIGN **RESIDENTIAL:** 255 LITRES/PERSON/DAY 0.28 L/s/ha (COMMERCIAL/INSTITUTIONAL) PIPE ROUGHNES 28 m<sup>3</sup> / HA / DAY PER MECP 2.4 PERSONS / UNIT (EXISTING DEVELOPMENT) COMMERCIAL **POPULATION DENSITY:** PIPE SIZES: 1.5 2.4 PERSONS / UNIT (NEW DEVELOPMENT) PERCENT FULL: COM/INST. PEAKING FACT( CITY OF PORT COLBORNE **MUNICIPALITY:** 14 $M = 1 + \frac{1}{4 + P^0}$ **PROJECT :** NORTHLAND ESTATES SUBDIVISION **PROJECT NO:** 21132 COMMERCIAL/ INSTITUTIONAL **LOCATION** AREA RESIDENTIAL Accumulated Total Total Pi Number Infiltration Populatio Weather To of n Density Population Total Peaking Flow **Peak Flow** Diam **Location and Description** Increment Accumulated Area Flow Flow From Flow M.H M.H. (hectares) (hectares) Units (pph) Increment Population Factor (L/s) (L/s) (L/s) (L/s) (L/s)(mi 25 B1 - Barrick Road 662 1.83 1.83 38 38 4.34 0.49 0.49 0.51 1.00 660 16 21.0 25 B2 - Barrick Road 3.00 24 0.79 0.79 662 661 1.17 10 20.5 62 4.29 0.84 1.63 25 B3 - Barrick Road 663 1.05 4.05 8 18.3 19 82 4.27 1.03 1.03 1.13 2.16 661 20 B4 - West Side Road 663 664 0.65 4.70 3.7 2 84 4.26 1.06 1.06 1.32 2.37 1 B5 - West Side Road 664 650 0.57 5.27 5 12 96 1.20 1.48 2.68 20 21.1 4.25 1.20 650 1.35 1.35 20 B6 - West Side Road 651 0.66 5.93 5 18.2 12 108 4.23 1.66 3.01 20 B7 - West Side Road 651 646 0.47 6.40 5.1 2 110 4.23 1.38 1.38 1.79 3.17 B8 - West Side Road 646 619 0.24 6.64 0 0.0 0 110 4.23 1.38 1.38 1.86 3.24 20 EX 620 4.13 4.13 2.01 2.01 3.16 20 X1 - Port Colborne Mall 4.13 1.16 EX - External Northland Est. PROP NEC - Northland Est. Condo (Mixed U PROP 0.69 0.69 50 173.9 120 120 4.22 1.49 0.69 0.34 1.83 0.19 2.02 NE - Northland Estates Sub PROP 620 8.89 9.58 163 44.0 391 511 3.97 5.99 6.32 2.68 9.01 20 20 619 13.71 5.99 3.84 Northland Avenue 620 511 3.97 8.33 12.17 20.52 622 7.20 20 619 621 0.17 3.92 9.54 5.75 15.29 S1 - Northland Avenue S2 - Northland Avenue 621 622 1.21 21.73 19 37.7 46 667 3.91 7.69 10.04 6.08 16.12 20 622 623 0.53 22.26 36.2 7.90 6.23 20 S3 - Northland Avenue 8 19 686 3.90 10.24 16.48 623 624 2.08 24.34 93 107.3 223 3.83 10.27 12.61 6.82 19.43 20 S4 - Northland Avenue 910 S5 - Northland Avenue 624 626 1.04 25.38 2.3 2 912 3.83 10.30 12.64 7.11 19.75 20 20 S6 - Northland Avenue 626 625 0.83 26.21 6 17.3 14 926 3.82 10.45 12.79 7.34 20.13 S7 - Northland Avenue 625 627 0.17 26.38 14.1 2 929 3.82 10.47 12.82 7.39 20.20 20 1 25 0.68 C1 - Steele Street 671 659 0.68 6 21.2 14 14 4.40 0.19 0.19 0.19 0.38 C2 - Steele Street 659 654 0.82 1.50 5 12 26 0.34 0.42 0.76 25 14.6 4.36 0.34 25 C3 - Steele Street 654 649 0.87 2.37 22.1 0.58 0.58 1.25 8 19 46 4.32 0.66 C4 - Steele Street 649 648 3.13 8 25.3 65 0.82 0.82 0.88 1.70 25 0.76 19 4.29 C5 - Steele Street 627 0.82 3.95 23.4 30 648 8 19 84 4.26 1.06 1.06 1.11 2.16 S8 - Steele Street 627 614 0.21 30.54 2 22.9 5 1018 3.80 11.40 13.74 8.55 22.29 30 614 2.15 22 53 20 X4 - Royal Road 2.15 24.6 53 4.31 0.67 0.67 0.60 1.27 813 0.35 33.04 3 23.61 30 S9 - Steele Street 614 20.6 7 1078 3.78 12.02 14.36 9.25

24

1102

12.27

3.77

9.47

14.61

24.08

UPPER CANADA CONSULTANTS

S10 - Steele Street

813

\* All sewer lengths and slopes taken from City provided GIS \*\*

\* Analysis terminates at Steele Street Pumping Station \*\*

810

0.77

33.81

10

31.2

GN											
IESS:	0.013	FOR MAN	INING'S E	QUATION							
L:	1.016 IMPERIAL EQUIVALENT FACTOR TOTAL PEAK FLOW / CAPACITY										
14 - P <sup>0.5</sup>	Where P = design population in thousands										
	DE	SIGN FL	OW								
Pipe	Pipe	Pipe		Full Flow	Percent						
iameter	Length	Slope	Velocity	Capacity	Full						
(mm)	(m)	(%)	(m/s)	(L/s)							
250	111.5	0.28	0.65	32.83	3.1%						
250	130.4	0.24	0.60	30.39	5.4%						
250	119.2	0.58	0.93	47.25	4.6%						
200	81.8	0.22	0.49	16.05	14.8%						
200	91.7	0.61	0.82	26.72	10.0%						
200	91.9	0.36	0.63	20.53	14.7%						
200	90.9	0.40	0.67	21.64	14.7%						
200	91.1	0.50	0.75	24.19	13.4%						
200											
200	100.0	0.40	0.67	21.64	41.6%						
200	19.0	0.40	0.67	21.64	56.2%						
200	66.1	0.50	0.75	24.19	63.2%						
200	23.8	0.50	0.75	24.19	65.2% 66.6%						
200	26.5	0.30	0.73	22.95	71.8%						
200	70.8	0.13	0.71	24.44	79.5%						
200	81.5	0.93	1.02	33.00	59.8%						
200	90.9	0.50	0.75	24.19	83.2%						
200	60.4	1.80	1.42	45.91	44.0%						
250	79.9	0.80	1.10	55.49	0.7%						
250	81.3	1.50	1.50	75.98	1.0%						
250	93.9	0.66	0.99	50.40	2.5%						
250	94.1	0.78	1.08	54.79	3.1%						
300	97.4	0.15	0.54	39.07	5.5%						
300	44.7	0.49	0.97	70.62	31.6%						
200											
300	50.3	0.54	1.02	74.13	31.9%						
300	96.4	0.48	0.96	69.89	34.4%						

UPPER CANADA CONSU						C A			SIGN SH												
3-30 HANNOVER DRIVE					OTEL		NITARY S				NATIVOT	C									
ST.CATHARINES, ONTA	RIO				SIEE	LE SIREE	Γ SPS OVEI	KALL SAN	IIAKY S	EWER A	NALYSI	5									
L2W 1A3						FUI	LLY DEVE	CLOPED (	CONDITI	ONS											
DESIGN FLOWS					INFILTRA	TION RATI	E:	0.28	L / s / ha (	RESIDEN	ITIAL)				SEWER DES	SIGN					
RESIDENTIAL:	255	LITRES/P	ERSON/DA	Y				0.28	L / s / ha (	COMME	RCIAL/IN	ISTITUT	IONAL)		PIPE ROUGH	INESS:	0.013	FOR MAN	NNING'S E	QUATION	
COMMERCIAL	28	$m^3/HA/2$	DAY PER M	<b>IECP</b>	POPULATI	ON DENSIT	Y:	2.4	PERSONS	S / UNIT (	EXISTIN	IG DEVE	LOPMEN	T)	PIPE SIZES:		1.016	IMPERIA	L EOUIVA	LENT FAC	CTOR
COM/INST. PEAKING FACTO	-				10102.111				PERSONS					-)	PERCENT FU	JLL:			-	W / CAPAC	
	CITY OF		BORNE								(		/								
			ATES SUBD	IVISION											$M = 1 + \frac{1}{4}$	14	Where P	= design po	opulation in	thousands	
	21132														4	$+ P^{0.5}$		8r	· · · · · · · ·		
											COMMI	ERCIAL/									
LOCATI	ON		A	REA			RESIDEN	TIAL			INSTITU				Accumulated		DE	SIGN FL	OW		
					Number	Populatio				Total			Weather	Infiltration	n Total	Pipe	Pipe	Pipe	Full Flow	Full Flow	Percent
Location and Description	From	То	Increment	Accumulated	of	n Density	Population	Total	Peaking	Flow	Area	Flow	Flow	Flow	Peak Flow	Diameter	Length	Slope	Velocity	Capacity	Full
	M.H	M.H.	(hectares)	(hectares)	Units	(pph)	Increment	Population	Factor	(L/s)		(L/s)	(L/s)	(L/s)	(L/s)	(mm)	(m)	(%)	(m/s)	(L/s)	
BSX - Barrick Road West (No	ot Included,	)	7.69	7.69	240	74.9	576	576	3.94	6.70			6.70	2.15	8.85						
B1a - Future Dev (towns)		660	0.41	0.41	16	93.7	38	38	4.34	0.49			0.49	0.11	0.61	200	90.0	0.40	0.67	21.64	
B1 - Barrick Road	660	662	1.83	2.24	16	21.0	38	77	4.27	0.97			0.97	0.63	1.60	250	111.5	0.28	0.65	32.83	4.9%
B2 - Barrick Road	662	661	1.17	3.41	10	20.5	24	101	4.24	1.26			1.26	0.95	2.22	250	130.4	0.24	0.60	30.39	7.3%
B3 - Barrick Road	661	663	1.05	4.46	8	18.3	19	120	4.22	1.49			1.49	1.25	2.74	250	119.2	0.58	0.93	47.25	5.8%
B4 - West Side Road	663	664	0.65	5.11	1	3.7	2	122	4.22	1.52			1.52	1.43	2.95	200	81.8	0.22	0.49	16.05	18.4%
B5 - West Side Road	664	650	0.57	5.68	6	25.3	14	137	4.20	1.70			1.70	1.59	3.29	200	91.7	0.61	0.82	26.72	12.3%
B6 - West Side Road	650	651	0.66	6.34	5	18.2	12	149	4.19	1.84			1.84	1.78	3.62	200	91.9	0.36	0.63	20.53	17.6%
B7 - West Side Road	651	646	0.47	6.81	1	5.1	2	151	4.19	1.87			1.87	1.91	3.78	200	90.9	0.40	0.67	21.64	17.5%
B8 - West Side Road	646	619	0.24	7.05	0	0.0	0	151	4.19	1.87			1.87	1.97	3.84	200	91.1	0.50	0.75	24.19	15.9%
X1 - Port Colborne Mall	EX	620	4.13	4.13		0.0					4.13	2.01	2.01	1.16	3.16	200					
JEX - External Northland Es	t.	PROP	4.24	4.24	23	13.0	55	55	4.31	0.70			0.70	1.19	1.89						
NEC - Northland Est. Condo	(Mixed Us	PROP	0.69	0.69	50	173.9	120	120	4.22	1.49	0.69	0.34	1.83	0.19	2.02						
NE - Northland Estates Sub	PROP	620	8.89	13.82	233	62.9	559	734	3.88	8.42			8.75	3.87	12.62	200	100.0	0.40	0.67	21.64	58.3%
Northland Avenue	620	619		17.95				734	3.88	8.42			8.75	5.03	13.78	200	19.0	0.40	0.67	21.64	63.7%
S1 - Northland Avenue	619	621	0.17	25.17				886	3.83	10.02			12.36	7.05	19.41	200	66.1	0.50	0.75	24.19	80.2%
S2 - Northland Avenue	621	622	1.21	26.38	19	37.7	46	931	3.82	10.50			12.84	7.39	20.23	200	23.8	0.50	0.75	24.19	83.6%
S3 - Northland Avenue	622	623	0.53	26.91	8	36.2	19	950	3.81	10.70			13.04	7.53	20.58	200	26.5	0.45	0.71	22.95	89.6%
S4 - Northland Avenue	623	624	2.08	28.99	93	107.3	223	1174	3.75	13.00			15.35	8.12	23.46	200	70.8	0.51	0.75	24.44	96.0%
S5 - Northland Avenue	624	626	1.04	30.03	1	2.3	2	1176	3.75	13.03			15.37	8.41	23.78	200	81.5	0.93	1.02	33.00	72.1%
S6 - Northland Avenue	626	625	0.83	30.86	6	17.3	14	1190	3.75	13.17			15.52	8.64	24.16	200	90.9	0.50	0.75	24.19	99.9%
S7 - Northland Avenue	625	627	0.17	31.03	1	14.1	2	1193	3.75	13.20			15.54	8.69	24.23	200	60.4	1.80	1.42	45.91	52.8%
C1 - Steele Street	671	659	0.68	0.68	6	21.2	14	14	4.40	0.19			0.19	0.19	0.38	250	79.9	0.80	1.10	55.49	0.7%
C2 - Steele Street	659	654	0.82	1.50	5	14.6	12	26	4.36	0.34			0.34	0.42	0.76	250	81.3	1.50	1.50	75.98	1.0%
C3 - Steele Street	654	649	0.87	2.37	8	22.1	19	46	4.32	0.58			0.58	0.66	1.25	250	93.9	0.66	0.99	50.40	2.5%
C4 - Steele Street	649	648	0.76	3.13	8	25.3	19	65	4.29	0.82			0.82	0.88	1.70	250	94.1	0.78	1.08	54.79	3.1%
C5 - Steele Street	648	627	0.82	3.95	8	23.4	19	84	4.26	1.06			1.06	1.11	2.16	300	97.4	0.15	0.54	39.07	5.5%
S8 - Steele Street	627	614	0.21	35.19	2	22.9	5	1282	3.73	14.10			16.44	9.85	26.30	300	44.7	0.49	0.97	70.62	37.2%
X4 - Royal Road		614	2.15	2.15	22	24.6	53	53	4.31	0.67			3.01	0.60	3.62	200	,				2,12/0
	<u>(14</u>																50.2	0.54	1.00	74.12	27.22
S9 - Steele Street	614	813	0.35	37.69	3	20.6	7	1342	3.71	14.71			17.05	10.55	27.60	300	50.3	0.54	1.02	74.13	37.2%
S10 - Steele Street	813	810	0.77	38.46	10	31.2	24	1366	3.71	14.95			17.29	10.77	28.06	300	96.4	0.48	0.96	69.89	40.1%
** Analysis terminates at Ste		<u> </u>																			
** All sewer lengths and slop	oes taken fr	om City pro	ovided GIS *	**																	



# **APPENDIX C**

Northland Estates – Stormwater Management Plan

# STORMWATER MANAGEMENT PLAN

# NORTHLAND ESTATES

# **CITY OF PORT COLBORNE**

**Prepared for:** 

2600261 Ontario Inc.

**Prepared by:** 

Upper Canada Consultants 3-30 Hannover Drive St. Catharines, Ontario L2W 1A3

**Revised May 2024** 

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# **APPENDICES**

Appendix AWeighted Percent Impervious Calculation Sheet<br/>Stormwater Management Facility Calculations

Appendix B MIDUSS Output Files

# **REFERENCES**

1. Stormwater Management Planning and Design Manual Ontario Ministry of Environment (March 2003)

### STORMWATER MANAGEMENT PLAN

### NORTHLAND ESTATES

### **CITY OF PORT COLBORNE**

#### 1.0 INTRODUCTION

#### 1.1 Study Area

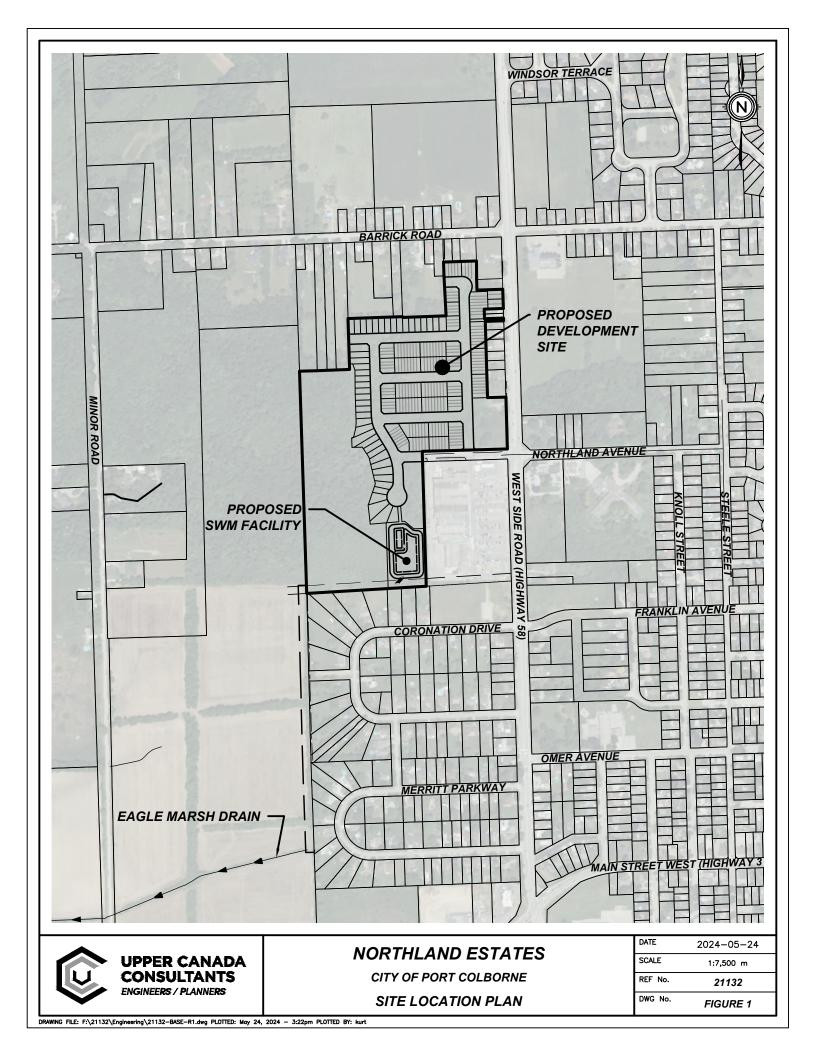
The proposed residential development is located in the City of Port Colborne as part of Lot 31 and Concession 2. As shown on the enclosed Site Location Plan (Figure 1), the subject property is situated north of Coronation Drive North, east of Minor Road, south of Barrick Road and west of West Side Road (Regional Road 58) with site entrances on Northland Avenue. This Stormwater Management Plan has been written to obtain approvals as part of the Redline of Draft Plan of Subdivision process.

The approximately 16.67ha property is bound by a Locally Significant Wetland to the west, a commercial plaza at the south east corner, and multiple residential properties to the north, east and south. The drainage areas contributing to this stormwater management plan consist primarily of the subject lands, though incorporate surrounding residential areas that convey stormwater flows through the development lands. The receiving body of water for the proposed stormwater flows will be the Eagle Marsh Drain.

#### 1.2 Objectives

The objectives of this study are as follows:

- 1. Establish specific criteria for the management of stormwater from this site.
- 2. Determine the impact of development on the stormwater peak flow & volume from this site.
- 3. Investigate alternatives for controlling the quantity and quality of stormwater from this site.
- 4. Establish property requirements for the Stormwater Management Facility for the Draft Plan of Subdivision.



#### **1.3 Existing & Proposed Conditions**

#### a) Existing Conditions

Historically, the site has been used for agricultural purposes, though more recently has been vacant land. The approximately 16.67-hectare property includes 5.83 hectares of undevelopable lands along the western limits comprised of an existing Locally Significant Wetland. The proposed development is located within the upper reaches of the Eagle Marsh Drain drainage area, with the current actual drain upstream limit located approximately 500m south of the south-west corner of the site. The existing topography of the site generally directs flows to the south-east to the adjacent Locally Significant Wetland or Eagle Marsh Drain with all flows ultimately outletting to the Eagle Marsh Drain.

The majority of native soils within the study area have been characterized as imperfectly drained loam/clay loam Franktown Soils (hydrologic soil group CB) with bedrock located less than 1m below the surface. Within the south-western portion of the site, the soil transitions to a low permeability clay and silt resulting in the perched water necessary to create the Locally Significant Wetlands.

#### b) Proposed Conditions

Approximately 11.0 hectares of the site is proposed to be developed, consisting of 44 single family dwellings, 4 semi-detached units, 189 townhouse units, and a mixed-use commercial/residential block with 50 units, resulting in a total unit count of 287 units. The site shall be provided with full municipal services including sanitary sewers, storm sewers and watermain with asphalt pavement, concrete curbs and gutters. The proposed stormwater management plan discusses the proposed development under fully developed conditions.

The Northland Estates Subdivision development was previously draft approved with an associated Stormwater Management (SWM) Plan detailing the construction of a swale from the proposed SWM Facility to the current upstream limit of the Eagle Marsh Drain approximately 500m south of the south-east corner of the site providing a sufficient outlet. Since this approval, a design was set into motion by the City's Municipal Drain Engineering Consultant to extend the Eagle Marsh Drain from its' current upstream limit, through the rear yards of houses on Coronation Drive to the south-east corner of the site. It is expected that the Eagle Marsh Drain extension will be constructed prior to the development of the Northland Estates Subdivision and will therefore become the focus stormwater outlet for this development.

#### 2.0 STORMWATER MANAGEMENT CRITERIA

New developments are required to provide stormwater management in accordance with provincial and municipal policies including:

- Stormwater Quality Guidelines for New Development (MECP/MNRF, May 1991)
- Stormwater Management Planning and Design Manual (MECP, March 2003)

Based on the comments and outstanding policies from various agencies (City of Port Colborne, Regional Municipality of Niagara, Niagara Peninsula Conservation Authority (NPCA), and the Ministry of the Environment, Conservation and Parks (MECP), and others) the following site-specific considerations were identified:

- The receiving watercourse, Eagle Marsh Drain has been identified by the Ministry of Natural Resources watercourse evaluation as a **Type 2** (*Important*) fish habitat. Based on this fish habitat, the corresponding MECP level of protection for stormwater management <u>quality</u> practices on all new developments shall be *Normal*.
- The site outlets to the Eagle Marsh Drain which contains lands that would be negatively impacted by increased flooding levels, and, therefore, stormwater quantity control is considered necessary to maintain the downstream peak water elevations.

Based on the above policies and site specific considerations, the following stormwater management criteria have been established for this site.

- Stormwater **quality** controls are to be provided for the internal storm system of the development according to MECP guidelines. It is proposed to provide Normal Protection (70% TSS removal) to the stormwater before outletting to the Eagle Marsh Drain.
- Stormwater **quantity** controls are to be provided for the outlet to limit the proposed development peak flows from the 2, 5, 10, 25, 50, and 100 year storm events to existing peak flow levels

### 3.0 STORMWATER ANALYSIS

A stormwater analysis has been conducted by Upper Canada Consultants as part of the design of the Northland Estates development using the MIDUSS computer modelling program. A new stormwater analysis was conducted to represent the existing and future conditions to the Eagle Marsh Drain.

This program was selected because it is applicable to an urban drainage area like the study area, it is relatively easy to use and modify for the proposed drainage conditions and control facilities, and it readily allows for the use of design storm hyetographs for the various return periods being investigated. Copies of the current model output files are enclosed in Appendix B.

#### 3.1 Design Storms

Design storm hyetographs were developed using a Chicago distribution based on the Ministry of Transportations (MTO) Intensity-Duration-Frequency curves for the development area in Port Colborne. These curves were utilized due to the developments' proximity to West Side Road (Highway 58) and review requirements of the MTO. Hyetographs for the 25mm, 2, 5, 10, 25, 50 and 100 year events were developed using a 4-hour Chicago distribution. Table 1 summarizes the rainfall data.

### Stormwater Management Plan Northland Estates – City of Port Colborne

	Table 1	. Rainfall Data	
Design Storm	Chi	cago Distribution Paran	neters
(Return Period)	a	b	С
25mm	512.000	0.0	0.699
2 Year	397.149	0.0	0.699
5 Year	524.867	0.0	0.699
10 Year	608.845	0.0	0.699
25 Year	715.568	0.0	0.699
50 Year	794.298	0.0	0.699
100 Year	871.279	0.0	0.699
	Intensit	$xy  (mm/hr) = \frac{a}{(t_d + b)^c}$	

#### **3.2** Existing Conditions

The existing conditions were modelled to establish the stormwater peak flows and volumes prior to development within this site. The existing drainage areas for this subwatershed are shown on Figure 2 with a schematic depicting the modelling strategy detailed on Figure 4. This area was determined from field investigations and a combination of recent topographic surveys as well as topographic information gathered from the Niagara Peninsula Conservation Authority (NPCA).

Stormwater flows from the majority of the development site are conveyed southerly overland towards the natural gas easement under existing conditions shown by Drainage Area EX10. Flows from the rear of the adjacent commercial property (EX20) join and are directed through EX30 to the south-west corner of the development property (Outlet A). Stormwater flows from Drainage Area EX40 are conveyed through the wetland to EX50 and ultimately directed south to Outlet A, confluencing with the previously described drainage areas. Under existing conditions, stormwater flows are directed south from Outlet A to ultimately discharge to the Eagle Marsh Drain (Outlet B).

Input parameters for the computer model for the existing conditions are shown in Table 2. Table 3 details the stormwater peak flows and volumes generated by the various design storm events.

#### 3.3 Proposed Conditions

The future drainage areas for the proposed development, shown in Figure 3, were modelled to establish the stormwater peak flows and volumes once development has been completed at the proposed site.

It is proposed to construct and internal storm sewer system to collect peak flows from the proposed development, and discharge to a proposed Stormwater Management (SWM) Facility. The facility has been designed to accommodate potential future development north-east of the site fronting Barrick Road. Stormwater flows discharging from the SWM facility will outlet to a proposed channel conveying flows westerly through a channel within the existing natural gas easement to the south-west corner of the site (Outlet A) to the expected future upstream limit of the Eagle Marsh Drain. As stated previously, it is expected the Drain Extension will be completed prior to construction of this development.

Stormwater flows from the rear of lots 20 to 43 as part of Drainage Area A40 will outlet uncontrolled to the adjacent Locally Significant Wetland to maintain runoff volumes as required by the Water Balance Study (Terra-Dynamics, 2022). Stormwater flows directed southerly from the existing residential properties north of the site, fronting Barrick Road, will be captured and conveyed via swales and rear yard catch basins located on the proposed properties backing onto the Barrick road properties.

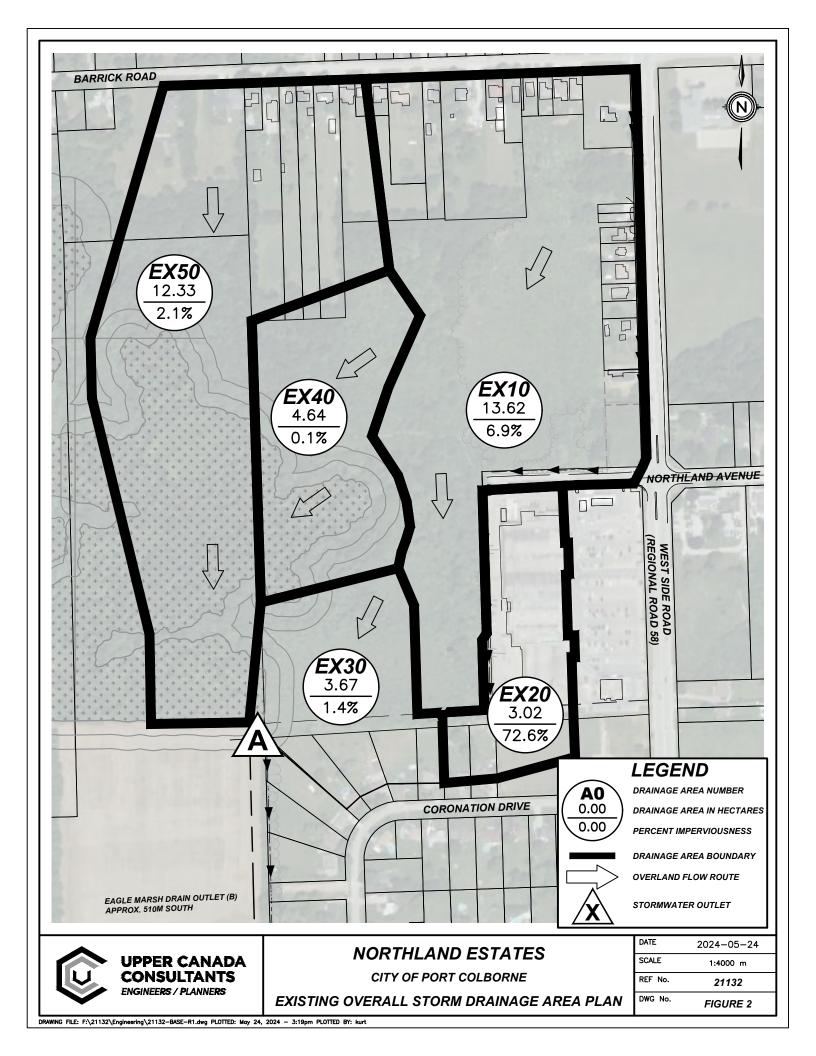
Input parameters for the computer model with the proposed development conditions are shown in Table 2. Impervious Calculations for existing conditions are included in Appendix A.

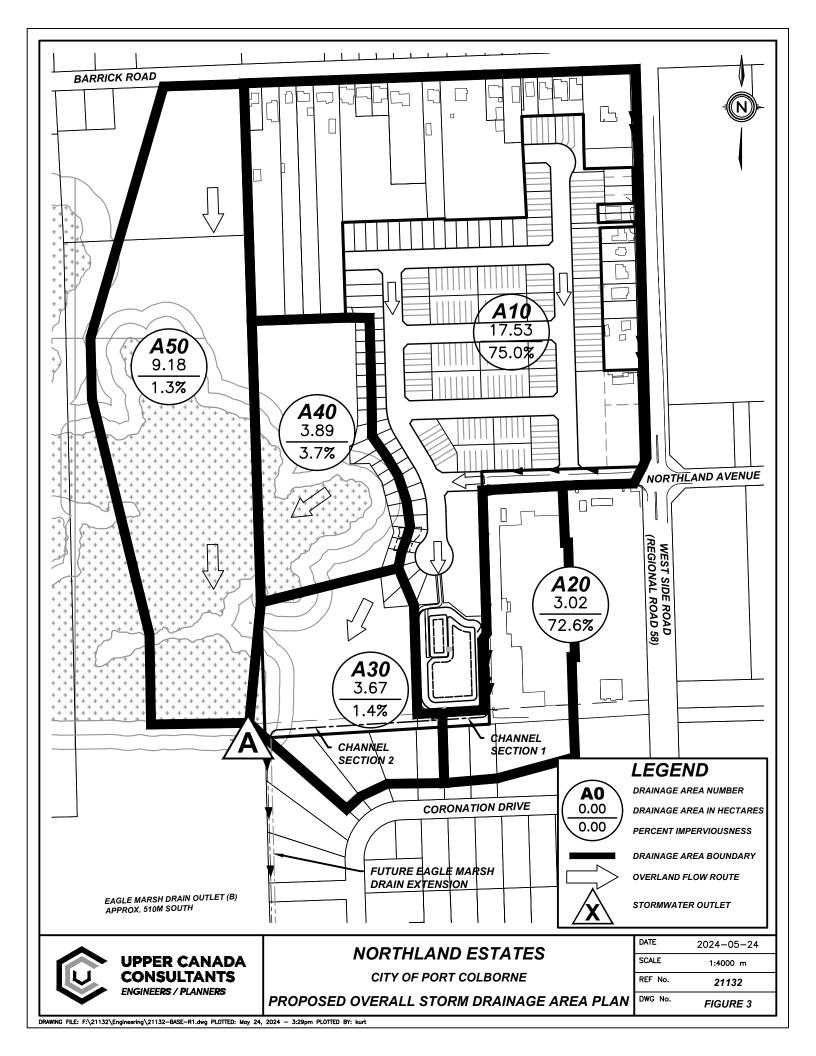
Table 2. Hydrologic Parameters								
Area No.	Area (ha)	Length (m)	Slope (%)	SCS CN	Percent Impervious			
Existing Conditions								
EX10	13.62	500	2.0	77	6.9			
EX20	3.02	100	0.5	77	72.6			
EX30	3.67	80	0.5	77	1.4			
EX40	4.64	100	0.5	77	0.1			
EX50	12.33	350	1.0	77	2.1			
	37.28	Total Area		·				
		Futi	are Conditions					
A10	17.99	500	1.0	77	75.0			
A20	3.02	100	0.5	77	72.6			
A30	3.21	80	0.5	77	1.6			
A40	3.89	100	0.5	77	3.7			
A50	9.18	350	1.0	77	1.3			
37.29 Total Area								

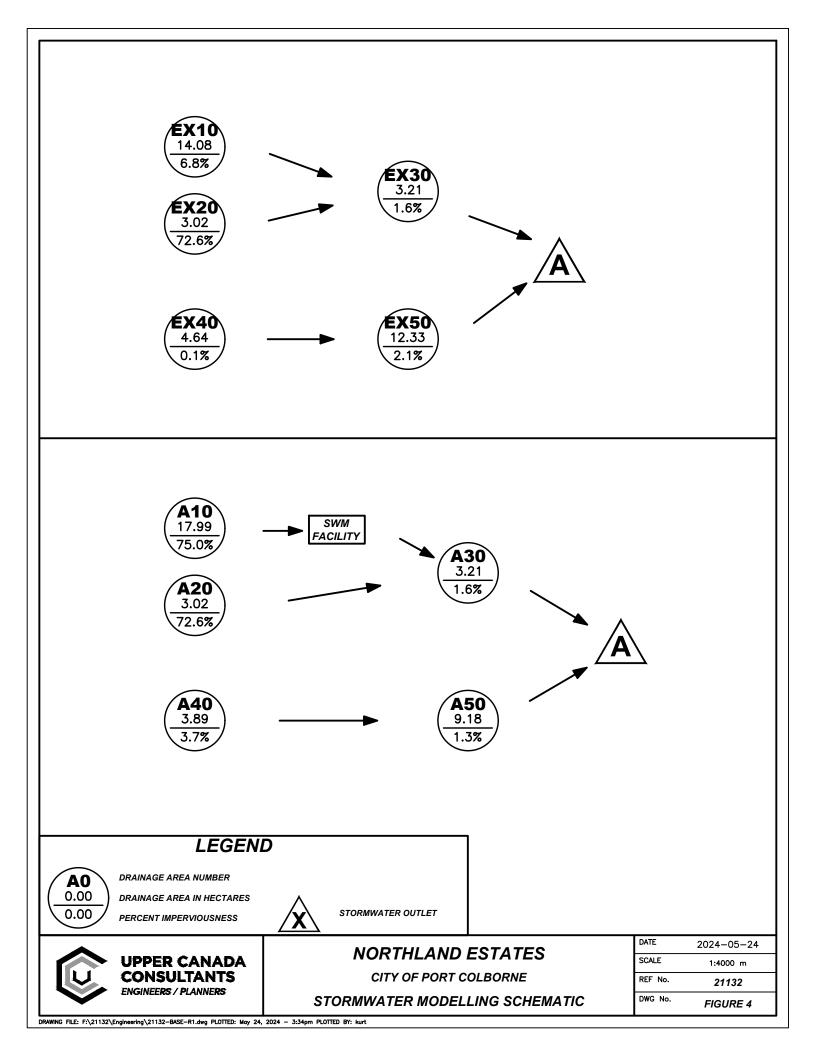
The results of the modelling are shown in Table 3, where the peak flows and runoff volumes were calculated for the 2, 5, 10, 25, 50 and 100 year design storm events.

Table 3.    Peak Flows and Volumes at Outlet A							
Design Storm	P	eak Flow (m	<sup>3</sup> /s)	Volume (m <sup>3</sup> )			
	Existing	Future*	Change	Existing	Future*	Change	
2 Year	0.327	1.588	+386%	3,364	6,093	+2,729	
5 Year	0.513	2.192	+327%	5,645	8,952	+3,307	
10 Year	0.668	2.682	+301%	7,329	11,015	+3,686	
25 Year	0.916	3.377	+269%	9,637	13,758	+4,121	
50 Year	1.168	3.900	+234%	11,443	15,825	+4,382	
100 Year	1.451	4.424	+205%	13,268	17,899	+4,631	
*Note: Future stormwater values depict conditions without stormwater quantity controls							

As seen above in Table 3, stormwater quantity controls are considered necessary for the proposed development since the peak flows and volumes outletting from the proposed development area increase as a result of the proposed development. The existing and future stormwater drainage areas shown on Figures 2 and 3 were used to assess the stormwater management plan for this study. Figure 4 outlines the stormwater schematic used to model the conditions for this development.







#### 4.0 STORMWATER MANAGEMENT ALTERNATIVES

#### 4.1 Screening of Stormwater Management Alternatives

A variety of stormwater management alternatives are available to control the quality of stormwater, most of which are described in the Stormwater Management Planning and Design Manual (MECP, March 2003). Alternatives for the proposed and ultimate developments were considered in the following broad categories: lot level, vegetative, infiltration, and end-of-pipe controls. General comments on each category are provided below. Individual alternatives for the proposed development are listed in Table 4 with comments on their effectiveness and applicability to the proposed outlet.

#### a) Lot Level Controls

Lot level controls are not generally suitable as the primary control facility for quality control. They are generally used to enhance stormwater quality in conjunction with other types of control facilities.

#### b) Vegetative Alternatives

Vegetative stormwater management practices are not generally suitable as the primary control facility for quality control. They are generally used to enhance stormwater quality in conjunction with other types of control facilities.

#### c) <u>Infiltration Alternatives</u>

Where soils are suitable, infiltration techniques can be very effective in providing quantity and quality control. However, the very small amount of surface area on this site dedicated to permeable surfaces such as greenspace and landscaping make this an impractical option. Therefore, infiltration techniques will not be considered for this development.

#### d) End-of-Pipe Alternatives

Surface storage techniques can be very effective in providing quality and quantity control. Dry facilities are effective practices for stormwater erosion and flood control for large drainage areas.

Wet facilities are effective practices for stormwater erosion, quality and quantity control for large drainage areas.

	Table 4. Evaluation of Stormwater Management Practices							
Criteria for Implementation of Stormwater Management Practices (SWMP)								
Northland Estates	Topography	Soils	Bedrock	Groundwater	Area	Technical	Recommend	
Site Conditions	Variable 1 to 3%	Clay Loam <12mm/hr	At Considerable Depth	At Considerable Depth	± 17.99ha	Effectiveness (10 high)	Implementation Yes / No	Comments
Lot Level Controls								
Lot Grading	<5%	nlc	nlc	nlc	nlc	2	Yes	Quality/quantity benefits
Roof Leaders to Surface	nlc	nlc	nlc	nlc	nlc	2	Yes	Quality/quantity benefits
Roof Ldrs.to Soakaway Pits	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 0.5 ha	6	No	Unsuitable site conditions
Sump Pump Fdtn. Drains	nlc	nlc	nlc	nlc	nlc	2	No	Unsuitable site conditions
Vegetative								
Grassed Swales	< 5 %	nlc	nlc	nlc	nlc	7	Yes	Quality/quantity benefits
Filter Strips(Veg. Buffer)	< 10 %	nlc	nlc	>.5m Below Bottom	< 2 ha	5	No	Unsuitable site conditions
Infiltration								
Infiltration Basins	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 5 ha	2	No	Unsuitable site conditions
Infiltration Trench	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 2 ha	4	No	Unsuitable site conditions
Rear Yard Infiltration	< 2.0 %	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	< 0.5 ha	7	No	Unsuitable site conditions
Perforated Pipes	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	nlc	4	No	Unsuitable site conditions
Pervious Catch basins	nlc	loam, infiltr. > 15 mm/hr	>1m Below Bottom	>1m Below Bottom	nlc	3	No	Unsuitable site conditions
Sand Filters	nlc	nlc	nlc	>.5m Below Bottom	< 5 ha	5	No	High maintenance/poor aesthetics
Surface Storage								
Dry Ponds	nlc	nlc	nlc	nlc	> 5 ha	7	No	No quality control
Wet Ponds	nlc	nlc	nlc	nlc	> 5 ha	9	Yes	Very effective quality control
Wetlands	nlc	nlc	nlc	nlc	> 5 ha	10	No	Very effective quality control
Other								
Oil/Grit Separator	nlc	nlc	nlc	nlc	<2 ha	3	No	Limited benefit/area too large

Reference: Stormwater Management Practices Planning and Design Manual - 1994 nlc - No Limiting Criteria

#### 4.2 Selection of Stormwater Management Alternatives

Stormwater management alternatives were screened based on technical effectiveness, physical suitability for this site, and their ability to meet the stormwater management criteria established for proposed and future development areas. The following stormwater management alternatives are recommended for implementation on the proposed development:

- Lot grading to be kept as flat as practical, while remaining consistent with municipal standards, in order to slow down stormwater and encourage infiltration.
- **Roof leaders to be discharged to the ground surface** in order to slow down stormwater and encourage infiltration.
- **Grassed swales** to be used to collect rear lot drainage. Grassed swales tend to filter sediments and slow down the rate of stormwater.
- A wet pond facility to be constructed to provide stormwater quality enhancement for frequent storms.

#### 5.0 STORMWATER MANAGEMENT PLAN

A MIDUSS model was created to assess existing, future and ultimate development peak flows and stormwater volumes generated by the proposed subdivision. The stormwater management facility was sized according to MECP Guidelines (MECP, March 2003) as follows:

#### 5.1 Proposed Stormwater Management Facility

#### 5.1.1 Stormwater Quality

The stormwater drainage outlet for the proposed development is the Eagle Marsh Drain, which has been identified by the Ministry of Natural Resources watercourse evaluation as a **Type 2** fish habitat. Based on this fish habitat, the corresponding MECP level of protection for stormwater management <u>quality</u> practices on all new developments shall be *Normal* (70% TSS removal). Based on Table 3.2 of SWMP & Design Manual, the water quality storage requirement is approximately 136.7m<sup>3</sup>/ha for *Normal* protection for developments with 75% impervious areas. The drainage area requiring stormwater quality improvement draining to the proposed facility is 17.99 hectares. The storage volumes required for this proposed facility are shown in Table 5.

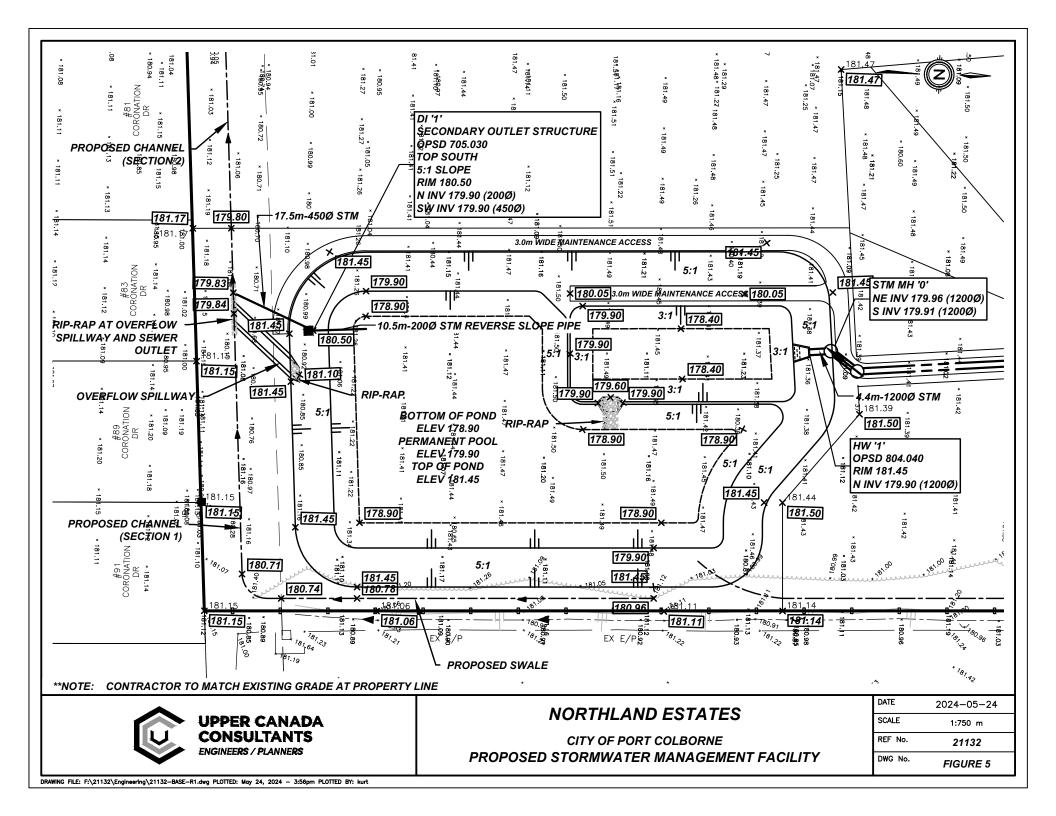


Table 5.         Stormwater Quality Volume Calculations						
Total Water Quality Volume= 17.53 ha x 136.7 m³/haReference: Table 3.2, SWMP & Design= 2,396.4 m³Manual (MECP 2003) $\rightarrow$ 5,588.0 m³ (provided)						
Permanent Pool Volume = 17.53 ha x 96.7 m <sup>3</sup> /ha = 1,695.2 m <sup>3</sup> $\rightarrow$ 2,745 m <sup>3</sup> (provided)	Extended Detention Volume = 17.53 ha x 40 m <sup>3</sup> /ha = 701.2 m <sup>3</sup> $\rightarrow$ 2,843 m <sup>3</sup> (provided)					

### 5.1.3 Stormwater Quantity Control

As shown in the previous Table 3, stormwater management quantity controls are required to reduce the peak flows from the development area to existing conditions up to and including the 100-year design storm event. The stormwater peak flows from the proposed development shall be reduced to existing levels by providing stormwater quantity storage. It is proposed to construct a control structure outlet to reduce the peak stormwater flows discharging from the proposed facility.

### 5.1.4 Stormwater Management Facility Configuration

As seen on the Proposed Stormwater Management Facility detail (Figure 5), the layout of the stormwater management facility is providing a single sewer outlet to a proposed ditch immediately south of the proposed SWM facility. The ditch will convey flows west through the natural gas easement to the future Eagle Marsh Drain outlet (Outlet A) at the southwest corner of the site.

It is proposed to construct a three-stage outlet for the stormwater management facility as shown in Figure 5. The first stage of control consists of a reverse slope pipe acting as a 200mm diameter orifice to provide the required quality controls. The second stage of control consists of a ditch inlet catch basin and outlet pipe which provides an outlet for flows exceeding the extended detention volume. An emergency spillway will provide an outlet for flows exceeding the capacity of the ditch inlet catch basin and outlet pipe.

The proposed effective bottom elevation of the facility is 178.90m, and the permanent pool water level is 179.90m for a water depth of 1.0 metres. The configuration of the facility provides  $2,745m^3$  of permanent pool volume, which is more than the required  $1,695m^3$ . The proposed top of pond is at an elevation of 181.45m which provides a total active volume of  $8,479m^3$ . As stated previously, it is known that the bedrock elevation is quite close (+/- 1.0m) to the surface. It is expected that a considerable amount of rock excavation will be necessary to provide the depths required for the stormwater quality and quantity controls.

Based on the configuration of the proposed facility, the 200mm diameter quality orifice shall provide 24.2 hours (24 hrs is MECP minimum) of detention during the 25mm design storm event. The rim elevation for the proposed ditch inlet chamber is 180.50m and will provide an extended detention volume of 2,842m<sup>3</sup>, which is more than the required 701m<sup>3</sup>.

The outflow pipe from the stormwater management facility is to be 450mm in diameter and will convey the stormwater flows from the ditch inlet to the proposed channel ultimately conveying flows to the Eagle Marsh Drain. The emergency overflow spillway will be constructed at an elevation of 181.10m with a base width of 2.0m and side slopes of 2:1 to the top of the facility. A stage-storage-discharge relationship was determined for the facility and is included in Appendix A for reference purposes.

The proposed on-site storm sewer system will convey stormwater flows up to and including the 5-year design storm event directly to the stormwater management facility. During extreme storm events greater than the 5-year event, overland flows from the development area shall be directed to the proposed stormwater management facility. The storm sewer system will be design to convey stormwater flows from the development site as well as the expected future development area to the north-east. As well, stormwater flows from the private condo development at the north-west corner of the intersection of Northland Avenue and West Side Road will discharge stormwater flows directly to the Subdivision storm sewer system without the need for quantity or quality controls.

Table 6 summarizes the peak inflows and outflows for the stormwater management facility along with corresponding pond elevations. Based on the MIDUSS model, Table 6 shows the maximum wet pond elevation of 181.15m, and an active storage volume of 6,580m<sup>3</sup> for the 100-year design storm event. This will provide a freeboard of 0.30m during the 100 year design storm event.

Table 6. Stormwater Management Wet Pond Facility Characteristics						
Design	P	eak Flows (L/	Maximum	Maximum		
Storm		Fut	ture	Elevation (m)	Volume (m <sup>3</sup> )	
(Return Period)	Existing	Inflow	Outflow			
25mm	84	924	48	180.36	2,183	
2 Year	129	1,646	87	180.56	3,185	
5 Year	191	2,324	155	180.73	4,113	
10 Year	238	2,767	203	180.85	4,769	
25 Year	304	3,322	281	180.99	5,590	
50 Year	397	3,762	342	181.09	6,171	
100 Year	484	4,115	468	181.15	6,580	

As seen in Table 6 above, the proposed stormwater management facility will restrict flows from the proposed development area to existing storm levels up to and including the 100-year design storm event.

Table 7 details the difference in peak stormwater flows for existing and future conditions with the constructed and operational stormwater management facility.

Table 7.	Impacts of Wet Po	ond Facility on Peak Flows	at Outlet A			
		Peak Flow (m <sup>3</sup> /s)				
Design Storm	Existing	Future with SWM	Change*			
2 Year	0.327	0.285	-12.8%			
5 Year	0.513	0.431	-15.4%			
10 Year	0.668	0.559	-16.3%			
25 Year	0.916	0.757	-17.4%			
50 Year	1.168	0.957	-18.1%			
100 Year	1.451	1.182	-18.5%			
	<b>Note:</b> *indicates the percent change between existing conditions and future conditions with stormwater management controls in place.					

As shown in Table 7 above, peak stormwater flows discharging from the proposed development site to Outlet A at the south-west corner will ultimately be reduced as a result of the proposed development plan during all storm events.

The proposed facility has a single storm sewer inlet, therefore, the sediment forebay was designed to minimize the transport of heavy sediment from the storm sewer outlet throughout the facility and to localize maintenance activities. Calculations for the forebay sizing follow MECP Guidelines and are shown in Tables 8 for the storm sewer outlet.

Table 8.         Stormwater Management Facility Forebay Sizing				
a) Forebay Settling Length (MOI	ECC SWM	IP&D, E	quation 4	4.5)
	r =	3.5	:1	(Length:Width Ratio)
Settling Length = $\sqrt{\frac{r * Q_p}{V_s}}$	$Q_p =$	0.048	m <sup>3</sup> /s	(25mm Storm Pond Discharge)
N S	$V_s =$	0.0003	m/s	(Settling Velocity)
Settling Length = <b>23.66</b>				
b) Dispersion Length (MOECC S	SWMP&D	, Equatic	on 4.6)	
				(5 Yr Stm Sew Design Inflow)
$Dispersion \ Length = \frac{8 * Q}{D * V_f}$	D =	1.50	m	(Depth of Forebay)
				(Desired Velocity)
Dispersion Length = 24.79	m			
c) Minimum Forebay Deep Zone	Bottom W	/idth (M	OECC S	WMP&D, Equation 4.7)
Dian anairm I an ath	Minimun	n Foreba	y Lengtł	n from Equations 3.3 and 3.4
$Width = \frac{Dispersion \ Length}{8}$		24.79	m	(minimum required length)
Width = <b>3.10</b>	<b>m</b> (minir	num requ	uired wi	dth)
d) Average Velocity of Flow				
	Q =	0.924	m <sup>3</sup> /s	(Quality Design Inflow)
0	A =	21.75	$m^2$	(Cross Sectional Area)
Average Velocity = $\frac{Q}{A}$	D =	1.50	m	(Depth of Forebay)
А	$\mathbf{W} =$	10.00	m	(Proposed Bottom Width)
	<b>S</b> =	3	:1	(Side slopes - minimum)
Average Velocity = 0.04	m/s			
Is this Acceptable? Yes	(Maxi	mum vel	locity of	flow = 0.15 m/s)
e) Cleanout Frequency				
Is this Acceptable? Yes	L =	35.0	m	(Proposed Bottom Length)
	ASL =	3.13	m <sup>3</sup> /ha	(Annual Sediment Loading)
	A =	17.58	ha	(Drainage Area)
	FRC =	70	%	(Facility Removal Efficiency)
	FV =	889.50	$m^3$	(Forebay Volume)
Cleanout Frequency = <b>11.3</b>	years			
Is this Acceptable? Yes				(10 year minimum cleanout frequency)

### 5.1.5 Proposed Channel

As part of the proposed stormwater management plan, a channel will be constructed to provide an outlet for stormwater flows discharged from the stormwater management facility and surrounding lands. The proposed channel will begin at the south-east corner of the site, providing an outlet for stormwater flows discharging from the adjacent commercial property (287 West Side Road) and surrounding residential lands (Drainage Area A20). The channel will continue west within the existing natural gas easement to the south-west corner of the development and discharge to the future upstream Eagle Marsh Drain limit (Outlet A) at the south-west corner of the site.

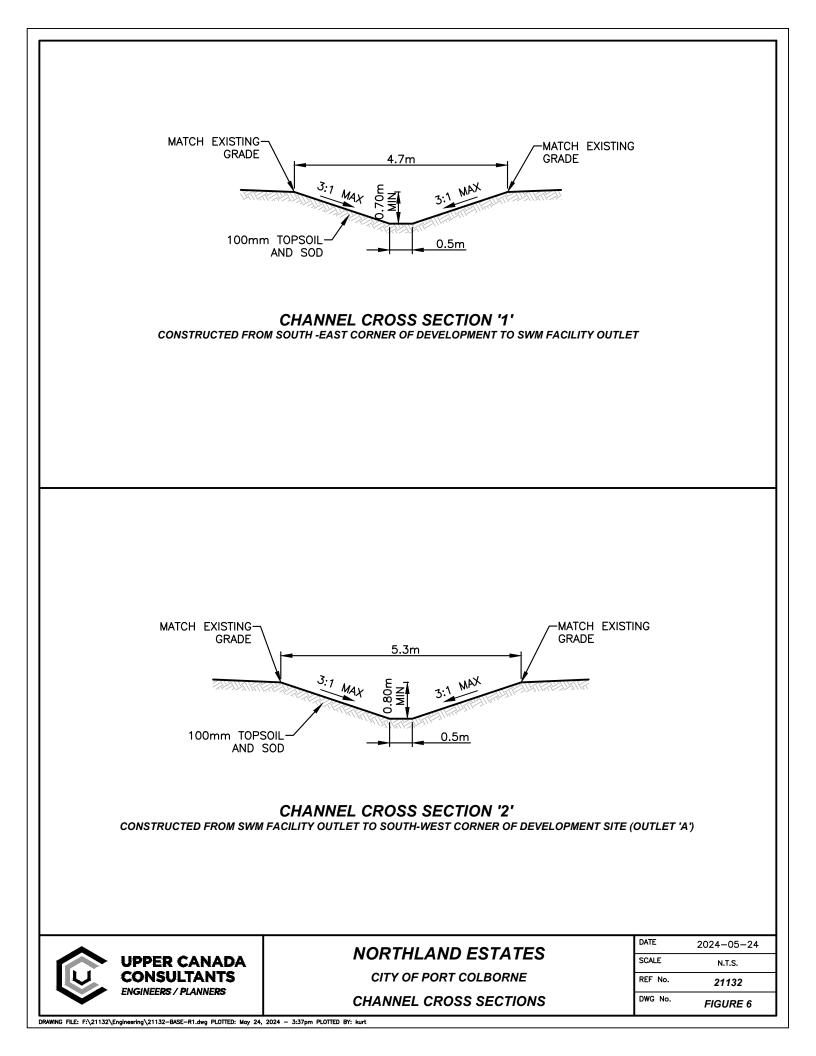
As part of the stormwater analysis of this development, the channel has been modelled using the MIDUSS computer modelling program to have capacity for flows up to and including the 100-year design storm event. The channel has been modelled in three sections as follows:

- 1. Start of channel at south-east corner of development to proposed stormwater management facility outlet.
- 2. SWM facility outlet to south-west corner (Outlet A) of development property.

The modelled sections of the channel have been noted on the Proposed Overall Storm Drainage Area Plan (Figure 3) included previously on Page 9 of this report. The channel modelling was incorporated into the overall development MIDUSS stormwater management model and utilizes input parameters noted previously in the report.

The proposed channel has been modelled to have capacity for stormwater flows from the proposed development and surrounding lands for storm events up to and including the 100-year design storm event. Table 10 below details the stormwater characteristics of the proposed channel conveying stormwater flows from upstream of the SWM facility outlet to the Eagle Marsh Drain during the 100-year design storm event. It is proposed to construct a channel with dimensions and side slopes as detailed in Table 10. Cross sections of the proposed channel have been included on the next page.

Table 9. Channel Characteristics							
Channel Section	Length (m)	Base Width (m)	Slope (%)	Side Slopes	Minimum Proposed Channel Depth (m)	Peak Flow Rate (m <sup>3</sup> /s)	100-Year Peak Flow Depth (m)
1 – Start	50	0.5	0.30	3:1	0.70m	0.694	0.64
2 - End	200	0.5	0.20	3:1	0.80m	0.843	0.76



### 6.0 SEDIMENT AND EROSION CONTROL

Sediment and erosion controls are required during all construction phases of this development to limit the transport of sediment into the adjacent Locally Significant Wetland as well as the Eagle Marsh Drain.

The following additional erosion and sediment controls will also be implemented during construction:

- Install silt control fencing along the limits of construction of the development to collect sediment in overland flows before discharging to downstream systems. The silt control fence installed along east end of site will be installed along the wetland buffer to act as the limit of construction.
- Re-vegetate disturbed areas as soon as possible after grading works have been completed.
- Lot grading and siltation controls plans will be provided with sediment and erosion control measures to the appropriate agencies for approval during the final design stage.

### 7.0 STORMWATER MANAGEMENT FACILITY MAINTENANCE

#### 7.1 Wetpond Facility

Maintenance is a necessary and important aspect of urban stormwater quality and quantity measures such as constructed wetlands. Many pollutants (ie. nutrients, metals, bacteria, etc.) bind to sediment and therefore removal of sediment on a scheduled basis is required.

The wet pond for this development is subject to frequent wetting and deposition of sediments as a result of frequent low intensity storm events. The purpose of the wet pond is to improve post development sediment and contaminant loadings by detaining the 'first flush' flow for a 24 hour period. For the initial operation period of the stormwater management facility, the required frequency of maintenance is not definitively known and many of the maintenance tasks will be performed on an 'as required' basis. For example, during the home construction phase of the development there will be a greater potential for increased maintenance frequency, which depends on the effectiveness of sediment and erosion control techniques employed.

Inspections of the wet pond will indicate whether or not maintenance is required. Inspections should be made after every significant storm during the first two years of operation or until all development is completed to ensure the wet pond is functioning properly. This may translate into an average of six inspections per year. Once all building activity is finalized, inspections shall be performed annually. The following points should be addressed during inspections of the facility.

- a) Standing water above the inlet storm sewer invert a day or more after a storm may indicate a blockage in the reverse slope pipe or orifice. The blockage may be caused by trash or sediment and a visual inspection would be required to determine the cause.
- b) The vegetation around the wet pond should be inspected to ensure its function and aesthetics. Visual inspections will indicate whether replacement of plantings are required. A decline in vegetation habitat may indicate that other aspects of the constructed wet pond are operating improperly, such as the detention times may be inadequate or excessive.
- c) The accumulation of sediment and debris at the wet pond inlet sediment forebay or around the high water line of the wet pond should be inspected. This will indicate the need for sediment removal or debris clean up.
- d) The wet pond has been created by excavating a detention area. The integrity of the embankments should be periodically checked to ensure that it remains watertight and the side slopes have not sloughed.

Grass cutting is a maintenance activity that is done solely for aesthetic purposes. It is recommended that grass cutting be eliminated. It should be noted that municipal by-laws may require regular grass maintenance for weed control.

Trash removal is an integral part of maintenance and an annual cleanup, usually in the spring, is a minimum requirement. After this, trash removal is performed as required basis on observation of trash build-up during inspections.

To ensure long term effectiveness, the sediment that accumulates in the forebay area should be removed periodically to ensure that sediment in not deposited throughout the facility. For sediment removal operations, typical grading/excavating equipment should be used to remove sediment from the inlet forebay and detention areas. Care should be taken to ensure that limited damage occurs to existing vegetation and habitat.

Generally, the sediment which is removed from the detention pond will not be contaminated to the point that it would be classified as hazardous waste. However, the sediment should be tested to determine the disposal options.

### 8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this study, the following conclusions are offered:

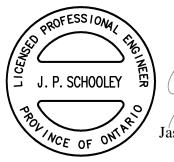
- Infiltration techniques are not suitable for this site as the primary control facility due to the low soil infiltration rates and the large drainage area for this development.
- The proposed stormwater management facilities will provide stormwater quality and quantity controls for the approximately 17.99-hectare catchment area.
- The proposed channel will convey stormwater flows from the proposed stormwater management facility and surrounding lands directly to the Eagle Marsh Drain.
- Various lot level vegetative stormwater management practices can be implemented to enhance stormwater quality.
- This report was prepared in accordance with the provincial guidelines contained in "Stormwater Management Planning and Design Manual, March 2003".

The above conclusions lead to the following recommendations:

- That the stormwater management criteria established in this report be accepted.
- That a stormwater management wet pond facility be constructed to provide stormwater quality protection to MECP *Normal* Protection levels and quantity controls as outlined in this report.
- That additional lot level controls and vegetative stormwater management practices as described previously in this report be implemented.

Prepared By:

Kurt Tiessen, E.I.T.



Reviewed By:

Jason Schooley, P.Eng. Revised May 24, 2024

# APPENDICES

### **APPENDIX A**

Weighted Impervious Calculation Sheet Stormwater Management Facility Calculations

Weighted Impervio	usness Percentage Calo	culation Workshee	t
Project Name:	Northland Estates		
Project Number:	21132		
Date:	May 2024		
Person:	K. Tiessen E.I.T		
EX10 - EXISTING CONDITIONS			
	Footprint	% Impervious	Effective Impervious Area
Residential Dwellings	5108.1 m <sup>2</sup>	100.0% ea	5108.1 m <sup>2</sup>
Open Space	129385.9 m <sup>2</sup>	2% ea	2587.7 m <sup>2</sup>
Northland Roadway	1731.0 m <sup>2</sup>	100% ea	1731.0 m <sup>2</sup>
Northand Roadway	1731.0 11	100 <i>%</i> ea	1751.0 11
TOTAL CATCHMENT IMPERVIOUS AREAS			9,427 m <sup>2</sup>
TOTAL CATCHMENT AREA			136,225 m <sup>2</sup>
	EFFECTIVE WEIGHTED CAT		6.9 %
		RUNOFF COEFFICIENT	0.25
EX30 - EXISTING CONDITIONS	Footprint	% Impervious	Effective Impervious Area
	$100.4$ $^{2}$	100.0%	$400 4^2$
Residential Dwellings	468.4 m <sup>2</sup>	100.0% ea	468.4 m <sup>2</sup>
Open Space	36193.6 m <sup>2</sup>	0% ea	36.2 m <sup>2</sup>
TOTAL CATCHMENT IMPERVIOUS AREAS			505 m <sup>2</sup>
TOTAL CATCHMENT AREA			36,662 m <sup>2</sup>
	EFFECTIVE WEIGHTED CAT	CHMENT % IMPERVIOUS RUNOFF COEFFICIENT	1.4 % 0.21
EX50 - EXISTING CONDITIONS	Footprint	% Impervious	Effective Impervious Area
	os 40 z 2	100.0%	oc to z <sup>2</sup>
Residential Dwellings	2519.7 m <sup>2</sup>	100.0% ea	2519.7 m <sup>2</sup>
Open Space	120794.5 m <sup>2</sup>	0% ea	120.8 m <sup>2</sup>
TOTAL CATCHMENT IMPERVIOUS AREAS			2,640 m <sup>2</sup>
TOTAL CATCHMENT AREA			123,314 m <sup>2</sup>
	EFFECTIVE WEIGHTED CAT	CHMENT % IMPERVIOUS RUNOFF COEFFICIENT	2.1 % 0.21
EX20/A20 - EXISTING/FUTURE CONDITIONS	Footprint	% Impervious	Effective Impervious Area
Residential Dwellings	265.2 m <sup>2</sup>	100.0% ea	265.2 m <sup>2</sup>
Commercial Area	21633.8 m <sup>2</sup>	100.0% ea	21633.8 m <sup>2</sup>
	_		_
Open Space	8284.3 m <sup>2</sup>	0% ea	8.3 m <sup>2</sup>
TOTAL CATCHMENT IMPERVIOUS AREAS			21,907 m <sup>2</sup>
TOTAL CATCHMENT AREA			30,183 m <sup>2</sup>
	EFFECTIVE WEIGHTED CAT	CHMENT % IMPERVIOUS RUNOFF COEFFICIENT	72.6 % 0.71

A30 - FUTURE CONDITIONS			
	Footprint	% Impervious	Effective Impervious Area
Residential Dwellings	468.4 m <sup>2</sup>	100.0% ea	468.4 m <sup>2</sup>
Open Space	36193.6 m <sup>2</sup>	0% ea	36.2 m <sup>2</sup>
TOTAL CATCHMENT IMPERVIOUS AREAS			505 m <sup>2</sup>
TOTAL CATCHMENT AREA			36,662 m <sup>2</sup>
	EFFECTIVE WEIGHTED CATCH	MENT % IMPERVIOUS	
A40 - FUTURE CONDITIONS			-
	Footprint	% Impervious	Effective Impervious Area
Future Single Residential	4968.4 m <sup>2</sup>	28.6% ea	1421.0 m <sup>2</sup>
Open Space	33977.2 m <sup>2</sup>	0% ea	34.0 m <sup>2</sup>
TOTAL CATCHMENT IMPERVIOUS AREAS			1,455 m <sup>2</sup>
TOTAL CATCHMENT AREA			38,946 m <sup>2</sup>
	EFFECTIVE WEIGHTED CATCH	MENT % IMPERVIOUS	
A50 - FUTURE CONDITIONS	F		0.23
	Footprint	% Impervious	Effective Impervious Area
Existing Residential Dwellings	1079.7 m <sup>2</sup>	100.0% ea	1079.7 m <sup>2</sup>
Open Space	90692.0 m <sup>2</sup>	0% ea	90.7 m <sup>2</sup>
TOTAL CATCHMENT IMPERVIOUS AREAS			1,170 m <sup>2</sup>
TOTAL CATCHMENT AREA			91,772 m <sup>2</sup>
	EFFECTIVE WEIGHTED CATCH	MENT % IMPERVIOUS	1.3 %
	F	RUNOFF COEFFICIENT	0.21

Upper Canada Consultants 30 HANNOVER DRIVE, UNIT 3 St. Catharines, Ontario L2W 1A3 PROJECT NAME: NORTHLAND ESTATES PROJECT NO.: 21132

#### STORMWATER MANAGEMENT FACILITY WETPOND

**DATE: MAY 2024** 

Quality Requirements Drainage Area (ha) = 17.53			Quality Or meter (m) =			Ditch Inlet ength (m) =		Dia	Outflow Pip meter (m) =		Minor	Overflow S Length (m) =		
0	$(m^3/ha) = 1$		(@ 75% Imp)	Cd =			Width $(m) =$		DR	Cd =			lopes $(X:1) =$	
	ol (m <sup>3</sup> /ha) = $9$			Invert (m) =			ope (X:1) =			Invert (m) =			Invert $(m) =$	
	$1 \text{ Vol } (\text{m}^3) = 1$			mvert (m)	179.90		vation (m) =			Overt $(m) =$		WIIIO	mvert (m)	101.10
	ive Vol (m <sup>3</sup> ) $(m^3)$					Infet Ele		1.84		oven (iii) –	180.50			
	MOEE $(m^3)$		m <sup>3</sup>				Cu	1.04		MOE Ea	uation 4.11 Dra	wdown Coef	ficient 'C?' =	1,6
	Pool Elev. $=$		m							MOE Eq	uation 4.11 Dra uation 4.11 Dra OE Equation 4	wdown Coef	ficient 'C3' =	
Elevation	Increment Depth	Active Depth	Surface Area (m <sup>2</sup> )	Average Surface Area (m <sup>2</sup> )	Increment Volume (m <sup>3</sup> )	Permanent Volume (m <sup>3</sup> )	Active Volume (m <sup>3</sup> )	Quality Orifice (m <sup>3</sup> /s)	Ditch Inlet (m <sup>3</sup> /s)	Max Pipe Orifice (m <sup>3</sup> /s)	Overflow Spillway (m <sup>3</sup> /s)	Total Outflow (m <sup>3</sup> /s)	Average Discharge (m <sup>3</sup> /s)	Average Drawdow Time
178.90	(m)	(m) -1.00	2,147	(m)	(m)	(m) 0	(m)	(m /s)	(m /s)	(m /s)	(m /s)	(m /s)	(m /s)	(hr)
	0.50	-0.50	*	2,440	1,220	Ũ								
179.40	0.50		2,733	3,050	1,525	1,220								
179.90	0.00	0.00	3,368	3,809	0	2,745								
179.90	0.60	0.00	4,251	4,738	2,843		0.0	0.000	0.000	0.00	0.00	0.000	0.031	
180.50	0.40	0.60	5,225	5,519	2,208		2842.9	0.062	0.000	0.249	0.000	0.062	0.143	25.65
180.90	0.20	1.00	5,813	5,964	1,193		5050.5	0.084	0.140	0.382	0.000	0.224	0.287	29.95
181.10	0.15	1.20	6,116	6,231	935		6243.3	0.093	0.257	0.433	0.000	0.350	0.514	31.11
181.25		1.35	6,347	,			7177.9	0.100	0.359	0.468	0.220	0.678		31.61
181.45	0.20	1.55	6,661	6,504	1,301		8478.7	0.107	0.511	0.511	0.888	1.399	1.038	31.96

3. Overflow Weir flow is calculated using a trapezondial weir to convey outflow for less frequent storms through the embankment with an emergency spillway.

4. Total Outflow is calculated by adding the Overflow Spillway with the lowest of Quality Orifice plus Ditch Inlet or Max Pipe Orifice.

## APPENDIX B MIDUSS Output Files

#### **Existing Conditions**

Output File (4.7) EX.OUT opened 2024-05-24 14:20 Units used are defined by G = 9.810 Units used are defined by G = 9.810 24 144 10.000 are MAXDT MAXHYD & DTMIN values Licensee: UPPER CANADA CONSULTANTS 35 COMMENT line(s) of comment F line(s) of comment PROJECT NAME: NORTHLAND ESTATES, PORT COLBORNE PROJECT NO.: 21132 STORMWATER MANAGEMENT ANALYSIS MAY 2022 EXISTING CONDITIONS 14 START 1=Zero; 2=Define 1 35 \*\* 25mm DESIGN STORM EVENT \*\* 2 STORM l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Constant b (min) Exponent c 512.000 6.000 .800 Fraction to peak r Duration ó 240 min 25.036 mm Total depth IOUS 400 240.000 IMPERVIOUS З .013 98.000 .100 .518 CATCHMENT 4 CATCHN 20.000 3.020 100.000 .500 72.600 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Per Cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; Z=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Taitiol Networkiem 100.000 .000 . 250 .100 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 202 000 000 000 c.m/s 130 .797 .614 C perv/imperv/total 1 .202 .130 .797 .614 C p ADD RINOFF .202 .202 .000 . HYDROGRAPH DISPLAY 5 is # of Hysto/Hydrograph chosen Volume = .4636960E+03 c.m CHANNEL 15 .000 c.m/s 27 11 Base Width . 500 .500 Base Width = 10.000 Left bank slope 1: 10.000 Right bank slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .326 metres Velocity = .164 m/sec Flow Capacity = .130 metres ROUTE 10.000 ROUTE Conduit Length 50.000 .000 Conduit Length .000 Supply X-factor <.5. .369 Supply K-lag (sec) .808 Beta weighting factor .000 Routing timestep 1 No. of sub-reaches .202 .202 .179 OMPINE .000 228 369 .808 .000 c.m/s 17 .179 c.m/s 14 4 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 2.000 6.900 .000 .250 Manning "n" SCS Curve No or C 77.000 000 SCS Curve No or C 00 Ia/S Coefficient 10 Taila Abstraction 1 Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv .084 .000 .179 .179 c.m/s .130 .804 .177 C perv/imperv/total D PUNDRE .100 7.587 15 ADD RUNOFF .179 084 .179 c.m/s 084 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .6027209E+03 c.m 27 ROUTE Conduit Length .000 000 Conduit Length 500 Supply X-factor <.5 500 Supply K-lag (sec) 500 Beta weighting factor 500 Routing timestep 1 No. of sub-reaches .084 .084 .084 .500 .000 600.000 .179 c.m/s COMBINE 1 Junction Node No. 17 .084 .084 .094 CONFLUENCE 1 JUNCIAN NOde No. .084 .263 .084 CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .084 .084 .263 c.m/s .084 18 .000 c.m/s

%Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C .000 . 250 77.000 .100 Ia/S Coefficient 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .010 .263 .084 .000 c.m/s .130 .785 .139 C perv/imperv/total 15 ADD RUNOFF .010 .269 .084 .000 c.m/s 11 CHANNEL CHANNEL .500 Base Width = ).000 Left bank slope 1: ).000 Right bank slope 1: .060 Manning's "n" .000 O/a Depth in metres .100 Select Grade in % 10 000 10.000 Depth = .366 metres Velocity = .177 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .148 metres ROUTE 200.000 Conduit Length .135 9 200.000 Conduit Length .135 Supply X-factor <.5 849.757 Supply K-lag (sec) .500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .010 .269 .193 17 COMBINE 2 Junction Node No. .010 .269 .193 14 STRT .000 c.m/s 14 × .193 c.m/s START 1=Zero; 2=Define 1 l=Zero; Z=Deline CATCHMENT 40.000 ID No.ó 99999 4 4.640 Area in hectares 100.000 Length (PERV) metres Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp.with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .500 100.000 . 250 Manning "n" SCS Curve No or C Ia/S Coefficient 77.000 .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .011 .000 .193 .193 c.m/s .130 .797 .131 C perv/imperv/total 15 ADD RUNOFF .100 .011 .193 .193 c.m/s .011 CATCHMENT 4 50.000 12.330 350.000 1.000 ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 2.100 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .024 .011 .193 .193 c.m/s .130 .803 .144 C perv/imperv/total INOFF 350.000 Length (IMPERV) .000 250 77.000 .100 7.587 1 .024 15 .193 c.m/s 9 Conduit Length .000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .024 .029 .029 WE .500 000 500 600.000 1 .193 c.m/s .024 .029 .029 . COMBINE 2 Junction Node No. .024 .029 .029 . CONFLUENCE 2 Junction Node No. .024 .214 .029 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1786801E+04 c.m STAPT 17 2 .214 c.m/s 18 .000 c.m/s 27 14 START 1=Zero; 2=Define 1 COMMENT 3 line(s) of comment 35 \*\* 2 YEAR DESIGN STORM EVENT \*\* 2 STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a Constant b (min) Exponent c Fraction to peak r 397.149 .000 .699 .400 240.000 Duration ó 240 min 34.453 mm Total depth 3 IMPERVIOUS NUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient .013 98.000 .100 Initial Abstraction 4 CATCHMENT CATCHM 20.000 3.020 100.000 .500 72.600 ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 100.000 Length (IMPERV) Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient

77.000 .100

 
 Initial Abstraction

 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv

 .275
 .000
 .029
 .000 c.m/s

 .204
 .828
 .657
 C perv/imperv/total
 7.587 15 ADD RUNOFF .029 .275 .000 c.m/s .275 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .6835738E+03 c.m CHANNEL 27 CHANNEL .500 Base Width = 10.000 Left bank slope 1: 10.000 Right bank slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .369 metres Velocity = .178 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .150 metres .150 metres ROUTE 50.000 .000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) 211.250 211.250 Supply K-lag (sec) .842 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .275 .275 .257 COMBINE .257 .000 c.m/s .275 .275 .257 COMBINE 1 Junction Node No. .275 .275 .257 START 17 .257 c.m/s 14 1=Zero; 2=Define 1 l l=2erc. CATCHMENT -^ 000 ID No.ó 99999 -> hectar 4 10.000 13.620 500.000 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 2.000 6.900 500.000 Length (IMPERV) .000 .250 77.000 .100 7.587 Initial Abstraction /.5% Initial Abstraction
1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
.129 .000 .257 .257 c.m/s
.204 .847 .248 C perv/imperv/total
ADD RUNOFF
.129 .129 .257 .257 c.m/s
HYDROGRAPH DISPLAY
5 is # of Hyeto/Hydrograph chosen
Volume = 116471EF04 c = 116471EF04 c = 1 15 27 Volume = .1164711E+04 c.m 9 ROUTE ROUTE .000 Conduit Length .500 Supply X-factor <.5 .000 Supply K-lag (sec) .500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .129 .129 .129 .129 .257 c.m/s COMBINE 1 Junction Node No. .129 .129 .129 CONFLUENCE 17 .386 c.m/s 18 CONFLUENCE Junction Node No. 129 .386 .129 1 .000 c.m/s .129 .300 CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) \*Tmm. with Zero Dpth .129 .386 4 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient .000 . 250 77.000 .100 7.587 Initial Abstraction 15 11 Base Width .500 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % 10.000 .060 .100 Depth = .428 metres = .195 m/sec Velocity Velocity = .195 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .177 metres ROUTE 200.000 Conduit Length .077 Supply X-factor <.5 Supply K-lag (sec) 
 769.853
 Supply K-lag (sec)

 .500
 Beta weighting factor

 600.000
 Routing timestep

 1
 No. of sub-reaches

 .025
 .399

 COMBINE
 .025

 2
 Junction Node No.

 .025
 .399

 .025
 .399
 .000 c.m/s .025 .399 START .284 c.m/s 14 1=Zero; 2=Define L 1=Zero. CATCHMENT 40 000 ID No.ó 99999 - bectare 4 40.000 4.640 Area in hectares Length (PERV) metres 100.000 Gradient (%) Per cent Impervious Length (IMPERV) .500 .100 100 000 Length (IMPERV) %Inp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C .000 77.000

Ia/S Coefficient Initial .100 7.587 .100 IA/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .028 .000 .284 .284 c.m/s .204 .828 .205 C perv/imperv/total 15 ADD RUNOFF .028 .284 .284 c.m/s .028 CATCHMENT 4 50.000 12.330 ID No.ó 99999 Area in hectares Length (PERV) metres 350.000 Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp.with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 1.000 2.100 350 000 .000 . 250 Manning "n" SCS Curve No or C Ia/S Coefficient 77.000 .100 iars coefficient Initial Abstraction Option l=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .051 .028 .284 .284 c.m/s .204 .848 .217 C perv/imperv/total mean 15 ADD RUNOFF .284 .051 .078 .284 c.m/s 9 ROUTE Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .000 .000 600.000 1 .078 .051 .078 .284 c.m/s 17 COMBINE COMBINE 2 Junction Node No. .051 .078 CONFLUENCE .078 .327 c.m/s 18 CONFLUENCE 2 Junction Node No. .051 .327 .078 HYDROGRAPH DISPLAY .000 c.m/s 27 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .3363599E+04 c.m START 1 l=Zero; 2=Define COMMENT 3 line(s) of comment 14 35 \*\* 5 YEAR DESIGN STORM EVENT \*\* 2 STORM 1=Chicago; 2=Huff; 3=User; 4=Cdn1hr; 5=Historic 1 524.867 Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 45.533 mm Total depth IOUS .000 .699 400 240.000 3 Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction 98.000 .100 .518 .... CATCHMENT 20 000 ID No.ó 99999 in hecta: 20.000 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) .500 72.600 100.000 .000 Graufel (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" SCS Curve No or C Ia/S Coefficient 77.000 100 Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .364 .000 .078 .000 c.m/s .278 .869 .707 C perv/imperv/total UNNOFF 7.587 15 ADD RUNOFF .364 .078 .000 c.m/s .364 .354 .554 .078 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .9720645E+03 c.m CHANNEL 27 CTANNEL - .9,20045E+U3 C.M CTANNEL .500 Base Width = 10.000 Left bank slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .413 metres Velocity = .191 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .170 metres ROUTE 11 .170 metres ROUTE 50.000 .000 196.842 
 ROUTE

 50.000
 Conduit Length

 .000
 Supply X-factor <.5</td>

 196.842
 Supply K-lag (sec)

 .873
 Beta weighting factor

 600.000
 Routing timestep

 1
 No. of sub-paraboto
 9 1 No. of sub-reaches .364 .364 .3 .350 .000 c.m/s .350 c.m/s 1 1=Zero; 2=Define CATCHMENT 10.000 ID No.ó 99999 1 4 CATCHN 10.000 13.620 500.000 2.000 6.900 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning 'n' SCS Curve No or C La/S Coefficient Initial Abstraction 500.000 .000 250 77.000 .100

Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .191 .000 .350 .350 c.m/s .278 .884 .320 C perv/imperv/total 1 ADD RUNOFF 15 .191 .350 .350 c.m/s .191 .191 .191 .350 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1982292E+04 c.m ROUTE 27 Conduit Length .000 
 .vvv
 Conduit Length

 .500
 Supply X-fag (sec)

 .500
 Beta weighting factor

 .500
 Beta weighting factor

 .000
 Routing timestep

 1
 No. of sub-reaches

 .191
 .191

 .0MEINE
 .500 .000 600.000 .350 c.m/s .191 .191 COMBINE Junction Node No. 17 . .191 .191 .191 CONFLUENCE .541 c.m/s 18 
 CONFLUENCE

 1
 Junction Node No.

 .191
 .541
 .191

 CATCHMENT
 30.000
 ID No.6 99999
 3.670
 Area in hectares

 80.000
 Length (PERV) metres
 Condiant (%)
 Condiant (%)
 Condiant (%)
 .000 c.m/s 4 Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .500 1.400 80.000 .000 . 250 Manning "n" ) Manning "n" 0 SCS Curve No or C 1 Ia/S Coefficient 7 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .059 .541 .191 .000 c.m/s .278 .877 .286 C perv/imperv/total propose 77.000 .100 7.587 1 15 ADD RUNOFF .570 .191 .000 c.m/s .059 CHANNEL 11 Base Width = Left bank slope 1: Right bank slope 1: . 500 10.000 10.000 Right Dank Slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .493 metres Velocity = .213 m/sec Flow Capacity = .531 c.m/s Critical depth = .208 metres POUTUPE ROUTE Conduit Length 200.000 200.000 Conduit Length .016 Supply K-factor <.5 703.815 Supply K-lag (sec) .500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .059 .570 .414 COMBINE .000 c.m/s 17 COMBINE OMBINE Junction Node No. 059.570.414 , anctic .059 START 1 . 570 .414 c.m/s 14 START 1 =Zero; 2=Define CATCHMENT 40.000 ID No.6 99999 4.640 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) .100 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CM/C/ 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 4 100.000 .000 Option 1=SCS CM/C7 2=HORION, S=Green-AmpL7 4=Repeat Manning "n" O SCS Curve No or C ) Ia/S Coefficient 7 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .069 .000 .414 .414 c.m/s .278 .869 .278 C perv/imperv/total propage .250 77 000 .100 15 ADD RUNOFF .069 .414 .414 c.m/s .069 4 CATCHMENT 50.000 12.330 350.000 ID No.ó 99999 Area in hectares Length (PERV) metres 1.000 2.100 Gradient (%) Per cent Impervious Length (IMPERV) 350.000 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS (N/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C .000 . 250 77.000 .100 Ia/S Coefficient 7.587 Initial Abstraction Option l=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .119 .069 .414 .414 c.m/s .278 .884 .291 C perv/imperv/total 1 15 ADD RUNOFF .119 ROUTE .178 .414 .414 c.m/s 9 Conduit Length .000 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep .500 .000 .500 1 No. of suc \_ .119 .178 No. of sub-reaches .414 c.m/s .178 COMBINE 2 Junction Node No. .119 .178 CONFLUENCE 2 Junction Node No. .119 .513 17 .513 c.m/s .178 18 .178 .000 c.m/s .119 .513 HYDROGRAPH DISPLAY 27 5 is # of Hyeto/Hydrograph chosen Volume = .5645400E+04 c.m START 1 1=Zero; 2=Define 14 COMMENT 3 line(s) of comment 35

\*\*\*\*\* \*\* 10 YEAR DESIGN STORM EVENT \*\* STORM 2 1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic I=Chicago/2=HUT/3=USEY/ Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 52.818 mm Total depth COUS 608.845 .000 .400 240.000 3 IMPERVIOUS OUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction .013 98.000 .100 .518 .518 ..... CATCHMENT ?^ 000 ID No.ó 99999 in hecta: 4 20.000 ID No.5 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 3.020 100.000 .500 72.600 100.000 SImp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .000 1 Option 1-SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
 Manning "n"
 SCS Curve No or C
 Initial Abstraction
 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
 .442 .000 .178 .000 c.m/s
 .320 .887 .732 C perv/imperv/total .250 .250 77.000 .100 7.587 15 ADD RUNOFF ADD RUNOFF .442 .442 .178 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1167105E+04 c.m CHANNEL .442 .178 .000 c.m/s 27 11 Base Width .500 
 .500
 Base Width
 =

 10.000
 Left bank slope 1:
 1

 10.000
 Right bank slope 1:
 1

 .060
 Manning's \*n\*
 1

 1.000
 O/a Depth in metres
 1

 .000
 Select Grade in %
 Depth

 Depth
 =
 .446 metres

 Velocity
 =
 .200 m/sec
 10.000 10.000 velocity = .200 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .186 metres ROUTE 50.000 Conduit Length 9 .000 187.592 Supply X-factor <.5 Supply K-lag (sec) .894 600.000 1 .000 c.m/s 17 1 .411 c.m/s 14 1=Zero; 2=Define 1 1 1=2010. CATCHMENT '^ 000 ID No.6 99999 - 'n hectau 4 13.620 Area in hectares Length (PERV) metres 500.000 2.000 6.900 Gradient (%) Per cent Impervious Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS (NV/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning \*\* SCS Curve No or C 500.000 .250 77.000 Ia/S Coefficient .100 Initial Abstraction 15 .238 .411 .411 c.m/s .238 .238 HYDROGRAPH DISPLAY 27 is # of Hyeto/Hydrograph chosen ume = .2587458E+04 c.m Volume ROUTE .000 .500 9 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor .000 .500 Routing timestep No. of sub-reaches .238 .238 . 600.000 1 .238 .411 c.m/s .238 .255 COMBINE 1 Junction Node No. .238 .238 .238 17 1 .649 c.m/s CONFLUENCE 18 
 CONFLUENCE

 1
 Junction Node No.

 .238
 .649
 .238

 CATCHMENT
 30.000
 ID No.6 99999

 3.670
 Area in hectares

 00.000
 IO No.6 (STREAD)
 1 .000 c.m/s 4 80.000 Length (PERV) metres .500 Gradient (%) Per cent Impervious Per Cent Impervious
Length (IMPERV)
%Imp. with Zero Dpth
Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 80.000 . 250 Manning "n" SCS Curve No or C 77.000 .100 Ta/S Coefficient 7 587 Initial Abstraction 

 Initial Abstraction

 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv

 .093
 .649
 .238
 .000 c.m/s

 .320
 .893
 .328
 C perv/imperv/total

 15 ADD RUNOFF .695 .238 .000 c.m/s .093 11 CHANNEL Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres 500 .500 10.000 10.000

.060

.100 Select Grade in % Liou Select Grade in % Depth = .533 metres Velocity = .224 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .227 metre 3.531 c.m/s .227 metres ROUTE 
 ROUTE

 200.000
 Conduit Length

 .000
 Supply X-factor <.5</td>

 669.769
 Supply K-lag (sec)

 .524
 Beta weighting factor

 600.000
 Routing timestep

 1
 No. of sub-reaches

 .093
 .695
 .511

 COMBINE
 COMBINE
 .000 c.m/s 17 2 Junction Node No. .093 .695 .511 .511 c.m/s START COMBINE 14 START 1 1=Zero; 2=Define CATCHMENT 4 ID No.ó 99999 40.000 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 4.640 100.000 .100 100.000 Length (IMPERV) %tmp.with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv 101 .000 .511 .511 c.m/s 320 .887 .320 C perv/imperv/total OFF Length (IMPERV) .000 250 .250 77.000 .100 7.587 1 .101 .320 ADD RUNOFF .101 .101 CATCHMENT 50.000 ID No.6 99999 15 .101 .511 .511 c.m/s 4 50.000 12.330 Area in hectares Area in nectares Length (PERV) metres Gradient (%) Per cent impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Mervine 4 350.000 1.000 2.100 350.000 .000 .250 Manning "n" Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .181 .101 .511 c.m/s .320 .898 .332 C perv/imperv/total PINNARE 77.000 100 7.587 .181 .269 .511 .511 c.m/s ROUTE 15 9 ROUTE .000 Conduit Length .500 Supply X-factor <.5 .000 Supply X-factor <.5 .500 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .181 .269 .269 COMBINE .269 .511 c.m/s COMBINE 2 Junction Node No. .181 .269 .269 CONFLUENCE 17 .668 c.m/s CONFLUENCE Junction Node No. .181 .668 .269 .000 c.m/s 18 .181 .668 .269 .0 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .7329000E+04 c.m 27 14 START 1=Zero; 2=Define 1 COMMENT 3 line(s) of comment 35 \*\* 25 YEAR DESIGN STORM EVENT \*\* STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic 1 l=Ch1cago;2=Hu1f;3=User; Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 62.077 mm Total depth COUS 715.568 .000 400 240.000 IMPERVIOUS 3 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .013 Manning "n" 98.000 SCS Curve No or C .100 Ia/S Coefficient .518 Initial Abstraction CATCHMENT 20.000 ID No.6 99999 3.020 Area in hectares 100.000 Length (PERV) metres .500 Gradient (%) 72.600 Per cent Impervious 100.000 Length (IMPERV) .000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n" 1 .013 100.000 .500 72.600 . 250 Manning "n" SCS Curve No or C 77.000 0 SCS Curve No or C 0 Ia/S Coefficient 7 Initial Abstraction 0ption 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .543 .000 .269 .000 c.m/s .367 .905 .757 C perv/imperv/total .100 1 15 ADD RUNOFF .543 .269 .000 c.m/s 543 .543 .543 .269 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1419536E+04 c.m CHANNEL 27 11 Base Width = .500 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres Select Grade in % = .484 metres 10.000 .060 .100 Depth

Velocity = .211 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .204 metres 9 ROUTE Conduit Length 50.000 
 000
 Conduit Length

 000
 Supply X-factor <.5</td>

 126
 Supply K-lag (sec)

 916
 Beta weighting factor

 000
 Routing timestep

 1
 No. of sub-reaches

 .543
 .543

 .543
 .485
 .000 178.126 .916 .000 c.m/s 17 COMBINE Junction Node No. 1 1 Junction Node No. .543 .543 START 1 1=Zero; 2=Define CATCHMENT 10.000 ID No.ó 99999 .485 485 c m/s 14 4 10.000 13.620 Area in hectares Length (PERV) metres 500.000 Length (PERV) metres Gradient (\$) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 2.000 6.900 500.000 .000 .250 Manning "n" 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option I=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .304 .000 .485 .485 c.m/s .367 .911 .404 C perv/imperv/total 15 ADD RUNOFF 304 204 107 .250 Manning "n" .304 .485 .485 c.m/s . 304 .304 .304 .485 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .3418805E+04 c.m 27 ROUTE Conduit Length .000 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .500 .000 500 600.000 1 No. of Suc -.304 .304 .304 .485 c.m/s .302 COMBINE 1 Junction Node No. .304 .304 .304 .789 c.m/s 17 1 Junction Node No. .304 .304 .304 .789 c.m/s CONFLURCE 1 Junction Node No. .304 .789 .304 .000 c.m/s CATCHMENT 30.000 ID No.6 99999 3.670 Area in hectares 80.000 Length (PERV) metres .500 Gradient (%) 1.400 Per cent Impervious 80.000 Length (IMPERV) .000 %Imp.with Zero Dpth 1 Option 1=SCS CN/c; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n\* 1 18 4 .250 Manning "n" Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .137 .789 .304 .000 c.m/s .367 .908 .374 C perv/imperv/total Dupore 77.000 100 7.587 1 15 ADD RUNOFF .865 .304 .000 c.m/s .137 11 CHANNEL Base Width = Left bank slope 1: Right bank slope 1: .500 10.000 10.000 Right bank slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .580 metres Velocity = .237 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .250 metre POUTF .250 metres 9 ROUTE 200.000 Conduit Length .000 Supply X-factor <.5 634.232 Supply K-lag (sec) .570 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches ROUTE 1 No. of sub-reaches .137 .865 .6 .651 17 C 2 .000 c.m/s 2 Junction Node No. .137 .865 .651 COMBINE .651 c.m/s 14 START 1 1=Zero; 2=Define CATCHMENT 40.000 ID No.6 99999 4 40.000 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 4.640 4.640 100.000 .500 .100 100.000 .000 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampl; 4=repeat Manning "n" SCS Curve No or C IA/S Coefficient 7 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .162 .000 .651 .651 c.m/s .367 C perv/imperv/total RINOFF .250 77.000 .100 7.587 1 15 ADD RUNOFF .. .16∠ CATCHMENT ^^ ∩00 ID No.ó 99999 - in hecta: .162 .651 .651 c.m/s 4 50.000 12.330 350.000 Area in hectares Length (PERV) metres Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=2CS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" 1.000 2.100 350.000 .000

.250

SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr: 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 70 .162 .651 .651 c.m/s 67 .911 .378 C perv/imperv/total 77.000 .100 1 .270 .270 .162 .367 .911 15 ADD RUNOFF ...NOFF . 270 ROUTE 9 Conduit Length .000 Conduit Length 50 Supply X-factor <.5 500 Beta weighting factor 500 Routing timestep 1 No. of sub-reaches .270 .404 .404 MBINE .500 .000 500 600 000 .651 c.m/s COMBINE 2 Junction Node No. 17 2 . . 404 .270 .404 CONFLUENCE .916 c.m/s 18 CONFLUENCE 2 Junction Node No. .270 .916 .404 HYDROGRAPH DISPLAY .000 c.m/s 27 5 is # of Hyeto/Hydrograph chosen Volume = .9636599E+04 c.m 14 START 1=Zero; 2=Define COMMENT 3 line(s) of comment 35 \*\* 50 YEAR DESIGN STORM EVENT \*\* 2 STORM 1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic l=Chicago;2=Huff;3=User;4 Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 68.907 mm Total depth COUS 794 298 .000 .400 240.000 З IMPERVIOUS JUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction .013 98.000 .100 .518 ... CATCHMENT ` 000 ID No.ó 99999 ` hecta: .518 20 000 20.000 3.020 100.000 .500 72.600 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 100.000 Length (IMPERV) Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C In/S Coefficient Initial Abstraction Initial Abstraction .000 .250 77.000 .100 7.587 15 27 11 CHANNEL Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres .500 .000 10.000 .060 1.000 1.000 O/a Depth in metres .100 Select Grade in % Depth = .509 metres Velocity = .218 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .216 metres ROUTE Conduit Length 50.000 50.000 Conduit Length .000 Supply K-factor <.5 172.375 Supply K-lag (sec) .930 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .619 .619 .539 COMBINE .000 c.m/s 17 COMBINE OMBINE Junction Node No. 619 .619 .539 1 .539 c.m/s 14 START 1 =Zero; 2=Define CATCHMENT 10.000 ID No.6 99999 4 10.000 13.620 Area in hectares Length (PERV) metres 500.000 Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat 2.000 6.900 500.000 .000 .250 Manning "n" SCS Curve No or C Ia/S Coefficient 77.000 .100 Jays Coerricient
 Initial Abstraction
 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
 .397
 .000
 .539
 .539 c.m/s
 .398
 .918
 .434
 C perv/imperv/total 7.587 1 15 ADD RUNOFF .397 .539 .539 c.m/s . 397 27 HYDROGRAPH DISPLAY Volume = .4069199E+04 c.m 9 ROUTE Conduit Length .000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .397 .397 .397 .500 .000 500 600.000 1 .539 c.m/s 17 COMBINE

Junction Node No. 1 . 397 CONFLUENCE .397 .397 .898 c.m/s 18 1 Junction Node No. .898 .397 .000 c.m/s .397 CATCHMENT 4 30.000 3.670 80.000 ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) .500 1.400 Per cent Impervious Length (IMPERV) 80.000 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS (N/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning \*\* SCS Curve No or C Ia/S Coefficient Initial Abstraction Drion 1=Friend's 2=Destangle; 2=CMM UVD; 4=Lin Pro-Drion 1=Friend's 2=Destangle; 2=Destangle; 2=CMM UVD; 4=Lin Pro-Drion 1=Friend's 2=Destangle; 2= .000 1 .250 77.000 .100 7.587 Initial ADSTRACTION Option 1=Triangl; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 173 .898 .397 .000 c.m/s .397 .916 .404 C perv/imperv/total .173 ADD RUNOFF .173 15 .000 c.m/s 1.001 .397 11 CHANNEL CHANNEL .500 Base Width = 10.000 Left bank slope 1: 10.000 Right bank slope 1: .060 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .614 metres Velocity = .245 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .266 metres ROUTE 10.000 10.000 .060 1.000 .100 Depth .266 metres ROUTE 200.000 .000 611.414 9 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor .600 600.000 Routing timestep No. of sub-reaches 73 1.001 . 1 .173 .767 .000 c.m/s COMBINE 2 Junction Node No. .173 1.001 .767 START 17 2 .767 c.m/s 14 1=Zero; 2=Define 1 4 CATCHMENT ID No.ó 99999 Area in hectares Length (PERV) metres 40.000 4.640 100.000 .500 Gradient (%) Per cent Impervious .100 Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient ender: Comparison C 100.000 .000 .250 77.000 .100 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .206 .000 .767 .767 c.m/s .397 .913 .398 C perv/imperv/total 15 ADD RUNOFF .206 .767 .767 c.m/s .206 .206 .206 .767 .767 c.m/s MENT ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning \*n\* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .357 .206 .767 .767 c.m/s .398 .918 .409 C perv/imperv/total KUNOPF CATCHMENT 4 CATCHM 50.000 12.330 350.000 1.000 2.100 350.000 .000 1 250 .250 77.000 .100 7.587 1 15 ADD RUNOFF .523 .767 .357 767 c m/s ROUTE 9 Conduit Length .000 .500 conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches .357 .523 .523 NE .000 .500 600.000 1 .523 .767 c.m/s .357 ... COMBINE 2 Junction Node No. 357 .523 .523 1.168 c.m/s 17 18 CONFLUENCE 2 Junction Node No. .357 1.168 .523 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1143120E+05 c.m .000 c.m/s 27 14 START 1=Zero; 2=Define 1 L=Ze COMMENT 35 \*\* 100 YEAR DESIGN STORM EVENT \*\* 2 STORM 1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic Coefficient a Constant b (min) Exponent c Fraction to peak r 871 279 .000 400 240.000 Duration ó 240 min 75.585 mm Total depth 3 IMPERVIOUS UUS Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning \*n\* SCS Curve No or C Ia/S Coefficient Initial Abstraction 1 013 98.000 .100

CATCHMENT 4 20.000 3.020 100.000 ID No.ó 99999 Area in hectares Length (PERV) metres Cengun (PRKV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Lo(C decidiaiant .500 72.600 100.000 .000 250 77.000 .100 Ia/S Coefficient Ja/S Coerricient
 Initial Abstraction
 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
 .694
 .000
 .523
 .000 c.m/s
 .425
 .921
 .785
 C perv/imperv/total 7.587 1 ADD RUNOFF 15 .694 .523 .000 c.m/s .694 .694 .024 .225 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1792627E+04 c.m 27 5 18 # Volume = CHANNEL .500 10.000 Base Width = .500 Base Width = 10.000 Left bank slope 1: 10.000 Right bank slope 1: .660 Manning's "n" 1.000 O/a Depth in metres .100 Select Grade in % Depth = .532 metres Velocity = .224 m/sec Flow Capacity = 3.531 c.m/s Critical depth = .227 metres ROUTE 9 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 04 604 501 50.000 .000 .943 600.000 1 .694 .694 .591 .000 c.m/s 17 COMBINE COMBINE 1 Junction Node No. .694 .694 .591 START 1 1-Zero; 2=Define CATCHMENT 0.000 ID No.6 99999 1 .591 c.m/s 14 1 4 CATCHM 10.000 13.620 500.000 2.000 6.900 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) Per cent Impervious
Length (IMPERV)
% Imp. with Zero Dpth
Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat
Manning "n"
SCS Curve No or C
Ia/S Coefficient
Initial Abstraction
Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
.484 .000 .591 .591 c.m/s
.425 .922 .459 C perv/imperv/total
RUNOFF 500.000 .000 250 .250 77.000 .100 7.587 1 15 ADD RUNOFF ADD RUNOFF .484 .484 .591 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .4729494E+04 c.m .591 c.m/s 27 9 ROUTE Conduit Length .000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 500 .000 .500 600.000 1 No. of sub-reaches .484 .484 .484 .591 c.m/s 17 COMBINE COMBINE Junction Node No. .484 .484 .484 CONFLUENCE 1.003 c.m/s 18 ONFLUENCE Junction Node No. .484 1.003 .484 .000 c.m/s .484 1.003 CATCHMENT 4 ID No.ó 99999 30.000 3.670 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin, Re 3.670 80.000 .500 1.400 80.000 .000 250 .250 77.000 .100 7.587 Option l=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 1.003 .484 .000 c.m/s .425 .922 .432 C perv/imperv/total 1 .210 1.003 .494 .210 1.137 .484 .210 1.137 .484 CHANNEL .500 Base Width = 10.000 Left bank slope 1: .060 Manning's 'n." 1.000 O/a Depth in metres .100 Select Grade in % Depth = .646 metres Velocity = .253 m/sec Flow Capacity = .281 metres ROUTE 15 .000 c.m/s 11 ROUTE 200.000 .000 592.153 Conduit Length Supply X-factor <.5 Supply K-lag (sec)

.626 Beta weighting factor 600.000 Routing timestep 1 No. of sub-reaches .210 1.137 .891 .891 .000 c.m/s 17 COMBINE Junction Node No. 2 Juncti .210 START 1 1.137 .891 .891 c.m/s 14 START 1 1=Zero; 2=Define CATCHMENT 40.000 ID No.ó 99999 4 640 brog in bostor 4 4.640 Area in hectares 4.640 100.000 .500 .100 100.000 .000 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Hornign : 4=Repeat .250 Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 77.000 .100 .252 .000 .891 .891 c.m/s .425 .921 .425 C perv/imperv/total 15 ADD RUNOFF .252 .891 .891 c.m/s .252 CATCHMENT 50.000 ID No.ó 99999 - in hectar .252 4 50.000 12.330 350.000 Area in hectares Length (PERV) metres 1.000 Gradient (%) Per cent Impervious 2.100 Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS (N/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Iso(6 Confficient 350.000 .000 . 250 77.000 .100 IA/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .437 .252 .891 .891 c.m/s .425 .922 .436 C perv/imperv/total ADD RUNOFF .437 .545 .000 ...... .100 Ia/S Coefficient 15 .437 ROUTE .645 .891 .891 c.m/s 9 Conduit Length .000 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep .000 .500 600.000 1 No. of sub-reaches .437 .645 . .645 .645 .891 c.m/s .437 .645 COMBINE 2 Junction Node No. .437 .645 CONFLUENCE 2 Junction Node No. .437 .1.451 17 2 .645 1.451 c.m/s 18 \_ Junction Node No. .437 1.451 .645 . HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1326780E+05 c.m MANUAL 2 .000 c.m/s 27 20

#### **Developed Conditions – NO SWM**

)ev	eloped	Condition	s - N	O SWM ed 2024-05-24 15:09 810	
	Output F Units us	ile (4.7) NOSWM.OU ed are defined by	T open G = 9.	ed 2024-05-24 15:09 810	
	24	144 10.000	are M	AXDT MAXHYD & DTMIN va	lues
35	Licensee COMMENT	: UPPER CANADA CON	SULTANTS		
	3 lin	e(s) of comment			
	PROJECT I	NAME: NORTHLAND ES NO.: 21132	TATES		
14		CONDITIONS WITH S	WM		
14	START 1 1=Z	ero; 2=Define			
35	COMMENT				
		e(s) of comment ****************	****		
		R DESIGN STORM EVE			
2	STORM				
	1 397.149	l=Chicago;2=Huff Coefficient a	;3=User;4	=Cdnlhr;5=Historic	
	.000	Constant b (	min)		
	.699	Exponent c Fraction to peak	r		
	240.000	Duration ó 240	min		
3	IMPERVIO		al depth		
	1	Option 1=SCS CN/	C; 2=Hort	on; 3=Green-Ampt; 4=Re	apeat
	.013 98.000	Manning "n" SCS Curve No or	с		
	.100	Ia/S Coefficient			
4	.518 CATCHMEN	Initial Abstract T	lon		
	20.000	ID No.ó 99999			
	3.020 100.000	Area in hectares Length (PERV) me	tres		
	.500	Gradient (%) Per cent Impervi			
	100.000	Length (IMPERV)			
	.000	%Imp. with Zero : Option 1=SCS_CN/		on; 3=Green-Ampt; 4=Re	eneat
	.250	Manning "n"		on, s-orcen mape, r-ne	.peac
	77.000 .100	SCS Curve No or Ia/S Coefficient	С		
	7.587	Initial Abstract	ion		
	1	Option l=Triangl 275 .000		anglr; 3=SWM HYD; 4=Li .000 c.m/s	.n. Reserv
15	.:	204 .828	.657	C perv/imperv/total	
15	ADD RUNO	275 .275	.025	.000 c.m/s	
27		PH DISPLAY # of Hyeto/Hydrogr	anh shasa		
	Volume	= .6835738E+03 c.	m		
11	CHANNEL .500	Base Width =			
	3.000	Left bank slope	1:		
	3.000	Right bank slope Manning's "n"	1:		
	1.500	0/a Depth in met			
	.300 Depth	Select Grade in = .433	* metres		
	Velocity Flow Cap	= .353 acity = 5.657	m/sec		
	Critical	depth = .211	metres		
9	ROUTE 50.000	Conduit Length			
	.000	Supply X-factor	<.5		
	106.220	Supply K-lag (se Beta weighting f	c) actor		
	200.000	Routing timestep			
	1	No. of sub-reach 275 .275	es .270	.000 c.m/s	
17	COMBINE				
		ction Node No. 275 .275	.270	.270 c.m/s	
14	START 1 1=Z	ero; 2=Define			
4	CATCHMEN	Г			
	10.000	ID No.ó 99999 Area in hectares			
	500.000	Length (PERV) me	tres		
	1.000 75.000	Gradient (%) Per cent Impervi	0115		
	500.000	Length (IMPERV)			
	.000	%Imp. with Zero : Option 1=SCS CN/		on; 3=Green-Ampt; 4=Re	epeat
	. 250	Manning "n"		· · · · · · ·	
	77.000 .100	SCS Curve No or Ia/S Coefficient			
	7.587	Initial Abstract	ion		
	1	646 .000	r; 2=Rect .270	anglr; 3=SWM HYD; 4=Li .270 c.m/s	.n. keserv
15	ADD RUNO	204 .852	.690	C perv/imperv/total	
15	1.	646 1.646	.270	.270 c.m/s	
27		PH DISPLAY # of Hyeto/Hydrogr	anh choce	2	
	Volume	= .4165142E+04 c.			
9	ROUTE	Conduit Length			
	.500	Supply X-factor			
	.000	Supply K-lag (se Beta weighting f			
	600.000	Routing timestep			
	1	NO. OF Sub reach	es 1.646	.270 c.m/s	
17	COMBINE		2.040	.2.0 C.m/S	
		ction Node No. 646 1.646	1.646	1.916 c.m/s	
18	CONFLUEN	CE			
		ction Node No. 646 1.916	1.646	.000 c.m/s	
4	CATCHMEN	т			
	30.000 3.670	ID No.ó 99999 Area in hectares			
	80.000	Length (PERV) me	tres		

.500 Gradient (%) Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" 1.400 80.000 .000 . 250 77.000 SCS Curve No or C Ia/S Coefficient 100 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .025 1.916 1.646 .000 c.m/s .204 .838 .213 C perv/imperv/total 15 ADD RUNOFF .025 1.929 1.646 .000 c.m/s 11 CHANNEL Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres .500 3.000 3.000 .060 1.500 .200 Select Grade in % = 1.059 metres = .495 m/sec ity = 4.619 c m/s Depth = Velocity = Flow Capacity = Critical depth = 1.059 metres .495 m/sec 4.619 c.m/s .533 metres 1.557 .000 c.m/s 17 
 COMBINE

 2
 Junction Node No.

 .025
 1.929

 START
 1.12ero; 2=Define

 CATCHMENT
 40.000
 ID No.6 99999

 3.890
 Area in hectar
 n Node No. 1.929 1.557 1.557 c.m/s 14 4 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" COS Course No. or C 3.890 100.000 .500 3.700 100.000 .000 .250 Manning 'n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .025 .000 1.557 1.557 c.m/s .204 .828 .227 C perv/imperv/total 77.000 100 7.587 15 ADD RUNOFF .025 .025 1.557 1.557 c.m/s 4 CATCHMENT 50.000 9.180 ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 350.000 1.000 1.300 Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Is/S Coefficient Is/S Coefficient 350.000 .250 77.000 .100 15 9 Conduit Length .000 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep .500 .000 .500 No. of sub-reaches 1 .038 .061 COMBINE .061 1.557 c.m/s 17 JINE Junction Node No. .038 .061 .061 1.588 c.m/s 2 .038 .061 .061 CONFLUENCE 2 Junction Node No. .038 1.588 .061 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .6093000E+04 c.m START 1 1=Zero; 2=Define COMMENT 18 .000 c.m/s 27 14 COMMENT 35 \*\* 5 YEAR DESIGN STORM EVENT \*\* 2 STORM 1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic l=Chlcago, z=Hulr, --Gell, Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 45.533 mm Total depth Te 524.867 .000 .699 400 240.000 IMPERVIOUS 3 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .013 Manning "n" 98.000 SCS Curve No or C Ia/S Coefficient .100 Initial Abstraction CATCHMENT 20.000 3.020 4 ID No.ó 99999 Area in hectares Length (PERV) metres Gradient (%) 100.000 .500

	72.600	Per cent Impervio	us		
	100.000	Length (IMPERV)			
	1			; 3=Green-Ampt; 4=Re	peat
	.250	Manning "n" SCS Curve No or C			
	.100	Ia/S Coefficient Initial Abstracti			
	1	Option 1=Trianglr	; 2=Rectar	glr; 3=SWM HYD; 4=Li	n. Reserv
	.36	8.869		.000 c.m/s C perv/imperv/total	
15	ADD RUNOFF .36		.061	.000 c.m/s	
27	HYDROGRAPH				
	Volume =	.9720645E+03 c.m	pn cnosen		
11	CHANNEL .500	Base Width =			
	3.000	Base Width = Left bank slope Right bank slope	1:		
	.060	Manning's "n"			
		0/a Depth in metr Select Grade in %			
	Depth	= .489 = .379 ity = 5.657	metres m/sec		
	Flow Capac Critical d	ity = 5.657 epth = .243	c.m/s		
9			metres		
	50.000	Conduit Length Supply X-factor <	.5		
	98.911	Supply K-lag (sec Beta weighting fa	)		
	200.000	Routing timestep			
	.36	No. of sub-reache	s .364	.000 c.m/s	
17	COMBINE	ion Node No.			
14	.36 START		.364	.364 c.m/s	
	1 1=Zer	o; 2=Define			
4	CATCHMENT 10.000	ID No.ó 99999			
	17.530 500.000	Area in hectares	rac		
	1.000	Area in hectares Length (PERV) met Gradient (%) Per cent Impervio	165		
	500.000	Per cent Impervio Length (IMPERV)	us		
		%Imp. with Zero D Option 1=SCS CN/C		; 3=Green-Ampt; 4=Re	peat
	.250	Manning "n" SCS Curve No or C			1
	.100	Ia/S Coefficient			
	7.587 1	Initial Abstracti Option 1=Trianglr	: 2=Rectar	glr; 3=SWM HYD; 4=Li	n. Reserv
	2.32		.364	.364 c.m/s C perv/imperv/total	
15	ADD RUNOFF 2.32		.364	.364 c.m/s	
27	HYDROGRAPH	DISPLAY of Hyeto/Hydrogra			
	Volume =	.5784277E+04 c.m	ph chosen		
9	ROUTE	Conduit Length			
		Supply X-factor < Supply K-lag (sec			
		Beta weighting fa Routing timestep	ctor		
	1 1	No. of sub-reache	s o port	264	
17	2.32 COMBINE		2.324	.364 c.m/s	
		ion Node No. 4 2.324	2.324	2.688 c.m/s	
18	CONFLUENCE	ion Node No.			
4	2.32		2.324	.000 c.m/s	
4	CATCHMENT 30.000	ID No.ó 99999			
		Area in hectares Length (PERV) met	res		
	.500	Gradient (%) Per cent Impervio	119		
	80.000	Length (IMPERV)			
	1			; 3=Green-Ampt; 4=Re	peat
		Manning "n" SCS Curve No or C			
		Ia/S Coefficient Initial Abstracti	on		
	1	Option 1=Trianglr	; 2=Rectar	glr; 3=SWM HYD; 4=Li	n. Reserv
	.05	8.877	.286	C perv/imperv/total	
15	ADD RUNOFF .05		2.324	.000 c.m/s	
11	CHANNEL	Base Width =			
	3.000	Left bank slope Right bank slope	1:		
	.060	Manning's "n"			
		0/a Depth in metr Select Grade in %			
	Depth Velocity	= 1.215 = .539	metres		
	Flow Capac	ity = 4.619	c.m/s metres		
9	Critical d ROUTE		metres		
	.000	Conduit Length Supply X-factor <	.5		
	278.130	Supply K-lag (sec Beta weighting fa	)		
	600.000	Routing timestep No. of sub-reache			
17	.05	9 2.717	2.118	.000 c.m/s	
17	COMBINE 2 Junct	ion Node No.			
		0			
14	.05 START	9 2.717 o; 2=Define	2.118	2.118 c.m/s	

4	CATCHMEN	rm
		ID No.ó 99999
	3.890 100.000	Area in hectares Length (PERV) metres
	.500	Gradient (%) Per cent Impervious
	3.700 100.000	Per cent Impervious Length (IMPERV)
	.000	%Imp. with Zero Dpth
	1 .250	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n"
	77.000 .100	SCS Curve No or C Ia/S Coefficient
	7.587	Initial Abstraction
	1	Option         1=Trianglr;         2=Rectanglr;         3=SWM         HYD;         4=Lin.         Reserv           060         .000         2.118         2.118 c.m/s         2.118 c.m/s
		278 .869 .299 C perv/imperv/total
15	ADD RUNO	060 .060 2.118 2.118 c.m/s
4	CATCHMEN 50.000	
	9.180	Area in hectares
	350.000 1.000	Length (PERV) metres Gradient (%)
	1.300 350.000	Gradient (%) Per cent Impervious Length (IMPERV)
	.000	%Imp. with Zero Dpth
	1 .250	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n"
	77.000	SCS Curve No or C
	7.587	Ia/S Coefficient Initial Abstraction
	1	Option         1=Trianglr;         2=Rectanglr;         3=SWM         HYD;         4=Lin.         Reserv           088         .060         2.118         2.118 c.m/s         2.118 c.m/s
		278 .884 .286 C perv/imperv/total
15	ADD RUNO	088 .138 2.118 2.118 c.m/s
9	ROUTE	Conduit Length
	.500	Supply X-factor <.5
	.000	Supply K-lag (sec) Beta weighting factor
	600.000	Routing timestep
		No. of sub-reaches 088 .138 .138 2.118 c.m/s
17	COMBINE 2 Jun	action Node No.
18		088 .138 .138 2.192 c.m/s
10		ction Node No.
27		088 2.192 .138 .000 c.m/s PH DISPLAY
27	5 is	# of Hyeto/Hydrograph chosen
14	Volume START	= .8952002E+04 c.m
35	1 1=Z COMMENT	ero; 2=Define
35	3 lin	e(s) of comment
		**************************************
0	******	****************
2	STORM 1	l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic
	608.845 .000	Coefficient a Constant b (min)
	.699	Exponent c
	.400 240.000	Fraction to peak r Duration ó 240 min
3	IMPERVIO	52.818 mm Total depth
2	1	
	.013	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	98.000	
	.100	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient
4	.100 .518 CATCHMEN	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction T
4	.100	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction
4	.100 .518 CATCHMEN 20.000 3.020 100.000	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres
4	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious
4	.100 .518 CATCHMEN 20.000 3.020 100.000 .500	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%)
4	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .000 1	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat</pre>
4	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 1 .250 77.000	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C</pre>
4	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .000 1 .250	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction</pre>
4	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .10 77.000 77.000 7.587 1	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin, Reserv</pre>
-	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .000 .250 77.000 .100 7.587 1	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total</pre>
4	.100 .518 CATCHMEN 20.000 3.020 100.000 .550 72.600 100.000 .000 .250 77.000 .100 7.587 1	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total</pre>
-	. 100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .000 .250 77.000 .100 7.587 1 ADD RUNO HYDROGRA	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imm, wit Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total FF 442 .442 .138 .000 c.m/s
15 27	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .000 .250 77.000 .100 7.587 1 .100 7.587 1 .100 .100 .100 7.587 1	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Srias .000 c.m/s 320 .887 .732 C perv/imperv/total PF 442 .442 .138 .000 c.m/s PH DISPLAY # of Hyeto/Bydrograph chosen = .1167105F04 c.m</pre>
15	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .100 .000 1 .250 77.000 .100 7.587 ADD RUNO HDPRORA 5 is Volume CHANNEL	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total FF 442 .442 .138 .000 c.m/s PH DISPLAY # of Hyeto/Hydrograph chosen = .1167105E+04 c.m</pre>
15 27	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .000 .250 77.000 .100 7.587 1 ADD RUNO HYDROGRA HYDROGRA Sume CHANNEL .500 3.000	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total MF 442 .442 .138 .000 c.m/s PH DISPLAY # of Hyeto(Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1:</pre>
15 27	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .000 .100 77.587 1 .250 77.000 .100 7.587 1 ADD RUNO HYDROGRA HYDROGRA SOU .SOU	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp_wit Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total FF 442 .442 .138 .000 c.m/s HPH DISDLAY # of Hyeto/Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Manning's *n*</pre>
15 27	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .100 .250 77.000 7.587 1 ADD RUNO ADD RUNO HVDROGRA 5 is Volume CHANNEL .500 3.000 .650 .550	<pre>Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr: 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total MF 442 .442 .138 .000 c.m/s H DISPLAY # of Hyeto(Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Right bank slope 1: Nanning * n* O/A Depth in metres Select Grade in &amp; 1 Select Orade in &amp; 1 Select Orade</pre>
15 27	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 1 .250 77.000 .100 75.87 ADD RUNO HYDROGRA 5 is Volume CHANNEL 500 3.000 3.000 HOL	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total FF 442 .138 .000 c.m/s 442 .442 .138 .000 c.m/s 454 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Manning's "n" O/a Dept in metres Select Grade in % = .531 metres</pre>
15 27	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .000 .100 77.587 1 .250 77.000 .100 7.587 1 ADD RUNO ADD RUNO HYDROGRA SOU 3.000 3.000 3.000 3.000 .500 .500 .500	<pre>Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total FF 442 .442 .138 .000 c.m/s HPH DISLAY # of Hyeto/Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Righ</pre>
15 27 11	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .100 .250 77.000 .100 7.587 1 HYDROGRA 5 is Volume CHANNEL .500 3.000 3.000 .1500 1.500 1.500 1.500 1.500 1.500 1.500 2.500 2.500 .1500 3.000 2.500 2.500 .1500 3.000 2.500 2.500 .1500 2.500 .1500 2.500 .1000 .0000 .1000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .000000	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total FF 442 .138 .000 c.m/s 442 .442 .138 .000 c.m/s 454 .000 c.m/s Base Width = Left bank slope 1: Right bank slope 1: Right bank slope 1: Manning's "n" O/a Dept in metres Select Grade in % = .531 metres</pre>
15 27	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .100 .250 77.000 .100 .100 7.587 1 ADD RUNO ADD RUNO ADD RUNO S00 3.000 3.000 3.000 .500 3.000 .500 3.000 .500 .5	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/Imperv/total FF 442 .442 .138 .000 c.m/s PH DISPLAY # of Hyeto/Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1: Manning's *n* O/A Depth in metres Select Grade in % = .531 metres = .338 m/sec adety = .267 metres Conduit Length</pre>
15 27 11	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .100 .000 1.250 77.000 .100 77.000 .100 7.587 ADD RUNO ADD RUNO HYDROGRA 5 is Volume CHANNEL .500 3.000 3.000 1.500 1.500 1.500 0.660 1.500 0.000 0.000 1.500 2.500 .000 1.500 0.0000 0.00000 0.00000 0.000000	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/Imperv/total FF 442 .442 .138 .000 c.m/s PH DISPLAY # of Hyeto/Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1: Manning's *n* O/a Depth in metres Select Grade in % = .531 metres cacity = 5.657 c.m/s .depth = .267 metres Conduit Length Supply X-factor &lt;.5 Supply X-factor &lt;.5 Supply X-factor &lt;.5</pre>
15 27 11	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .250 77.000 .100 7.587 1 .250 77.000 .100 7.587 1 MDD RUNO HYDROGRA HYDROGRA SO 3.000 3.000 .300 Depth Velocity Flow Cap Critical ROUTE 50.000 .000 .000 94.229 .618	<pre>Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C: 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total FF 442 .442 .138 .000 c.m/s H DISPLAY # of Hyeto/Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Right</pre>
15 27 11	.100 .518 CATCHMEN 20.000 .500 72.600 100.000 .000 .250 77.000 .100 7.587 1 ADD RUNO HYDROGRA 5 1 HYDROGRA 5 1 HYDROGRA 5 0.000 .000 .000 3.000 3.000 3.000 3.000 3.000 .500 .5	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imm, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total FF 442 .442 .138 .000 c.m/s # of Hyeto/Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1: Right bank slop</pre>
15 27 11	.100 .518 CATCHMEN 20.000 .500 72.600 100.000 .250 77.000 .250 77.000 .100 7.587 1 ADD RUNO HYDROGRA 5 HYDROGRA 5	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imm, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total FF 442 .442 .138 .000 c.m/s HPH DISPLAY # of Hyeto/Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Rig</pre>
15 27 11	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 1 .250 77.000 .100 77.000 .100 77.000 .100 7.587 1 ADD RUNO ADD R	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total PF 442 .442 .138 .000 c.m/s HDISPLAY # of Hyeto(Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Right</pre>
15 27 11	.100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 1 .250 77.000 .100 77.000 .100 77.000 .100 7.587 1 ADD RUNO ADD R	<pre>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imm, wit Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 442 .000 .138 .000 c.m/s 320 .887 .732 C perv/imperv/total FF 442 .442 .138 .000 c.m/s HPH DISDLAY # of Hyeto/Hydrograph chosen = .1167105E+04 c.m Base Width = Left bank slope 1: Right bank slope 1: Righ</pre>

14	START				
	1 1=Zero; 2=De	fine			
4	CATCHMENT 10.000 ID No.d	5 99999			
	17.530 Area ir	hectares (PERV) met	200		
	1.000 Gradier	it (%)			
		t Impervio (IMPERV)			
	.000 %Imp. v	ith Zero D	pth : 2=Hort	on; 3=Green-Ampt;	4=Repeat
	.250 Manning	f "n"			
	.100 Ia/S Co	ve No or C efficient			
		Abstracti 1=Trianglr		anglr; 3=SWM HYD;	4=Lin. Reserv
	2.767	.000	.425	.425 c.m/s C perv/imperv/t	
15	ADD RUNOFF				Otal
27	2.767 HYDROGRAPH DISPLA	2.767 Y	.425	.425 c.m/s	
	5 is # of Hyet Volume = .69334	o/Hydrogra	ph chose	n	
9	ROUTE		-		
	.500 Supply	: Length X-factor <			
		K-lag (sec eighting fa			
	600 000 Routing	f timestep sub-reache			
	2.767	2.767	2.767	.425 c.m/s	
17	COMBINE 1 Junction Not	le No.			
18		2.767	2.767	3.192 c.m/s	
20	1 Junction Not		0.868		
4	CATCHMENT	3.192	2.767	.000 c.m/s	
	30.000 ID No.d 3.670 Area ir	999999 hectares			
	80.000 Length .500 Gradier	(PERV) met	res		
	1.400 Per cer	nt Impervio	us		
	.000 %Imp. v	(IMPERV) with Zero D	pth		
	1 Option .250 Manning	1=SCS_CN/C	; 2=Hort	on; 3=Green-Ampt;	4=Repeat
	77.000 SCS Cui	ve No or C			
	7.587 Initial	efficient Abstracti			
		3.192		anglr; 3=SWM HYD; .000 c.m/s	4=Lin. Reserv
15	.320 ADD RUNOFF	.893	.328	C perv/imperv/t	otal
11	.093	3.238	2.767	.000 c.m/s	
11	CHANNEL .500 Base Wi	.dth =			
		ank slope ank slope			
	.060 Manning				
	.200 Select	Grade in %			
	Depth = Velocity = Flow Capacity = Critical depth =	1.303 .564	m/sec		
	Flow Capacity = Critical depth =	4.619	c.m/s metres		
9	ROUTE	Length			
	.000 Supply	X-factor <			
	.565 Beta we	K-lag (sec eighting fa			
		g timestep sub-reache	s		
17	.093 COMBINE	3.238	2.571	.000 c.m/s	
1,	2 Junction Not		0 5 5 3	0.551 /	
14	.093 START		2.571	2.571 c.m/s	
4	1 1=Zero; 2=De CATCHMENT	fine			
	40.000 ID No.d 3.890 Area in	999999 hectares			
	100.000 Length	(PERV) met	res		
		nt Impervio	us		
		(IMPERV) with Zero D	pth		
	1 Option .250 Manning		; 2=Hort	on; 3=Green-Ampt;	4=Repeat
	77.000 SCS Cur	ve No or C	:		
	7.587 Initial	efficient Abstracti			
	1 Option .086	1=Trianglr .000		anglr; 3=SWM HYD; 2.571 c.m/s	4=Lin. Reserv
15	.320 ADD RUNOFF	.887	.341	C perv/imperv/t	otal
	.086	.086	2.571	2.571 c.m/s	
4	CATCHMENT 50.000 ID No.d				
		hectares (PERV) met	res		
	1.000 Gradier				
	350.000 Length	(IMPERV)			
	1 Option	ith Zero D 1=SCS CN/C		on; 3=Green-Ampt;	4=Repeat
	.250 Manning				
	.100 Ia/S Co	efficient			
	1 Option	Abstracti 1=Trianglr	; 2=Rect	anglr; 3=SWM HYD;	4=Lin. Reserv
	.134 .320	.086 .898	2.571 .327	2.571 c.m/s C perv/imperv/t	otal
15	ADD RUNOFF .134	.208	2.571	2.571 c.m/s	
9	ROUTE	Length			
	conduit				

	.500	Supply X-factor <.5
	.000	Supply K-lag (sec)
	.500	Supply K-lag (sec) Beta weighting factor
	600.000	Routing timestep No. of sub-reaches
	.13	34 .208 .208 2.571 c.m/s
17	COMBINE	
	2 Junct	tion Node No. 34 .208 .208 2.682 c.m/s
18	CONFLUENCE	5
		ion Node No.
27	.1: HYDROGRAPI	
21		of Hyeto/Hydrograph chosen
		.1101540E+05 c.m
14	START 1 1=Zei	co; 2=Define
35	COMMENT	
		(s) of comment
		R DESIGN STORM EVENT **
	*******	****
2	STORM	
		1=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a
	.000	Constant b (min)
		Exponent c
		Fraction to peak r Duration ó 240 min
		52.077 mm Total depth
3	IMPERVIOUS	
	1.013	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n"
	98.000	SCS Curve No or C
		Ia/S Coefficient Initial Abstraction
4	.518 CATCHMENT	INILIAI ADSTRACTION
-		ID No.ó 99999 Area in hectares
	3.020	Area in hectares
	100.000 .500	Length (PERV) metres Gradient (%)
	12.000	Per cent impervious
		Length (IMPERV)
		<pre>%Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat</pre>
	050	
	77.000	Manning "n" SCS Curve No or C Ia/S Coefficient
	7.587	Initial Abstraction
	1	Option 1-Trianglr: 2-Regtanglr: 3-SWM MVD: 4-Lin Reserve
	.54	13 .000 .208 .000 c.m/s
15	ADD RUNOFI	
	.54	43 .543 .208 .000 c.m/s
27	HYDROGRAPH 5 is #	I DISPLAY of Hyeto/Hydrograph chosen
		.1419536E+04 c.m
11	CHANNEL	
	.500 3.000	Base Width = Left bank slope 1:
	3.000	Right bank slope 1:
		Manning's "n"
	200	O/a Depth in metres Select Grade in %
	Depth	= .579 metres = 419 m/sec
	Flow Capao Critical o	
9	ROUTE	
		Conduit Length
		Supply X-factor <.5 Supply K-lag (sec)
	.640	Beta weighting factor
	200.000	Routing timestep No. of sub-reaches
	1.54	
17	COMBINE	
		tion Node No.
14	.54 START	43 .543 .500 .500 c.m/s
	1 1=Zei	co; 2=Define
4	CATCHMENT 10.000	
	17.530	ID No.ó 99999 Area in hectares
	500.000	Length (PERV) metres
		Gradient (%) Per cent Impervious
	500.000	Length (IMPERV)
	.000	%Imp. with Zero Dpth
	1 .250	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n"
	77.000	Ial SCS Curve No or C Ia/S Coefficient
	.100 7.587	Ia/S Coefficient
	7.587	Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	3.3	22 .000 .500 .500 c.m/s
15	.30 ADD RUNOFI	57 .910 .774 C perv/imperv/total
10	ADD RONOFI 3.3	
27	HYDROGRAPH	H DISPLAY
		of Hyeto/Hydrograph chosen .8425626E+04 c.m
9	ROUTE	
		Conduit Length
		Supply X-factor <.5 Supply K-lag (sec)
	.500	Beta weighting factor
	600.000	Routing timestep No. of sub-reaches
	1 3.33	No. of sub-reaches 22 3.322 3.322 .500 c.m/s
17	COMBINE	
	1 Junct	zion Node No.
18	3.32 CONFLUENCE	
	1 Junct	tion Node No.
	2 2	22 3.822 3.322 .000 c.m/s
4	CATCHMENT	

	20.000 TD N- 6.00000
	30.000 ID No.ó 99999 3.670 Area in hectares
	80.000 Length (PERV) metres .500 Gradient (%)
	1.400 Per cent Impervious
	80.000 Length (IMPERV) .000 %Imp. with Zero Dpth
	<pre>1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n"</pre>
	77.000 SCS Curve No or C
	.100 Ia/S Coefficient 7.587 Initial Abstraction
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.367 .908 .374 C perv/imperv/total
15	ADD RUNOFF .137 3.898 3.322 .000 c.m/s
11	CHANNEL .500 Base Width =
	3.000 Left bank slope 1:
	3.000 Right bank slope 1: .060 Manning's "n"
	1.500 O/a Depth in metres .200 Select Grade in %
	Depth = 1.403 metres Velocity = .590 m/sec
	Flow Capacity = 4.619 c.m/s
9	Critical depth = .730 metres ROUTE
	200.000 Conduit Length .000 Supply X-factor <.5
	254.140 Supply K-lag (sec)
	.582 Beta weighting factor 600.000 Routing timestep
	1 No. of sub-reaches .137 3.898 3.213 .000 c.m/s
17	COMBINE
	2 Junction Node No. .137 3.898 3.213 3.213 c.m/s
14	START 1 1=Zero; 2=Define
4	CATCHMENT
	40.000 ID No.ó 99999 3.890 Area in hectares
	100.000 Length (PERV) metres .500 Gradient (%)
	3.700 Per cent Impervious
	100.000 Length (IMPERV) .000 %Imp. with Zero Dpth
	<ol> <li>Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat</li> <li>Manning "n"</li> </ol>
	77.000 SCS Curve No or C
	.100 Ia/S Coefficient 7.587 Initial Abstraction
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .138 .000 3.213 3.213 c.m/s
15	.367 .905 .387 C perv/imperv/total
15	ADD RUNOFF .138 .138 3.213 3.213 c.m/s
4	CATCHMENT 50.000 ID No.ó 99999
	9.180 Area in hectares 350.000 Length (PERV) metres
	1.000 Gradient (%)
	1.300 Per cent Impervious 350.000 Length (IMPERV)
	.000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 Manning "n"
	77.000 SCS Curve No or C .100 Ia/S Coefficient
	7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.200 .138 3.213 3.213 c.m/s
15	ADD RUNOFF
9	.200 .313 3.213 3.213 c.m/s ROUTE
	.000 Conduit Length .500 Supply X-factor <.5
	.000 Supply K-lag (sec)
	.500 Beta weighting factor 600.000 Routing timestep
	1 No. of sub-reaches .200 .313 .313 3.213 c.m/s
17	COMBINE 2 Junction Node No.
	.200 .313 .313 3.377 c.m/s
18	CONFLUENCE 2 Junction Node No.
27	.200 3.377 .313 .000 c.m/s HYDROGRAPH DISPLAY
2,	5 is # of Hyeto/Hydrograph chosen
14	Volume = .1375860E+05 c.m START
35	1 1=Zero; 2=Define COMMENT
	3 line(s) of comment
	** 50 YEAR DESIGN STORM EVENT **
2	**************************************
	<pre>1 l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic 794.298 Coefficient a</pre>
	.000 Constant b (min)
	.699 Exponent c .400 Fraction to peak r
	240.000 Duration ó 240 min 68.907 mm Total depth
3	IMPERVIOUS
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .013 Manning "n"
	98.000 SCS Curve No or C .100 Ia/S Coefficient
4	.518 Initial Abstraction CATCHMENT
4	20.000 ID No.ó 99999

Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 3.020 100.000 .500 72.600 100.000 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 10. 000 or m(s) .000 1 .250 77.000 7.587 .619 .000 .313 .000 c.m/s .397 .913 .772 C perv/imperv/total 15 27 11 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor 86.544 .653 .053 Beta weighting fact 00.000 Routing timestep 1 No. of sub-reaches .619 .619 COMBINE 1 Junction Node No. 619 .610 200.000 . 553 .000 c.m/s 17 \_ Junction Node No. .619 .619 .553 .553 c.m/s START 1 14 1=Zero; 2=Define 4 CATCHMENT ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp, with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C 10.000 17.530 ID No.ó 99999 500.000 1.000 75.000 500.000 .250 77.000 SCS Curve No or C Ia/S Coefficient .100 .100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 3.726 .000 .553 .553 c.m/s .398 .920 .789 C perv/imperv/total ADD RUNOFF 3.726 3.726 .553 .553 c.m/s 15 3.726 .553 .553 c.m/s 27 HYDROGRAPH DISPLAY OGRAPH DISPLAY is # of Hyeto/Hydrograph chosen me = .9530810E+04 c.m 5 is Volume ROUTE .000 .500 .000 Conduit Length Supply X-factor <.5 Supply K-lag (sec) 500 Beta weighting factor .500 Beta weighting factor 00.000 Routing timestep 1 No. of sub-reaches 3.726 3.726 3.726 COMBINE 1 Junction Node No. 3.726 3.726 3.726 CONFLUENCE 600.000 .553 c.m/s 17 1 4.279 c.m/s CONFLUENCE 18 Junction Node No. 3.726 4.279 3.726 1 .000 c.m/s CATCHMENT 30.000 ID No.ó 99999 3.670 Area in hectar Area in hectares Length (PERV) metres 80.000 Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" CGC Corror No ce C .500 80.000 . 250 77.000 SCS Curve No or C SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .173 4.279 3.726 .000 c.m/s .397 .916 .404 C perv/imperv/total were 100 7.587 ADD RUNOFF .173 4.382 3.726 CHANNEL 15 .000 c.m/s 11 Base Width = Left bank slope 1: Right bank slope 1: Manning's "n" O/a Depth in metres .500 3.000 3.000 .060 1.500 
 1.500
 0/a Depth in metres

 .200
 Select Grade in %

 Depth
 =
 1.469 metres

 Velocity
 =
 .608 m/sec

 Flow Capacity
 4.619 c.m/s

 Critical depth
 .768 metres
 ROUTE 2005.000 Conduit Length .000 Supply X-factor < 5 246.805 Supply K-lag (sec) .593 Beta weighting factor 500.000 Routing timestep 1 No. of sub-reaches .173 4.382 3.687 COMBINE 2 Junction Y-1 200.000 246.805 600.000 1 .000 c.m/s 17 Junction Node No. 2

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	.173 4.382 3.687 3.687 c.m/s	
14	START 1 =Zero; 2=Define	
4	CATCHMENT 40.000 ID No.ó 99999	
	3.890 Area in hectares 100.000 Length (PERV) metres	
	.500     Gradient (%)       3.700     Per cent Impervious	
	100.000 Length (IMPERV) .000 %IMp. with Zero Dpth	
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250 Manning "n" 77.000 SCS Curve No or C	
	.100 Ia/S Coefficient 7.587 Initial Abstraction	
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .174 .000 3.687 3.687 c.m/s	
15	.397 .913 .416 C perv/imperv/total ADD RUNOFF	
4	.174 .174 3.687 3.687 c.m/s CATCHMENT	
	50.000 ID No.ó 99999 9.180 Area in hectares	
	350.000 Length (PERV) metres	
	1.000 Gradient (%) 1.300 Per cent Impervious 350.000 Length (IMPERV)	
	.000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250 Manning "n"	
	.100 Ia/S Coefficient	
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv	
	.265 .174 3.687 3.687 c.m/s .398 .918 .404 C perv/imperv/total	
15	ADD RUNOFF .265 .404 3.687 3.687 c.m/s	
9	ROUTE .000 Conduit Length	
	.500 Supply X-factor <.5 .000 Supply K-lag (sec)	
	.500 Beta weighting factor 600.000 Routing timestep	
	1 No. of sub-reaches .265 .404 .404 3.687 c.m/s	
17	COMBINE 2 Junction Node No.	
18	.265 .404 .404 3.900 c.m/s CONFLUENCE	
	2 Junction Node No. .265 3.900 .404 .000 c.m/s	
27	HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen	
14	Volume = .1582500E+05 c.m START	
35	COMMENT	
35	3 line(s) of comment	
	** 100 YEAR DESIGN STORM EVENT **	
2	STORM	
	1 l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic 871.279 Coefficient a	
	.000 Constant b (min) .699 Exponent c	
	.400 Fraction to peak r 240.000 Duration ó 240 min	
3	75.585 mm Total depth IMPERVIOUS	
	<pre>1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .013 Manning "n"</pre>	
	98.000 SCS Curve No or C .100 Ia/S Coefficient	
4	.518 Initial Abstraction CATCHMENT	
	20.000 ID No.ó 99999 3.020 Area in hectares	
	100.000 Length (PERV) metres .500 Gradient (%)	
	72.600 Per cent Impervious 100.000 Length (IMPERV)	
	.000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250 Manning "n" 77.000 SCS Curve No or C	
	.100 Ia/S Coefficient 7.587 Initial Abstraction	
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .694 .000 .404 .000 c.m/s	
15	.425 .921 .785 C perv/imperv/total ADD RUNOFF	
27	.694 .694 .404 .000 c.m/s HYDROGRAPH DISPLAY	
	is # of Hyeto/Hydrograph chosen Volume = .1792627E+04 c.m	
11	CHANNEL .500 Base Width =	
	3.000 Left bank slope 1: 3.000 Right bank slope 1:	
	.060 Manning's "n"	
	1.500 O/a Depth in metres .300 Select Grade in %	
	Depth = .642 metres Velocity = .446 m/sec	
	Flow Capacity = 5.657 c.m/s Critical depth = .332 metres	
9	ROUTE 50.000 Conduit Length	
	.000 Supply X-factor <.5 84.095 Supply K-lag (sec)	
	.665 Beta weighting factor 200.000 Routing timestep	
	1 No. of sub-reaches .694 .694 .615 .000 c.m/s	

17 COMBINE Junction Node No. .694 .694 1 .615 .615 c.m/s START 1 1=Zero; 2=Define 14 4 CATCHMENT ID No.ó 99999 10.000 17.530 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 500.000 1.000 75.000 500.000 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning \*n\* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 4.115 .000 .615 .615 c.m/s .425 .926 .801 C perv/imperv/total NOFF .000 1 .250 .230 77.000 .100 7.587 1 4.115 ADD RUNOFF 15 ADD RUNOFF 4.115 4.115 .615 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1061312E+05 c.m .615 c.m/s 27 9 ROUTE Conduit Length .000 Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep .500 .000 .500 600.000 1 No. of sub-reaches 4.115 4.115 4.115 .615 c.m/s COMBINE 17 COMBINE 1 Junction Node No. 4.115 4.115 4.115 4.721 c.m/s CONFLUENCE 1 Junction Node No. 4.115 4.721 4.115 .000 c.m/s CARCHMENT 1 18 CATCHMENT 30.000 ID No.ó 99999 3.670 Area in hectar 4 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .210 4.721 4.115 .000 c.m/s .425 .922 .432 C perv/imperv/total NOFF 30.000 3.870 80.000 .500 1.400 80.000 .000 .250 77.000 .100 7.587 1 15 ADD RUNOFF ....0FF .210 CHANNEL 1.000 4.855 4.115 .000 c.m/s 11 CHANNEL 1.000 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1: 3.000 O'a Depth in metres 3.000 O'a Depth in metres 3.000 Select Grade in % Depth = 1.454 metres Velocity = .623 m/sec Flow Capacity = 10.613 c.m/s Critical depth = .734 metres Critical depth = .734 metres ROUTE 200.000 .000 240.715 q Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor Routing timestep .600 600.000 1 No. of sub-reaches .210 4.855 4 COMBINE 4.155 .000 c.m/s 17 2 Junction Node No. .210 4.855 4.155 START 4.155 c.m/s 14 START 1 1=Zero; 2=Define CATCHMENT 40.000 ID No.ó 99999 4 40.000 3.890 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious 100.000 .500 3.700 100.000 Length (IMPERV) Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Twitiol Motoraction .000 .250 77.000 .100 7.587 Initial Abstraction Option l=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .211 .000 4.155 4.155 c.m/s .425 .921 .443 C perv/imperv/total 1 .211 .425 ADD RUNOFF .211 .211 CATCEMENT 15 .211 4.155 4.155 c.m/s 4 ID No.0 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C; 2=Horton; 3=Green-Ampt; 4=Repeat 350.000 1.000 1.300 350.000 .000 1 Option 1=SCS CM/CT 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ta/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 25 .211 4.155 4.155 c.m/s 25 .922 .432 C perv/imperv/total .250 77.000 100 7.587 1 425 15 ADD RUNOFF

		.325	.499	4.155	4.155	c.m/s
9	ROUTE					
	.000	Condui	t Length			
	.500	Supply	/ X-factor	<.5		
	.000	Supply	/ K-lag (s	sec)		
	.500	Beta v	eighting	factor		
	600.000	Routir	ng timeste	p		
	1	No. of	sub-reac	hes		
		.325	.499	.499	4.155	c.m/s
17	COMBIN	E				
	2 J	unction No	de No.			
		.325	.499	.499	4.424	c.m/s
18	CONFLU	ENCE				
	2 J	unction No	de No.			
		.325	4.424	.499	.000	c.m/s
27	HYDROG	RAPH DISPI	AY			
				graph chosen		

Volume = .1789860E+05 c.m MANUAL 20

### **Developed Conditions – FULL SWM**

)ev	eloped	Conditions – FULL SWM le (4.7) SWM.OUT opened 2024-05-24 14:19 d are defined by G = 9.810
	Output Fi Units use	le (4.7) SWM.OUT opened 2024-05-24 14:19 d are defined by G = 9.810
	24	144 IU.UUU are MAXDI MAXHID & DIMIN Values
35	Licensee: COMMENT	UPPER CANADA CONSULTANTS
	3 line	(s) of comment
		IAME: NORTHLAND ESTATES IO.: 21132
14	PROPOSED START	CONDITIONS WITH SWM
14		ro; 2=Define
35	COMMENT	(s) of comment
	*******	************
		ESIGN STORM EVENT **
2	STORM	
	1 512.000	l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic Coefficient a
	6.000	Constant b (min) Exponent c
	.800	Fraction to peak r
	240.000	Duration ó 240 min 25.036 mm Total depth
3	IMPERVIOU	IS
	.013	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n"
	98.000	SCS Curve No or C
	.100	Ia/S Coefficient Initial Abstraction
4	CATCHMENT	
		ID No.ó 99999 Area in hectares
		Length (PERV) metres
	.500 72.600	Gradient (%) Per cent Impervious
	100.000	Length (IMPERV) %Imp. with Zero Dpth
	1	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250 77.000	Manning "n" SCS Curve No or C
	.100	Ia/S Coefficient
	1	Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
	.2	02 .000 .000 .000 c.m/s 30 .797 .614 C perv/imperv/total
15	ADD RUNOR	F
27		02 .202 .000 .000 c.m/s PH DISPLAY
	5 is ‡	of Hyeto/Hydrograph chosen .4636960E+03 c.m
11	CHANNEL	
	.500	Base Width = Left bank slope 1:
	3.000	Right bank slope 1:
	.060	Manning's "n" O/a Depth in metres
	.300 Depth	Select Grade in %
	Velocity	
	Flow Capa Critical	city = 2.047 c.m/s depth = .180 metres
9	ROUTE	
	50.000	Conduit Length Supply X-factor <.5
	114.938 .531	Supply X-factor <.5 Supply K-lag (sec)
	200.000	Beta weighting factor Routing timestep
	1	No. of sub-reaches 02 .202 .192 .000 c.m/s
17	COMBINE	
	1 Juno	ution Node No. 102 .202 .192 .192 c.m/s
14	START	
4	CATCHMENT	
	10.000 17.530	ID No.ó 99999 Area in hectares
	500.000	Length (PERV) metres
	1.000 75.000	Gradient (%) Per cent Impervious
	500.000	Length (IMPERV) %Imp. with Zero Dpth
	.000 1	Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
	.250	Manning "n" SCS Curve No or C
	.100	Ia/S Coefficient
	7.587 1	Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
		24 .000 .192 .192 c.m/s
15	ADD RUNOR	
27		24 .924 .192 .192 c.m/s H DISPLAY
27	5 is ‡	of Hyeto/Hydrograph chosen
10	Volume = POND	.2788153E+04 c.m
	6 Depth -	Discharge - Volume sets
	179.900 180.500	.000 .0 .0620 2842.9
	180.900	.224 5050.5
	181.100 181.250	.350 6243.3 .678 7177.9
	181.450 Peak Out 4	1.399 8478.7 low = .048 c.m/s epth = 180.361 metres torage = 2183. c.m 24 .924 .048 .192 c.m/s
	Maximum I	epth = 180.361 metres
	Maximum S	torage = 2183. c.m 24 .924 .048 .192 c.m/s
17	COMBINE	
	. 9	tion Node No. 24 .924 .048 .204 c.m/s
18	CONFLUENO 1 Juno	YE stion Node No.
		124 .204 .048 .000 c.m/s

4	CATCHMEN	TT.				
		ID No.ó	99999			
	3.670		hectares			
	80.000 .500	Length Gradien	(PERV) me	tres		
	1.400		t Impervi	ous		
	80.000		(IMPERV)			
	.000		ith Zero 1 1=SCS CN/0		on; 3=Green-Ampt; 4=Repeat	
	.250	Manning	"n"			
	77.000	SCS Cur	ve No or (	2		
	7.587		efficient Abstract	ion		
	1	Option	1=Triangl:	r; 2=Rect	anglr; 3=SWM HYD; 4=Lin. Reserv	
			.204	.048	.000 c.m/s C perv/imperv/total	
15	ADD RUNC	130 FF	./85	.139	C perv/imperv/total	
		010	.210	.048	.000 c.m/s	
11	CHANNEL .500	Base Wi	dth =			
	3.000	Left b	ank slope			
	3.000		ank slope	1:		
	.060 1.000	Manning 0/a Dep	th in met:	res		
	.200		Grade in 3	ę		
	Depth Velocity		. 420	metres m/sec		
	Flow Cap	acity =	1.671	c.m/s		
9	Critical	. depth =	.184	metres		
9	ROUTE 200.000	Conduit	Length			
	.271	Supply	X-factor			
	529.337 .500		K-lag (se ighting fa			
	600.000					
	1	No. of	timestep sub-reach	es		
17	COMBINE.	010	.210	.185	.000 c.m/s	
		nction Nod				
14	START	010	.210	.185	.185 c.m/s	
14		lero; 2=De	fine			
4	CATCHMEN		00000			
	3.890	ID No.ó Area in	hectares			
	100.000		(PERV) me	tres		
	.500	Gradien Per cen	t (%) t Impervi	ous		
	100.000	Length	(IMPERV)			
	.000		ith Zero 1		.on; 3=Green-Ampt; 4=Repeat	
	.250	Manning	"n"		on, s-oreen mape, r-nepeue	
	77.000		ve No or ( efficient	2		
	7.587		Abstract:	ion		
	1	Option 014	1=Triangl: .000	r; 2=Rect	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s	
		130	.797	.155		
15	ADD RUNC		014	105	105 /	
4	CATCHMEN	014 TT	.014	.185	.185 c.m/s	
	50.000	ID No.ó	00000			
	9.180	Area in	hectares	tres		
	9.180 350.000 1.000	Area in Length Gradien	hectares (PERV) me t (%)			
	9.180 350.000 1.000 1.300	Area in Length Gradien Per cen	hectares (PERV) me t (%) t Impervie			
	9.180 350.000 1.000 1.300 350.000 .000	Area in Length Gradien Per cen Length %Imp. w	hectares (PERV) me t (%) t Impervio (IMPERV) ith Zero 1	ous Dpth		
	9.180 350.000 1.000 350.000 .000 1	Area in Length Gradien Per cen Length %Imp. w Option	hectares (PERV) me t (%) t Impervie (IMPERV) ith Zero I 1=SCS CN/6	ous Dpth	on; 3=Green-Ampt; 4=Repeat	
	9.180 350.000 1.000 1.300 350.000 .000	Area in Length Gradien Per cen Length %Imp. w Option Manning	hectares (PERV) me t (%) t Impervie (IMPERV) ith Zero I 1=SCS CN/6	ous Dpth C; 2=Hort	on; 3=Green-Ampt; 4=Repeat	
	9.180 350.000 1.000 350.000 .000 1 .250 77.000 .100	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co	<pre>hectares (PERV) me t (%) t Impervia (IMPERV) ith Zero 1 l=SCS CN/d "n" ve No or 0 efficient</pre>	ous Dpth C; 2=Hort C	on; 3=Green-Ampt; 4=Repeat	
	9.180 350.000 1.000 1.300 350.000 .000 1 .250 77.000	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial	<pre>hectares (PERV) me t (%) t Impervia (IMPERV) ith Zero I l=SCS CN/d "n" ve No or ( efficient Abstract;</pre>	ous Dpth C; 2=Hort C ion		
	9.180 350.000 1.000 350.000 .000 1 .250 77.000 .100 7.587 1	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015	<pre>. hectares (PERV) met t (%) t Impervia (IMPERV) ith Zero I 1=SCS CN/d "n" ve No or d efficient Abstract 1=Triangl: .014</pre>	Dus Dpth C; 2=Hort C ion r; 2=Rect .185	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s	
15	9.180 350.000 1.300 350.000 .000 1 250 77.000 .100 7.587 1	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015	hectares (PERV) met t (%) t Impervia (IMPERV) tith Zero 1 1=SCS CN/6 "n" ve No or 6 efficient Abstract 1=Triangl:	ous Dpth C; 2=Hort C ion r; 2=Rect	anglr; 3=SWM HYD; 4=Lin. Reserv	
15	9.180 350.000 1.000 350.000 .000 1.250 77.000 100 7.587 1  ADD RUNC	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015	<pre>. hectares (PERV) met t (%) t Impervia (IMPERV) ith Zero I 1=SCS CN/d "n" ve No or d efficient Abstract 1=Triangl: .014</pre>	Dus Dpth C; 2=Hort C ion r; 2=Rect .185	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s	
15	9.180 350.000 1.000 1.300 350.000 .000 1 .250 77.000 .100 7.587 1 ADD RUNC ROUTE	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 130 JFF 015	hectares (PERV) met t (%) t Impervia (IMPERV) ith Zeron i l=SCS CN/4 "n" ve No or 4 efficient Abstract 1=Triang]: .014 .803 .025	Dus Dpth C; 2=Hort C ion r; 2=Rect .185 .139	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/imperv/total	
	9.180 350.000 1.000 350.000 .000 1.250 77.000 100 7.587 1  ADD RUNC	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 130 JFF 015 Conduit Supply	hectares (PERV) me: t (%) t Impervi ith Zero 1 1=SCS CN/( "n" ve No or ( efficient Abstract 1=Triangl: .014 .803 .025 Length X-factor	Dus Dpth C; 2=Hort C ion r; 2=Rect .185 .139 .185 .185	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/imperv/total	
	9.180 350.000 1.000 1.300 350.000 .000 .250 77.000 .100 7.587 1  ADD RUNE  ROUTE       	Area in Length Gradiem Per cen Length %1mp. w Option Manning SCS Cur Ia/S Co Initial 0ption 015 015 Conduit Supply Supply	hectares (PERV) met t (%) t Impervi (IMPERV) ith Zero 1 1=SCS CN/( "n" ve No or ( efficient Abstract .014 .803 .025 Length X-factor K-lag (see	Dus Dpth C; 2=Hort C ion r; 2=Rect .185 .139 .185 .185	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/imperv/total	
	9.180 350.000 1.000 1.300 350.000 .250 77.000 7.587 1 ADD RUNC ROUTE .000 .500	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur La/S CO Initial Option 015 130 015 Conduit Supply Supply Beta we	hectares (PERV) met t (%) t Impervi. (IMPERV) ihl Zero b 1=SCS CN/( "n" ve No or ( efficient Abstract. 1=Triangl: .014 .803 .025 Length X-factor K-lag (seighting f	Dus Dpth C; 2=Hort C ion r; 2=Rect .185 .139 .185 .185	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/imperv/total	
	9.180 350.000 1.000 1.300 350.000 .000 .100 77.000 77.000 77.587 1  ADD RUNE ROUTE  ROUTE       	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Seta we Routing No. of	hectares (PERV) mev t (%) (IMPERV) ith Zero 1 I=SCS CN/* *n* ve No or c efficient Abstract. .014 .803 .025 Length X-factor : K-lag (se ighting f; timestep sub-reach	Dus Dpth C: 2=Hort C ion r; 2=Rect .185 .139 .185 .185 .185 .185 .185 .185 .185	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/iotal .185 c.m/s	
9	9.180 350.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 77.000 .507 .000 .500	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Seta we Routing No. of	hectares (VERV) met t (%) t Impervi (IMPERV) ihZero ) I=SCS CN/( *n* ve No or ( efficient I=Triang): .014 .803 .025 Length X-factor X-factor K-lag (sei ighting f	Dus Dpth C: 2=Hort C: ion r; 2=Rect 185 .139 .185 .185 .185 .185 .20 actor	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/imperv/total	
	9.180 350.000 1.000 1.000 .100 .000 .100 77.000 .100 77.000 .100 .000 .000 .5	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Beta we Routing No. of 015	hectares (VERV) me t (%) t Impervi (IMPERV) ih Zero 1 l=SCS CN/4 *n* ve No or 2 efficient Abstract. 1=Triangl: .014 .803 .025 Length X-factor K-lag (sei ighting f, timestep sub-reach. .025 e No.	Dus Dpth 2/ 2=Hort 2 ion .185 .185 .185 .185 <.5 2) actor 28 .025	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s	
9	9.180 350.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 75.87 ADD RUNE ROUTE .000 .500 .500 .000 .500 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial 0015 130 015 Conduit Supply Supply Beta we Routing No. of 015	hectares (PERV) me t (%) (IMPERV) ith Zero 1 I=SCS CN/* *n* ve No or c efficient Abstract. .014 .803 .025 Length X-factor K-lag (se ighting f, timestep sub-reach .025	Dus Dpth C: 2=Hort C ion r; 2=Rect .185 .139 .185 .185 .185 .185 .185 .185 .185	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/iotal .185 c.m/s	
9	9.180 350.000 1.000 1.000 1.300 350.000 .000 .100 77.000 77.000 77.000 .100 7.587 1 .000 .500 .000 .500 .000 .507 .000 .507 .000 .507 .000 .507 .000 .507 .000 .507 .000 .507 .000 .507 .000 .507 .000 .507 .000 .507 .000 .507 .000 .500 .000 .507 .000 .507 .000 .500 .000 .507 .000 .500 .000 .500 .000 .507 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .500 .500 .000 .500 .500 .500 .500 .500 .000 .500 .500 .500 .500 .000 .500	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial 0015 130 015 Conduit Supply Supply Beta we Routing No. of 015	hectares (PERV) me t (%) t Impervin (IMPERV) iht Zero 1 leSCS CM/ *n* ve No or c efficient Abstract 1-Triangl: .014 .025 Length X-factor K-lag (sei ighting f, t imestep sub-reach .025 e No. .025	Dus Dpth 2: 2=Hort 2 ion r; 2=Redt .139 .185 .139 .185 .139 .185 .139 .185 .025 .025	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s	
9 17 18	9.180 350.000 1.000 1.000 1.000 2.500 77.000 7.587 1  ADD RUTE  ROUTE   ROUTE       	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial 0ption 015 Conduit Supply Supply Supply No. of 015 No. of 015 Notion Nod 015 Notion Nod 015 CE Cettion Nod	hectares (PERV) me t (%) t Impervin (IMPERV) iht Zero 1 leSCS CM/ *n* ve No or c efficient Abstract 1-Triangl: .014 .025 Length X-factor K-lag (sei ighting f, t imestep sub-reach .025 e No. .025	Dus Dpth 2/ 2=Hort 2 ion .185 .185 .185 .185 <.5 2) actor 28 .025	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/imperv/total .185 c.m/s .185 c.m/s	
9	9.180 30.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 75.87 ADD RUTE .000 .500 .000 .500 .000 .500 .0000 .00000 .0000 .0000 .0000 .00000 .00000 .0000 .00000 .00000 .00000 .00000 .000000 .00000000	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Supply Supply No. of 015 No. of 015 No. of 015 No. of 015 CCE Curtion Nod 015 CCE Curton Nod	hectares (PERV) met t (%) t Imperv) ith Zero 1 =SCS CM/* =SCS CM/* =SCS CM/* abstract. 1=Triangl: .014 .803 .025 Length X-factor K-lag (se ighting f, timestep sub-reach. .025 e No. .025 e No. .202	Dus Dpth 2: 2=Hort 2 ion r; 2=Redt .139 .185 .139 .185 .139 .185 .139 .185 .025 .025	anglr; 3-SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/Imperv/total .185 c.m/s .185 c.m/s .185 c.m/s	
9 17 18	9.180 30.000 1.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 75.87 ADD RUNC ROUTE .000 .500 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .0000 .000 .000 .000 .000 .000 .000 .000	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial 0ption 015 130 015 Conduit Supply Supply Supply Beta we Routing No. of 015 CC Conduit Supply	hectares (PERV) met t (%) t Impervi (IMPERV) ith Zero 1 I=SCS CM/ * Ne No or C efficient Abstract. 1=Triangl: .014 .803 .025 Length X-factor K-lag (se ighting f, timestep sub-reach .025 e No. .025 e No. .202 fine	Dus Dpth 2: 2=Hort 2 ion r; 2=Redt .139 .185 .139 .185 .139 .185 .139 .185 .025 .025	anglr; 3-SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/Imperv/total .185 c.m/s .185 c.m/s .185 c.m/s	
9 17 18 14	9.180 350.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 75.87 1 .000 .500 .500 .500 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .0	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Deta we Routing No. of 015 CCS icction Nod 015 CCS icction Nod 015 CCS icction Nod	hectares (PERV) met t (%) t Impervi (IMPERV) ith Zero 1 I=SCS CM/ *n* ve No or 2 efficient Abstract. 1=Triangl: .014 .014 .025 Length X-factor K-lag (se ighting f, timestep sub-reach .025 e No. .025 e No. .202 fine omment	Dus Dpth 27 2=Hort 2 ion 12=Rect 1.85 .139 .185 .139 .185 .139 .185 .139 .185 .139 .185 .025 .025 .025	anglr; 3-SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/Imperv/total .185 c.m/s .185 c.m/s .185 c.m/s	
9 17 18 14	9.180 350.000 1.000 1.300 350.000 .000 1 .250 77.000 77.000 77.000 75.87 ADD RUNC ROUTE ROUTE	Area in Length Gradien Per cen Length %Imp. w Option Office SCS Cur Ia/S Co Initial Option OIS Conduit Supply Supply Beta we Routing No. of OIS conduit Supply Supply Supply Beta we Routing No. of OIS conduit Supply Supply Supply Supply Supply Beta we Routing No. of OIS conduit Supply Supply Beta we Routing No. of Conduit Supply Supply Supply Supply Beta we Routing No. of Conduit Supply Suppl	hectares (PERV) mev t (%) ith Zero 1 isSCS (N/* *n* ve No or 2 isSCS (N/* Abstract. .014 .803 .025 Length X-factor . K-lag (se ub-reach. .025 e No. .025 e No. .025 fine omment *Tormertererererererererererererererererere	Dus Dpth 2/ 2=Hort 1 1 1 139 .185 .139 .185 .025 .025 .025 .025	anglr; 3-SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/Imperv/total .185 c.m/s .185 c.m/s .185 c.m/s	
9 17 18 14 35	9.180 350.000 1.000 1.000 1.000 1.000 2.50 77.000 7.587 1  ADD RUTE  ROUTE  ROUTE       COMEINE 2 Jun       	Area in Length Gradien Per cen Length %Imp. w Option Office SCS Cur Ia/S Co Initial Option OIS Conduit Supply Supply Beta we Routing No. of OIS conduit Supply Supply Supply Beta we Routing No. of OIS conduit Supply Supply Supply Supply Supply Beta we Routing No. of OIS conduit Supply Supply Beta we Routing No. of Conduit Supply Supply Supply Supply Beta we Routing No. of Conduit Supply Suppl	hectares (PERV) met t (%) t Impervi (IMPERV) ith Zero 1 I=SCS CM/ *n* ve No or 2 efficient Abstract. 1=Triangl: .014 .014 .025 Length X-factor K-lag (se ighting f, timestep sub-reach .025 e No. .025 e No. .202 fine omment	Dus Dpth 2/ 2=Hort 1 1 1 139 .185 .139 .185 .025 .025 .025 .025	anglr; 3-SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/Imperv/total .185 c.m/s .185 c.m/s .185 c.m/s	
9 17 18 14	9.180 350.000 1.000 1.000 1.000 1.000 1.000 1.250 77.000 77.000 7.587 1  ADD RUNE ROUTE ADD RUNE 2  COMBINE 2  COMPLUEN 2  COMPLUEN 2       	Area in Length Gradien Per cen Length % Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Beta we Routing No. of 015 Conduit Supply Supply Beta we Routing No. of 015 CE Letion Nod 015 CE Letion Nod 015 Letion Nod 015	hectares (PERV) me t (%) (IMPERV) ith Zero 1 1=SCS CN/(* *n* ve No or 2 deficient 1=Triangl: .014 .803 .025 Length X-factor K-lag (see ighting f, timestep sub-reach .025 e No. .202 fine omment * STORM EVEL ***********************************	Dus Dpth 2: 2=Hort 2 ion r; 2=Redt .139 .185 .139 .185 c.5 2) actor 20 .025 .025 .025	anglr; 3-SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/Imperv/total .185 c.m/s .185 c.m/s .185 c.m/s	
9 17 18 14 35	9.180 350.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 75.87 ADD COUTE .000 .500 .500 .000 .000 .500 .0000 .000 .000 .000 .000 .000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Supply Supply No. of 015 Conduit Supply Suppl	hectares (PERV) met t (%) t Imperv) ith Zero 1 l=ScS CM/* "n" ve No or 2 efficient Abstract. 1=Triangl: .014 .803 .025 Length X-factor 4 K-lag (see ighting f, timestep sub-reach .025 e No. .025 e No. .025 e No. .025 fine omment ************************************	Dus Dpth C: 2=Hort C ion r; 2=Rect .185 .139 .185 .139 .185 .139 .185 .025 .025 .025 .025 .025 .025	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	
9 17 18 14 35	9.180 350.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 75.87 .000 .507 .000 .500 600.000 .500 600.000 .000 .500 .500 .000 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .0000 .000 .000 .000 .000 .0000 .0000 .0000 .0000 .0000 .000	Area in Length Gradien Per cen Nemosities SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Dis Conduit Supply Supply No. of 015 Conduit Supply Suppl	hectares (PERV) me t (%) t Imperv) (IMPERV) ith Zero 1 l=SCS CM/* *n* ve No or 2 efficient Abstract. .014 .803 .025 Length X-factor K-lag (sei ighting f, timestep sub-reach .025 e No. .025 e No. .025 e No. .025 e No. .025 fine omment ************************************	Dus Dpth C: 2=Hort C ion :12=Rect .185 .139 .185 .139 .185 .139 .185 .025 .025 .025 .025 .025 .025 .025 .02	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	
9 17 18 14 35	9.180 350.000 1.300 350.000 .000 1.300 77.000 77.000 77.000 77.000 70.000 75.87 .000	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial 0ption 015 Conduit Supply Sup	hectares (PERV) me t (%) (IMPERV) ith Zero 1 1=SCS CN/* *n* ve No or 2 storm Abstract. .014 .803 .025 Length X-factor . K-lag (see ighting fi timestep sub-reach. .025 e No. .025 e No. .025 fine omment ************************************	Dus Dpth 2/ 2=Hort 1 100 r; 2=Rect 185 .139 .185 .025 .025 .025 .025 .025 .025 .025 .02	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	
9 17 18 14 35	9.180 350.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 75.87 .000 .507 .000 .500 600.000 .500 600.000 .000 .500 .500 .000 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .000 .500 .0000 .000 .000 .000 .000 .0000 .0000 .0000 .0000 .0000 .000	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial 0ption 015 Conduit Supply Sup	hectares (PERV) me t (%) t Impervi (IMPERV) ith Zero 1 =SCS CM/ *n* ve No or 2 efficient Abstract. 1=Triangl: .014 .803 .025 Length X-factor K-lag (see ighting f, timestep sub-reach .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 fine comment ************************************	Dus Dpth 2/ 2=Hort 1 100 r; 2=Rect 185 .139 .185 .025 .025 .025 .025 .025 .025 .025 .02	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	
9 17 18 14 35	9.180 30.000 1.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 7.587 1 .000 .500 .500 .500 .500 .500 .500 .500 .500 .500 .500 .500 .000 .5	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 Conduit Supply Sup	hectares (PERV) met t (%) t Impervi (IMPERV) ilt Zero 1 l=SCS CM/ *n* ve No or 2 deficient Abstract. 1=Triangl: .014 .803 .025 Length X-factor K-lag (see ighting f timestep sub-reach .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 fine comment ************************************	Dus Dpth C: 2=Hort C ion :185 .139 .185 .139 .185 .025 .025 .025 .025 .025 .025 .025 .02	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/inperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	
9 17 18 14 35 2	9.180 350.000 1.300 350.000 .000 .100 77.000 77.000 77.000 75.87 .007 .100 75.87 .000 .500 .0000 .000 .000 .000 .000 .000 .000 .000 .000	Area in Length Gradien Per cen Length %Img. w Option Official SCS Cur Ia/S Co Initial Option OI5 Conduit Supply Supply DI5 Conduit Supply Supply Beta we Routing No. of OI5 Conduit Supply Supply Eta we Routing No. of OI5 Conduit Supply Supply Eta we Routing No. of OI5 Conduit Supply Supply Eta we Routing No. of OI5 CE Center Conter Conduit CE Conduit Supply Supply Beta we Routing No. of OI5 CE Center Conte	hectares (PERV) met t (%) t Imperv) ith Zero 1 l=ScS CN/* *n* ve No or 2 state abstract. .014 .025 Length X-factor - K-lag (see ighting f, timestep sub-reach .025 e No. .025 e No. .025 fine omment ************************************	Dus Dpth C: 2=Hort C ion :185 .139 .185 .139 .185 .025 .025 .025 .025 .025 .025 .025 .02	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	
9 17 18 14 35 2	9.180 350.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 75.87 .000 .507 .000 .500 600.000 .000 .500 600.000 .000 .500 .0000 .000 .000 .000 .0000 .0000 .0000 .0000 .0000 .000	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Deta we Routing No. of 015 CCE Letion Nod 015 CCE Letion Nod 015 CCE Constan Exponen Fraction Juration Supply Duration Constan Exponen Fraction Constan Fraction Constan Exponen Fraction Constan Exponen Fraction Constan Exponen Fraction Constan Exponen Fraction Constan Exponen Fraction Constan Exponen Fraction Constan Exponen Fraction Constan Exponen Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fraction Constan Fracti	hectares (PERV) me t (%) t Imperv) ith Zero 1 l=ScS CN/* *n* ve No or C efficient Abstract. 1=Triangl: .014 .803 .025 Length X-factor - K-lag (se) ighting f, timestep sub-reach .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 fine comment ************************************	Dus Dpth C: 2=Hort C: .185 .139 .185 .139 .185 c.5 .025 .025 .025 .025 .025 .025 .025 .0	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/inperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	
9 17 18 14 35 2	9.180 350.000 1.000 1.300 350.000 .000 1.300 77.000 77.000 77.000 77.000 7.587 .0000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000 .000	Area in Length Gradien Per cen Length Voption Manning SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Deta we Routing No. of 015 Conduit Supply Beta we Routing No. of 015 Cele (c) of c Conduit Supply Beta we Routing No. of 015 Cele (c) of c Cele (c) of c) c Cele (c) of c) c Cele (c) c) c Cele (c)	hectares (PERV) met t (%) ith Zero 1 1=SCS CN/* *n* ve No or C efficient 1=Triangl: .014 .803 .025 Length X-factor . .025 e No. .025 e No. .025 e No. .025 e No. .025 fine omment ************************************	Dus Dpth C; 2=Hort 2 ion :185 .139 .185 .139 .185 c.5 2) actor :025 .025 .025 .025 .025 .025 .025 .025	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/inperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	
9 17 18 14 35 2	9.180 350.000 1.000 1.300 350.000 .000 1.300 77.000 77.000 77.000 75.87 .000 .013 .000 .013 .000 .013 .000 .013 .010 .013 .010 .013 .010	Area in Length Gradien Per cen Length %Imp. w Option Manning SCS Cur Ia/S Co Initial 0ption 015 Conduit Supply Supply Beta we Routing No. of 015 CCC Conduit Supply Supply Supply Supply Supply Supply Beta we Routing No. of 015 CCC Conduit Supply Supply Supply Beta we Routing No. of 015 CCC CCC CCC Lection Nod 015 CCC CCC Lection Nod 015 CCC CCC Lection Nod 015 CCC CCC CCC Lection Nod 015 CCC CCC CCC Constan Exponen Fraction Duratio 34.453 m USO Option Manning SCS CCUR Larks Option CCC Larks Larks Confin Larks Con Initial Tr	hectares (PERV) met t (%) t Impervi (IMPERV) ith Zero 1 l=SCS CN/ *n* ve No or 2 efficient Abstract. 1=Triangl: .014 .803 .025 Length X-fad (ser ighting f timestep sub-reach .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 fine sub-reach .025 e No. .025 e No. .025 imestep sub-reach .025 e No. .025 imestep sub-reach .025 imestep sub-reach .025 imestep sub-reach .025 imestep sub-reach .025 imestep sub-reach .025 e No. .025 imestep sub-reach .026 imestep sub-reach .026 im	Dus Dpth C; 2=Hort 2 ion :185 .139 .185 .139 .185 c.5 2) actor :025 .025 .025 .025 .025 .025 .025 .025	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/inperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	
9 17 18 14 35 2 3	9.180 30.000 1.000 1.300 350.000 .000 .100 77.000 .100 77.000 .100 7.507 .000 .507 .000 .500 .000 .000 .000 .500 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .00000 .0000 .000000 .00000 .0000 .000000 .00000 .0000 .00000000	Area in Length Gradien Per cen SCS Cur Ia/S Co Initial Option 015 Conduit Supply Supply Dis Conduit Supply Supply Beta we Routing No. of 015 Conduit Supply Supply Conduit Supply Supply Beta we Routing No. of 015 Conduit Supply Supply Beta we Routing No. of 015 Conduit Supply Supply Beta we Routing No. of 015 CE Letion Nod 015 CE Letion Nod 015 CE Letion Soft CE Letica Coeffic Constan Exponen Fraction Juratio 34.453 m US OUS	hectares (PERV) met t (%) t Imperv) ith Zero 1 l=SCS CN/4 *n* ve No or C efficient Abstract. .014 .803 .025 Length X-factor K-lag (see ighting f, timestep sub-reach .025 e No. .025 e No. .025 inne go;2=Huff STORM EVE ***********************************	Dus Dpth C; 2=Hort 2 ion :185 .139 .185 .139 .185 c.5 2) actor :025 .025 .025 .025 .025 .025 .025 .025	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/inperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	
9 17 18 14 35 2 3	9.180 350.000 1.000 1.300 350.000 .000 1.300 77.000 77.000 77.000 75.87 .000 .013 .000 .013 .000 .013 .000 .013 .010 .013 .010 .013 .010	Area in Length Gradien Per cen Length %Imp. w Option Olf 130 SCS Cur Ia/S Co Initial Option Olf Conduit Supply Supply Beta we Routing No. of 015 Conduit Supply Beta we Routing No. of 015 Conduit Supply Beta we Routing No. of 015 Conduit Supply Beta we Routing No. of 015 Conduit Supply Beta we Routing No. of 015 CE Ection Nod 015 CE Ection Nod 015 CE Ection Soft CE Ection Soft CE Ection Soft CI Supply Supply Beta we Routing No. of 015 CE Ection Nod 015 CE Ection Soft CE Ection Soft CE Ection Soft CO Supply Supply Beta we Routing No. of CI Supply Supply Supply Supply CE Ection Nod Of Supply CE Ection Nod CI Supply Supply CE Ection Nod CI Supply CE Ection Nod CI Supply CE Ection Soft CE Ection Nod CI Supply CE Ection Nod CI Supply CE Ection Nod CO Supply CE Ection Nod CO Supply CE Ection Nod CO Supply CE Ection Nod CO Supply CE Ection Nod CO Supply CE Ection Nod CI Supply CE Ection Nod CO Supply CE Ection Nod CE Supply CE Ection Nod CE Supply CE Ection Nod CE Supply CE CE CE Ection Nod CE Supply CE CE CE Ection Nod CE Supply CE CE Ection Nod CE Supply CE CE CE Ection Nod CE CE CE CE CE CE CE CE CE CE CE CE CE	hectares (PERV) met t (%) t Impervi (IMPERV) ith Zero 1 l=SCS CN/ *n* ve No or 2 efficient Abstract. 1=Triangl: .014 .803 .025 Length X-fad (ser ighting f timestep sub-reach .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 e No. .025 fine sub-reach .025 e No. .025 e No. .025 imestep sub-reach .025 e No. .025 imestep sub-reach .025 imestep sub-reach .025 imestep sub-reach .025 imestep sub-reach .025 imestep sub-reach .025 e No. .025 imestep sub-reach .026 imestep sub-reach .026 im	Dus Dpth 2: 2=Hort 1.185 .139 .185 .025 .025 .025 .025 .025 .025 .025 .02	anglr; 3=SWM HYD; 4=Lin. Reserv .185 c.m/s C perv/inperv/total .185 c.m/s .185 c.m/s .202 c.m/s .000 c.m/s	

	.500 Gradient (%) 72.600 Per cent Impervious	
	100.000 Length (IMPERV)	
	.000 *Imp. with zero bpth 1 Option I=SCS CN(; Z=Horton; 3=Green-Ampt; 4=Repeat .250 Manning *n* 77.000 SCS Curve No or C .100 Ia/S Coefficient	
	77.000 SCS Curve No or C	
	.100 Ia/S Coefficient 7.587 Initial Abstraction	
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv	
	.275 .000 .025 .000 c.m/s .204 .828 .657 C perv/imperv/total	
15	.204 .828 .657 C perv/imperv/total ADD RUNOFF	
	.275 .275 .025 .000 c.m/s	
27	HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen	
	Volume = .6835738E+03 c.m	
11	CHANNEL	
	.500 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1:	
	.060 Manning's "n"	
	.060 Manning's 'n' 1.000 O/a Depth in metres .300 Select Grade in % Depth = .433 metres	
	Depth = .433 metres Velocity = .353 m/sec Flow Capacity - 2.047 c m/c	
	Velocity = .353 m/sec Flow Capacity = 2.047 c.m/s	
	Critical depth = .211 metres	
9	ROUTE	
	50.000 Conduit Length .000 Supply X-factor <.5	
	106.220 Supply K-lag (sec)	
	.567 Beta weighting factor	
	.567 Beta weighting factor 200.000 Routing timestep 1 No. of sub-reaches	
	.275 .275 .270 .000 c.m/s	
17	COMBINE 1 Junction Node No.	
	1 Junction Node No. .275 .275 .270 .270 c.m/s	
14	START	
4	1 1=Zero; 2=Define CATCHMENT	
-1	CAICHMENT 10.000 ID No.6 99999 17.530 Area in hectares 500.000 Length (PERV) metres	
	17.530 Area in hectares	
	500.000 Length (PERV) metres 1.000 Gradient (%)	
	75.000 Per cent Impervious	
	500.000 Length (IMPERV)	
	.000 %Imp. with Zero Dpth 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250 Manning "n"	
	77.000 SCS Curve No or C	
	.100 Ia/S Coefficient 7.587 Initial Abstraction	
	7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv	
	1.646 .000 .270 .270 c.m/s .204 .852 .690 C perv/imperv/total	
15	ADD RUNOFF	
	1.646 1.646 .270 .270 c.m/s	
27	HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen	
	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m	
10	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m POND	
	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m POND 6 Depth - Discharge - Volume sets 179.900 .000 .0	
	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m POND 6 Depth - Discharge - Volume sets 179.900 .000 .0 180.500 .0620 2842.9	
	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m POND 6 Depth - Discharge - Volume sets 179.900 .000 .0 180.500 .0620 2842.9 180.900 .224 5050.5	
	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m POND 6 Depth - Discharge - Volume sets 179.900 .00 .0 180.500 .0620 2842.9 180.900 .224 5050.5 181.100 .350 6243.3	
	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m POND 6 Depth - Discharge - Volume sets 179.900 .000 .0 180.500 .0620 2842.9 180.900 .224 5050.5 181.100 .350 6243.3 181.250 .678 7177.9 181.450 1.300 8478.7	
	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m POND 6 Depth - Discharge - Volume sets 179.900 .000 .0 180.500 .0620 2842.9 180.900 .224 5050.5 181.100 .350 6243.3 181.250 .678 7177.9 181.450 1.300 8478.7	
	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m POND 6 Depth - Discharge - Volume sets 179.900 .000 .0 180.500 .0620 2842.9 180.900 .224 5050.5 181.100 .350 6243.3 181.250 .678 7177.9 181.450 1.399 8478.7 Peak Outflow = .087 c.m/s Maximum Depth = 180.562 metres Maximum Storage = 3185.c.m	
	5 is # of Hyeto/Hydrograph chosen Volume = .4165142E+04 c.m POND 6 Depth - Discharge - Volume sets 179.900 .000 .0 180.500 .0620 2842.9 180.900 .224 5050.5 181.100 .350 6243.3 181.250 .678 7177.9 181.450 1.300 8478.7	
10	<pre>5</pre>	
10	<pre>5</pre>	
10	<pre>5</pre>	
10 17 18	<pre>5</pre>	
10	<pre>5</pre>	
10 17 18	<pre>5</pre>	
10 17 18 4	<pre>5</pre>	
10 17 18 4 15 11	<pre>5</pre>	
10 17 18 4	<pre>5</pre>	
10 17 18 4 15 11	<pre>5</pre>	

17	COMBINE 2 Junct	ion Node No.			
14	.02 START		.254	.254 c.m/s	
4	CATCHMENT	ro; 2=Define ID No.ó 99999			
	3.890	Area in hectares Length (PERV) metr	res		
	.500	Gradient (%) Per cent Imperviou			
	100.000	Length (IMPERV) %Imp. with Zero Dp			
	1			; 3=Green-Ampt; 4=Re	peat
	77.000 .100	SCS Curve No or C Ia/S Coefficient			
	1	Initial Abstractic Option 1=Trianglr	; 2=Rectan	glr; 3=SWM HYD; 4=Li	n. Reserv
	.02	.828	.254 .227	.254 c.m/s C perv/imperv/total	
15	ADD RUNOFF		.254	.254 c.m/s	
4		ID No.ó 99999 Area in hectares			
	350.000	Length (PERV) met: Gradient (%)	res		
	1.300	Per cent Imperviou Length (IMPERV)	us		
	.000	%Imp. with Zero D		; 3=Green-Ampt; 4=Re	peat
	.250	Manning "n" SCS Curve No or C		· · · · · ·	
	7.587	Ia/S Coefficient Initial Abstractio	on		
	.03	Option 1=Trianglr 38 .025	; 2=Rectan .254	glr; 3=SWM HYD; 4=Li: .254 c.m/s C perv/imperv/total	n. Reserv
15	.20 ADD RUNOFF	7			
9	.03 ROUTE		.254	.254 c.m/s	
	.500	Conduit Length Supply X-factor <			
	.500	Supply K-lag (sec Beta weighting fac Routing timestep			
		No. of sub-reaches	s .061	.254 c.m/s	
17	COMBINE 2 Junct	ion Node No.			
18	.03 CONFLUENCE	5	.061	.285 c.m/s	
14		ion Node No. 38 .285	.061	.000 c.m/s	
35		co; 2=Define			
	3 line(	s) of comment	****		
		DESIGN STORM EVEN			
2	STORM 1	1=Chicago;2=Huff;	3=User;4=C	dnlhr;5=Historic	
	.000	Coefficient a Constant b (m: Exponent c	in)		
	.400	Exponent c Fraction to peak Duration ó 240 m:			
3	4 IMPERVIOUS	15.533 mm Tota	l depth		
	1		; 2=Horton	; 3=Green-Ampt; 4=Re	peat
	98.000 .100	SCS Curve No or C Ia/S Coefficient			
4	CATCHMENT		on		
	3.020	ID No.ó 99999 Area in hectares			
	.500	Length (PERV) metr Gradient (%) Per cent Imperviou			
	100.000	Length (IMPERV) %Imp. with Zero Dp			
	1 .250	Option 1=SCS CN/C Manning "n"	; 2=Horton	; 3=Green-Ampt; 4=Re	peat
	.100	SCS Curve No or C Ia/S Coefficient			
	1	Initial Abstractic Option 1=Trianglr	; 2=Rectan	glr; 3=SWM HYD; 4=Li:	n. Reserv
15	.36 .27 ADD RUNOFF	.869	.061 .707	.000 c.m/s C perv/imperv/total	
27	. 36 HYDROGRAPH	.364	.061	.000 c.m/s	
21	5 is#	of Hyeto/Hydrograp .9720645E+03 c.m			
11	CHANNEL .500	Base Width =			
	3.000	Left bank slope Right bank slope	1: 1:		
	1.000	Manning's "n" O/a Depth in metro	es		
	Depth	Select Grade in % = .489 r = .379 r	metres		
	Velocity Flow Capac Critical d	city = 2.047 d	c.m/s		
9	ROUTE 50.000	Conduit Length			
	.000 98.910	Supply X-factor < Supply K-lag (sec Beta weighting fac	.5 )		
	200.000	Routing timestep			
	1	No. of sub-reaches	s .364	.000 c.m/s	
17	COMBINE				

	1 Junctic	on Node No.			
14	START	.364	.364	.364 c.m/s	
4	1 1=Zero; CATCHMENT				
	10.000 IE 17.530 Ar	) No.ó 99999 ea in hectares			
		ength (PERV) met adient (%)	ires		
	75.000 Pe	er cent Impervio ength (IMPERV)	ous		
	.000 %I	mp. with Zero I			
	.250 Ma	nning "n"		on; 3=Green-Ampt; 4=Repeat	
	.100 Ia	S Curve No or ( /S Coefficient			
		itial Abstract: tion 1=Triangli		anglr; 3=SWM HYD; 4=Lin. Reser	cv
	2.324	.000	.364	.364 c.m/s C perv/imperv/total	
15	ADD RUNOFF 2.324	2.324	.364	.364 c.m/s	
27	HYDROGRAPH D	DISPLAY Hyeto/Hydrogra			
10		5784277E+04 c.r			
10	6 Depth - Dis	charge - Volume			
	179.900 180.500	.0620 28	.0 342.9		
	180.900 181.100		050.5 243.3		
	181.250 181.450	1.399 84	177.9 178.7		
	Peak Outflow Maximum Dept	1.399 84 7 = .155 2h = 180.730 2age = 4113	5 c.m/s ) metres		
	Maximum Stor	age = 4113 2.324	. c.m .155	.364 c.m/s	
17	COMBINE		.155	.304 C.m/5	
10	2.324	on Node No. 2.324	.155	.397 c.m/s	
18	CONFLUENCE 1 Junctic				
4	2.324 CATCHMENT	.397	.155	.000 c.m/s	
		) No.ó 99999 ea in hectares			
	80.000 Le .500 Gr	ength (PERV) met adient (%)	ires		
	1.400 Pe 80.000 Le	adient (%) er cent Impervic ength (IMPERV)	ous		
	.000 %I	mp. with Zero I		on; 3=Green-Ampt; 4=Repeat	
	.250 Ma	unning "n" IS Curve No or (		Silv S-Green Amper 4-Repeat	
	.100 Ia	/S Coefficient			
	7.587 In 1 Op	tion l=Triangli	c; 2=Rect	anglr; 3=SWM HYD; 4=Lin. Reserve	cv
	.278	.397	.155	.000 c.m/s C perv/imperv/total	
15	ADD RUNOFF .059	.426	.155	.000 c.m/s	
11		se Width =			
	3.000 Ri	ft bank slope ght bank slope			
		nning's "n" a Depth in metr	res		
	.200 Se Depth	elect Grade in 9 = .570 - 339	2		
	Velocity Flow Capacit		m/acc		
9	Critical dep ROUTE		metres		
9	200.000 Cc	onduit Length			
	442.546 Su	upply X-factor • upply K-lag (see	2)		
	600.000 Rc	outing timestep	ICCOL		
	.059	o. of sub-reache .426	es .357	.000 c.m/s	
17	COMBINE 2 Junctic	on Node No.			
14	.059 START	.426	.357	.357 c.m/s	
4	1 1=Zero; CATCHMENT	2=Define			
-	40.000 II	No.ó 99999 ea in hectares			
	100.000 Le	ength (PERV) met	ires		
	3.700 Pe	adient (%) r cent Impervio	ous		
	.000 %I	ength (IMPERV) mp. with Zero I			
	.250 Ma	nning "n"		on; 3=Green-Ampt; 4=Repeat	
		S Curve No or ( /S Coefficient	2		
	1 Op	itial Abstract: tion 1=Triangli	; 2=Rect	anglr; 3=SWM HYD; 4=Lin. Reser	cv
	.060	.000	.357	.357 c.m/s C perv/imperv/total	
1.5					
15	.278 ADD RUNOFF		.357		
4	.278 ADD RUNOFF .060 CATCHMENT	.060	.357	.357 c.m/s	
	.278 ADD RUNOFF .060 CATCHMENT 50.000 IE 9.180 Ar	.060 No.ó 99999 Tea in hectares			
	.278 ADD RUNOFF .060 CATCHMENT 50.000 IE 9.180 Ar 350.000 Le 1.000 Gr	.060 ) No.ó 99999 rea in hectares ength (PERV) met radient (%)	ires		
	.278 ADD RUNOFF .060 CATCHMENT 50.000 II 9.180 Az 350.000 Le 1.300 Pe 350.000 Le	.060 No.6 99999 Tea in hectares Ength (PERV) met adient (%) Er cent Impervio Ength (IMPERV)	eres		
	.278 ADD RUNOFF .060 CATCHMENT 50.000 ID 9.180 Ar 350.000 Le 1.000 Gr 1.300 Pe 350.000 Le .000 %I 1 Op	.060 ) No.6 99999 rea in hectares ength (PERV) met adient (%) er cent Impervio ength (IMPERV) imp. with Zero I tion 1=SCS CN/(	tres ous Opth		
	278 ADD RUNOFF 060 CATCHMENT 50.000 II 9.180 Ar 1.300 C 1.300 C 350.000 Le 000 %I 0 C 7.250 M% 77.000 SC	.060 ) No.ó 99999 rea in hectares ength (PERV) met radient (%) mer cent Impervit (IMPERV) mp. with Zero I otion 1=SCS CN/( unning *n* S Curve No or (	tres ous Opth C; 2=Hort	.357 c.m/s	
	278 ADD RUNOFF 060 CATCHHENT 50.000 Lt 1.000 Gt 1.300 Lt 350.000 Lt 250 M0 10 77.000 SC 100 SC 100 SC 100 SC 	.060 ) No.6 99999 rea in hectares adient (%) rr cent Impervic mp. with Zero I ttion 1=SCS CN/C unning "n" SC Curve No or ( //S Coefficient titial Abstract:	bus Dpth C; 2=Hort C Lion	.357 c.m/s on; 3=Green-Ampt; 4=Repeat	
	278 ADD RUNOFF 060 CATCHHENT 50.000 Lt 1.000 Gt 1.300 Lt 350.000 Lt 250 M0 10 77.000 SC 100 SC 100 SC 100 SC 	.060 ) No.6 99999 rea in hectares adient (%) rr cent Impervic mp. with Zero I ttion 1=SCS CN/C unning "n" SC Curve No or ( //S Coefficient titial Abstract:	bus Dpth C; 2=Hort C Lion	.357 c.m/s	rv

.088 .060 .357 .357 c.m/s .278 .884 .286 C perv/imperv/total 15 ADD RUNOFF .088 .138 .357 .357 c.m/s 9 ROUTE .000 Conduit Length .500 Supply X-factor <.5 .000 Supply K-lag (sec) .500 Beta weighting factor S00.000 Routing timestep 1 No. of sub-reaches .088 .138 .11 COMBINE 2 Junction Node No. .088 .431 .11 START 1 =zeroi 2=Define COMMENT Conduit Length .000 600.000 1 .138 .357 c.m/s 17 .138 .431 c.m/s 18 .138 .000 c.m/s 14 COMMENT 35 COMMENT line(s) of comment \*\* 10 YEAR DESIGN STORM EVENT \*\* 2 STORM 1=Chicago; 2=Huff; 3=User; 4=Cdnlhr; 5=Historic l=chicago;2=Hufr;3=User;4 Coefficient a Constant b (min) Exponent c Fraction to peak r Duration ó 240 min 52.818 mm Total depth US 608.845 .000 .400 240.000 IMPERVIOUS 3 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction .013 98.000 .100 .518 4 CATCHMENT ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "\* SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Triang1r; 2=Rectang1r; 3=SWM HYD; 4=Lin. Reserv 42 .000 .138 .000 c.m/s ID No.ó 99999 20.000 3.020 100.000 .500 72.600 100.000 .000 1 .250 .230 77.000 .100 7.587 1 .442 .000 .138 .000 c.m/s .320 .887 .732 C perv/imperv/total ALD RUNOFF .442 .442 .138 HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .1167105E+04 c.m CHANNEL 15 ADD RUNOFF .000 c.m/s 27 11 Supply K-lag (sec) Beta weighting factor Routing timestep No. of sub-reaches 42 .442 .425 .618 200.000 1 No. 02 .442 .442 .... COMBINE 1 Junction Node No. .442 .442 .425 .000 c.m/s 17 1 .425 c.m/s 14 L 1=Zero, 2.. CATCHMENT 10.000 ID No.6 99999 17.530 Area in hectares 500.000 Length (PERV) metres ~~dient (%) 4 10.000 17.530 500.000 Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning \*\* SCS Curve No or C La(S Coefficient 1.000 500.000 .250 77.000 Ia/S Coefficient .100 7.587 

 7.587
 Initial Abstraction

 1
 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv

 2.767
 .000
 .425
 .425 c.m/s

 .320
 .892
 .749
 C perv/imperv/total

 ADD RUNOFF
 2.767
 2.767
 .425
 .425 c.m/s

 HYDROGRAPH DISPLAY
 5
 is # of HyetO/Hydrograph chosen
 Volume = .6933451E+04 c.m

 Volume
 .6933451E+04 c.m
 POND

 Initial Abstraction 15 27 10 
 180.500
 .0620
 2842.9

 180.900
 .224
 5050.5

 181.100
 .350
 6243.3

 181.450
 1.399
 8478.7

 Peak Outflow
 =
 .203 c.m/s

 Maximum Depth
 =
 180.849 metres

 Maximum Storage
 4769. c.m
 2.767
 .203
 .425 c.m/s

17	COMBINE	
1/	1 Junction Node No.	
18	2.767 2.767 .203 .468 c.m/s	
10	CONFLUENCE 1 Junction Node No.	
4	2.767 .468 .203 .000 c.m/s CATCHMENT	
4	30.000 ID No.ó 99999	
	3.670 Area in hectares 80.000 Length (PERV) metres	
	.500 Gradient (%)	
	1.400 Per cent Impervious 80.000 Length (IMPERV)	
	.000 %Imp. with Zero Dpth	
	<pre>1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .250 Manning "n"</pre>	
	77.000 SCS Curve No or C	
	.100 Ia/S Coefficient 7.587 Initial Abstraction	
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Rese	rv
	.093 .468 .203 .000 c.m/s .320 .893 .328 C perv/imperv/total	
15	ADD RUNOFF	
11	.093 .514 .203 .000 c.m/s CHANNEL	
	.500 Base Width =	
	3.000 Left bank slope 1: 3.000 Right bank slope 1:	
	.060 Manning's "n"	
	1.000 O/a Depth in metres .200 Select Grade in %	
	Depth = .616 metres	
	Verocity555 m/sec	
	Flow Capacity = 1.671 c.m/s Critical depth = .287 metres	
9	ROUTE 200.000 Conduit Length	
	.177 Supply X-factor <.5	
	422.150 Supply K-lag (sec) .500 Beta weighting factor	
	600.000 Routing timestep	
	1 No. of sub-reaches .093 .514 .439 .000 c.m/s	
17	COMBINE	
	2 Junction Node No. .093 .514 .439 .439 c.m/s	
14	START	
4	1 l=Zero; 2=Define CATCHMENT	
	40.000 ID No.ó 99999 3.890 Area in hectares	
	100.000 Length (PERV) metres	
	.500 Gradient (%) 3.700 Per cent Impervious	
	100.000 Length (IMPERV)	
	1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250 Manning "n" 77.000 SCS Curve No or C	
	.100 Ia/S Coefficient	
	7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Rese	rv
	.086 .000 .439 .439 c.m/s .320 .887 .341 C perv/imperv/total	
15	ADD RUNOFF	
4	.086 .086 .439 .439 c.m/s CATCHMENT	
	50.000 ID No.6 99999	
	9.180 Area in hectares 350.000 Length (PERV) metres	
	1.000 Gradient (%)	
	1.300 Per cent Impervious 350.000 Length (IMPERV)	
	.000 %Imp. with Zero Dpth 1 Option 1=SCS_CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	
	.250 Manning "n"	
	77.000 SCS Curve No or C	
	.100 Ia/S Coefficient 7.587 Initial Abstraction 1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Rese	
	1 Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Rese .134 .086 .439 .439 c.m/s	rv
	.134 .086 .439 .439 c.m/s .320 .898 .327 C perv/imperv/total	
15	ADD RUNOFF .134 .208 .439 .439 c.m/s	
9	ROUTE	
	.000 Conduit Length .500 Supply X-factor <.5	
	.000 Supply K-lag (sec)	
	.500 Beta weighting factor 600.000 Routing timestep	
	1 No. of sub-reaches	
17	.134 .208 .208 .439 c.m/s COMBINE	
17	2 Junction Node No.	
18	.134 .208 .208 .559 c.m/s CONFLUENCE	
	2 Junction Node No.	
14	.134 .559 .208 .000 c.m/s START	
35	1 1=Zero; 2=Define COMMENT	
55	<pre>3 line(s) of comment</pre>	
	**************************************	
	********	
2	STORM 1 l=Chicago;2=Huff;3=User;4=Cdnlhr;5=Historic	
	715.568 Coefficient a	
	.000 Constant b (min) .699 Exponent c	
	.400 Fraction to peak r	
	.400 Fraction to peak r 240.000 Duration ó 240 min	
3	.400 Fraction to peak r 240.000 Duration ó 240 min 62.077 mm Total depth IMPERVIOUS	
3	.400 Fraction to peak r 240.000 Duration ó 240 min 62.077 mm Total depth IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat .013 Manning "n"	
3	.400 Fraction to peak r 240.000 Duration ó 240 min 62.077 mm Total depth IMPERVIOUS 1 Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat	

.100 Ia/S Coefficient .518 CATCHMENT 20.000 3.020 Initial Abstraction 4 ID No.ó 99999 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C? 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No. cr C 100.000 .500 72.600 100.000 . 250 77.000 SCS Curve No or C .100 Ia/S Coefficient 7.587 Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .543 .000 .208 .000 c.m/s .367 .905 .757 C perv/imperv/total ADD RUNOFF .543 .543 .208 HYDROGRAPH DISPLAY 15 .000 c.m/s 27 HYDROUGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .14195368+04 c.m CHANNEL .500 Base Width = 3.000 Left bank slope 1: 11 .500 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1: 0.600 Manning's "n" 1.000 O'a Depth in metres .300 Select Grade in % Depth = .579 metres Velocity = .419 m/sec Flow Capacity = 2.047 c.m/s Critical depth = .295 metres ROUTE ROUTE q Conduit Length Supply X-factor <.5 Supply K-lag (sec) Beta weighting factor 50.000 .0000 89.446 .640 200.000 Routing timestep No. of sub-reaches 43 .543 1 \_ No .543 COMBINE .500 .000 c.m/s 17 COMBINE 1 Junction Node No. .543 .543 .500 START 1 1=Zero; 2=Define .500 c.m/s 14 CATCHMENT 4 ID No.ó 99999 10.000 17.530 ID No.5 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) 17.530 500.000 1.000 75.000 500.000 Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 22 000 500 c m/s .000 .250 77.000 .100 7.587 1 3.322 .000 .500 .500 c.m/s .367 .910 .774 C perv/imperv/total ADD RUNOFF 15 ALD RUNOFF 3.322 3.322 .500 .500 c.m/s HYDROGRAPH DISPLAY 5 is # of Hyeto/Hydrograph chosen Volume = .8425626E+04 c.m POND 27 10 POND 
 POND

 6 Depth - Discharge - Volume sets

 179.900
 .000
 .0

 180.500
 .0620
 2842.9

 180.900
 .224
 5050.5

 181.100
 .350
 6243.3
 Discharge -.000 .0620 .224 .350 .678 .500 c.m/s 17 Junction Node No. 1 Junction Node No. 3.322 3.322 .281 .555 c.m/s 18 CONFLUENCE 
 CONFIDENCE

 1
 JUnction Node No.

 3.322
 .555
 .281

 CATCHMENT
 30.000
 ID No.6 99999

 3.670
 Area in hectares
 .000 c.m/s 4 ID No.6 99999 Area in hectares Length (PERV) metres Gradient (%) Per cent Impervious Length (IMPERV) %Imp. with Zero Dpth Option 1=SCS CM/C? 2=Horton; 3=Green-Ampt; 4=Repeat Manning "n" SCS Curve No or C 80.000 .500 1.400 80.000 .000 .250 77.000 SCS Curve No or C 100 Ia/S Coefficient 7.587 1 ADD RUNOFF .137 15 .631 .281 .000 c.m/s . CHANNEL 11 CHANNEL .500 Base Width = 3.000 Left bank slope 1: 3.000 Right bank slope 1: .060 Maning's "n" 1.000 O/a Depth in metres .200 Select Grade in % Depth = .671 metres Velocity = .374 m/sec Flow Capacity = .317 metres ROUTE 9 ROUTE 200.000 Conduit Length

	.151	Supply X-factor <.	F
	401.078	Supply K-lag (sec)	
	.500	Beta weighting fac Routing timestep	tor
	1	No. of sub-reaches	
17	COMBINE	137 .631	.560 .000 c.m/s
		ction Node No.	FC0/-
14	START	137 .631	.560 .560 c.m/s
4	1 1=Z CATCHMEN	ero; 2=Define T	
-	40.000	ID No.ó 99999	
	3.890 100.000	Area in hectares Length (PERV) metr	es
	.500	Gradient (%)	
	3.700 100.000	Per cent Imperviou Length (IMPERV)	S
	.000	simp. with zero bp	th 2=Horton; 3=Green-Ampt; 4=Repeat
	.250	Manning "n"	z=horcon, s=sreen Amper 4=kepeac
	77.000 .100	SCS Curve No or C Ia/S Coefficient	
	7.587	Initial Abstractio	
	1	Option l=Trianglr; 138 .000	2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .560 .560 c.m/s
15	ADD RUNO	367 .905	.387 C perv/imperv/total
		138 .138	.560 .560 c.m/s
4	CATCHMEN 50.000	T ID No.ó 99999	
	9.180	Area in hectares	
	350.000 1.000	Length (PERV) metr Gradient (%)	
	1.300 350.000	Per cent Imperviou Length (IMPERV)	s
	.000	simp. with zero bp	th
	1 .250	Option 1=SCS CN/C; Manning "n"	2=Horton; 3=Green-Ampt; 4=Repeat
	77.000	SCS Curve No or C Ia/S Coefficient	
	7.587	Initial Abstractio	
	1	Option 1=Trianglr; 200 .138	2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .560 .560 c.m/s
15		367 .911	.374 C perv/imperv/total
		200 .313	.560 .560 c.m/s
9	ROUTE	Conduit Length	
	.500	Supply X-factor <.	5
	.000	Supply K-lag (sec) Beta weighting fac	tor
	600.000 1	Routing timestep No. of sub-reaches	
17	COMBINE	200 .313	.313 .560 c.m/s
17	2 Jun	ction Node No.	
18	CONFLUEN	200 .313 CE	.313 .757 c.m/s
	2 Jun	ction Node No.	.313 .000 c.m/s
14	START		.515 .000 C.m/B
35		ero; 2=Define	
	COMMENT		
	3 lin	e(s) of comment	***
	3 lin ********* ** 50 YE	**************************************	T **
2	3 line ******** ** 50 YE ******** STORM	**************************************	T ** ****
2	3 line ********* ** 50 YE ********* STORM 1	AR DESIGN STORM EVEN	T **
2	3 lin ********* ** 50 YE ******** STORM 1 794.298 .000	AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi	T ** **** =User;4=Cdnlhr;5=Historic
2	3 line ******** ** 50 YE ************************************	AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak	T ** **** =User;4=Cdnlhr;5=Historic n) r
2	3 lin ******** ** 50 YE ******** STORM 1 794.298 .000 .699	AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi	T ** **** =User;4=Cdnlhr;5=Historic n) r n
2	3 lin. ******* ** 50 YE ******* STORM 1 794.298 .000 .699 .400 240.000 IMPERVIO	1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US	T ** =User;4=Cdnlhr;5=Historic n) r n depth
	3 linn ***50 YE ******** 570RM 1 794.298 .000 .699 .400 240.000 IMPERVIOL 1 .013	<pre>AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning *n*</pre>	T ** **** =User;4=Cdnlhr;5=Historic n) r n
	3 lin. ******** ******** STORM 1794.298 .000 .699 .400 240.000 IMPERVIO 1 .013 98.000	AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration 6 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C	T ** =User;4=Cdnlhr;5=Historic n) r n depth
3	3 lin. ******** ** 50 YE. ******** STORM 1 794.298 .000 .699 .400 240.000 IMPERVIOI 1 013 98.000 .518	AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio	T ** **** =User;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat
	3 lin. ******** * 50 YE: ******* STORM 1 794.298 .000 .699 .400 240.000 IMPERVIO 1 1 .013 98.000 .513 98.000 .513 CATCHHENY 20.000	AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration 6 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 99999	T ** **** =User;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat
3	3 lin. ************************************	AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T D No.6 99999 Area in hectarse	T ** =User;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n
3	3 lin. ********* ** 50 YE: ************************************	AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration 6 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction T ID No.6 99999 Area in hectares Lendth (PERV) metr	T ** =User;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n
3	3 lin. ******** ******** STORM 1 794.298 .000 .699 .400 240.000 IMPERVIO 1 .013 98.000 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600	AR DESIGN STORM EVEN 1-Chicago:2-Huff/3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1-SCS CN/C; Manning "n" SCS Curve No or C IA/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV)	<pre>T ** =User;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n es s</pre>
3	3 lin. ** 50 YE. STORM 1 794.298 .000 240.000 IMPERVIO 240.000 IMPERVIO 10 .013 98.000 .100 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600	<pre>AR DESIGN STORM EVEN l=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning 'm' SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp.wit Zero Dp</pre>	T ** =User;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n es s th
3	3 lin. ** 50 YE. ** 50 YE. ************************************	<pre>AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning *n* SCS Curve No r C Ia/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp.with Zero Dp Option 1=SCS CN/C; Manning *n*</pre>	<pre>T ** =User;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n es s</pre>
3	3 lin. ******** ******* STORM 1 794.298 .000 .699 .400 240.000 IMPERVIOU 1 .013 98.000 .518 CATCHMEN 20.000 3.020 100.000 .500 72.600 100.000 .1	AR DESIGN STORM EVEN 1-Chicago:2-Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1-SCS CN/C; Manning "n" SCS Curve No or C IA/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp. with Zero Dp Option 1-SCS CN/C;	T ** =User;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n es s th
3	3 lin. ******** ******* STORM 1 794.298 .000 .699 .400 240.000 IMPERVIOU 240.000 IMPERVIOU 240.000 .518 CATCHMEN 20.000 3.020 100.000 .550 72.600 100.000 .250 77.000	<pre>l=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 9999 Area in hectares Length (FPRV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp wit Zero Dp Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n es s th 2=Horton; 3=Green-Ampt; 4=Repeat n</pre>
3	3 lin. ************************************	<pre>AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68,907 mm Total US Option 1=SCS CN/C; Manning *n* SCS Curve No or C IA/S Coefficient Initial Abstractio F ID No.ó 99999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp.with Zero Dp Option 1=SCS CN/C; Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstractio Option 1=Trianglr; 619 .000</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s</pre>
3	3 lin. ********* * 50 YE: ******* STORM 1 794.298 .000 .699 .400 240.000 IMPERVIO 1 0.13 98.000 .510 .500 72.600 100.000 .500 72.600 100.000 .100 .250 77.000 .100 .100 .100 .100 .100 .100	<pre>AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning 'n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 9999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp. with Zero Dp Option 1=SCS CN/C; Manning 'n" SCS Curve No or C Ia/S Coefficient Initial Abstractio Option 1=Trianglr; 619 .000 397 .913 FF</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s .772 C perv/imperv/total</pre>
3	3 lin. ************************************	<pre>AR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration 6 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) metr Gradient (%) Per cent Imperviou 1 a/S Coefficient Initial Abstractio Option 1=frianglr; 619 .619</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s</pre>
3 4 15	3 lin. ************************************	<pre>aR DESIGN STORM EVEN 1=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration 6 240 mi 68,907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (FPRV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp.wit Zero Dp Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstraction Option 1=Trianglr; 619 .010 PH DISPLAY # of Hyeto/Hydrograp # of Hyeto/Hydrograp</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s .772 C perv/imperv/total .313 .000 c.m/s</pre>
3 4 15	3 lin. ************************************	<pre>l=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning 'n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp.with Zero Dp Option 1=SCS CN/C; Manning 'n" SCS Curve No or C Ia/S Coefficient Initial Abstractio Option 1=Trianglr; 619 .010 PF 619 PH DISPLAY</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s .772 C perv/imperv/total .313 .000 c.m/s</pre>
3 4 15 27	3 lin. ************************************	<pre>l=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T D No.6 99999 Area in hectares Length (DERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp. with Zero Dp Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio Option 1=rianglr; 619 .000 397 .913 FF DISPLAY # of Hyeto/Hydrograp = .1606272E/04 c.m Base Width =</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n es s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s .772 C perv/imperv/total .313 .000 c.m/s h chosen</pre>
3 4 15 27	3 lin. ********* ** 50 YE: ********* STORM 1 794.298 .000 .659 .400 240.000 IMPERVIO 1 .013 98.000 .518 CATCHMEN 20.000 3.020 100.000 .518 CATCHMEN 20.000 3.020 100.000 .518 CATCHMEN 250 77.000 .100 7.587 1 .000 7.587 1 .000 .510 .000 .510 .000 .510 .000 .00	<pre>l=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T D No.6 99999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp. with Zero Dp Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio Option 1=Trianglr; 619 .000 397 .913 FF = .1606272E+04 c.m Base Width = Left bank slope Right Dank slope</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s .772 C perv/imperv/total .313 .000 c.m/s</pre>
3 4 15 27	3 lin. ************************************	<pre>l=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68,907 mm Total US Option 1=SCS CN/C; Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 9999 Area in hectarss Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp, with Zero Dp Option 1=SCS CN/C; Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstractio Option 1=Trianglr; 619 .619 PH DISPLAY # of Hyeto/Hydrograp = .1606272E+04 c.m Base Width = Left bank slope Right bank slope Right bank slope Right bank slope</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s .772 C perv/imperv/total .313 .000 c.m/s h chosen 1: 1:</pre>
3 4 15 27	3 lin. ******** * 50 YE: ******* STORM 1 794.298 .000 .699 .400 240.000 IMPERVIO 1 0.13 98.000 .510 .013 98.000 .510 .000 .500 72.600 100.000 .500 72.600 100.000 .250 77.000 .100 .250 77.000 .100 .100 .100 .100 .100 .100	<pre>l=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 9999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %Imp.with Zero Dp Option 1=SCS CN/C; Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstractio Option 1=Trianglr; 619 .010 377 .913 FF = .1606272E+04 c.m Base Width = Left bank slope Right bank slope Right bank slope Right bank slope Right in the conditioner in the conditi</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv 313 .000 c.m/s 1.313 .000 c.m/s h chosen 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.</pre>
3 4 15 27	3 lin. ******** * 50 YE: ******* STORM 1 794.298 .000 .699 .400 240.000 IMPERVIO 1 0.13 98.000 .518 CATCHMEN 20.000 .518 CATCHMEN 20.000 .510 .510 .500 72.600 100.000 .500 72.600 100.000 .250 77.000 .000 .250 77.000 .000 .518 77.000 .000 .518 77.000 .000 .518 77.000 .000 .518 77.000 .000 .000 .000 .000 .000 .000	<pre>l=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) metr Gradient (%) Per cent Imperviou Length (</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s h chosen 1 1 1 s s etress/sec</pre>
3 4 15 27	3 lin. ************************************	<pre>l=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (FERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %] SCS Curve No or C Ia/S Coefficient Initial Abstractio Option 1=Trianglr; 19 .000 37 .913 FF 619 .619 PH DISPLAY # of Hyeto/Hydrograp = .1606272E+04 c.m Base Width = Left bank slope Manning's "n" O/a Depth in metre Select Grade in % = .433 m acity = 2.047 c</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Roctanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s h chosen 1: 1: s etres /sec .m/s</pre>
3 4 15 27	3 lin. ************************************	<pre>l=Chicago:2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning *n* SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (PERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) % The cent Imperviou Length (IMPERV) % The cent Imperviou Doption 1=SCS CN/C; Manning *n* O/a Depth in metre Select Grade in % = .433 m acity = 2.047 c depth = .314 m</pre>	<pre>T ** euser;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n ess th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Roctanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s h chosen 1: 1: s etres /sec .m/s</pre>
3 4 15 27 11	3 lin. ******** ** 50 YE: ******** STORM 1 794.298 .000 .699 .400 240.000 IMPERVIOU 1 .013 98.000 .518 CATCHMEN 20.000 .518 CATCHMEN 20.000 .518 CATCHMEN 20.000 .500 72.600 100.000 .100 .250 77.587 7.597 7.587 7.597	<pre>l=Chicago;2=Huff;3 Coefficient a Constant b (mi Exponent c Fraction to peak Duration ó 240 mi 68.907 mm Total US Option 1=SCS CN/C; Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstractio T ID No.6 99999 Area in hectares Length (FERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) metr Gradient (%) Per cent Imperviou Length (IMPERV) %] SCS Curve No or C Ia/S Coefficient Initial Abstractio Option 1=Trianglr; 19 .000 37 .913 FF 619 .619 PH DISPLAY # of Hyeto/Hydrograp = .1606272E+04 c.m Base Width = Left bank slope Manning's "n" O/a Depth in metre Select Grade in % = .433 m acity = 2.047 c</pre>	<pre>T ** **** User;4=Cdnlhr;5=Historic n) r n depth 2=Horton; 3=Green-Ampt; 4=Repeat n es s th 2=Horton; 3=Green-Ampt; 4=Repeat n 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv .313 .000 c.m/s h chosen 1: 1: s etres /sec/s</pre>

	86.544 .653	Supply K-lag (sec Beta weighting fa	) ctor	
	200.000	Routing timestep No. of sub-reache		
	1	No. of sub-reache 19 .619	s .553	.000 c.m/s
17	COMBINE			
	1 Junc	tion Node No. 19 .619	.553	.553 c.m/s
14	START		. 555	.555 C.m/s
		ero; 2=Define		
4	CATCHMENT 10.000	ID No.ó 99999		
	17.530	Area in hectares		
	500.000 1.000	Area in hectares Length (PERV) met Gradient (%)	res	
	75.000	Per cent Impervio	us	
	500.000	Length (IMPERV)		
	1	%Imp. with Zero D Option 1=SCS CN/C		on; 3=Green-Ampt; 4=Repeat
		Manning "n" SCS Curve No or C		
	77.000	Ia/S Coefficient		
	7.587	Initial Abstracti		
		Option l=Trianglr 26 .000	; 2=Recta .553	anglr; 3=SWM HYD; 4=Lin. Reserv .553 c.m/s
	.3	.920	.789	.553 c.m/s C perv/imperv/total
15	ADD RUNOF	rF 26 3.726	.553	.553 c.m/s
27	HYDROGRAF	PH DISPLAY		
		of Hyeto/Hydrogra .9530810E+04 c.m		1
10	POND			
	6 Depth -	Discharge - Volume		
	180.500	.000 .0620 28	.0 42.9 50.5	
	180.900	. 224 50		
	181.100 181.250	.350 62	43.3 77.9	
	181.450	1.399 84	78.7	
	Peak Outf Maximum r	low = .342 Depth = 181.088 Storage = 6171.	c.m/s metres	
	Maximum S	Storage = 6171.	c.m	
17	3.7 COMBINE	3.726	.342	.553 c.m/s
- '	1 Junc	tion Node No.		
18	3.7 CONFLUENC	26 3.726 E	.342	.624 c.m/s
10	1 Junc	tion Node No.		
	3.7		.342	.000 c.m/s
4	CATCHMENT 30.000	ID No.ó 99999		
	3.670	Area in hectares		
	.500	Length (PERV) met Gradient (%)	res	
	1.400	Gradient (%) Per cent Impervio	us	
	80.000 .000	Length (IMPERV) %Imp. with Zero D	pth	
	1	Option 1=SCS CN/C		on; 3=Green-Ampt; 4=Repeat
		Manning "n" SCS Curve No or C		
	.100	Ia/S Coefficient		
	7.587 1	Initial Abstracti	on ; 2=Recta	anglr; 3=SWM HYD; 4=Lin. Reserv
	.1	./3 .624	.342	.000 C.m/s
15		19.7 .916	.404	C perv/imperv/total
	ADD RUNOF	°F		
		.73 .727	.342	.000 c.m/s
11	.1 CHANNEL	.73 .727	.342	
11	.1 CHANNEL .500 3.000	.73 .727 Base Width = Left bank slope	1:	
11	.1 CHANNEL .500 3.000 3.000	.73 .727 Base Width = Left bank slope Right bank slope	1:	
11	.1 CHANNEL .500 3.000	.73 .727 Base Width = Left bank slope Right bank slope Manning's "n" O/a Depth in metr	1: 1: es	
11	.1 CHANNEL .500 3.000 3.000 .060 1.000 .200	.73 .727 Base Width = Left bank slope Right bank slope Manning's "n" O/a Depth in metr Select Grade in %	1: 1: es	
11	.1 CHANNEL .500 3.000 .060 1.000 .200 Depth	.73 .727 Base Width = Left bank slope Right bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 200	1: 1: es metres	
11	.1 CHANNEL .500 3.000 .060 1.000 .200 Depth Velocity Flow Capa	.73 .727 Base Width = Left bank slope Right bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 acity = 1.671	1: 1: es metres m/sec c.m/s	
11	.1 CHANNEL .500 3.000 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE	73 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 koity = 1.671 depth = .339	1: 1: es metres m/sec c.m/s	
	.1 CHANNEL .500 3.000 0.060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000	.73 .727 Base Width = Left bank slope Manning's "n" O/a Dept hin metr Select Grade in % = .712 = .388 kcity = 1.671 depth = .339 Conduit Length	1: 1: metres m/sec c.m/s metres	
	.1 CHANNEL .500 3.000 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE	7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 city = 1.671 depth = .339 Conduit Length Supply X-factor < Supply X-factor <	1: 1: es metres m/sec c.m/s metres .5 )	
	1 CHANNEL .500 3.000 0.000 1.000 200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500	.73 .727 Base Width = Left bank slope Manning's "n" 0/a Depth in metr Select Grade in % = .712 = .388 kcity = 1.671 depth = .339 Conduit Length Supply X-factor < Supply K-lag (sec Beta weighting fa	1: 1: es metres m/sec c.m/s metres .5 )	
	1 CHANNEL .500 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012	.73 .727 Base Width = Left bank slope Manning's "n" 0/a Depth in metr Select Grade in % = .712 = .388 kcity = 1.671 depth = .339 Conduit Length Supply X-factor < Supply X-factor < Supply X-facg (sec Beta weighting fa Routing timestep No. of sub-reache	1: 1: es metres m/sec c.m/s metres .5 ) ctor s	
9	.1 CHANNES 500 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 .500 600.000 1 .1	73 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Bupply X-factor Bupply X-factor Bu	1: 1: es metres m/sec c.m/s metres .5 ) ctor	
	.1 CHANNEL .500 3.000 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMENNE	73 .727 Base Width = Left bank slope Right bank slope Manning's "n" 0/a Depth in metr Select Grade in % = .712 = .388 city = 1.671 depth = .339 Conduit Length Supply K-lag (sec Beta weighting fa Routing fimestep No. of sub-reache. 727 tion Node No.	1: 1: es metres m/sec c.m/s metres .5 ) ctor s	.000 c.m/s
9	1 CHANNES 500 3.000 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 500 600.000 1 1 COMBINE 2 Junc 2 Junc 1.1	7.3 .727 Base Width = Left bank slope Manning's "n" 0/a Dept in metr Select Grade in % = .712 388 kcity = 1.671 depth = .339 Conduit Length Supply X-factor < Supply X-factor < Supply X-factor < Beta weighting fa Routing timestep No. of sub-reache 73 .727	1: 1: es metres m/sec c.m/s metres .5 ) ctor s	.000 c.m/s
9	1 CHANNEL .500 3.000 3.000 .000 l.000 Depth Velocity Flow Cape Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 Junc .1 START	73 .727 Base Width = Left bank slope Right bank slope Manning's "n" 0/a Depth in metr Select Grade in % = .712 = .388 city = 1.671 depth = .339 Conduit Length Supply K-lag (sec Beta weighting fa Routing fimestep No. of sub-reache. 727 tion Node No.	1: 1: es metres m/sec c.m/s metres .5 ) ctor s .660	.000 c.m/s
9	1 CHANNEL .500 3.000 3.000 .060 1.000 .200 Depth Velocity Flow Capper Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .COMBINE 2 June .1 START 1 1=26 CATCHMENT	.73 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 kdty = 1.671 depth = .339 Conduit Length Supply X-factor < Supply X-factor < .3727 thion Node No. .73 .727 thion Node No. .73 .727 thion Supple Suppl	1: 1: es metres m/sec c.m/s metres .5 ) ctor s .660	.000 c.m/s
9 17 14	.1 CHANNE 500 3.000 .000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 Junc START 1 1=Ze CATCHMENT 40.000	7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < 7.3 .727 tion Node No. .73 .727 tion Node No. .73 .727 DD No.6 99999	1: 1: es metres m/sec c.m/s metres .5 ) ctor s .660	.000 c.m/s
9 17 14	1 CHANNE 500 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 Junc START 1 =Ze CATCHNETN 40.000 3.890 100.000	<pre>.73 .727 Base Width = Left bank slope Kight bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor &lt; Supply X-factor &lt; Supply X-lag (sec Beta weighting fa Routing fa Routing fimestep No. of sub-reache .73 .727 ttion Node No73 .727 ttion Node No74 .727 ttion Node No75 .727 ttio</pre>	1: 1: es metres m/sec c.m/s metres .5 ) ctor s .660 .660	.000 c.m/s
9 17 14	1 CHANNE . 500 3.000 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 JUNC 1 COMBINE 2 JUNC 1 COMBINE 2 JUNC 1 COMBINE 2 JUNC .1 COMBINE 2 JUNC .1 START 1 =Ze CATCHMENT 40.000 3.890	7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 kcity = 1.671 depth = .339 Conduit Length Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < To supply X-factor < To Node No. .73 .727 Titon Node No. .73 .727 TD No.6 99999 Area in hectares Length (PERV) met Gradient (%)	1: 1: es metres metres .s ) ctor s .660 .660	.000 c.m/s
9 17 14	1 CHANNE 500 3.000 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .1 COMBINE 2 JUNC .1 START 1 1=2e CATCHMENT 40.000 3.890 100.000 .500 3.700 100.000	7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor < Supply X-factor < Beta weighting fa Routing timestep No. of sub-reache .73 .727 roo; 2=Define ID No.6 99999 Area in hectares Length (PERV) met Gradient (%) Per cent Impervio Length (IMPERV)	1: 1: es metres m/sec c.m/s ctor s .660 .660 res us	.000 c.m/s
9 17 14	.1 CHANNE, 500 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 132 387.012 .500 600.000 1 .1 COMBINE 2 JUNC 1 1=2 CATCHMENT 1 1=2 CATCHMENT 1 1=500 3.890 100.000 .500 3.700	73 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor 4 Supply X-factor 4 Supply X-factor 4 Supply X-factor 4 Supply X-factor 4 Supply X-factor 4 Supply X-1ag (see Beta weighting fa Routing timestep No. of sub-reache .73 .727 ttion Node No. .73 .727 ttion Node No. .73 .727 ttion Node No. .73 .727 ttion No.6 99999 Area in hectares Length (PBRV) met Gradient (%) Per cent Impervio Length (IMPERV)	1: 1: es metres m/sec c.m/s metres .5 ) ctor .660 .660 res us pth	.000 c.m/s .000 c.m/s .660 c.m/s
9 17 14		73 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply K-lag (sec Beta weighting fa Routing famester No. of sub-reache. 73 .727 tion Node No. .73 .727 tion Node No. .73 .727 tion No.6 99999 Area in hectares Length (PERV) met Gradient (%) Par cont Impervio Length (IMPERV) %Imp. with Zero D Option 1=SCS CN/C Manning "n"	1: 1: es metres m/sec c.m/s metres .5 ) ctor .660 .660 res us pth	.000 c.m/s
9 17 14	.1 CHANNE 500 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .12 COMBINE 2 Junc .1 START 1 1=2e CATCHMENT 40.000 3.890 100.000 .500 3.700 100.000 .000 .700	7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < To node No. 7.3 .727 tion No. 99999 Area in hectares Length (IMPERV) % Imp. with Zero D Option 1=SCS CN/C Maning "n" SCS Curve No or C	1: 1: es metres m/sec c.m/s metres .5 ) ctor .660 .660 res us pth	.000 c.m/s .000 c.m/s .660 c.m/s
9 17 14	1 CHANNE 500 3.000 .000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .132 387.012 .500 600.000 1 .132 387.012 .500 600.000 1 .132 387.012 .500 600.000 1 .132 387.012 .500 600.000 1 .122 .500 .132 .500 .132 .500 .132 .500 .132 .500 .132 .500 .132 .500 .132 .500 .132 .500 .132 .500 .132 .500 .132 .500 .132 .500 .132 .500 .132 .132 .500 .132 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .500 .12 .12 .500 .12 .12 .12 .12 .12 .12 .12 .12	7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor < Supply X-factor < Beta weighting fa Routing timestep No. of sub-reache 73 .727 trion Node No. 73 .727 trion Second Length (UMPERV) % Imp. with Zero D Option 1=SCS CN/C Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstracti	1: 1: es metres m/sec c.m/s metres .5 ) ctor .660 .660 res us pth ; 2=Horto on	.000 c.m/s .000 c.m/s .660 c.m/s on; 3=Green-Ampt; 4=Repeat
9 17 14	11 CHANNE 500 3.000 3.000 .060 1.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .COMBINE 2 Junc COMBINE 2 Junc COMBINE 2 Junc COMBINE 2 Junc COMBINE 2 Junc .1 STRAT 1 1=2e CATCHMENT 40.000 3.890 100.000 .500 3.700 100.000 .250 77.000 .100 7.587 1	<pre>.73 .727 Base Width = Left bank slope Manning's "n" O/a Dept in metr Select Grade in % = .712</pre>	1: 1: es metres metres .5 ) ctor s .660 .660 res us pth ; 2=Hortc on ; 2=Rects	.000 c.m/s .000 c.m/s .660 c.m/s on; 3=Green-Ampt; 4=Repeat anglr; 3=SWM HYD; 4=Lin. Reserv
9 17 14	1 CHANNE 500 3.000 .000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .132 387.012 .500 600.000 1 .132 387.012 .500 600.000 1 .132 387.012 .500 600.000 1 .122 .500 600.000 1 .122 .500 .132 .132 .500 600.000 1 .122 .500 .120 .500 .120 .500 .120 .132 .500 .120 .500 .120 .500 .120 .500 .120 .500 .120 .500 .120 .132 .500 .120 .120 .500 .120 .500 .120 .500 .120 .500 .120	7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor < Supply X-factor < Beta weighting fa Routing timestep No. of sub-reache 73 .727 trion Node No. 73 .727 trion Second Length (UMPERV) % Imp. with Zero D Option 1=SCS CN/C Manning "n" SCS Curve No or C Ia/S Coefficient Initial Abstracti	1: 1: es metres m/sec c.m/s metres .5 ) ctor .660 .660 res us pth ; 2=Horto on	.000 c.m/s .000 c.m/s .660 c.m/s on; 3=Green-Ampt; 4=Repeat
9 17 14	.1 CHANNE, 500 3.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 132 387.012 .500 600.000 1 .1 COMBINE 2 Junc 1 1=22 CATCHMENT 1 1=22 CATCHMENT 1 1=250 77.000 .000 .250 77.000 .000 .000 .000 .000 .000 .000	7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-lacg (sec Beta weighting fa Routing timestep No. of sub-reache. 7.3 .727 ttion Node No. 7.3 .727 ttion Node Solored No. 7.3 .727 ttion Node No. 7.3 .727 ttion	1: 1: es metres m/sec c.m/s metres .5 .660 .660 res us pth ; 2=Horto .60 .416	.000 c.m/s .000 c.m/s .660 c.m/s on; 3=Green-Ampt; 4=Repeat anglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total
9 17 14 4		7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < To node No. 7.3 .727 eroi 2=Define I No.6 99999 Area in hectares Length (DERV) met Gradient (\$) Per cent Impervio Length (IMPERV) *Imp. with Zero D Option 1=SCS CN/C Maning "n" SCS Coefficient Initial Abstracti Option 1=Trianglr 74 .070 From 174 .070 Supply X-174	1: 1: es metres m/sec c.m/s metres .5 ) ctor .660 res us pth ; 2=Horto .660	.000 c.m/s .000 c.m/s .660 c.m/s on; 3=Green-Ampt; 4=Repeat anglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s
9 17 14 4	.1 CHANNES 500 3.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .12 COMBINE 2 Junc .1 START 1 1=2e CATCHMENT 40.000 .3.890 100.000 .000 100.000 .1 .500 3.700 100.000 .1 .500 3.890 100.000 .1 .500 3.890 100.000 .1 .250 7.250 7.250 1.250 .1 .3 ADD RUNOE .1 .3 ADD RUNOE .1 .3 .3 ADD RUNOE	7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < Supply X-factor < To node No. 7.3 .727 ero; 2=Define D No.6 99999 Area in hectares Length (PERV) met Cradient (%) Per cent Impervio Length (IMPERV) % Imp. with Zero D Option 1=SCS CN/C Maning "n" SCS Curve No or C IA/S Coefficient Initial Abstracti Option 1=Trianglr 74 .174 D No.6 99999	1: 1: es metres m/sec c.m/s metres .5 .660 .660 res us pth ; 2=Horto .60 .416	.000 c.m/s .000 c.m/s .660 c.m/s on; 3=Green-Ampt; 4=Repeat unglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total
9 17 14 4		73 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor - Supply X-factor - Supply X-factor - Supply X-factor - Supply X-factor - Supply X-factor - To No.6 sub-reache 73 .727 tion Node No. .73 .727 .10 No.6 99999 Area in hectares SCS Curve No or C Ia/S Coefficient Intial Abstracti Option 1=Tianglr .74 .174 ID No.6 99999 Area in hectares	1: 1: es metres m/sec c.m/s metres .5 ) ctor s .660 .660 res us pth ; 2=Horto .660 .416 .660	.000 c.m/s .000 c.m/s .660 c.m/s on; 3=Green-Ampt; 4=Repeat unglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total
9 17 14 4		73 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-lactor < Supply X-lactor < Supply X-lactor < Supply X-lactor < Supply X-lactor < Supply X-lactor < Supply X-lactor    Conduit Length Supply X-lactor    Supply X-lactor    PN0.6 99999   Area in hectares   Area in hectares   SCS Curve No or C   Ta/S Cofficient   Thial Abstracti   Option 1=Trianglr   74   .000   97   .9999   Area in hectares   Length (PERV) met   Got on 1=Trianglr   74   .000   97   .9999   Area in hectares   Length (PERV) met	1: 1: es metres m/sec c.m/s metres .5 ) ctor s .660 .660 res us pth ; 2=Horto .660 .416 .660 res	.000 c.m/s .000 c.m/s .660 c.m/s on; 3=Green-Ampt; 4=Repeat unglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total
9 17 14 4	.1 CHANNE .500 3.000 .200 Depth Velocity Flow Capa Critical ROUTE 200.000 .132 387.012 .500 600.000 1 .132 387.012 .132 387.012 .132 387.012 .132 387.012 .132 387.012 .132 387.012 .132 387.012 .132 387.012 .132 .132 .100 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .00000 .0000 .0000 .00000 .00000 .00000 .00000000	7.3 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-factor < Supply X-factor < Beta weighting fa Routing finest No. of sub-reacher 7.3 .727 tion Node No. .73 .727 tion Node No. .73 .727 troit 2=Define D No.6 99999 Area in hectares Length (IMPERV) at SCS Curve No or C Ia/S Coefficient Initial Abstracti Option 1=Trianglr .74 .174 ID No.6 99999 Area in hectares Length (PERV) met Gradient (%) Per cent Impervio	1: 1: es metres m/sec c.m/s metres .5 ) ctor s .660 .660 res us pth ; 2=Horto .660 .416 .660 res	.000 c.m/s .000 c.m/s .660 c.m/s on; 3=Green-Ampt; 4=Repeat unglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total
9 17 14 4		73 .727 Base Width = Left bank slope Manning's "n" O/a Depth in metr Select Grade in % = .712 = .388 conduit Length Supply X-lactor < Supply X-lactor < Supply X-lactor < Supply X-lactor < Supply X-lactor < Supply X-lactor < Supply X-lactor    Conduit Length Supply X-lactor    Supply X-lactor    PN0.6 99999   Area in hectares   Area in hectares   SCS Curve No or C   Ta/S Cofficient   Thial Abstracti   Option 1=Trianglr   74   .000   97   .9999   Area in hectares   Length (PERV) met   Got on 1=Trianglr   74   .000   97   .9999   Area in hectares   Length (PERV) met	1: 1: es metres m/sec c.m/s metres .5 ) ctor s .660 .660 res us pth ; 2=Horto .660 .416 .660 res us	.000 c.m/s .000 c.m/s .660 c.m/s on; 3=Green-Ampt; 4=Repeat unglr; 3=SWM HYD; 4=Lin. Reserv .660 c.m/s C perv/imperv/total

	1	Option 1-	CC CNI/C:	2-Worton:	3=Green-Ampt; 4=Repeat
	.250	Manning "	n"	Z=HOFLON,	3=Green-Ampt, 4=Repeat
	77.000 .100	SCS Curve Ia/S Coef:			
	7.587	Initial A	bstractior	1 2-Rostangl	r; 3=SWM HYD; 4=Lin. Reserv
	:	265 .	174	.660	.660 c.m/s
15	ADD RUNO	. 898	918	.404 C	perv/imperv/total
9	ROUTE	265	404	.660	.660 c.m/s
-	.000	Conduit L			
	.500	Supply X- Supply K-	lag (sec)		
	.500	Beta weigl	hting fact	or	
	1	Routing t No. of sul	b-reaches		
17	COMBINE		404	.404	.660 c.m/s
		tion Node 1 265		.404	.957 c.m/s
18	CONFLUEN	Œ			
	.:	tion Node 1 265	957	.404	.000 c.m/s
14	START 1 1=Ze	ero; 2=Defin	ne		
35	COMMENT	e(s) of com			
	*******	*********	********		
	100 .	ZEAR DESIGN			
2	STORM 1	1=Chicago	:2=Huff:3=	User:4=Cdr	lhr;5=Historic
	871.279	Coefficier	nt a		
	.000	Constant Exponent	С		
	.400 240.000	Fraction Duration			
		75.585 mm			
3	IMPERVIOU 1		SCS CN/C;	2=Horton;	3=Green-Ampt; 4=Repeat
	.013 98.000	Manning " SCS Curve			
	.100	Ia/S Coef:	ficient		
4	CATCHMEN			1	
	20.000 3.020	ID No.ó 9 Area in h			
	100.000	Length (Pl	ERV) metre	es	
	72.600	Gradient Per cent	Impervious	3	
	100.000	Length (II %Imp. with	MPERV) h Zero Dpt	h	
	1 .250		SCS CN/C;		3=Green-Ampt; 4=Repeat
	77.000	SCS Curve	No or C		
	.100 7.587	Ia/S Coef: Initial A	bstractior		
	1	Option 1=	Trianglr;		r; 3=SWM HYD; 4=Lin. Reserv
				.404	.000 c.m/s
16		125 .	921	.404 .785 C	.000 c.m/s perv/imperv/total
15	ADD RUNO	125 .: ?F 594 .:	921 694		
15 27	ADD RUNOI . ( HYDROGRAI	125 .: ?F	921 694	.785 C	perv/imperv/total
	ADD RUNOI .( HYDROGRAI 5 is ;	F 94 294 .0	921 694 Hydrograpi	.785 C	perv/imperv/total
27	ADD RUNO ( HYDROGRAJ 5 is Volume CHANNEL .500	FF 594 . *PH DISPLAY # of Hyeto/J = .17926271 Base Widtl	921 694 Hydrograph E+04 c.m h =	.785 C	perv/imperv/total
27	ADD RUNOI (HYDROGRAI 5 is 4 Volume = CHANNEL .500 3.000 3.000	PF S94 PH DISPLAY of Hyeto/I = .1792627 Base Widtl Left ban Right ban	921 694 Hydrograph E+04 c.m h = k slope 1 k slope 1	.785 C	perv/imperv/total
27	ADD RUNO 	PF S94 H DISPLAY of Hyeto/J 17926271 Base Widtl Left band Right band Manning's	921 694 E+04 c.m h = k slope 1 "n"	.785 C .404 n chosen	perv/imperv/total
27	ADD RUNOI 	PF FF F of Hyeto// = .17926271 Base Widtl Left banl Right banl Manning's O/a Depth Select Gra	921 694 Hydrograph E+04 c.m h = k slope I "n" in metress ade in %	.785 C .404 1 chosen	perv/imperv/total
27	ADD RUNOU (HYDROGRAI 5 is 4 Volume - CHANNEL .500 3.000 .060 1.000 .300 Depth Velocity	<pre>H25 FF F594 H DISPLAY # of Hyeto// = .1792627! Base Widtl Left bani Right bani Manning's O/a Depth Select Gra = =</pre>	921 694 Hydrograph E+04 c.m h = k slope ] "n" in metres ade in % .642 me .446 m.	.785 C .404 1 chosen L: L: S setres (sec	perv/imperv/total
27	ADD RUNOU ( HYDROGRAI 5 is 4 CHANNEL .500 3.000 0.660 1.000 .300 Depth Velocity Flow Cap: Critical	PF 994 PH DISPLAY # of Hyeto// = .1792627: Base Widtl Left banl Manning's O/a Depth Selecth = acity =	921 694 Hydrograph E+04 c.m h = k slope 1 k slope 1 k slope 1 "n" in metres ade in % .642 met	.785 C .404 n chosen L: L: settres (sec mm/s	perv/imperv/total
27	ADD RUNOU ( HYDROGRAI 5 is 4 CHANNEL .500 3.000 .060 1.000 .300 Depth Velocity Flow Capi Critical ROUTE	PF 974 974 975 974 975 974 975 975 975 975 975 975 975 975	921 694 E+04 c.m h = k slope 1 *n" in metres ade in % .642 me .446 m, 2.047 c. .332 me	.785 C .404 n chosen L: L: settres (sec mm/s	perv/imperv/total
27	ADD RUNNO HYDROGRAI 5 is 4 CHANNEL 500 3.000 3.000 1.000 1.000 1.000 Depth Velocity Flow Capt Critical ROUTE 50.000 .000	<pre>Hard States States</pre>	921 694 Hydrograph E+04 c.m h = k slope 1 "n" in metres ade in % .642 me .446 m, 2.047 c. .332 me ength factor <.5	.785 C .404 n chosen L: L: s etres (sec m/s etres	perv/imperv/total
27	ADD RUNNO ( HYDROGRAI 5 is 4 CHANNEL .500 3.000 3.000 .060 1.000 .300 Depth Velocity Flow Capu Critical ROUTE 50.000 .000 84.095 .665	<pre>394 SPF SPF SPF SPF SPF SPF SPF SPF SPF SPF</pre>	921 694 Hydrograph E+04 c.m h = k k slope 1 n metres ade in % .446 m, .2.047 c. .332 me ength factor <. lag (sec) hting fact	.785 C .404 n chosen 1: 1: 2: setres /sec m/s etres	perv/imperv/total
27	ADD RUNNO ( HYDROGRAI 5 is 4 CHANNEL .500 3.000 3.000 0.060 1.000 .300 Depth Velocity Flow Capt Critical ROUTE 50.000 .000 84.095 .665 200.000 1	<pre>394</pre>	921 494 494 494 494 494 494 494 49	.785 C .404 a chosen l: :: s stres tres m/s stres 5 5 cor	perv/imperv/total .000 c.m/s
27 11 9	ADD RUNNO ( HYDROGRAL 5 is 4 Volume CHANNEL 500 3.000 0.000 1.000 0.000 Velocity Flow Capt Velocity Flow Capt Critical ROUTE 50.000 .000 84.095 .665 200.000 1 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 .00000 .00000 .0000 .0000 .0000 .00000 .0000 .0000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .000000 .00000 .0000000 .000000 .0000000 .00000000	<pre>394 SPF SPF SPF SPF SPF SPF SPF SPF SPF SPF</pre>	921 494 494 494 494 494 494 494 49	.785 C .404 n chosen 1: 1: 2: setres /sec m/s etres	perv/imperv/total
27	ADD RUNNO ( HYDROGRAI 5 is 4 CHANNEL .500 3.000 3.000 1.000 1.000 1.000 1.000 1.000 1.000 2.000 Critical ROUTE 50.000 0.000 84.095 .665 200.000 1 .000 .0000 .00000 .00000 .0000 .00000 .0000 .0000 .0000 .0000 .0000 .0000 .00000 .0000 .00000 .0000 .0000 .0000 .0000 .0000 .0000 .00000 .0000 .0000 .00000 .0000 .0000 .0000 .00000 .0000 .00000 .0000 .00000 .00000 .00000 .000000	<pre>125</pre>	921 Hydrograph E+04 c.m h = k slope 1 n" n" in metres a.642 mm .446 my .2.047 c. .332 mm ength factor <: lag (sec) hting factor b-reaches 694 No.	.785 C .404 a chosen L: L: Stres sec sec sec scor .615	.000 c.m/s
27 11 9	ADD RUNDO ( HYDROGRAI 5 is 4 CHANNEL .500 3.000 3.000 0.000 1.000 .300 Depth Velocity Flow Cape Critical ROUTE 50.000 .000 84.095 .665 200.000 1 	<pre>125</pre>	<pre>941 694 Hydrograp1 E+04 c.m h = k slope 1 n*n* in metres ade in %</pre>	.785 C .404 a chosen L: :: s stres tres m/s stres 5 5 cor	perv/imperv/total .000 c.m/s
27 11 9	ADD RUNDO ( HYDROGRAI 5 is 4 CHANNEL .500 3.000 3.000 0.000 1.000 .300 Depth Velocity Flow Cape Critical ROUTE 50.000 .000 84.095 .665 200.000 1 	<pre>325</pre>	<pre>941 694 Hydrograp1 E+04 c.m h = k slope 1 n*n* in metres ade in %</pre>	.785 C .404 a chosen L: L: Stres sec sec sec scor .615	.000 c.m/s
27 11 9 17 14	ADD RUNNO () HYDROGRAL 5 is 4 Volume : CHANNEL .500 3.000 3.000 .000 .000 .000 84.095 .665 200.000 1 Junt COMBINE 1 Junt START 1 =27 CATCHNEN 1.000	<pre>FF FF FPH DISPLAY FOF Hyetc// solution Base Widtl Left bank Right bank Manning's O/a Depth Select G F acity = acity = acity = conduit L Supply X Suppl X Supp</pre>	941 Hydrograpi E+04 c.m h = k k slope 1 in metres ad.e14 6 m, 2.047 c. .332 me ength factor <.; lag (sec) hting fact inmestep b-reaches 694 No. 694 ne 9999	.785 C .404 a chosen L: L: Stres sec sec sec scor .615	.000 c.m/s
27 11 9 17 14	ADD RUNNO ( HYDROGRAI 5 16 1000 3.000 3.000 3.000 0.000 1.000 1.000 0.000 0.000 200.000 1 Junc 1 Junc 1 2.000 1.000 1.000 200.000 200.000 1.000 1.000 200.0000 200.00000 200.0000 200.00000 200.0000 200.000000 200.00000 200.00000000 200.000000000 200.0000000	<pre>FF FF FPH DISPLAY For Hyetco// solution Base Widtl Left bank Right bank Manning's O/a Depth Select Gr e acity = depth = Conduit Lk Supply X Suppl X Suppl X Suppl X Suppl X</pre>	941 694 Hydrograph E+04 c.m h = k k slope 1 in metres ade in % .642 me .642 me .446 m, 2.047 c. .332 me ength factor <.; lag (sec) hting fact immestep b-reaches 694 No. 694 ne 9999 ectares EV) metres	.785 C .404 a chosen 1: :: :: : : : : : : : : : : : : : : :	.000 c.m/s
27 11 9 17 14	ADD RUNDO () HYDROGRAI 5 is 4 Volume - CHANNEL 5 00 3.000 3.000 0.000 1.000 0.000 Velocity Flow Capp Critical ROUTE 50.000 0.000 84.095 .665 200.000 1 Junc START 1 Zz CATCHMENS 1 Junc 500.000 1.000 1.22 1.	<pre>FF</pre>	941 Hydrograph E+04 c.m h = k k slope 1 n metres a.642 mm .446 mm 2.047 c. .332 mm ength factor <br lag (sec) hting factor <br b-reaches 694 No. 694 me 9999 ectares ERV) metre(%) Impervious	.785 C .404 a chosen 1: :: :: : : : : : : : : : : : : : : :	.000 c.m/s
27 11 9 17 14	ADD RUNNO () HYDROGRAI 5 is 4 CHANNEL .500 3.000 .000 1.000 .300 Depth Velocity Flow Capt Critical ROUTE 50.000 84.095 .665 200.000 1.JUNC COMBINE 1.JUNC COMBINE 1.JUNC COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 1.JUNC .COMBINE 	<pre>125</pre>	921 694 Hydrograph E+04 c.m h = k slope 1 * n* in metres ade in % .642 me .446 m, .426 M, .332 me ength factor <.f lag (sc) hting factor <.f lag (sc) hting factor 694 No. 694 ne 9999 ectares EEV) metre(%) Impervious MEERV)	.785 C .404 a chosen l: :: stres tres tres cor .615 .615	.000 c.m/s
27 11 9 17 14	ADD RUNNO () HYDROGRAI 5 is d CHANNEL .500 3.000 .060 1.000 .300 Performed Velocity Flow Capt Critical ROUTE 50.000 .000 84.095 .665 200.000 1.0000 1.0000 1.000 1.000	<pre>125</pre>	921 694 Hydrograph E+04 c.m h = k slope 1 "n" in metrer adde in % .642 me .446 m. .426 Me .426 me .332 me ength factor <.5 lmg fact lmg fact b-reaches 694 No. 694 9999 ectares ERV) metre( %) Impervious MPERV) h Zero Dpt SCS CN/C; SCS CN/C;	.785 C .404 a chosen L: L: Stres (sec mm/s ttres cor .615 .615	.000 c.m/s
27 11 9 17 14	ADD RUNNO ( HYDROGRAI 5 is 2 CHANNEL .500 3.000 3.000 .000 .000 Velocity Plow Capi Critical ROUTE 50.000 .000 84.095 .665 200.000 1 June COMBINE 1 June .000 START 1 = 24 CATCHMENN 1.000 .000 1.000 .000 1.000 .000	<pre>394 394 394 394 394 394 394 394 394 394</pre>	921 694 Hydrograpl E+04 c.m h = k slope 1 "n" in metres ade in % .642 me .446 m. .2.047 c. .332 me ength factor <.5 lag (sec) bring fact imestep b-reaches 694 No. 694 ne 9999 ectares EFV) metre MPERV) h Zero Dpt SCS CN/C; n" No or C	.785 C .404 a chosen L: L: Stres (sec mm/s ttres cor .615 .615	.000 c.m/s .000 c.m/s .615 c.m/s
27 11 9 17 14	ADD RUNNO ( HYDROGRAI 5 is 4 CHANNEL .500 3.000 3.000 .060 1.000 .300 Depth Velocity Flow Capp Critical ROUTE 50.000 .665 200.000 1.000 .307 .665 200.000 1.12 .0000 .000 .000 .000 .000	<pre>125</pre>	921 694 Hydrograpl #+04 c.m h = k slope 1 "n" in metres ade in % .642 me .446 m. .2.047 c. .332 me ength factor <.5 lag (sec) bring fact immestep b-reaches 694 No. 694 me 9999 ectares EV) metres Devroup SCS CN/C': n" No or C ficient betraction	.785 C .404 a chosen 1: :: :: setres :sec :or .615 .615 .615 ses a the 2=Horton;	<pre>cprv/imperv/total .000 c.m/s .000 c.m/s .615 c.m/s 3=Green-Ampt; 4=Repeat</pre>
27 11 9 17 14	ADD RUNNO () HYDROGRAI 5 is 4 CHANNEL .500 3.000 .000 1.000 .000 bepth Velocity Flow Capt Critical ROUTE 50.000 200.000 1.000 84.095 .665 200.000 1.000 .000 84.095 .665 200.000 1.000 .000 1.250 75.000 50.000 .000 .250 77.000 .100 7.587 1	<pre>394 594 594 595 596 597 597 597 597 597 597 597 507</pre>	<pre>941 694 Hydrograp1 E+04 c.m h = k slope 1 k slope 1 n*n* in metres ade in %     .642 me .446 m,     .047 c332 me ength factor &lt;.f lag (sc) htning factor Hing factor ength factor &lt;.f lag (sc) htning factor ength factor S694 No. 694 No. 694 No. 694 No. No co ficient batractior Triandlr; No or C ficient batractior </pre>	.785 C .404 a chosen l: :: : : : : : : : : : : : : : : : :	<pre>: perv/imperv/total .000 c.m/s .000 c.m/s .615 c.m/s 3=Green-Ampt; 4=Repeat r; 3=SWM HYD; 4=Lin. Reserv</pre>
27 11 9 17 14 4	ADD RUNNO () HYDROGRAI 5 is 4 CHANNEL .500 3.000 .000 1.000 .300 Depth Velocity Flow Capt Critical ROUTE 50.000 .000 84.095 .665 200.000 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 1.Jun .COMBINE 	<pre>125</pre>	<pre>941 694 Hydrograp1 E+04 c.m h = k slope 1 k slope 1 n*n* in metres ade in %     .642 me .446 m,     .047 c332 me ength factor &lt;.f lag (sc) htning factor Hing factor ength factor &lt;.f lag (sc) htning factor ength factor S694 No. 694 No. 694 No. 694 No. No co ficient batractior Triandlr; No or C ficient batractior </pre>	.785 C .404 a chosen 1: :: :: stres :sec :sec :or .615 .615 .615	<pre>cprv/imperv/total .000 c.m/s .000 c.m/s .615 c.m/s 3=Green-Ampt; 4=Repeat</pre>
27 11 9 17 14 4	ADD RUNNO () HYDROGRAI 5 is d () CHANNEL .500 3.000 .000 .000 L000 .000 Bepth Velocity Flow Capt Critical ROUTE 50.000 .000 84.095 .665 200.000 1 Junn .000 84.095 .665 200.000 1 Junn .000 1 Junn .000 1 Junn .000 1.2 .000 1.2 .000 1.2 .000 .000 .000 .000 .000 .000 1.000 .000 .000 1.000 .0	<pre>125</pre>	<pre>941 941 941 941 941 941 941 944 94 94 94 94 94 94 94 94 94 94 94 94</pre>	.785 C .404 a chosen 1: :: :: stres :sec :sec :or .615 .615 .615	<pre>: perv/imperv/total .000 c.m/s .000 c.m/s .615 c.m/s 3=Green-Ampt; 4=Repeat r; 3=SWM HYD; 4=Lin. Reserv .615 c.m/s</pre>
27 11 9 17 14 4	ADD RUNNO () HYDROGRAI 5 is 4 Volume - CHANNEL 5 is 0 3.000 3.000 .060 1.000 .000 Pepth Velocity Flow Capp Critical ROUTE 50.000 .000 84.095 .665 200.000 1	<pre>125</pre>	<pre>941 694 Hydrograp1 E+04 c.m h = k slope 1 n*n* in metres ade in %     .642 mm     .446 m,     .047 c.     .332 mm ength factor &lt;.f lag (sc) htning factor     .694 No.     .694 No.     .694 No.     .694 No.     thing factor     .15 </pre>	.785 C .404 a chosen 1: :: : : : : : : : : : : : : : : : :	<pre>: perv/imperv/total .000 c.m/s .615 c.m/s 3=Green-Ampt; 4=Repeat r; 3=SWM HYD; 4=Lin. Reserv .615 c.m/s : perv/imperv/total</pre>
27 11 9 17 14 4 15 27	ADD RUNNO () HYDROGRAI 5 is 4 CHANNEL .500 3.000 3.000 .000 bepth Velocity Flow Cape Critical ROUTE 50.000 1.000 84.095 .665 200.000 1.000 84.095 .665 200.000 1.000 84.095 .665 200.000 1.000 75.000 500.000 1.12Z CATCHMEN 1.000 75.000 500.000 1.250 77.000 .000 1.250 77.000 .000 75.87 1.22 .0000 .000 .000 .000 .000	<pre>125</pre>	<pre>941 694 Hydrograpl E+04 c.m h = k slope 1 *n* in metres adde in % .642 mm .446 m, 2.047 c332 mm ength factor &lt;.5 lag (see) hting fact lag (see) hting fact lag (see) hting fact exp b-reaches for No. 694 me 9999 ectares Ev() metre( %) Lapor Dpt SCS CN/C; n* No or C ficient bstraction ficient bstraction p26 115 Hydrograph </pre>	.785 C .404 a chosen 1: :: : : : : : : : : : : : : : : : :	<pre>: perv/imperv/total .000 c.m/s .615 c.m/s 3=Green-Ampt; 4=Repeat r; 3=SWM HYD; 4=Lin. Reserv .615 c.m/s : perv/imperv/total</pre>
27 11 9 17 14 4	ADD RUNNO () HYDROGRAI 5 is 4 CHANNEL .500 3.000 .000 1.000 .000 Depth Velocity Flow Capt Critical ROUTE 50.000 200.000 1.000 84.095 .665 200.000 1.000 COMBINE 1.JUNN COMBINE 1.JUNN COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 1.JUNN .COMBINE 	<pre>394 SPF SPF SPF SPF SPF SPF SPF SPF SPF SPF</pre>	<pre>941 941 941 941 941 944 944 944 944 944</pre>	.785 C .404 a chosen l: l: l: stres %sec m/s ttres .615 .615 .615 .615 2=Horton; 1 2=Rectangl .615 .801 C .615 a chosen	<pre>: perv/imperv/total .000 c.m/s .615 c.m/s 3=Green-Ampt; 4=Repeat r; 3=SWM HYD; 4=Lin. Reserv .615 c.m/s : perv/imperv/total</pre>
27 11 9 17 14 4 15 27	ADD RUNNO () HYDROGRAI 5 is 4 CHANNEL .500 3.000 .000 bepth Velocity Flow Cappt Critical ROUTE 50.000 .000 84.095 .665 200.000 1.000 COMBINE 1. Junn (COMBINE 1. Junn .000 84.095 .665 200.000 1. JUNN COMBINE 1. JUNN COMBINE 1. JUNN .000 1. JUNN .000 1. JUNN .000 1. JUNN .000 1. JUNN .000 1. JUNN .000 1. JUNN .000 1. JUNN .0000 .000 .000 .000 .00	<pre>125</pre>	<pre>941 954 954 954 954 954 954 954 954 954 955 95 95 95 95 95 95 95 95 95 95 95 95</pre>	.785 C .404 a chosen l: :: : : : : : : : : : : : : : : : :	<pre>: perv/imperv/total .000 c.m/s .615 c.m/s 3=Green-Ampt; 4=Repeat r; 3=SWM HYD; 4=Lin. Reserv .615 c.m/s : perv/imperv/total</pre>
27 11 9 17 14 4 15 27	ADD RUNNO ADD RUNNO	<pre>394 394 394 394 394 394 394 394 394 394</pre>	941 694 Hydrograph E+04 c.m h = k slope 1 "n" in metres add in % .642 mm .446 m. .446 m. .446 m. .446 m. .146 m. .332 mc ength factor <.5 lag (sec) bring fact immestep b-reaches 694 No. 694 No. 694 me 9999 ectares EV) metres EV) metro MpErV) h Zero Dpt SCS CN/C; n" No or C ficient betractor trianglr; 000 926 115 Hydrograph E+05 c.m - Volume s	.785 C .404 a chosen 1: :: s ttres (sec m/s ttres 5 : : .615 .615 .615 .615 .615 .615 .615 .615	<pre>: perv/imperv/total .000 c.m/s .615 c.m/s 3=Green-Ampt; 4=Repeat r; 3=SWM HYD; 4=Lin. Reserv .615 c.m/s : perv/imperv/total</pre>

	181.250	.67	78 717	7.9 8 7	
	101.450 Peak Outf	1.39 low =	.468	c.m/s	
	Maximum D	epth =	78 717 99 847 .468 181.154 6580.	metres	
	Maximum S 4.1	torage = 15 4	6580. ( 1.115	2.m .468	.615 c.m/s
17	COMBINE				
	1 Junc 4.1		e No. 1.115	.468	.709 c.m/s
18	CONFLUENC	E		. 100	.,05 C.m/8
	1 Junc	tion Node		.468	.000 c.m/s
4	CATCHMENT	15		. 100	.000 C.m/S
	30.000 3.670	ID No.ó	99999		
	80.000	Length (	PERV) metro	es	
	.500	Gradient	(%)		
	1.400 80.000	Per cent	(%) Imperviou IMPERV)	5	
	.000	%Imp. wi	ith Zero Dp	th	
	1	Option 1 Manning	L=SCS CN/C;	2=Horton;	3=Green-Ampt; 4=Repeat
			"n" /e No or C		
	.100	Ia/S Coe	efficient		
	7.587	Initial Option 1	Abstraction	2=Rectano	glr; 3=SWM HYD; 4=Lin. Reserv
	. 2	10	.709	.468	.000 c.m/s C perv/imperv/total
15	.4 ADD RUNOF	25	.922	.432	C perv/imperv/total
	. 2		.843	.468	.000 c.m/s
11	CHANNEL		l+b -		
		Base Wid Left ba	ith = ink slope :	1:	
	3.000	Right ba	ank slope	1:	
	.060 1.000	Manning 0/a Dept	's "n" :h in metre:	5	
	.200	Select (	Frade in %		
	Depth	=	.757 m .402 m	etres	
	Flow Capa	city =	.402 m 1.671 c .364 m	.m/s	
-		depth =	.364 m	etres	
9	ROUTE 200.000	Conduit	Length		
	.111	Supply 3	<pre>4-factor &lt;.</pre>	5	
	372.831 .500	Supply H	(-lag (sec) ighting fac	tor	
	600.000	Routing	timestep		
	1	No. of s	sub-reaches	775	000 /-
17	.2 COMBINE	τU	.843	.775	.000 c.m/s
	2 Junc				
14	. 2 START	10	.843	.775	.775 c.m/s
	1 1=Ze		ine		
4	CATCHMENT				
	40.000 3.890	וט No.ó Area in	99999 hectares		
	100.000	Length (	PERV) metre	es	
		Gradient		-	
	100.000	Length (	Imperviou: (IMPERV)		
	.000	%Imp. wi	ith Zero Dp	th	2 Guran Ametic ( D
	1 .250	Option 1 Manning	"n"	∠=Horton;	3=Green-Ampt; 4=Repeat
	77.000	SCS Curv	7e No or C		
	.100	Ia/S Coe	efficient Abstraction	n	
	1	Option 1	l=Trianglr;	2=Rectang	glr; 3=SWM HYD; 4=Lin. Reserv
			.000 .921	.775	.775 c.m/s C perv/imperv/total
15	ADD RUNOF	F			
,	.2		.211	.775	.775 c.m/s
4	CATCHMENT 50.000	ID No.ó	99999		
	9.180	Area in	hectares		
		Length ( Gradient	(PERV) metro : (%)	25	
	1.300	Per cent	: Imperviou	5	
	350.000	Length (	IMPERV) ith Zero Dp	+ h	
		Option 1	L=SCS CN/C;		3=Green-Ampt; 4=Repeat
	1				
	.250	Manning	"n"		
	.250 77.000	Manning	7e No or C		
	.250 77.000 .100 7.587	Manning SCS Curv Ia/S Coe Initial	ve No or C efficient Abstraction		
	.250 77.000 .100 7.587 1	Manning SCS Curv Ia/S Coe Initial Option I	ve No or C efficient Abstraction L=Trianglr;	2=Rectang	;]r; 3=SWM HYD; 4=Lin. Reserv .775 c.m/s
	.250 77.000 .100 7.587 1 .3 .4	Manning SCS Curv Ia/S Coe Initial Option 1 25 25	ve No or C efficient Abstraction L=Trianglr;	2=Rectang .775	lr; 3=SWM HYD; 4=Lin. Reserv .775 c.m/s C perv/imperv/total
15	.250 77.000 .100 7.587 1 .3 .4 ADD RUNOF	Manning SCS Curv Ia/S Coe Initial Option 1 25 25 F	ve No or C efficient Abstraction L=Trianglr; .211 .922	2=Rectang .775 .432	.775 c.m/s C perv/imperv/total
15	.250 77.000 .100 7.587 1 .3 .4 ADD RUNOF	Manning SCS Curv Ia/S Coe Initial Option 1 25 25 F 25	ve No or C efficient Abstraction L=Trianglr; .211 .922 .499	2=Rectang .775	.775 c.m/s
	.250 77.000 .100 7.587 1 .3 .4 ADD RUNOF .3 ROUTE .000	Manning SCS Curv Ia/S Coe Initial Option 1 25 25 F 25 Conduit	ve No or C ffficient Abstraction =Trianglr; .211 .922 .499 Length	2=Rectang .775 .432 .775	.775 c.m/s C perv/imperv/total
	.250 77.000 .100 7.587 1 .3 .4 ADD RUNOF .3 ROUTE .000 .500	Manning SCS Curr Ia/S Coe Initial Option J 25 25 F 25 Conduit Supply J	ve No or C efficient Abstraction L=Trianglr; .211 .922 .499	2=Rectang .775 .432 .775	.775 c.m/s C perv/imperv/total
	.250 77.000 .100 7.587 1 .3 .4 ADD RUNOF .3 ROUTE .000 .500 .500	Manning SCS Curv Ia/S Code Initial Option 1 25 25 F 25 Conduit Supply H Beta wei	re No or C ffficient Abstraction [=Trianglr; .211 .922 .499 Length C-factor <.1 (-lag (sec) ighting fac	2=Rectang .775 .432 .775	.775 c.m/s C perv/imperv/total
	.250 77.000 .100 7.587 1 .3 .4 ADD RUNOF .3 ROUTE .000 .500 .000 .500 .600.000	Manning SCS Curv Ia/S Coo Initial Option 1 25 F 25 Conduit Supply A Beta wei Routing	re No or C efficient Abstraction L=Trianglr; .211 .922 .499 Length C-factor <.! C-lag (sec) ighting fact timestep	2=Rectang .775 .432 .775	.775 c.m/s C perv/imperv/total
9	.250 77.000 .100 7.587 1 .3 .4 ADD RUNOF .000 .500 .500 600.000 1 .3	Manning SCS Curv Ia/S Coe Initial Option 1 25 F 25 Conduit Supply J Beta wei Routing No. of s	re No or C afficient Abstraction =Trianglr; .211 .922 .499 Length (-factor <.! (-factor <.e) (-lag (sec) ighting fact timestep sub-reaches	2=Rectang .775 .432 .775	.775 c.m/s C perv/imperv/total
	.250 77.000 .100 7.587 .4 ADD RUNOF .000 .500 .500 .500 .500 .500 .500 .50	Manning SCS Curv Ia/S Coe Initial Option 1 25 25 Conduit Supply 1 Beta wei Routing No. of s 25	<pre>re No or C efficient Abstraction =Trianglr; .211 .922 .499 Length (-factor &lt;.) (-factor &lt;.) (-lag (sec) ghting fac timestep sub-reaches .499</pre>	2=Rectan <u>c</u> .775 .432 .775 5 tor	.775 c.m/s C perv/imperv/total .775 c.m/s
9	.250 77.000 .100 7.587 .4 ADD RUNOF .000 .500 .500 .500 .500 .500 .500 .50	Manning SCS Curv Ia/S Coc Initial Option 1 25 25 F 25 Conduit Supply J Supply J Supply J Beta wei Routing No. of s 25 tion Node	re No or C fficient Abstraction =Trianglr; .211 .922 .499 Length <-factor <.! c-lag (sec) .ghting fac timestep sub-reaches .499 ≥ No.	2=Rectan <u>c</u> .775 .432 .775 5 tor	.775 c.m/s C perv/imperv/total .775 c.m/s
9	.250 77.000 .100 7.587 .3 .4 ADD RUNOF .000 .500 .500 .500 .500 .500 .500 .50	Manning SCS Curv Initial Option 1 25 25 Conduit Supply 1 Supply 1 Beta wei Routing No. of s 25 tion Node 25 E	<pre>re No or C fficient Abstraction =Trianglr; .211 .922 .499 Length (-factor &lt;.! c-lag (sec) ighting fac timestep sub-reaches .499 e No. .499</pre>	2=Rectang .775 .432 .775 5 tor .499	.775 c.m/s C perv/imperv/total .775 c.m/s .775 c.m/s
9	.250 77.000 .100 7.587 1 .3 .4 ADD RUNOF .3 ROUTE .000 .500 .500 .000 .500 .000 1 .3 COMEINE 2 JUNC 2 JUNC 2 JUNC	Manning SCS Curv In/S Coc Initial Option 1 25 25 Conduit Supply 1 Supply 1 Beta wei Routing No. of s 25 tion Node 25	<pre>re No or C re No or C refficient Abstraction I=Trianglr; .211 .922 .499 Length C-factor &lt;.! C-lag (sec) ighting fac timestep sub-reaches .499 e No.</pre>	2=Rectang .775 .432 .775 5 tor .499	.775 c.m/s C perv/imperv/total .775 c.m/s .775 c.m/s
9	.250 77.000 .100 7.587 1 .3 .4 ADD RUNOF .3 ROUTE .000 .500 .500 .000 .500 .000 1 .3 COMEINE 2 JUNC 2 JUNC 2 JUNC	Manning SCS Curv Ia/S Coc Initial Option 1 25 25 Conduit Supply 3 Supply 4 Beta wei Routing No. of s 25 tion Node 25 E	<pre>re No or C re No or C refficient Abstraction I=Trianglr; .211 .922 .499 Length C-factor &lt;.! C-lag (sec) ighting fac timestep sub-reaches .499 e No.</pre>	2=Rectang .775 .432 .775 5 tor .499 .499	.775 c.m/s C perv/imperv/total .775 c.m/s .775 c.m/s 1.182 c.m/s
9 17 18	.250 77.000 .100 7.587 .3 .4 ADD RUNOF .000 .500 .500 .500 .500 600.000 1 COMFINE 2 Junc CONFIJUENC 2 Junc	Manning SCS Curv Ia/S Coc Initial Option 1 25 25 Conduit Supply 3 Supply 4 Beta wei Routing No. of s 25 tion Node 25 E	<pre>re No or C re No or C refficient Abstraction I=Trianglr; .211 .922 .499 Length C-factor &lt;.! C-lag (sec) ighting fac timestep sub-reaches .499 e No.</pre>	2=Rectang .775 .432 .775 5 tor .499 .499	.775 c.m/s C perv/imperv/total .775 c.m/s .775 c.m/s 1.182 c.m/s