C.C. Tatham & Associates Ltd.
Consulting Engineers

WASAGA SHORES SUBDIVISION

Town of Wasaga Beach

Preliminary Stormwater Management Report

prepared by:

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prepared for

VanderMeer Homes Ltd.

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CCTA File 116028

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1 Introduction

C.C. Tatham & Associates Ltd. (CCTA) has been retained by VanderMeer Homes Ltd. to prepare a Stormwater Management Report in support of the proposed 22-lot residential subdivision within the Town of Wasaga Beach, in Simcoe County. This report has been prepared to address the Stormwater Management Criteria associated with this project.

1.1 Site Description

The residential development site is currently a vacant wood lot consisting of a mix of coniferous and deciduous trees along with smaller shrub trees. The site is bounded by Nottawasaga Bay to the north, woodlot, residential lands and Shore Lane to the east, woodlot and residential lands to the south and Constance Boulevard and Betty Boulevard to the west. The site is legally described as Part of Lots 34 and 35, Concession 3, Plan 51R-30394 in the Town of Wasaga Beach. We have enclosed Figure 1.0 – Site Location Plan in overleaf for reference.

1.2 Geotechnical Investigation & Reports

Geotechnical investigations and chemical analysis were completed by Soil Engineers Ltd. for the Wasaga Shores development.

The field work consisted of 9 boreholes to depths of 5.0 m to 6.6 m at various locations across the site. The geotechnical report commented and made recommendations for construction of house foundations, underground services, trench backfilling, pavement design, soil parameters, excavation, etc. It was noted that groundwater was detected at depths of 4.0 m and 5.9 m in three of the boreholes, while all other boreholes remained dry upon completion of the field work.

Chemical analysis was undertaken on four soil samples from the geotechnical boreholes to determine requirements for removal of material off-site in accordance with O.Reg 153 Part XV.1 of the Environmental Protection Act. It was concluded that the soil sampled meets Table 1 Standards.

The geotechnical and chemical analysis reports have been provided under separate cover.

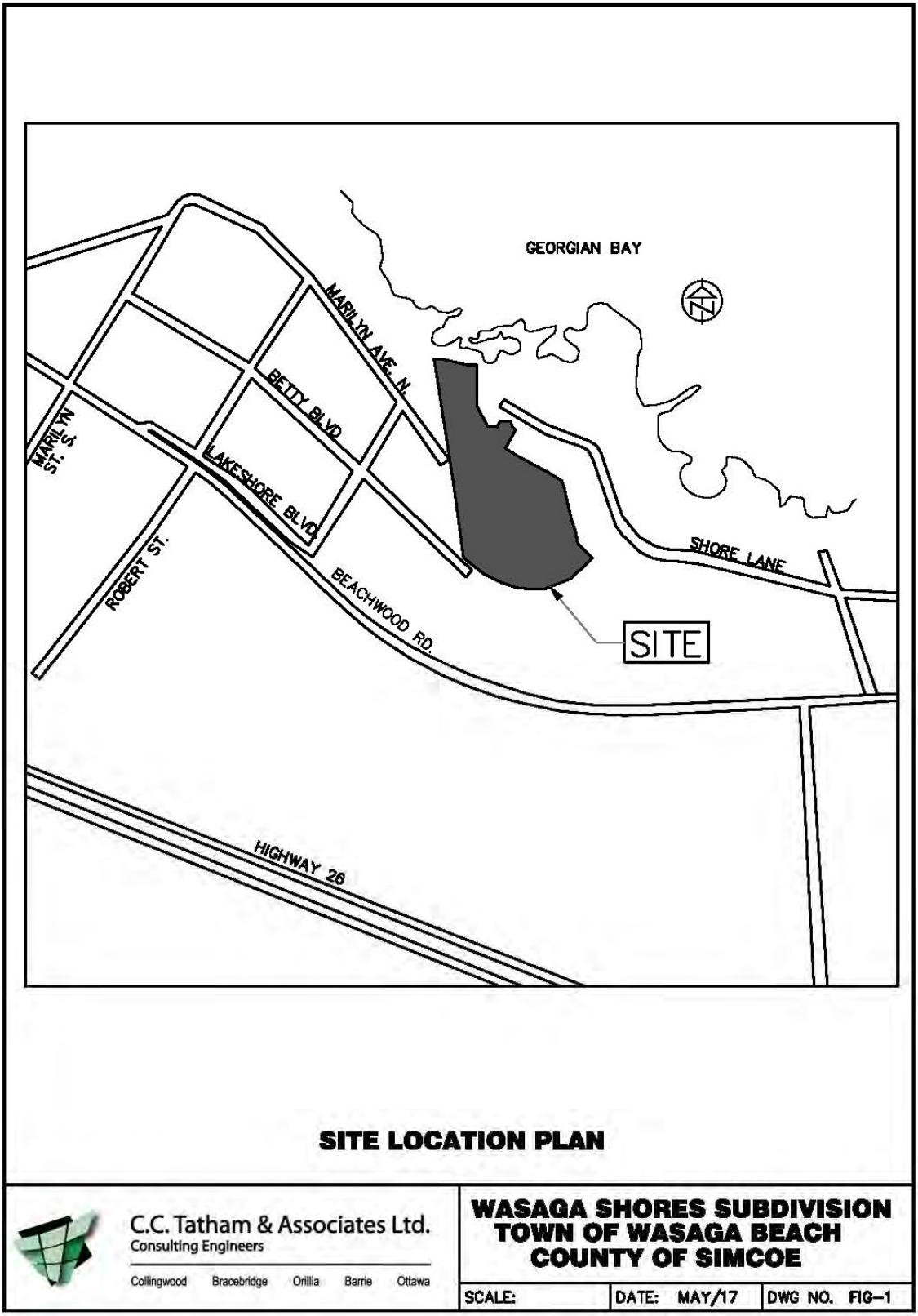
1.3 Existing Land Use

The existing property is currently a vacant woodlot and contains natural forest and wetland cover. The site has a drainage course traversing the property which conveys surface runoff north to the Nottawasaga Bay. The subject site is dedicated under the Town's Zoning By-Law (Schedule B) as R1H.

1.4 Proposed Land Use

Betty Boulevard will be extended northeast to Shore Lane while Constance Boulevard will be extended southeast to bisect the Betty Boulevard extension. The existing lands will be subdivided into the proposed 22-lot residential development which accounts for 3.64 ha including the road network and walkways.

Figure 1: Site Location Plan



2 Stormwater Management

2.1 Stormwater Management Objectives and Background

The primary objective of this report is to demonstrate that the proposed development will conform to the SWM criteria established in the MOE Stormwater Management Planning and Design Manual (March, 2003) and The NVCA Development Review Guidelines (December 2013).

This will be accomplished by evaluating the effect of expansion on the local drainage conditions, constructing on-site quality control measures, and providing solutions to mitigate siltation and erosion during and after construction.

The stormwater management strategy for the proposed development site has been prepared recognizing the pertinent Conservation Authority, Municipal and Provincial guidelines on water resources including the following:

- Environmental Impact Study, South-West Portion of Lot 35, Concession 3, Town of Wasaga Beach, County of Simcoe, Azimuth Environmental Consulting Inc., (December 2012);
- Nottawasaga Valley Conservation Authority Technical Guidelines, Nottawasaga Valley Conservation Authority (December 2013);
- Town of Wasaga Beach Engineering Standards, Town of Wasaga Beach, (March 2015);
- Drainage, Hydrology and Stormwater Management Report, Highway 26 New Alignment between Collingwood and Wasaga Beach, Ontario Ministry of Transportation (July 2009); and
- Stormwater Management Planning and Design Manual, Ministry of the Environment, (March 2003).

2.2 Stormwater Management Criteria

Several environmental factors and site conditions govern the design of the stormwater management plan for the residential development. The SWM criteria to be adhered to during detailed design are as follows:

- The SWM plan must safely convey the Regional Storm event to the Nottawasaga Bay outlet;
- The SWM plan must achieve Level 1 “Enhanced” stormwater runoff treatment including 80% removal of Total Suspended Solids and treatment of 90% of the total runoff volume;
- Due to the site’s proximity to Nottawasaga Bay, stormwater quantity control is not required in an effort to “Beat the Peak”; and
- The SWM plan must promote groundwater recharge and infiltration where possible.

3 Pre-Development OTTHYMO Analysis

3.1 Existing Catchment Areas

The site is characterized by two catchment areas identified as Catchment 100 and Catchment 101 on the enclosed Pre-Development Drainage Plan (DP-1).

Catchment 101 is 3.64 ha of vacant wood lot north of Beachwood Road consisting of a mix of coniferous and deciduous trees with smaller shrub trees. This catchment drains to Nottawasaga Bay by a small watercourse which traverses the property. The pre-development catchment parameters have been calculated and are enclosed in Appendix A. The catchment characteristics are summarized in Table 1 below.

Table 1: Pre-Development Catchment Parameters

Catchment ID	Catchment Area (ha)	SCS Curve Number (CN)
Catchment 101	3.64	35.3

A Visual OTTHYMO model has been developed based on the current Draft Plan provided by Bowers & Jones Surveying Ltd. to quantify the pre-development and post-development peak runoff flow rates from the site. The model has been developed utilizing the Ministry of Transportation (MTO) site specific Intensity-Duration-Frequency (IDF) curves located at:

(http://www.mto.gov.on.ca/IDF_Curves/terms.shtml)

A copy of the MTO IDF curve utilized for this report is enclosed in Appendix A for reference.

3.2 Pre-Development Peak Runoff Flow Rate Analysis

Table 2 below summarizes the pre-development peak runoff flow rates from each catchment and the total peak runoff flow rate at Point of Interest 'A' (ADD400). We have enclosed the Pre-Development Drainage Plan (DP-1) for reference.

Table 2: Pre-Development Peak Runoff Flow Rate Summary

Design Storm	Peak Runoff Flow Rate (m^3/s) Catchment 101	
	CHI	SCS
25 mm	0.003	-
2-Year	0.005	0.018
5-Year	0.011	0.034
10-Year	0.016	0.047
25-Year	0.025	0.066
50-Year	0.031	0.082
100-Year	0.039	0.100
Regional	0.113	-

CHI – Chicago 4 Hour Design Storms; SCS – SCS 24 Type II design Storms

Detailed pre-development Visual OTTHYMO modeling results for Catchment 101 are enclosed in Appendix B.

4 Post-Development OTTHYMO Analysis

4.1 Post-Development Site Plan

The development site will be severed into the proposed 22-lot subdivision. Betty Boulevard will be extended to connect with Shore Lane while Constance Boulevard will be extended to bisect Betty Boulevard. The Town standard local residential subdivision on a 20 m right-of-way is being proposed for the development (see DP-2).

The stormwater drainage infrastructure has been designed according to the dual drainage principle, with major and minor drainage systems. The minor drainage system primarily consists of a network of underground sewers. The minor system has been designed to collect and convey the runoff from frequent storm events, up to and including the 5-year storm. The major drainage system will convey storm runoff that exceeds the capacity of the minor system and will primarily use the road network and enhanced bioswales to convey the runoff to the existing municipal outlet on Shore Lane, which outlets to Nottawasaga Bay.

4.2 Post-Development Catchment Areas

The site is divided into five separate catchment areas identified on the Post-Development Drainage Plan (DP-2) as Catchment 202, Catchment 203, Catchment 204, Catchment 205 and Catchment 206.

Catchment 202 is 0.33 ha and contains a portion of lots 1 through 8 as well as a small portion of the Betty Boulevard extension. This catchment will drain north via a side-yard/rear-yard bioswale to a ditch inlet catch basin which connects with the underground minor system.

Catchment 203 is 1.83 ha and contains the Constance Boulevard R.O.W., most of the Betty Boulevard R.O.W., and a portion of lots 2 through 22. This catchment will be collected by storm sewers on Constance Boulevard and Betty Boulevard where it will be discharged north towards Shore Lane via a storm sewer between lots 11 and 12. This storm sewer will outlet to the existing municipal drain, which outlets to Nottawasaga Bay.

Catchment 204 is 0.82 ha and contains a portion of lots 12 through 22. This catchment will drain via a rear yard bioswale which will discharge into the storm sewer between lots 11 and 12. This storm sewer will outlet to the existing municipal drain, which outlets to Nottawasaga Bay. Calculations for the bioswale have been included in Appendix C.

Catchment 205 is 0.16 ha and contains a portion lot 11. This catchment will slope from west to east to the 6 m easement and will discharge into the existing municipal outlet at the end of Shore Lane.

Catchment 206 is 0.50 ha and contains most of lots 9 and 10. This catchment drains uncontrolled to the northwest corner of the development where it will discharge into Nottawasaga Bay.

The post-development catchment parameters have been calculated and are enclosed in Appendix C. The catchment characteristics are summarized in Table 3.

Table 3: Post-Development Catchment Parameters

Catchment ID	Catchment Area (Ha)	% Impervious	% Impervious Directly Connect
Catchment 202	0.33	10.7	10.7
Catchment 203	1.83	35.5	35.5
Catchment 204	0.82	33.4	10.0
Catchment 205	0.16	15.7	15.7
Catchment 206	0.50	14.1	10.0

4.3 Post-Development Peak Runoff Flow Rate Analysis

Table 4 summarizes the post-development peak runoff flow rates for Catchments 202 through 205, Catchment 206, and the combined post-development peak runoff flow rates for the entire site. We have enclosed the Post-Development Drainage Plan (DP-2) for reference.

Table 4: Post-Development Peak Runoff Flow Rate Summary

Design Storm	Peak Runoff Flow Rate (m^3/s)					
	Catchment 202-205		Catchment 206		Combined (ADD 404)	
	CHI	SCS	CHI	SCS	CHI	SCS
25 mm	0.119	-	0.010	-	0.129 (0.163)	-
2-Year	0.150	0.138	0.012	0.023	0.163 (0.245)	0.156 (0.301)
5-Year	0.204	0.197	0.021	0.039	0.223 (0.441)	0.227 (0.528)
10-Year	0.241	0.237	0.029	0.050	0.265 (0.626)	0.275 (0.729)
25-Year	0.290	0.299	0.040	0.065	0.324 (0.878)	0.347 (1.005)
50-Year	0.325	0.345	0.049	0.084	0.365 (1.085)	0.411 (1.188)
100-Year	0.366	0.391	0.058	0.096	0.411 (1.290)	0.466 (1.417)
Regional	0.214	-	0.051	-	0.265 (2.246)	-

CHI – Chicago 4 Hour Design Storms; SCS – SCS 24 Type II design Storms; (0.010) – Pre-development Flow Rates

Detailed post-development Visual OTTHYMO modeling results are enclosed in Appendix C.

5 Water Quality Control

Nottawasaga Bay requires Level 1 'Enhanced' water quality treatment to Provincial standards. The proposed SWM plan achieves 80% total suspended solids (TSS) removal prior to off-site discharge.

Level 1 'Enhanced' treatment will be satisfied utilizing an oil-grit separator and bioswales in accordance with the MOECC Guidelines. Bioswales will be incorporated into the design to reduce pollutant and sediment transport from being released downstream. The check dams will decrease flow velocities and encourage ponding & infiltration into the bioswales.

Bioswale sizing calculations are included in Appendix C.

5.1 Low Impact Development Techniques

Low Impact Development (LID) techniques are utilised in planning and engineering design to promote stormwater filtration, infiltration, water conservation and protect water quality. LID techniques allow planning and engineering design to implement hydrological controls while providing pre-to-post peak runoff flow rate matching in part with end of pipe stormwater quantity and quality control as part of the overall treatment train.

The existing subject lands contain small pocket wetlands that are fragmented and provide limited ecological function. The development proposal includes the removal of these pocket wetlands and the provision for offsetting this removal by way of providing an offset of enhanced plantings, bioswale creation, offsite compensation and/or a combination thereof. Soft engineering and bioengineering techniques will be utilized in favour of hard engineering and hardened structures to control surface erosion wherever possible.

6 Inspection and Maintenance

There are several components of the stormwater management system that require routine inspections and periodic maintenance. A Stormwater Management Maintenance Manual will be prepared upon the completion of final design that will outline a recommended inspection and maintenance plan for the development.

7 Flood and Erosion Study

A flood and erosion study for lots 9 & 10 is being conducted by C.C. Tatham & Associates Ltd. and will be included as part of the final SWM Report.

8 Siltation and Erosion Controls

Siltation and erosion controls will be implemented for all construction activities, including topsoil stripping, material stockpiling, road construction activities and grading operations. The detailed erosion and sediment control measures proposed will be implemented during and after construction and will be provided during final design and may include the following:

- heavy duty silt fence will be erected around the perimeter of the site before any grading operations commence to control sediment movement;
- a construction vehicle entrance will be constructed and maintained consisting of a stone mud mat to reduce off-site tracking of material; and
- rock check flow dams and straw bale check flow dams will be installed prior to construction and will be maintained and inspected throughout the course of construction as required to prevent the transportation of sediment and delirious materials offsite.

9 Conclusions & Recommendations

The proposed Stormwater Management Plan demonstrates that the development will meet the established criteria with respect to stormwater management set forth in governing documents and can proceed without negatively impacting the local drainage systems and Nottawasaga Bay. Level 1 'Enhanced' water quality control in the form of 80% TSS removal will be satisfied utilizing an oil-grit separator and bioswales in accordance with the MOECC Guidelines. Water quantity control is not required due to the site's proximity to Nottawasaga Bay.

In conclusion, the proposed stormwater management plan supports the concept of an environmentally sustainable development and will mitigate anticipated stormwater impacts associated with the construction of the proposed development.

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Intern Engineer

Reviewed by: Randy Simpson, B.A.Sc., P.Eng.
Senior Engineer, Project Manager

APPENDIX A:
PRE-DEVELOPMENT HYDROLOGICAL ANALYSIS

C.C. Tatham & Associates Ltd. Consulting Engineers — Collingwood, Bracebridge, Orillia, Barrie		
	Project:	Wasaga Shores Subdivision
	File No.:	116028
	Date:	May 2017
	Designed By:	AS
	Checked By:	
	Subject:	CN Calculator

Wasaga Shores Subdivision
CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment 101 **Area** 3.64 ha

WEIGHTED CN VALUE																									
Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Gravel			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
ets	EASTPORT	A	Sand	1	3.64	1	3.4289	0.942	32	0		49	0		38	0.2111	0.058	89	0		100	0		50	35.306
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	**3.64**	**1**	**3.42888**	**0.942**		**0**	**0**		**0**	**0**		**0.21112**	**0.058**		**0**	**0**		**0**	**0**		**35.3**

Time of Concentration Calculations

Initial Abstraction	**9.594 mm**

Wetlands	12
Woods	10
Meadows	8
Gravel	3
Lawns	5
Impervious	2

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	182.23	m
Minimum Catchment Elevation	177.76	m
Catchment length	250	m
Catchment Slope	2%	
Catchment Area	3.64	ha
Time of Concentration (Minutes)	**11.15**	
Time of Concentration (Hours)	**0.19**	
Time to Peak (2/3 x Time of Concentration)	**0.12**	

Time to Peak	**0.47 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	182.23	m
Minimum Catchment Elevation	177.76	m
Catchment length	250	m
Catchment Slope	2%	
Catchment Area	3.64	ha
Time of Concentration (Minutes)	**42.12**	
Time of Concentration (Hours)	**0.70**	
Time to Peak (2/3 x Time of Concentration)	**0.47**	

Runoff Coefficient	**0.11**

Landuse Type	Soil Series				
	ets	0	0	0	0
	1	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.08	#N/A	#N/A	#N/A	#N/A
Gravel	0.6	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.1	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.09	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.1102	#N/A	#N/A	#N/A	#N/A

Wasaga Shores Subdivision
PRE-DEVELOPMENT CONDITIONS

1	Nashyd	1	Route Pipe	1	Duhyd
1	Standhyd	1	Route Channel	1	Diverthyd
1	Addhyd	1	Route Reservoir		

C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers

Project:	Wasaga Shores
File No.:	116028
Subject:	Otthymo Flow Schematic
Date:	July 2017 **Figure:** 1

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

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       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O

        OOO     T      T    H   H    Y    M   M   OOO


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


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Design\OTTHYMO\SCS Pre-Development.out
  Summary filename: I:\2016 Projects\116028 - Wasaga Shores Subdivision\Design\Storm
Design\OTTHYMO\SCS Pre-Development.sum


DATE: 6/22/2017                           TIME: 2:36:41 PM

USER:


COMMENTS: _____________________________________________________________


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

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|                  |              028 - Wasaga Shores Subdivision\Design\
|                  |              Storm Design\OTTHYMO\SCS24H.MST
| Ptotal= 54.90 mm |    Comments: SCS Type II 24 HR MASS CURVE
--------------------
                       Duration of storm    = 23.75 hrs
                       Mass curve time step = 15.00 min
                       New Storm time step  =  5.00 min

                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .08     .22 |  6.08     .95 | 12.08    7.91 | 18.08    1.02
                 .17     .44 |  6.17    1.02 | 12.17    7.91 | 18.17     .95
                 .25     .66 |  6.25    1.10 | 12.25    7.91 | 18.25     .88
                                      Page 1
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.58	.51	6.58	.95	12.58	4.10	18.58	1.02
.67	.59	6.67	1.02	12.67	4.03	18.67	.95
.75	.66	6.75	1.10	12.75	3.95	18.75	.88
.83	.66	6.83	1.10	12.83	3.66	18.83	.95
.92	.66	6.92	1.10	12.92	3.37	18.92	1.02
1.00	.66	7.00	1.10	13.00	3.07	19.00	1.10
1.08	.66	7.08	1.17	13.08	3.00	19.08	1.02
1.17	.66	7.17	1.24	13.17	2.93	19.17	.95
1.25	.66	7.25	1.32	13.25	2.85	19.25	.88
1.33	.59	7.33	1.24	13.33	2.71	19.33	.95
1.42	.51	7.42	1.17	13.42	2.56	19.42	1.02
1.50	.44	7.50	1.10	13.50	2.42	19.50	1.10
1.58	.51	7.58	1.17	13.58	2.34	19.58	1.02
1.67	.59	7.67	1.24	13.67	2.27	19.67	.95
1.75	.66	7.75	1.32	13.75	2.20	19.75	.88
1.83	.66	7.83	1.32	13.83	2.05	19.83	.81
1.92	.66	7.92	1.32	13.92	1.90	19.92	.73
2.00	.66	8.00	1.32	14.00	1.76	20.00	.66
2.08	.73	8.08	1.39	14.08	1.68	20.08	.66
2.17	.81	8.17	1.46	14.17	1.61	20.17	.66
2.25	.88	8.25	1.54	14.25	1.54	20.25	.66
2.33	.81	8.33	1.54	14.33	1.61	20.33	.66
2.42	.73	8.42	1.54	14.42	1.68	20.42	.66
2.50	.66	8.50	1.54	14.50	1.76	20.50	.66
2.58	.66	8.58	1.54	14.58	1.68	20.58	.66
2.67	.66	8.67	1.54	14.67	1.61	20.67	.66
2.75	.66	8.75	1.54	14.75	1.54	20.75	.66
2.83	.66	8.83	1.61	14.83	1.61	20.83	.66
2.92	.66	8.92	1.68	14.92	1.68	20.92	.66
3.00	.66	9.00	1.76	15.00	1.76	21.00	.66
3.08	.73	9.08	1.76	15.08	1.68	21.08	.66
3.17	.81	9.17	1.76	15.17	1.61	21.17	.66
3.25	.88	9.25	1.76	15.25	1.54	21.25	.66
3.33	.81	9.33	1.83	15.33	1.61	21.33	.66
3.42	.73	9.42	1.90	15.42	1.68	21.42	.66
3.50	.66	9.50	1.98	15.50	1.76	21.50	.66
3.58	.66	9.58	1.98	15.58	1.68	21.58	.66
3.67	.66	9.67	1.98	15.67	1.61	21.67	.66
3.75	.66	9.75	1.98	15.75	1.54	21.75	.66
3.83	.73	9.83	2.12	15.83	1.39	21.83	.66
3.92	.81	9.92	2.27	15.92	1.24	21.92	.66
4.00	.88	10.00	2.42	16.00	1.10	22.00	.66
4.08	.88	10.08	2.49	16.08	1.02	22.08	.66
4.17	.88	10.17	2.56	16.17	.95	22.17	.66
4.25	.88	10.25	2.64	16.25	.88	22.25	.66
4.33	.88	10.33	2.85	16.33	.95	22.33	.66
4.42	.88	10.42	3.07	16.42	1.02	22.42	.66
4.50	.88	10.50	3.29	16.50	1.10	22.50	.66
4.58	.88	10.58	3.37	16.58	1.02	22.58	.66
4.67	.88	10.67	3.44	16.67	.95	22.67	.66
4.75	.88	10.75	3.51	16.75	.88	22.75	.66
4.83	.88	10.83	4.10	16.83	.95	22.83	.66
4.92	.88	10.92	4.68	16.92	1.02	22.92	.66
5.00	.88	11.00	5.27	17.00	1.10	23.00	.66
5.08	.88	11.08	5.27	17.08	1.02	23.08	.66
5.17	.88	11.17	5.27	17.17	.95	23.17	.66
5.25	.88	11.25	5.27	17.25	.88	23.25	.66
5.33	.88	11.33	8.93	17.33	.95	23.33	.66
5.42	.88	11.42	12.59	17.42	1.02	23.42	.66
5.50	.88	11.50	16.25	17.50	1.10	23.50	.66

5.58	.88	11.58	33.23	17.58	1.02	23.58	.66
5.67	.88	11.67	50.21	17.67	.95	23.67	.66
5.75	.88	11.75	67.20	17.75	.88	23.75	.66
5.83	.88	11.83	47.44	17.83	.95		
5.92	.88	11.92	27.67	17.92	1.02		
6.00	.88	12.00	7.91	18.00	1.10		

CALIB			
NASHYD (0101)	Area (ha)=	3.62	Curve Number (CN)= 35.3
ID= 1 DT= 5.0 min	Ia (mm)=	9.59	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	.47	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.22	6.083	.95	12.083	7.91	18.08	1.02
.167	.44	6.167	1.02	12.167	7.91	18.17	.95
.250	.66	6.250	1.10	12.250	7.91	18.25	.88
.333	.59	6.333	1.02	12.333	6.66	18.33	.95
.417	.51	6.417	.95	12.417	5.42	18.42	1.02
.500	.44	6.500	.88	12.500	4.17	18.50	1.10
.583	.51	6.583	.95	12.583	4.10	18.58	1.02
.667	.59	6.667	1.02	12.667	4.03	18.67	.95
.750	.66	6.750	1.10	12.750	3.95	18.75	.88
.833	.66	6.833	1.10	12.833	3.66	18.83	.95
.917	.66	6.917	1.10	12.917	3.37	18.92	1.02
1.000	.66	7.000	1.10	13.000	3.07	19.00	1.10
1.083	.66	7.083	1.17	13.083	3.00	19.08	1.02
1.167	.66	7.167	1.24	13.167	2.93	19.17	.95
1.250	.66	7.250	1.32	13.250	2.85	19.25	.88
1.333	.59	7.333	1.24	13.333	2.71	19.33	.95
1.417	.51	7.417	1.17	13.417	2.56	19.42	1.02
1.500	.44	7.500	1.10	13.500	2.42	19.50	1.10
1.583	.51	7.583	1.17	13.583	2.34	19.58	1.02
1.667	.59	7.667	1.24	13.667	2.27	19.67	.95
1.750	.66	7.750	1.32	13.750	2.20	19.75	.88
1.833	.66	7.833	1.32	13.833	2.05	19.83	.81
1.917	.66	7.917	1.32	13.917	1.90	19.92	.73
2.000	.66	8.000	1.32	14.000	1.76	20.00	.66
2.083	.73	8.083	1.39	14.083	1.68	20.08	.66
2.167	.81	8.167	1.46	14.167	1.61	20.17	.66
2.250	.88	8.250	1.54	14.250	1.54	20.25	.66
2.333	.81	8.333	1.54	14.333	1.61	20.33	.66
2.417	.73	8.417	1.54	14.417	1.68	20.42	.66
2.500	.66	8.500	1.54	14.500	1.76	20.50	.66
2.583	.66	8.583	1.54	14.583	1.68	20.58	.66
2.667	.66	8.667	1.54	14.667	1.61	20.67	.66
2.750	.66	8.750	1.54	14.750	1.54	20.75	.66
2.833	.66	8.833	1.61	14.833	1.61	20.83	.66
2.917	.66	8.917	1.68	14.917	1.68	20.92	.66
3.000	.66	9.000	1.76	15.000	1.76	21.00	.66
3.083	.73	9.083	1.76	15.083	1.68	21.08	.66
3.167	.81	9.167	1.76	15.167	1.61	21.17	.66
3.250	.88	9.250	1.76	15.250	1.54	21.25	.66
3.333	.81	9.333	1.83	15.333	1.61	21.33	.66
3.417	.73	9.417	1.90	15.417	1.68	21.42	.66
3.500	.66	9.500	1.98	15.500	1.76	21.50	.66
3.583	.66	9.583	1.98	15.583	1.68	21.58	.66

3.667	.66	9.667	1.98	15.667	1.61	21.67	.66
3.750	.66	9.750	1.98	15.750	1.54	21.75	.66
3.833	.73	9.833	2.12	15.833	1.39	21.83	.66
3.917	.81	9.917	2.27	15.917	1.24	21.92	.66
4.000	.88	10.000	2.42	16.000	1.10	22.00	.66
4.083	.88	10.083	2.49	16.083	1.02	22.08	.66
4.167	.88	10.167	2.56	16.167	.95	22.17	.66
4.250	.88	10.250	2.64	16.250	.88	22.25	.66
4.333	.88	10.333	2.85	16.333	.95	22.33	.66
4.417	.88	10.417	3.07	16.417	1.02	22.42	.66
4.500	.88	10.500	3.29	16.500	1.10	22.50	.66
4.583	.88	10.583	3.37	16.583	1.02	22.58	.66
4.667	.88	10.667	3.44	16.667	.95	22.67	.66
4.750	.88	10.750	3.51	16.750	.88	22.75	.66
4.833	.88	10.833	4.10	16.833	.95	22.83	.66
4.917	.88	10.917	4.68	16.917	1.02	22.92	.66
5.000	.88	11.000	5.27	17.000	1.10	23.00	.66
5.083	.88	11.083	5.27	17.083	1.02	23.08	.66
5.167	.88	11.167	5.27	17.167	.95	23.17	.66
5.250	.88	11.250	5.27	17.250	.88	23.25	.66
5.333	.88	11.333	8.93	17.333	.95	23.33	.66
5.417	.88	11.417	12.59	17.417	1.02	23.42	.66
5.500	.88	11.500	16.25	17.500	1.10	23.50	.66
5.583	.88	11.583	33.23	17.583	1.02	23.58	.66
5.667	.88	11.667	50.21	17.667	.95	23.67	.66
5.750	.88	11.750	67.19	17.750	.88	23.75	.00
5.833	.88	11.833	47.44	17.833	.95		
5.917	.88	11.917	27.67	17.917	1.02		
6.000	.88	12.000	7.91	18.000	1.10		

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .018 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 3.971
TOTAL RAINFALL (mm)= 54.626
RUNOFF COEFFICIENT = .073

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

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** SIMULATION NUMBER: 2 **
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MASS STORM	Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\SCS24H.MST
Ptotal= 72.60 mm	Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min
New Storm time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	.29	6.08	1.26	12.08	10.45	18.08	1.36
.17	.58	6.17	1.36	12.17	10.45	18.17	1.26
.25	.87	6.25	1.45	12.25	10.45	18.25	1.16
.33	.77	6.33	1.36	12.33	8.81	18.33	1.26
.42	.68	6.42	1.26	12.42	7.16	18.42	1.36

.50	.58	6.50	1.16	12.50	5.52	18.50	1.45
.58	.68	6.58	1.26	12.58	5.42	18.58	1.36
.67	.77	6.67	1.36	12.67	5.32	18.67	1.26
.75	.87	6.75	1.45	12.75	5.23	18.75	1.16
.83	.87	6.83	1.45	12.83	4.84	18.83	1.26
.92	.87	6.92	1.45	12.92	4.45	18.92	1.36
1.00	.87	7.00	1.45	13.00	4.07	19.00	1.45
1.08	.87	7.08	1.55	13.08	3.97	19.08	1.36
1.17	.87	7.17	1.65	13.17	3.87	19.17	1.26
1.25	.87	7.25	1.74	13.25	3.78	19.25	1.16
1.33	.77	7.33	1.65	13.33	3.58	19.33	1.26
1.42	.68	7.42	1.55	13.42	3.39	19.42	1.36
1.50	.58	7.50	1.45	13.50	3.19	19.50	1.45
1.58	.68	7.58	1.55	13.58	3.10	19.58	1.36
1.67	.77	7.67	1.65	13.67	3.00	19.67	1.26
1.75	.87	7.75	1.74	13.75	2.90	19.75	1.16
1.83	.87	7.83	1.74	13.83	2.71	19.83	1.06
1.92	.87	7.92	1.74	13.92	2.52	19.92	.97
2.00	.87	8.00	1.74	14.00	2.32	20.00	.87
2.08	.97	8.08	1.84	14.08	2.23	20.08	.87
2.17	1.06	8.17	1.94	14.17	2.13	20.17	.87
2.25	1.16	8.25	2.03	14.25	2.03	20.25	.87
2.33	1.06	8.33	2.03	14.33	2.13	20.33	.87
2.42	.97	8.42	2.03	14.42	2.23	20.42	.87
2.50	.87	8.50	2.03	14.50	2.32	20.50	.87
2.58	.87	8.58	2.03	14.58	2.23	20.58	.87
2.67	.87	8.67	2.03	14.67	2.13	20.67	.87
2.75	.87	8.75	2.03	14.75	2.03	20.75	.87
2.83	.87	8.83	2.13	14.83	2.13	20.83	.87
2.92	.87	8.92	2.23	14.92	2.23	20.92	.87
3.00	.87	9.00	2.32	15.00	2.32	21.00	.87
3.08	.97	9.08	2.32	15.08	2.23	21.08	.87
3.17	1.06	9.17	2.32	15.17	2.13	21.17	.87
3.25	1.16	9.25	2.32	15.25	2.03	21.25	.87
3.33	1.06	9.33	2.42	15.33	2.13	21.33	.87
3.42	.97	9.42	2.52	15.42	2.23	21.42	.87
3.50	.87	9.50	2.61	15.50	2.32	21.50	.87
3.58	.87	9.58	2.61	15.58	2.23	21.58	.87
3.67	.87	9.67	2.61	15.67	2.13	21.67	.87
3.75	.87	9.75	2.61	15.75	2.03	21.75	.87
3.83	.97	9.83	2.81	15.83	1.84	21.83	.87
3.92	1.06	9.92	3.00	15.92	1.65	21.92	.87
4.00	1.16	10.00	3.19	16.00	1.45	22.00	.87
4.08	1.16	10.08	3.29	16.08	1.36	22.08	.87
4.17	1.16	10.17	3.39	16.17	1.26	22.17	.87
4.25	1.16	10.25	3.48	16.25	1.16	22.25	.87
4.33	1.16	10.33	3.78	16.33	1.26	22.33	.87
4.42	1.16	10.42	4.07	16.42	1.36	22.42	.87
4.50	1.16	10.50	4.36	16.50	1.45	22.50	.87
4.58	1.16	10.58	4.45	16.58	1.36	22.58	.87
4.67	1.16	10.67	4.55	16.67	1.26	22.67	.87
4.75	1.16	10.75	4.65	16.75	1.16	22.75	.87
4.83	1.16	10.83	5.42	16.83	1.26	22.83	.87
4.92	1.16	10.92	6.20	16.92	1.36	22.92	.87
5.00	1.16	11.00	6.97	17.00	1.45	23.00	.87
5.08	1.16	11.08	6.97	17.08	1.36	23.08	.87
5.17	1.16	11.17	6.97	17.17	1.26	23.17	.87
5.25	1.16	11.25	6.97	17.25	1.16	23.25	.87
5.33	1.16	11.33	11.81	17.33	1.26	23.33	.87
5.42	1.16	11.42	16.65	17.42	1.36	23.42	.87
5.50	1.16	11.50	21.49	17.50	1.45	23.50	.87
5.58	1.16	11.58	43.95	17.58	1.36	23.58	.87
5.67	1.16	11.67	66.40	17.67	1.26	23.67	.87

5.75	1.16	11.75	88.86	17.75	1.16	23.75	.87
5.83	1.16	11.83	62.73	17.83	1.26		
5.92	1.16	11.92	36.59	17.92	1.36		
6.00	1.16	12.00	10.46	18.00	1.45		

CALIB				
NASHYD (0101)	Area (ha)=	3.62	Curve Number (CN)=	35.3
ID= 1 DT= 5.0 min	Ia (mm)=	9.59	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.47		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.29	6.083	1.26	12.083	10.45	18.08	1.36
.167	.58	6.167	1.36	12.167	10.45	18.17	1.26
.250	.87	6.250	1.45	12.250	10.45	18.25	1.16
.333	.77	6.333	1.36	12.333	8.81	18.33	1.26
.417	.68	6.417	1.26	12.417	7.16	18.42	1.36
.500	.58	6.500	1.16	12.500	5.52	18.50	1.45
.583	.68	6.583	1.26	12.583	5.42	18.58	1.36
.667	.77	6.667	1.36	12.667	5.32	18.67	1.26
.750	.87	6.750	1.45	12.750	5.23	18.75	1.16
.833	.87	6.833	1.45	12.833	4.84	18.83	1.26
.917	.87	6.917	1.45	12.917	4.45	18.92	1.36
1.000	.87	7.000	1.45	13.000	4.07	19.00	1.45
1.083	.87	7.083	1.55	13.083	3.97	19.08	1.36
1.167	.87	7.167	1.65	13.167	3.87	19.17	1.26
1.250	.87	7.250	1.74	13.250	3.78	19.25	1.16
1.333	.77	7.333	1.65	13.333	3.58	19.33	1.26
1.417	.68	7.417	1.55	13.417	3.39	19.42	1.36
1.500	.58	7.500	1.45	13.500	3.19	19.50	1.45
1.583	.68	7.583	1.55	13.583	3.10	19.58	1.36
1.667	.77	7.667	1.65	13.667	3.00	19.67	1.26
1.750	.87	7.750	1.74	13.750	2.90	19.75	1.16
1.833	.87	7.833	1.74	13.833	2.71	19.83	1.06
1.917	.87	7.917	1.74	13.917	2.52	19.92	.97
2.000	.87	8.000	1.74	14.000	2.32	20.00	.87
2.083	.97	8.083	1.84	14.083	2.23	20.08	.87
2.167	1.06	8.167	1.94	14.167	2.13	20.17	.87
2.250	1.16	8.250	2.03	14.250	2.03	20.25	.87
2.333	1.06	8.333	2.03	14.333	2.13	20.33	.87
2.417	.97	8.417	2.03	14.417	2.23	20.42	.87
2.500	.87	8.500	2.03	14.500	2.32	20.50	.87
2.583	.87	8.583	2.03	14.583	2.23	20.58	.87
2.667	.87	8.667	2.03	14.667	2.13	20.67	.87
2.750	.87	8.750	2.03	14.750	2.03	20.75	.87
2.833	.87	8.833	2.13	14.833	2.13	20.83	.87
2.917	.87	8.917	2.23	14.917	2.23	20.92	.87
3.000	.87	9.000	2.32	15.000	2.32	21.00	.87
3.083	.97	9.083	2.32	15.083	2.23	21.08	.87
3.167	1.06	9.167	2.32	15.167	2.13	21.17	.87
3.250	1.16	9.250	2.32	15.250	2.03	21.25	.87
3.333	1.06	9.333	2.42	15.333	2.13	21.33	.87
3.417	.97	9.417	2.52	15.417	2.23	21.42	.87
3.500	.87	9.500	2.61	15.500	2.32	21.50	.87
3.583	.87	9.583	2.61	15.583	2.23	21.58	.87
3.667	.87	9.667	2.61	15.667	2.13	21.67	.87
3.750	.87	9.750	2.61	15.750	2.03	21.75	.87

3.833	.97	9.833	2.81	15.833	1.84	21.83	.87
3.917	1.06	9.917	3.00	15.917	1.65	21.92	.87
4.000	1.16	10.000	3.19	16.000	1.45	22.00	.87
4.083	1.16	10.083	3.29	16.083	1.36	22.08	.87
4.167	1.16	10.167	3.39	16.167	1.26	22.17	.87
4.250	1.16	10.250	3.48	16.250	1.16	22.25	.87
4.333	1.16	10.333	3.78	16.333	1.26	22.33	.87
4.417	1.16	10.417	4.07	16.417	1.36	22.42	.87
4.500	1.16	10.500	4.36	16.500	1.45	22.50	.87
4.583	1.16	10.583	4.45	16.583	1.36	22.58	.87
4.667	1.16	10.667	4.55	16.667	1.26	22.67	.87
4.750	1.16	10.750	4.65	16.750	1.16	22.75	.87
4.833	1.16	10.833	5.42	16.833	1.26	22.83	.87
4.917	1.16	10.917	6.20	16.917	1.36	22.92	.87
5.000	1.16	11.000	6.97	17.000	1.45	23.00	.87
5.083	1.16	11.083	6.97	17.083	1.36	23.08	.87
5.167	1.16	11.167	6.97	17.167	1.26	23.17	.87
5.250	1.16	11.250	6.97	17.250	1.16	23.25	.87
5.333	1.16	11.333	11.81	17.333	1.26	23.33	.87
5.417	1.16	11.417	16.65	17.417	1.36	23.42	.87
5.500	1.16	11.500	21.49	17.500	1.45	23.50	.87
5.583	1.16	11.583	43.94	17.583	1.36	23.58	.87
5.667	1.16	11.667	66.40	17.667	1.26	23.67	.87
5.750	1.16	11.750	88.86	17.750	1.16	23.75	.00
5.833	1.16	11.833	62.73	17.833	1.26		
5.917	1.16	11.917	36.60	17.917	1.36		
6.000	1.16	12.000	10.46	18.000	1.45		

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .034 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 7.429
TOTAL RAINFALL (mm)= 72.237
RUNOFF COEFFICIENT = .103

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

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** SIMULATION NUMBER: 3 **
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MASS STORM	Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\SCS24H.MST
Ptotal= 84.30 mm	Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min
New Storm time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	.34	6.08	1.46	12.08	12.14	18.08	1.57
.17	.67	6.17	1.57	12.17	12.14	18.17	1.46
.25	1.01	6.25	1.69	12.25	12.14	18.25	1.35
.33	.90	6.33	1.57	12.33	10.23	18.33	1.46
.42	.79	6.42	1.46	12.42	8.32	18.42	1.57
.50	.67	6.50	1.35	12.50	6.41	18.50	1.69
.58	.79	6.58	1.46	12.58	6.29	18.58	1.57

.67	.90	6.67	1.57	12.67	6.18	18.67	1.46
.75	1.01	6.75	1.69	12.75	6.07	18.75	1.35
.83	1.01	6.83	1.69	12.83	5.62	18.83	1.46
.92	1.01	6.92	1.69	12.92	5.17	18.92	1.57
1.00	1.01	7.00	1.69	13.00	4.72	19.00	1.69
1.08	1.01	7.08	1.80	13.08	4.61	19.08	1.57
1.17	1.01	7.17	1.91	13.17	4.50	19.17	1.46
1.25	1.01	7.25	2.02	13.25	4.38	19.25	1.35
1.33	.90	7.33	1.91	13.33	4.16	19.33	1.46
1.42	.79	7.42	1.80	13.42	3.93	19.42	1.57
1.50	.67	7.50	1.69	13.50	3.71	19.50	1.69
1.58	.79	7.58	1.80	13.58	3.60	19.58	1.57
1.67	.90	7.67	1.91	13.67	3.48	19.67	1.46
1.75	1.01	7.75	2.02	13.75	3.37	19.75	1.35
1.83	1.01	7.83	2.02	13.83	3.15	19.83	1.24
1.92	1.01	7.92	2.02	13.92	2.92	19.92	1.12
2.00	1.01	8.00	2.02	14.00	2.70	20.00	1.01
2.08	1.12	8.08	2.14	14.08	2.59	20.08	1.01
2.17	1.24	8.17	2.25	14.17	2.47	20.17	1.01
2.25	1.35	8.25	2.36	14.25	2.36	20.25	1.01
2.33	1.24	8.33	2.36	14.33	2.47	20.33	1.01
2.42	1.12	8.42	2.36	14.42	2.59	20.42	1.01
2.50	1.01	8.50	2.36	14.50	2.70	20.50	1.01
2.58	1.01	8.58	2.36	14.58	2.59	20.58	1.01
2.67	1.01	8.67	2.36	14.67	2.47	20.67	1.01
2.75	1.01	8.75	2.36	14.75	2.36	20.75	1.01
2.83	1.01	8.83	2.47	14.83	2.47	20.83	1.01
2.92	1.01	8.92	2.59	14.92	2.59	20.92	1.01
3.00	1.01	9.00	2.70	15.00	2.70	21.00	1.01
3.08	1.12	9.08	2.70	15.08	2.59	21.08	1.01
3.17	1.24	9.17	2.70	15.17	2.47	21.17	1.01
3.25	1.35	9.25	2.70	15.25	2.36	21.25	1.01
3.33	1.24	9.33	2.81	15.33	2.47	21.33	1.01
3.42	1.12	9.42	2.92	15.42	2.59	21.42	1.01
3.50	1.01	9.50	3.03	15.50	2.70	21.50	1.01
3.58	1.01	9.58	3.03	15.58	2.59	21.58	1.01
3.67	1.01	9.67	3.03	15.67	2.47	21.67	1.01
3.75	1.01	9.75	3.03	15.75	2.36	21.75	1.01
3.83	1.12	9.83	3.26	15.83	2.14	21.83	1.01
3.92	1.24	9.92	3.48	15.92	1.91	21.92	1.01
4.00	1.35	10.00	3.71	16.00	1.69	22.00	1.01
4.08	1.35	10.08	3.82	16.08	1.57	22.08	1.01
4.17	1.35	10.17	3.93	16.17	1.46	22.17	1.01
4.25	1.35	10.25	4.05	16.25	1.35	22.25	1.01
4.33	1.35	10.33	4.38	16.33	1.46	22.33	1.01
4.42	1.35	10.42	4.72	16.42	1.57	22.42	1.01
4.50	1.35	10.50	5.06	16.50	1.69	22.50	1.01
4.58	1.35	10.58	5.17	16.58	1.57	22.58	1.01
4.67	1.35	10.67	5.28	16.67	1.46	22.67	1.01
4.75	1.35	10.75	5.40	16.75	1.35	22.75	1.01
4.83	1.35	10.83	6.29	16.83	1.46	22.83	1.01
4.92	1.35	10.92	7.19	16.92	1.57	22.92	1.01
5.00	1.35	11.00	8.09	17.00	1.69	23.00	1.01
5.08	1.35	11.08	8.09	17.08	1.57	23.08	1.01
5.17	1.35	11.17	8.09	17.17	1.46	23.17	1.01
5.25	1.35	11.25	8.09	17.25	1.35	23.25	1.01
5.33	1.35	11.33	13.71	17.33	1.46	23.33	1.01
5.42	1.35	11.42	19.33	17.42	1.57	23.42	1.01
5.50	1.35	11.50	24.95	17.50	1.69	23.50	1.01
5.58	1.35	11.58	51.03	17.58	1.57	23.58	1.01
5.67	1.35	11.67	77.10	17.67	1.46	23.67	1.01
5.75	1.35	11.75	103.18	17.75	1.35	23.75	1.01
5.83	1.35	11.83	72.84	17.83	1.46		

5.92	1.35	11.92	42.49	17.92	1.57
6.00	1.35	12.00	12.14	18.00	1.69

CALIB			
NASHYD (0101)	Area (ha)= 3.62	Curve Number (CN)= 35.3	
ID= 1 DT= 5.0 min	Ia (mm)= 9.59	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= .47		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.34	6.083	1.46	12.083	12.14	18.08	1.57
.167	.67	6.167	1.57	12.167	12.14	18.17	1.46
.250	1.01	6.250	1.69	12.250	12.14	18.25	1.35
.333	.90	6.333	1.57	12.333	10.23	18.33	1.46
.417	.79	6.417	1.46	12.417	8.32	18.42	1.57
.500	.67	6.500	1.35	12.500	6.41	18.50	1.69
.583	.79	6.583	1.46	12.583	6.29	18.58	1.57
.667	.90	6.667	1.57	12.667	6.18	18.67	1.46
.750	1.01	6.750	1.69	12.750	6.07	18.75	1.35
.833	1.01	6.833	1.69	12.833	5.62	18.83	1.46
.917	1.01	6.917	1.69	12.917	5.17	18.92	1.57
1.000	1.01	7.000	1.69	13.000	4.72	19.00	1.69
1.083	1.01	7.083	1.80	13.083	4.61	19.08	1.57
1.167	1.01	7.167	1.91	13.167	4.50	19.17	1.46
1.250	1.01	7.250	2.02	13.250	4.38	19.25	1.35
1.333	.90	7.333	1.91	13.333	4.16	19.33	1.46
1.417	.79	7.417	1.80	13.417	3.93	19.42	1.57
1.500	.67	7.500	1.69	13.500	3.71	19.50	1.69
1.583	.79	7.583	1.80	13.583	3.60	19.58	1.57
1.667	.90	7.667	1.91	13.667	3.48	19.67	1.46
1.750	1.01	7.750	2.02	13.750	3.37	19.75	1.35
1.833	1.01	7.833	2.02	13.833	3.15	19.83	1.24
1.917	1.01	7.917	2.02	13.917	2.92	19.92	1.12
2.000	1.01	8.000	2.02	14.000	2.70	20.00	1.01
2.083	1.12	8.083	2.14	14.083	2.59	20.08	1.01
2.167	1.24	8.167	2.25	14.167	2.47	20.17	1.01
2.250	1.35	8.250	2.36	14.250	2.36	20.25	1.01
2.333	1.24	8.333	2.36	14.333	2.47	20.33	1.01
2.417	1.12	8.417	2.36	14.417	2.59	20.42	1.01
2.500	1.01	8.500	2.36	14.500	2.70	20.50	1.01
2.583	1.01	8.583	2.36	14.583	2.59	20.58	1.01
2.667	1.01	8.667	2.36	14.667	2.47	20.67	1.01
2.750	1.01	8.750	2.36	14.750	2.36	20.75	1.01
2.833	1.01	8.833	2.47	14.833	2.47	20.83	1.01
2.917	1.01	8.917	2.59	14.917	2.59	20.92	1.01
3.000	1.01	9.000	2.70	15.000	2.70	21.00	1.01
3.083	1.12	9.083	2.70	15.083	2.59	21.08	1.01
3.167	1.24	9.167	2.70	15.167	2.47	21.17	1.01
3.250	1.35	9.250	2.70	15.250	2.36	21.25	1.01
3.333	1.24	9.333	2.81	15.333	2.47	21.33	1.01
3.417	1.12	9.417	2.92	15.417	2.59	21.42	1.01
3.500	1.01	9.500	3.03	15.500	2.70	21.50	1.01
3.583	1.01	9.583	3.03	15.583	2.59	21.58	1.01
3.667	1.01	9.667	3.03	15.667	2.47	21.67	1.01
3.750	1.01	9.750	3.03	15.750	2.36	21.75	1.01
3.833	1.12	9.833	3.26	15.833	2.14	21.83	1.01
3.917	1.24	9.917	3.48	15.917	1.91	21.92	1.01

4.000	1.35	10.000	3.71	16.000	1.69	22.00	1.01
4.083	1.35	10.083	3.82	16.083	1.57	22.08	1.01
4.167	1.35	10.167	3.93	16.167	1.46	22.17	1.01
4.250	1.35	10.250	4.05	16.250	1.35	22.25	1.01
4.333	1.35	10.333	4.38	16.333	1.46	22.33	1.01
4.417	1.35	10.417	4.72	16.417	1.57	22.42	1.01
4.500	1.35	10.500	5.06	16.500	1.69	22.50	1.01
4.583	1.35	10.583	5.17	16.583	1.57	22.58	1.01
4.667	1.35	10.667	5.28	16.667	1.46	22.67	1.01
4.750	1.35	10.750	5.40	16.750	1.35	22.75	1.01
4.833	1.35	10.833	6.29	16.833	1.46	22.83	1.01
4.917	1.35	10.917	7.19	16.917	1.57	22.92	1.01
5.000	1.35	11.000	8.09	17.000	1.69	23.00	1.01
5.083	1.35	11.083	8.09	17.083	1.57	23.08	1.01
5.167	1.35	11.167	8.09	17.167	1.46	23.17	1.01
5.250	1.35	11.250	8.09	17.250	1.35	23.25	1.01
5.333	1.35	11.333	13.71	17.333	1.46	23.33	1.01
5.417	1.35	11.417	19.33	17.417	1.57	23.42	1.01
5.500	1.35	11.500	24.95	17.500	1.69	23.50	1.01
5.583	1.35	11.583	51.02	17.583	1.57	23.58	1.01
5.667	1.35	11.667	77.10	17.667	1.46	23.67	1.01
5.750	1.35	11.750	103.18	17.750	1.35	23.75	.00
5.833	1.35	11.833	72.84	17.833	1.46		
5.917	1.35	11.917	42.49	17.917	1.57		
6.000	1.35	12.000	12.15	18.000	1.69		

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .047 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 10.221
TOTAL RAINFALL (mm)= 83.879
RUNOFF COEFFICIENT = .122

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

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** SIMULATION NUMBER: 4 **
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MASS STORM	Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\SCS24H.MST
Ptotal= 99.20 mm	Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min
New Storm time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	.40	6.08	1.72	12.08	14.28	18.08	1.85
.17	.79	6.17	1.85	12.17	14.28	18.17	1.72
.25	1.19	6.25	1.98	12.25	14.28	18.25	1.59
.33	1.06	6.33	1.85	12.33	12.04	18.33	1.72
.42	.93	6.42	1.72	12.42	9.79	18.42	1.85
.50	.79	6.50	1.59	12.50	7.54	18.50	1.98
.58	.93	6.58	1.72	12.58	7.41	18.58	1.85
.67	1.06	6.67	1.85	12.67	7.27	18.67	1.72
.75	1.19	6.75	1.98	12.75	7.14	18.75	1.59

.83	1.19	6.83	1.98	12.83	6.61	18.83	1.72
.92	1.19	6.92	1.98	12.92	6.08	18.92	1.85
1.00	1.19	7.00	1.98	13.00	5.56	19.00	1.98
1.08	1.19	7.08	2.12	13.08	5.42	19.08	1.85
1.17	1.19	7.17	2.25	13.17	5.29	19.17	1.72
1.25	1.19	7.25	2.38	13.25	5.16	19.25	1.59
1.33	1.06	7.33	2.25	13.33	4.89	19.33	1.72
1.42	.93	7.42	2.12	13.42	4.63	19.42	1.85
1.50	.79	7.50	1.98	13.50	4.36	19.50	1.98
1.58	.93	7.58	2.12	13.58	4.23	19.58	1.85
1.67	1.06	7.67	2.25	13.67	4.10	19.67	1.72
1.75	1.19	7.75	2.38	13.75	3.97	19.75	1.59
1.83	1.19	7.83	2.38	13.83	3.70	19.83	1.45
1.92	1.19	7.92	2.38	13.92	3.44	19.92	1.32
2.00	1.19	8.00	2.38	14.00	3.17	20.00	1.19
2.08	1.32	8.08	2.51	14.08	3.04	20.08	1.19
2.17	1.45	8.17	2.65	14.17	2.91	20.17	1.19
2.25	1.59	8.25	2.78	14.25	2.78	20.25	1.19
2.33	1.45	8.33	2.78	14.33	2.91	20.33	1.19
2.42	1.32	8.42	2.78	14.42	3.04	20.42	1.19
2.50	1.19	8.50	2.78	14.50	3.17	20.50	1.19
2.58	1.19	8.58	2.78	14.58	3.04	20.58	1.19
2.67	1.19	8.67	2.78	14.67	2.91	20.67	1.19
2.75	1.19	8.75	2.78	14.75	2.78	20.75	1.19
2.83	1.19	8.83	2.91	14.83	2.91	20.83	1.19
2.92	1.19	8.92	3.04	14.92	3.04	20.92	1.19
3.00	1.19	9.00	3.17	15.00	3.17	21.00	1.19
3.08	1.32	9.08	3.17	15.08	3.04	21.08	1.19
3.17	1.45	9.17	3.17	15.17	2.91	21.17	1.19
3.25	1.59	9.25	3.17	15.25	2.78	21.25	1.19
3.33	1.45	9.33	3.31	15.33	2.91	21.33	1.19
3.42	1.32	9.42	3.44	15.42	3.04	21.42	1.19
3.50	1.19	9.50	3.57	15.50	3.17	21.50	1.19
3.58	1.19	9.58	3.57	15.58	3.04	21.58	1.19
3.67	1.19	9.67	3.57	15.67	2.91	21.67	1.19
3.75	1.19	9.75	3.57	15.75	2.78	21.75	1.19
3.83	1.32	9.83	3.84	15.83	2.51	21.83	1.19
3.92	1.45	9.92	4.10	15.92	2.25	21.92	1.19
4.00	1.59	10.00	4.36	16.00	1.98	22.00	1.19
4.08	1.59	10.08	4.50	16.08	1.85	22.08	1.19
4.17	1.59	10.17	4.63	16.17	1.72	22.17	1.19
4.25	1.59	10.25	4.76	16.25	1.59	22.25	1.19
4.33	1.59	10.33	5.16	16.33	1.72	22.33	1.19
4.42	1.59	10.42	5.56	16.42	1.85	22.42	1.19
4.50	1.59	10.50	5.95	16.50	1.98	22.50	1.19
4.58	1.59	10.58	6.08	16.58	1.85	22.58	1.19
4.67	1.59	10.67	6.22	16.67	1.72	22.67	1.19
4.75	1.59	10.75	6.35	16.75	1.59	22.75	1.19
4.83	1.59	10.83	7.41	16.83	1.72	22.83	1.19
4.92	1.59	10.92	8.46	16.92	1.85	22.92	1.19
5.00	1.59	11.00	9.52	17.00	1.98	23.00	1.19
5.08	1.59	11.08	9.52	17.08	1.85	23.08	1.19
5.17	1.59	11.17	9.52	17.17	1.72	23.17	1.19
5.25	1.59	11.25	9.52	17.25	1.59	23.25	1.19
5.33	1.59	11.33	16.14	17.33	1.72	23.33	1.19
5.42	1.59	11.42	22.75	17.42	1.85	23.42	1.19
5.50	1.59	11.50	29.36	17.50	1.98	23.50	1.19
5.58	1.59	11.58	60.05	17.58	1.85	23.58	1.19
5.67	1.59	11.67	90.73	17.67	1.72	23.67	1.19
5.75	1.59	11.75	121.42	17.75	1.59	23.75	1.19
5.83	1.59	11.83	85.71	17.83	1.72		
5.92	1.59	11.92	50.00	17.92	1.85		
6.00	1.59	12.00	14.29	18.00	1.98		

CALIB			
NASHYD (0101)	Area (ha)= 3.62	Curve Number (CN)= 35.3	
ID= 1 DT= 5.0 min	Ia (mm)= 9.59	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= .47		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.40	6.083	1.72	12.083	14.28	18.08	1.85
.167	.79	6.167	1.85	12.167	14.28	18.17	1.72
.250	1.19	6.250	1.98	12.250	14.28	18.25	1.59
.333	1.06	6.333	1.85	12.333	12.04	18.33	1.72
.417	.93	6.417	1.72	12.417	9.79	18.42	1.85
.500	.79	6.500	1.59	12.500	7.54	18.50	1.98
.583	.93	6.583	1.72	12.583	7.41	18.58	1.85
.667	1.06	6.667	1.85	12.667	7.27	18.67	1.72
.750	1.19	6.750	1.98	12.750	7.14	18.75	1.59
.833	1.19	6.833	1.98	12.833	6.61	18.83	1.72
.917	1.19	6.917	1.98	12.917	6.08	18.92	1.85
1.000	1.19	7.000	1.98	13.000	5.56	19.00	1.98
1.083	1.19	7.083	2.12	13.083	5.42	19.08	1.85
1.167	1.19	7.167	2.25	13.167	5.29	19.17	1.72
1.250	1.19	7.250	2.38	13.250	5.16	19.25	1.59
1.333	1.06	7.333	2.25	13.333	4.89	19.33	1.72
1.417	.93	7.417	2.12	13.417	4.63	19.42	1.85
1.500	.79	7.500	1.98	13.500	4.36	19.50	1.98
1.583	.93	7.583	2.12	13.583	4.23	19.58	1.85
1.667	1.06	7.667	2.25	13.667	4.10	19.67	1.72
1.750	1.19	7.750	2.38	13.750	3.97	19.75	1.59
1.833	1.19	7.833	2.38	13.833	3.70	19.83	1.45
1.917	1.19	7.917	2.38	13.917	3.44	19.92	1.32
2.000	1.19	8.000	2.38	14.000	3.17	20.00	1.19
2.083	1.32	8.083	2.51	14.083	3.04	20.08	1.19
2.167	1.45	8.167	2.65	14.167	2.91	20.17	1.19
2.250	1.59	8.250	2.78	14.250	2.78	20.25	1.19
2.333	1.45	8.333	2.78	14.333	2.91	20.33	1.19
2.417	1.32	8.417	2.78	14.417	3.04	20.42	1.19
2.500	1.19	8.500	2.78	14.500	3.17	20.50	1.19
2.583	1.19	8.583	2.78	14.583	3.04	20.58	1.19
2.667	1.19	8.667	2.78	14.667	2.91	20.67	1.19
2.750	1.19	8.750	2.78	14.750	2.78	20.75	1.19
2.833	1.19	8.833	2.91	14.833	2.91	20.83	1.19
2.917	1.19	8.917	3.04	14.917	3.04	20.92	1.19
3.000	1.19	9.000	3.17	15.000	3.17	21.00	1.19
3.083	1.32	9.083	3.17	15.083	3.04	21.08	1.19
3.167	1.45	9.167	3.17	15.167	2.91	21.17	1.19
3.250	1.59	9.250	3.17	15.250	2.78	21.25	1.19
3.333	1.45	9.333	3.31	15.333	2.91	21.33	1.19
3.417	1.32	9.417	3.44	15.417	3.04	21.42	1.19
3.500	1.19	9.500	3.57	15.500	3.17	21.50	1.19
3.583	1.19	9.583	3.57	15.583	3.04	21.58	1.19
3.667	1.19	9.667	3.57	15.667	2.91	21.67	1.19
3.750	1.19	9.750	3.57	15.750	2.78	21.75	1.19
3.833	1.32	9.833	3.84	15.833	2.51	21.83	1.19
3.917	1.45	9.917	4.10	15.917	2.25	21.92	1.19
4.000	1.59	10.000	4.36	16.000	1.98	22.00	1.19
4.083	1.59	10.083	4.50	16.083	1.85	22.08	1.19

4.167	1.59	10.167	4.63	16.167	1.72	22.17	1.19
4.250	1.59	10.250	4.76	16.250	1.59	22.25	1.19
4.333	1.59	10.333	5.16	16.333	1.72	22.33	1.19
4.417	1.59	10.417	5.56	16.417	1.85	22.42	1.19
4.500	1.59	10.500	5.95	16.500	1.98	22.50	1.19
4.583	1.59	10.583	6.08	16.583	1.85	22.58	1.19
4.667	1.59	10.667	6.22	16.667	1.72	22.67	1.19
4.750	1.59	10.750	6.35	16.750	1.59	22.75	1.19
4.833	1.59	10.833	7.41	16.833	1.72	22.83	1.19
4.917	1.59	10.917	8.46	16.917	1.85	22.92	1.19
5.000	1.59	11.000	9.52	17.000	1.98	23.00	1.19
5.083	1.59	11.083	9.52	17.083	1.85	23.08	1.19
5.167	1.59	11.167	9.52	17.167	1.72	23.17	1.19
5.250	1.59	11.250	9.52	17.250	1.59	23.25	1.19
5.333	1.59	11.333	16.14	17.333	1.72	23.33	1.19
5.417	1.59	11.417	22.75	17.417	1.85	23.42	1.19
5.500	1.59	11.500	29.36	17.500	1.98	23.50	1.19
5.583	1.59	11.583	60.04	17.583	1.85	23.58	1.19
5.667	1.59	11.667	90.73	17.667	1.72	23.67	1.19
5.750	1.59	11.750	121.41	17.750	1.59	23.75	.00
5.833	1.59	11.833	85.72	17.833	1.72		
5.917	1.59	11.917	50.00	17.917	1.85		
6.000	1.59	12.000	14.29	18.000	1.98		

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .066 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 14.315
TOTAL RAINFALL (mm)= 98.705
RUNOFF COEFFICIENT = .145

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

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** SIMULATION NUMBER: 5 **
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MASS STORM
Ptotal=110.10 mm

Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\SCS24H.MST
Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min
New Storm time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	.44	6.08	1.91	12.08	15.85	18.08	2.06
.17	.88	6.17	2.06	12.17	15.85	18.17	1.91
.25	1.32	6.25	2.20	12.25	15.85	18.25	1.76
.33	1.17	6.33	2.06	12.33	13.36	18.33	1.91
.42	1.03	6.42	1.91	12.42	10.86	18.42	2.06
.50	.88	6.50	1.76	12.50	8.37	18.50	2.20
.58	1.03	6.58	1.91	12.58	8.22	18.58	2.06
.67	1.17	6.67	2.06	12.67	8.07	18.67	1.91
.75	1.32	6.75	2.20	12.75	7.93	18.75	1.76
.83	1.32	6.83	2.20	12.83	7.34	18.83	1.91
.92	1.32	6.92	2.20	12.92	6.75	18.92	2.06

1.00	1.32	7.00	2.20	13.00	6.17	19.00	2.20
1.08	1.32	7.08	2.35	13.08	6.02	19.08	2.06
1.17	1.32	7.17	2.50	13.17	5.87	19.17	1.91
1.25	1.32	7.25	2.64	13.25	5.73	19.25	1.76
1.33	1.17	7.33	2.50	13.33	5.43	19.33	1.91
1.42	1.03	7.42	2.35	13.42	5.14	19.42	2.06
1.50	.88	7.50	2.20	13.50	4.84	19.50	2.20
1.58	1.03	7.58	2.35	13.58	4.70	19.58	2.06
1.67	1.17	7.67	2.50	13.67	4.55	19.67	1.91
1.75	1.32	7.75	2.64	13.75	4.40	19.75	1.76
1.83	1.32	7.83	2.64	13.83	4.11	19.83	1.61
1.92	1.32	7.92	2.64	13.92	3.82	19.92	1.47
2.00	1.32	8.00	2.64	14.00	3.52	20.00	1.32
2.08	1.47	8.08	2.79	14.08	3.38	20.08	1.32
2.17	1.61	8.17	2.94	14.17	3.23	20.17	1.32
2.25	1.76	8.25	3.08	14.25	3.08	20.25	1.32
2.33	1.61	8.33	3.08	14.33	3.23	20.33	1.32
2.42	1.47	8.42	3.08	14.42	3.38	20.42	1.32
2.50	1.32	8.50	3.08	14.50	3.52	20.50	1.32
2.58	1.32	8.58	3.08	14.58	3.38	20.58	1.32
2.67	1.32	8.67	3.08	14.67	3.23	20.67	1.32
2.75	1.32	8.75	3.08	14.75	3.08	20.75	1.32
2.83	1.32	8.83	3.23	14.83	3.23	20.83	1.32
2.92	1.32	8.92	3.38	14.92	3.38	20.92	1.32
3.00	1.32	9.00	3.52	15.00	3.52	21.00	1.32
3.08	1.47	9.08	3.52	15.08	3.38	21.08	1.32
3.17	1.61	9.17	3.52	15.17	3.23	21.17	1.32
3.25	1.76	9.25	3.52	15.25	3.08	21.25	1.32
3.33	1.61	9.33	3.67	15.33	3.23	21.33	1.32
3.42	1.47	9.42	3.82	15.42	3.38	21.42	1.32
3.50	1.32	9.50	3.96	15.50	3.52	21.50	1.32
3.58	1.32	9.58	3.96	15.58	3.38	21.58	1.32
3.67	1.32	9.67	3.96	15.67	3.23	21.67	1.32
3.75	1.32	9.75	3.96	15.75	3.08	21.75	1.32
3.83	1.47	9.83	4.26	15.83	2.79	21.83	1.32
3.92	1.61	9.92	4.55	15.92	2.50	21.92	1.32
4.00	1.76	10.00	4.84	16.00	2.20	22.00	1.32
4.08	1.76	10.08	4.99	16.08	2.06	22.08	1.32
4.17	1.76	10.17	5.14	16.17	1.91	22.17	1.32
4.25	1.76	10.25	5.28	16.25	1.76	22.25	1.32
4.33	1.76	10.33	5.73	16.33	1.91	22.33	1.32
4.42	1.76	10.42	6.17	16.42	2.06	22.42	1.32
4.50	1.76	10.50	6.61	16.50	2.20	22.50	1.32
4.58	1.76	10.58	6.75	16.58	2.06	22.58	1.32
4.67	1.76	10.67	6.90	16.67	1.91	22.67	1.32
4.75	1.76	10.75	7.05	16.75	1.76	22.75	1.32
4.83	1.76	10.83	8.22	16.83	1.91	22.83	1.32
4.92	1.76	10.92	9.40	16.92	2.06	22.92	1.32
5.00	1.76	11.00	10.57	17.00	2.20	23.00	1.32
5.08	1.76	11.08	10.57	17.08	2.06	23.08	1.32
5.17	1.76	11.17	10.57	17.17	1.91	23.17	1.32
5.25	1.76	11.25	10.57	17.25	1.76	23.25	1.32
5.33	1.76	11.33	17.91	17.33	1.91	23.33	1.32
5.42	1.76	11.42	25.25	17.42	2.06	23.42	1.32
5.50	1.76	11.50	32.59	17.50	2.20	23.50	1.32
5.58	1.76	11.58	66.64	17.58	2.06	23.58	1.32
5.67	1.76	11.67	100.70	17.67	1.91	23.67	1.32
5.75	1.76	11.75	134.76	17.75	1.76	23.75	1.32
5.83	1.76	11.83	95.13	17.83	1.91		
5.92	1.76	11.92	55.49	17.92	2.06		
6.00	1.76	12.00	15.86	18.00	2.20		

CALIB NASHYD (0101) ID= 1 DT= 5.0 min	Area (ha)= 3.62 Curve Number (CN)= 35.3 Ia (mm)= 9.59 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= .47

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.44	6.083	1.91	12.083	15.85	18.08	2.06
.167	.88	6.167	2.06	12.167	15.85	18.17	1.91
.250	1.32	6.250	2.20	12.250	15.85	18.25	1.76
.333	1.17	6.333	2.06	12.333	13.36	18.33	1.91
.417	1.03	6.417	1.91	12.417	10.86	18.42	2.06
.500	.88	6.500	1.76	12.500	8.37	18.50	2.20
.583	1.03	6.583	1.91	12.583	8.22	18.58	2.06
.667	1.17	6.667	2.06	12.667	8.07	18.67	1.91
.750	1.32	6.750	2.20	12.750	7.93	18.75	1.76
.833	1.32	6.833	2.20	12.833	7.34	18.83	1.91
.917	1.32	6.917	2.20	12.917	6.75	18.92	2.06
1.000	1.32	7.000	2.20	13.000	6.17	19.00	2.20
1.083	1.32	7.083	2.35	13.083	6.02	19.08	2.06
1.167	1.32	7.167	2.50	13.167	5.87	19.17	1.91
1.250	1.32	7.250	2.64	13.250	5.73	19.25	1.76
1.333	1.17	7.333	2.50	13.333	5.43	19.33	1.91
1.417	1.03	7.417	2.35	13.417	5.14	19.42	2.06
1.500	.88	7.500	2.20	13.500	4.84	19.50	2.20
1.583	1.03	7.583	2.35	13.583	4.70	19.58	2.06
1.667	1.17	7.667	2.50	13.667	4.55	19.67	1.91
1.750	1.32	7.750	2.64	13.750	4.40	19.75	1.76
1.833	1.32	7.833	2.64	13.833	4.11	19.83	1.61
1.917	1.32	7.917	2.64	13.917	3.82	19.92	1.47
2.000	1.32	8.000	2.64	14.000	3.52	20.00	1.32
2.083	1.47	8.083	2.79	14.083	3.38	20.08	1.32
2.167	1.61	8.167	2.94	14.167	3.23	20.17	1.32
2.250	1.76	8.250	3.08	14.250	3.08	20.25	1.32
2.333	1.61	8.333	3.08	14.333	3.23	20.33	1.32
2.417	1.47	8.417	3.08	14.417	3.38	20.42	1.32
2.500	1.32	8.500	3.08	14.500	3.52	20.50	1.32
2.583	1.32	8.583	3.08	14.583	3.38	20.58	1.32
2.667	1.32	8.667	3.08	14.667	3.23	20.67	1.32
2.750	1.32	8.750	3.08	14.750	3.08	20.75	1.32
2.833	1.32	8.833	3.23	14.833	3.23	20.83	1.32
2.917	1.32	8.917	3.38	14.917	3.38	20.92	1.32
3.000	1.32	9.000	3.52	15.000	3.52	21.00	1.32
3.083	1.47	9.083	3.52	15.083	3.38	21.08	1.32
3.167	1.61	9.167	3.52	15.167	3.23	21.17	1.32
3.250	1.76	9.250	3.52	15.250	3.08	21.25	1.32
3.333	1.61	9.333	3.67	15.333	3.23	21.33	1.32
3.417	1.47	9.417	3.82	15.417	3.38	21.42	1.32
3.500	1.32	9.500	3.96	15.500	3.52	21.50	1.32
3.583	1.32	9.583	3.96	15.583	3.38	21.58	1.32
3.667	1.32	9.667	3.96	15.667	3.23	21.67	1.32
3.750	1.32	9.750	3.96	15.750	3.08	21.75	1.32
3.833	1.47	9.833	4.26	15.833	2.79	21.83	1.32
3.917	1.61	9.917	4.55	15.917	2.50	21.92	1.32
4.000	1.76	10.000	4.84	16.000	2.20	22.00	1.32
4.083	1.76	10.083	4.99	16.083	2.06	22.08	1.32
4.167	1.76	10.167	5.14	16.167	1.91	22.17	1.32
4.250	1.76	10.250	5.28	16.250	1.76	22.25	1.32

4.333	1.76	10.333	5.73	16.333	1.91	22.33	1.32
4.417	1.76	10.417	6.17	16.417	2.06	22.42	1.32
4.500	1.76	10.500	6.61	16.500	2.20	22.50	1.32
4.583	1.76	10.583	6.75	16.583	2.06	22.58	1.32
4.667	1.76	10.667	6.90	16.667	1.91	22.67	1.32
4.750	1.76	10.750	7.05	16.750	1.76	22.75	1.32
4.833	1.76	10.833	8.22	16.833	1.91	22.83	1.32
4.917	1.76	10.917	9.40	16.917	2.06	22.92	1.32
5.000	1.76	11.000	10.57	17.000	2.20	23.00	1.32
5.083	1.76	11.083	10.57	17.083	2.06	23.08	1.32
5.167	1.76	11.167	10.57	17.167	1.91	23.17	1.32
5.250	1.76	11.250	10.57	17.250	1.76	23.25	1.32
5.333	1.76	11.333	17.91	17.333	1.91	23.33	1.32
5.417	1.76	11.417	25.25	17.417	2.06	23.42	1.32
5.500	1.76	11.500	32.59	17.500	2.20	23.50	1.32
5.583	1.76	11.583	66.64	17.583	2.06	23.58	1.32
5.667	1.76	11.667	100.70	17.667	1.91	23.67	1.32
5.750	1.76	11.750	134.76	17.750	1.76	23.75	.00
5.833	1.76	11.833	95.14	17.833	1.91		
5.917	1.76	11.917	55.50	17.917	2.06		
6.000	1.76	12.000	15.86	18.000	2.20		

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .082 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 17.666
TOTAL RAINFALL (mm)= 109.550
RUNOFF COEFFICIENT = .161

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

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** SIMULATION NUMBER: 6 **
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MASS STORM Ptotal=121.00 mm	Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\SCS24H.MST Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min
New Storm time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	.48	6.08	2.10	12.08	17.42	18.08	2.26
.17	.97	6.17	2.26	12.17	17.42	18.17	2.10
.25	1.45	6.25	2.42	12.25	17.42	18.25	1.94
.33	1.29	6.33	2.26	12.33	14.68	18.33	2.10
.42	1.13	6.42	2.10	12.42	11.94	18.42	2.26
.50	.97	6.50	1.94	12.50	9.20	18.50	2.42
.58	1.13	6.58	2.10	12.58	9.03	18.58	2.26
.67	1.29	6.67	2.26	12.67	8.87	18.67	2.10
.75	1.45	6.75	2.42	12.75	8.71	18.75	1.94
.83	1.45	6.83	2.42	12.83	8.07	18.83	2.10
.92	1.45	6.92	2.42	12.92	7.42	18.92	2.26
1.00	1.45	7.00	2.42	13.00	6.78	19.00	2.42
1.08	1.45	7.08	2.58	13.08	6.61	19.08	2.26

1.17	1.45	7.17	2.74	13.17	6.45	19.17	2.10
1.25	1.45	7.25	2.90	13.25	6.29	19.25	1.94
1.33	1.29	7.33	2.74	13.33	5.97	19.33	2.10
1.42	1.13	7.42	2.58	13.42	5.65	19.42	2.26
1.50	.97	7.50	2.42	13.50	5.32	19.50	2.42
1.58	1.13	7.58	2.58	13.58	5.16	19.58	2.26
1.67	1.29	7.67	2.74	13.67	5.00	19.67	2.10
1.75	1.45	7.75	2.90	13.75	4.84	19.75	1.94
1.83	1.45	7.83	2.90	13.83	4.52	19.83	1.77
1.92	1.45	7.92	2.90	13.92	4.19	19.92	1.61
2.00	1.45	8.00	2.90	14.00	3.87	20.00	1.45
2.08	1.61	8.08	3.07	14.08	3.71	20.08	1.45
2.17	1.77	8.17	3.23	14.17	3.55	20.17	1.45
2.25	1.94	8.25	3.39	14.25	3.39	20.25	1.45
2.33	1.77	8.33	3.39	14.33	3.55	20.33	1.45
2.42	1.61	8.42	3.39	14.42	3.71	20.42	1.45
2.50	1.45	8.50	3.39	14.50	3.87	20.50	1.45
2.58	1.45	8.58	3.39	14.58	3.71	20.58	1.45
2.67	1.45	8.67	3.39	14.67	3.55	20.67	1.45
2.75	1.45	8.75	3.39	14.75	3.39	20.75	1.45
2.83	1.45	8.83	3.55	14.83	3.55	20.83	1.45
2.92	1.45	8.92	3.71	14.92	3.71	20.92	1.45
3.00	1.45	9.00	3.87	15.00	3.87	21.00	1.45
3.08	1.61	9.08	3.87	15.08	3.71	21.08	1.45
3.17	1.77	9.17	3.87	15.17	3.55	21.17	1.45
3.25	1.94	9.25	3.87	15.25	3.39	21.25	1.45
3.33	1.77	9.33	4.03	15.33	3.55	21.33	1.45
3.42	1.61	9.42	4.19	15.42	3.71	21.42	1.45
3.50	1.45	9.50	4.36	15.50	3.87	21.50	1.45
3.58	1.45	9.58	4.36	15.58	3.71	21.58	1.45
3.67	1.45	9.67	4.36	15.67	3.55	21.67	1.45
3.75	1.45	9.75	4.36	15.75	3.39	21.75	1.45
3.83	1.61	9.83	4.68	15.83	3.07	21.83	1.45
3.92	1.77	9.92	5.00	15.92	2.74	21.92	1.45
4.00	1.94	10.00	5.32	16.00	2.42	22.00	1.45
4.08	1.94	10.08	5.49	16.08	2.26	22.08	1.45
4.17	1.94	10.17	5.65	16.17	2.10	22.17	1.45
4.25	1.94	10.25	5.81	16.25	1.94	22.25	1.45
4.33	1.94	10.33	6.29	16.33	2.10	22.33	1.45
4.42	1.94	10.42	6.78	16.42	2.26	22.42	1.45
4.50	1.94	10.50	7.26	16.50	2.42	22.50	1.45
4.58	1.94	10.58	7.42	16.58	2.26	22.58	1.45
4.67	1.94	10.67	7.58	16.67	2.10	22.67	1.45
4.75	1.94	10.75	7.74	16.75	1.94	22.75	1.45
4.83	1.94	10.83	9.03	16.83	2.10	22.83	1.45
4.92	1.94	10.92	10.33	16.92	2.26	22.92	1.45
5.00	1.94	11.00	11.62	17.00	2.42	23.00	1.45
5.08	1.94	11.08	11.62	17.08	2.26	23.08	1.45
5.17	1.94	11.17	11.62	17.17	2.10	23.17	1.45
5.25	1.94	11.25	11.62	17.25	1.94	23.25	1.45
5.33	1.94	11.33	19.68	17.33	2.10	23.33	1.45
5.42	1.94	11.42	27.75	17.42	2.26	23.42	1.45
5.50	1.94	11.50	35.82	17.50	2.42	23.50	1.45
5.58	1.94	11.58	73.24	17.58	2.26	23.58	1.45
5.67	1.94	11.67	110.67	17.67	2.10	23.67	1.45
5.75	1.94	11.75	148.10	17.75	1.94	23.75	1.45
5.83	1.94	11.83	104.55	17.83	2.10		
5.92	1.94	11.92	60.99	17.92	2.26		
6.00	1.94	12.00	17.43	18.00	2.42		

CALIB

NASHYD (0101)	ID= 1 DT= 5.0 min

Area (ha)= 3.62 Curve Number (CN)= 35.3
Ia (mm)= 9.59 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.48	6.083	2.10	12.083	17.42	18.08	2.26
.167	.97	6.167	2.26	12.167	17.42	18.17	2.10
.250	1.45	6.250	2.42	12.250	17.42	18.25	1.94
.333	1.29	6.333	2.26	12.333	14.68	18.33	2.10
.417	1.13	6.417	2.10	12.417	11.94	18.42	2.26
.500	.97	6.500	1.94	12.500	9.20	18.50	2.42
.583	1.13	6.583	2.10	12.583	9.03	18.58	2.26
.667	1.29	6.667	2.26	12.667	8.87	18.67	2.10
.750	1.45	6.750	2.42	12.750	8.71	18.75	1.94
.833	1.45	6.833	2.42	12.833	8.07	18.83	2.10
.917	1.45	6.917	2.42	12.917	7.42	18.92	2.26
1.000	1.45	7.000	2.42	13.000	6.78	19.00	2.42
1.083	1.45	7.083	2.58	13.083	6.61	19.08	2.26
1.167	1.45	7.167	2.74	13.167	6.45	19.17	2.10
1.250	1.45	7.250	2.90	13.250	6.29	19.25	1.94
1.333	1.29	7.333	2.74	13.333	5.97	19.33	2.10
1.417	1.13	7.417	2.58	13.417	5.65	19.42	2.26
1.500	.97	7.500	2.42	13.500	5.32	19.50	2.42
1.583	1.13	7.583	2.58	13.583	5.16	19.58	2.26
1.667	1.29	7.667	2.74	13.667	5.00	19.67	2.10
1.750	1.45	7.750	2.90	13.750	4.84	19.75	1.94
1.833	1.45	7.833	2.90	13.833	4.52	19.83	1.77
1.917	1.45	7.917	2.90	13.917	4.19	19.92	1.61
2.000	1.45	8.000	2.90	14.000	3.87	20.00	1.45
2.083	1.61	8.083	3.07	14.083	3.71	20.08	1.45
2.167	1.77	8.167	3.23	14.167	3.55	20.17	1.45
2.250	1.94	8.250	3.39	14.250	3.39	20.25	1.45
2.333	1.77	8.333	3.39	14.333	3.55	20.33	1.45
2.417	1.61	8.417	3.39	14.417	3.71	20.42	1.45
2.500	1.45	8.500	3.39	14.500	3.87	20.50	1.45
2.583	1.45	8.583	3.39	14.583	3.71	20.58	1.45
2.667	1.45	8.667	3.39	14.667	3.55	20.67	1.45
2.750	1.45	8.750	3.39	14.750	3.39	20.75	1.45
2.833	1.45	8.833	3.55	14.833	3.55	20.83	1.45
2.917	1.45	8.917	3.71	14.917	3.71	20.92	1.45
3.000	1.45	9.000	3.87	15.000	3.87	21.00	1.45
3.083	1.61	9.083	3.87	15.083	3.71	21.08	1.45
3.167	1.77	9.167	3.87	15.167	3.55	21.17	1.45
3.250	1.94	9.250	3.87	15.250	3.39	21.25	1.45
3.333	1.77	9.333	4.03	15.333	3.55	21.33	1.45
3.417	1.61	9.417	4.19	15.417	3.71	21.42	1.45
3.500	1.45	9.500	4.36	15.500	3.87	21.50	1.45
3.583	1.45	9.583	4.36	15.583	3.71	21.58	1.45
3.667	1.45	9.667	4.36	15.667	3.55	21.67	1.45
3.750	1.45	9.750	4.36	15.750	3.39	21.75	1.45
3.833	1.61	9.833	4.68	15.833	3.07	21.83	1.45
3.917	1.77	9.917	5.00	15.917	2.74	21.92	1.45
4.000	1.94	10.000	5.32	16.000	2.42	22.00	1.45
4.083	1.94	10.083	5.49	16.083	2.26	22.08	1.45
4.167	1.94	10.167	5.65	16.167	2.10	22.17	1.45
4.250	1.94	10.250	5.81	16.250	1.94	22.25	1.45
4.333	1.94	10.333	6.29	16.333	2.10	22.33	1.45
4.417	1.94	10.417	6.78	16.417	2.26	22.42	1.45

4.500	1.94	10.500	7.26	16.500	2.42	22.50	1.45
4.583	1.94	10.583	7.42	16.583	2.26	22.58	1.45
4.667	1.94	10.667	7.58	16.667	2.10	22.67	1.45
4.750	1.94	10.750	7.74	16.750	1.94	22.75	1.45
4.833	1.94	10.833	9.03	16.833	2.10	22.83	1.45
4.917	1.94	10.917	10.33	16.917	2.26	22.92	1.45
5.000	1.94	11.000	11.62	17.000	2.42	23.00	1.45
5.083	1.94	11.083	11.62	17.083	2.26	23.08	1.45
5.167	1.94	11.167	11.62	17.167	2.10	23.17	1.45
5.250	1.94	11.250	11.62	17.250	1.94	23.25	1.45
5.333	1.94	11.333	19.68	17.333	2.10	23.33	1.45
5.417	1.94	11.417	27.75	17.417	2.26	23.42	1.45
5.500	1.94	11.500	35.81	17.500	2.42	23.50	1.45
5.583	1.94	11.583	73.24	17.583	2.26	23.58	1.45
5.667	1.94	11.667	110.67	17.667	2.10	23.67	1.45
5.750	1.94	11.750	148.10	17.750	1.94	23.75	.00
5.833	1.94	11.833	104.55	17.833	2.10		
5.917	1.94	11.917	60.99	17.917	2.26		
6.000	1.94	12.000	17.43	18.000	2.42		

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .100 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 21.300
TOTAL RAINFALL (mm)= 120.396
RUNOFF COEFFICIENT = .177

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

FINISH

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

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

        OOO     T      T    H   H    Y    M   M   OOO
```


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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.2\voin.dat

Output filename: I:\2016 Projects\116028 - Wasaga Shores Subdivision\Design\Storm Design\OTTHYMO\CHI Pre-Development.out
Summary filename: I:\2016 Projects\116028 - Wasaga Shores Subdivision\Design\Storm Design\OTTHYMO\CHI Pre-Development.sum

DATE: 6/22/2017 TIME: 2:43:16 PM

USER:

COMMENTS: _____

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  ***************************
  ** SIMULATION NUMBER:   1 **
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|    READ STORM    |    Filename: I:\2016 Projects\116
|                  |              028 - Wasaga Shores Subdivision\Design\
|                  |              Storm Design\OTTHYMO\CHIC25MM.4HR
| Ptotal= 24.97 mm |    Comments: OWEN SOUND 25 mm (from a 2 year-4hr stor
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	1.29	1.10	2.81	2.10	13.05	3.10	2.04
.20	1.36	1.20	3.22	2.20	8.44	3.20	1.89
.30	1.44	1.30	3.77	2.30	6.21	3.30	1.76
.40	1.53	1.40	4.55	2.40	4.91	3.40	1.65
.50	1.63	1.50	5.77	2.50	4.06	3.50	1.55
.60	1.75	1.60	7.86	2.60	3.47	3.60	1.46
.70	1.89	1.70	12.27	2.70	3.03	3.70	1.39

.80	2.06	1.80	26.17	2.80	2.70	3.80	1.32
.90	2.26	1.90	72.58	2.90	2.43	3.90	1.26
1.00	2.50	2.00	26.96	3.00	2.22	4.00	1.20

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| CALIB            |
| NASHYD   (0101)  |   Area    (ha)=   3.62   Curve Number   (CN)= 35.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   9.59   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .47

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.29	1.083	2.81	2.083	13.05	3.08	2.04
.167	1.35	1.167	3.14	2.167	9.36	3.17	1.92
.250	1.41	1.250	3.55	2.250	7.10	3.25	1.81
.333	1.48	1.333	4.08	2.333	5.69	3.33	1.72
.417	1.55	1.417	4.79	2.417	4.74	3.42	1.63
.500	1.63	1.500	5.77	2.500	4.06	3.50	1.55
.583	1.75	1.583	7.86	2.583	3.47	3.58	1.46
.667	1.86	1.667	11.39	2.667	3.12	3.67	1.40
.750	1.99	1.750	20.61	2.750	2.83	3.75	1.35
.833	2.14	1.833	44.73	2.833	2.59	3.83	1.30
.917	2.31	1.917	63.46	2.917	2.39	3.92	1.25
1.000	2.50	2.000	26.96	3.000	2.22	4.00	1.20

```
    Unit Hyd Qpeak  (cms)=    .294

    PEAK FLOW       (cms)=    .003 (i)
    TIME TO PEAK    (hrs)=   2.583
    RUNOFF VOLUME    (mm)=    .491
    TOTAL RAINFALL   (mm)=  24.971
    RUNOFF COEFFICIENT   =    .020

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

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


--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 433.495
| Ptotal= 32.45 mm |                          B=   1.500
--------------------                          C=    .725
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =   .33

                  The CORRELATION coefficient is =  .9997
```

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	119.80	111.59
10.	73.80	73.79
15.	55.60	56.79

30.	34.30	35.54
60.	21.10	21.88
120.	13.00	13.36
360.	6.00	6.06
720.	3.70	3.67
1440.	2.30	2.22

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.55	1.17	14.20	2.17	5.28	3.17	2.96
.33	2.87	1.33	73.79	2.33	4.62	3.33	2.78
.50	3.30	1.50	17.95	2.50	4.12	3.50	2.62
.67	3.93	1.67	10.46	2.67	3.74	3.67	2.48
.83	4.95	1.83	7.72	2.83	3.43	3.83	2.36
1.00	6.97	2.00	6.23	3.00	3.18	4.00	2.25

CALIB			
NASHYD (0101)	Area (ha)= 3.62	Curve Number (CN)= 35.3	
ID= 1 DT= 5.0 min	Ia (mm)= 9.59	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= .47		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	2.55	1.083	14.20	2.083	5.28	3.08	2.96
.167	2.55	1.167	14.20	2.167	5.28	3.17	2.96
.250	2.87	1.250	73.79	2.250	4.62	3.25	2.78
.333	2.87	1.333	73.79	2.333	4.62	3.33	2.78
.417	3.30	1.417	17.95	2.417	4.12	3.42	2.62
.500	3.30	1.500	17.95	2.500	4.12	3.50	2.62
.583	3.93	1.583	10.46	2.583	3.74	3.58	2.48
.667	3.93	1.667	10.46	2.667	3.74	3.67	2.48
.750	4.95	1.750	7.72	2.750	3.43	3.75	2.36
.833	4.95	1.833	7.72	2.833	3.43	3.83	2.36
.917	6.97	1.917	6.23	2.917	3.18	3.92	2.25
1.000	6.97	2.000	6.23	3.000	3.18	4.00	2.25

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .005 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 1.070
TOTAL RAINFALL (mm)= 32.454
RUNOFF COEFFICIENT = .033

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

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

CHICAGO STORM	IDF curve parameters: A= 575.484
Ptotal= 42.85 mm	B= 1.509
	C= .726

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .33

The CORRELATION coefficient is = .9997

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	158.50	147.71
10.	97.60	97.66
15.	73.50	75.16
30.	45.30	47.01
60.	27.90	28.92
120.	17.20	17.64
360.	8.00	8.00
720.	4.90	4.84
1440.	3.00	2.93

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.35	1.17	18.75	2.17	6.96	3.17	3.90
.33	3.77	1.33	97.66	2.33	6.08	3.33	3.66
.50	4.34	1.50	23.71	2.50	5.43	3.50	3.45
.67	5.17	1.67	13.81	2.67	4.92	3.67	3.27
.83	6.51	1.83	10.17	2.83	4.52	3.83	3.11
1.00	9.18	2.00	8.21	3.00	4.18	4.00	2.96

CALIB			
NASHYD (0101)	Area (ha)= 3.62	Curve Number (CN)= 35.3	
ID= 1 DT= 5.0 min	Ia (mm)= 9.59	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= .47		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	3.35	1.083	18.75	2.083	6.96	3.08	3.90
.167	3.35	1.167	18.75	2.167	6.96	3.17	3.90
.250	3.77	1.250	97.66	2.250	6.08	3.25	3.66
.333	3.77	1.333	97.66	2.333	6.08	3.33	3.66
.417	4.34	1.417	23.71	2.417	5.43	3.42	3.45
.500	4.34	1.500	23.71	2.500	5.43	3.50	3.45
.583	5.17	1.583	13.81	2.583	4.92	3.58	3.27
.667	5.17	1.667	13.81	2.667	4.92	3.67	3.27
.750	6.51	1.750	10.17	2.750	4.52	3.75	3.11
.833	6.51	1.833	10.17	2.833	4.52	3.83	3.11
.917	9.18	1.917	8.21	2.917	4.18	3.92	2.96
1.000	9.18	2.000	8.21	3.000	4.18	4.00	2.96

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .011 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 2.217
TOTAL RAINFALL (mm)= 42.848

RUNOFF COEFFICIENT = .052

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

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

CHICAGO STORM Ptotal= 49.63 mm	IDF curve parameters: A= 666.560 B= 1.500 C= .726 used in: INTENSITY = A / (t + B)^C Duration of storm = 4.00 hrs Storm time step = 10.00 min Time to peak ratio = .33

The CORRELATION coefficient is = .9997

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	184.00	171.26
10.	113.40	113.18
15.	85.40	87.09
30.	52.60	54.46
60.	32.40	33.51
120.	20.00	20.44
360.	9.30	9.26
720.	5.70	5.61
1440.	3.50	3.39

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.89	1.17	21.70	2.17	8.06	3.17	4.51
.33	4.37	1.33	113.18	2.33	7.04	3.33	4.24
.50	5.03	1.50	27.45	2.50	6.29	3.50	3.99
.67	5.99	1.67	15.98	2.67	5.70	3.67	3.78
.83	7.54	1.83	11.78	2.83	5.23	3.83	3.60
1.00	10.63	2.00	9.51	3.00	4.84	4.00	3.43

CALIB NASHYD (0101) ID= 1 DT= 5.0 min	Area (ha)= 3.62 Curve Number (CN)= 35.3 Ia (mm)= 9.59 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= .47

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	3.89	1.083	21.70	2.083	8.06	3.08	4.51
.167	3.89	1.167	21.70	2.167	8.06	3.17	4.51
.250	4.37	1.250	113.18	2.250	7.04	3.25	4.24
.333	4.37	1.333	113.18	2.333	7.04	3.33	4.24
.417	5.03	1.417	27.45	2.417	6.29	3.42	3.99
.500	5.03	1.500	27.45	2.500	6.29	3.50	3.99

.583	5.99	1.583	15.98	2.583	5.70	3.58	3.78
.667	5.99	1.667	15.98	2.667	5.70	3.67	3.78
.750	7.54	1.750	11.78	2.750	5.23	3.75	3.60
.833	7.54	1.833	11.78	2.833	5.23	3.83	3.60
.917	10.63	1.917	9.51	2.917	4.84	3.92	3.43
1.000	10.63	2.000	9.51	3.000	4.84	4.00	3.43

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .016 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 3.170
TOTAL RAINFALL (mm)= 49.630
RUNOFF COEFFICIENT = .064

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

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

CHICAGO STORM Ptotal= 58.46 mm	IDF curve parameters: A= 785.167 B= 1.500 C= .726 used in: INTENSITY = A / (t + B)^C Duration of storm = 4.00 hrs Storm time step = 10.00 min Time to peak ratio = .33

The CORRELATION coefficient is = .9997

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	216.40	201.74
10.	133.30	133.32
15.	100.40	102.58
30.	61.90	64.15
60.	38.10	39.47
120.	23.50	24.07
360.	10.90	10.91
720.	6.70	6.61
1440.	4.10	4.00

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	4.58	1.17	25.57	2.17	9.49	3.17	5.32
.33	5.15	1.33	133.32	2.33	8.30	3.33	4.99
.50	5.92	1.50	32.33	2.50	7.41	3.50	4.71
.67	7.05	1.67	18.83	2.67	6.72	3.67	4.46
.83	8.89	1.83	13.87	2.83	6.16	3.83	4.24
1.00	12.53	2.00	11.20	3.00	5.70	4.00	4.04

CALIB NASHYD (0101) ID= 1 DT= 5.0 min	Area (ha)= 3.62 Curve Number (CN)= 35.3 Ia (mm)= 9.59 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= .47

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	4.58	1.083	25.57	2.083	9.49	3.08	5.32
.167	4.58	1.167	25.57	2.167	9.49	3.17	5.32
.250	5.15	1.250	133.32	2.250	8.30	3.25	4.99
.333	5.15	1.333	133.32	2.333	8.30	3.33	4.99
.417	5.92	1.417	32.33	2.417	7.41	3.42	4.71
.500	5.92	1.500	32.33	2.500	7.41	3.50	4.71
.583	7.05	1.583	18.83	2.583	6.72	3.58	4.46
.667	7.05	1.667	18.83	2.667	6.72	3.67	4.46
.750	8.89	1.750	13.87	2.750	6.16	3.75	4.24
.833	8.89	1.833	13.87	2.833	6.16	3.83	4.24
.917	12.53	1.917	11.20	2.917	5.70	3.92	4.04
1.000	12.53	2.000	11.20	3.000	5.70	4.00	4.04

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .025 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 4.642
TOTAL RAINFALL (mm)= 58.461
RUNOFF COEFFICIENT = .079

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

**** SIMULATION NUMBER: 6 ****

CHICAGO STORM Ptotal= 64.77 mm

IDF curve parameters: A= 869.905
B= 1.500
C= .726
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .33

The CORRELATION coefficient is = .9997

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	240.30	223.51
10.	148.00	147.71
15.	111.50	113.65
30.	68.70	71.07
60.	42.30	43.73
120.	26.10	26.67
360.	12.10	12.09
720.	7.40	7.32
1440.	4.60	4.43

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	5.07	1.17	28.33	2.17	10.52	3.17	5.89

.33	5.70	1.33	147.71	2.33	9.19	3.33	5.53
.50	6.56	1.50	35.82	2.50	8.21	3.50	5.21
.67	7.82	1.67	20.86	2.67	7.44	3.67	4.94
.83	9.85	1.83	15.37	2.83	6.82	3.83	4.70
1.00	13.88	2.00	12.41	3.00	6.32	4.00	4.48

CALIB NASHYD (0101) ID= 1 DT= 5.0 min

Area (ha)= 3.62 Curve Number (CN)= 35.3
Ia (mm)= 9.59 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	5.07	1.083	28.33	2.083	10.52	3.08	5.89
.167	5.07	1.167	28.33	2.167	10.52	3.17	5.89
.250	5.70	1.250	147.71	2.250	9.19	3.25	5.53
.333	5.70	1.333	147.71	2.333	9.19	3.33	5.53
.417	6.56	1.417	35.82	2.417	8.21	3.42	5.21
.500	6.56	1.500	35.82	2.500	8.21	3.50	5.21
.583	7.82	1.583	20.86	2.583	7.44	3.58	4.94
.667	7.82	1.667	20.86	2.667	7.44	3.67	4.94
.750	9.85	1.750	15.37	2.750	6.82	3.75	4.70
.833	9.85	1.833	15.37	2.833	6.82	3.83	4.70
.917	13.88	1.917	12.41	2.917	6.32	3.92	4.48
1.000	13.88	2.000	12.41	3.000	6.32	4.00	4.48

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .031 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 5.846
TOTAL RAINFALL (mm)= 64.771
RUNOFF COEFFICIENT = .090

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

**** SIMULATION NUMBER: 7 ****

CHICAGO STORM Ptotal= 71.30 mm

IDF curve parameters: A= 957.619
B= 1.500
C= .726
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .33

The CORRELATION coefficient is = .9997

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	264.10	246.05

10.	162.70	162.60
15.	122.50	125.11
30.	75.50	78.24
60.	46.50	48.14
120.	28.60	29.36
360.	13.30	13.30
720.	8.20	8.06
1440.	5.00	4.87

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	5.58	1.17	31.18	2.17	11.58	3.17	6.49
.33	6.28	1.33	162.60	2.33	10.12	3.33	6.09
.50	7.23	1.50	39.44	2.50	9.04	3.50	5.74
.67	8.60	1.67	22.96	2.67	8.19	3.67	5.44
.83	10.84	1.83	16.92	2.83	7.51	3.83	5.17
1.00	15.28	2.00	13.66	3.00	6.95	4.00	4.93

CALIB					
NASHYD (0101)	Area	(ha)=	3.62	Curve Number (CN)=	35.3
ID= 1 DT= 5.0 min	Ia	(mm)=	9.59	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.47		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	5.58	1.083	31.18	2.083	11.58	3.08	6.49
.167	5.58	1.167	31.18	2.167	11.58	3.17	6.49
.250	6.28	1.250	162.60	2.250	10.12	3.25	6.09
.333	6.28	1.333	162.60	2.333	10.12	3.33	6.09
.417	7.23	1.417	39.44	2.417	9.04	3.42	5.74
.500	7.23	1.500	39.44	2.500	9.04	3.50	5.74
.583	8.60	1.583	22.96	2.583	8.19	3.58	5.44
.667	8.60	1.667	22.96	2.667	8.19	3.67	5.44
.750	10.84	1.750	16.92	2.750	7.51	3.75	5.17
.833	10.84	1.833	16.92	2.833	7.51	3.83	5.17
.917	15.28	1.917	13.66	2.917	6.95	3.92	4.93
1.000	15.28	2.000	13.66	3.000	6.95	4.00	4.93

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .039 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 7.221
TOTAL RAINFALL (mm)= 71.302
RUNOFF COEFFICIENT = .101

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

****
** SIMULATION NUMBER: 8 **
****

READ STORM	Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\TIMMINS.12
Ptotal=193.00 mm	Comments: TIMMINS REGIONAL 12 HOUR DURATION STORM

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	15.00	3.20	3.00	6.20	43.00	9.20	13.00
.40	15.00	3.40	3.00	6.40	43.00	9.40	13.00
.60	15.00	3.60	3.00	6.60	43.00	9.60	13.00
.80	15.00	3.80	3.00	6.80	43.00	9.80	13.00
1.00	15.00	4.00	3.00	7.00	43.00	10.00	13.00
1.20	20.00	4.20	5.00	7.20	20.00	10.20	13.00
1.40	20.00	4.40	5.00	7.40	20.00	10.40	13.00
1.60	20.00	4.60	5.00	7.60	20.00	10.60	13.00
1.80	20.00	4.80	5.00	7.80	20.00	10.80	13.00
2.00	20.00	5.00	5.00	8.00	20.00	11.00	13.00
2.20	10.00	5.20	20.00	8.20	23.00	11.20	8.00
2.40	10.00	5.40	20.00	8.40	23.00	11.40	8.00
2.60	10.00	5.60	20.00	8.60	23.00	11.60	8.00
2.80	10.00	5.80	20.00	8.80	23.00	11.80	8.00
3.00	10.00	6.00	20.00	9.00	23.00	12.00	8.00

CALIB					
NASHYD (0101)	Area	(ha)=	3.62	Curve Number (CN)=	35.3
ID= 1 DT= 5.0 min	Ia	(mm)=	9.59	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.47		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	15.00	3.083	3.00	6.083	43.00	9.08	13.00
.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00

2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Unit Hyd Qpeak (cms)= .294

PEAK FLOW (cms)= .113 (i)
TIME TO PEAK (hrs)= 7.167
RUNOFF VOLUME (mm)= 51.830
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = .269

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

FINISH

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APPENDIX B:
POST-DEVELOPMENT HYDROLOGICAL ANALYSIS

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Project: Wasaga Shores Subdivision	Date: April 2017
File No.: 116028	Designed: AS
Subject: Impervious Area Calculations	Checked

Site Area (Catchment 202)	=	3,270.0	sq.m	
Impervious Area	=	350.0	sq.m	(Asphalt, Driveways, Houses, etc.)
Pervious Area	=	2,920.0	sq.m	
Directly Connected Area	=	350.0	sq.m	(Asphalt, Driveways, Houses, etc.)
% Impervious	=	10.7		
% Directly Connected	=	10.7		

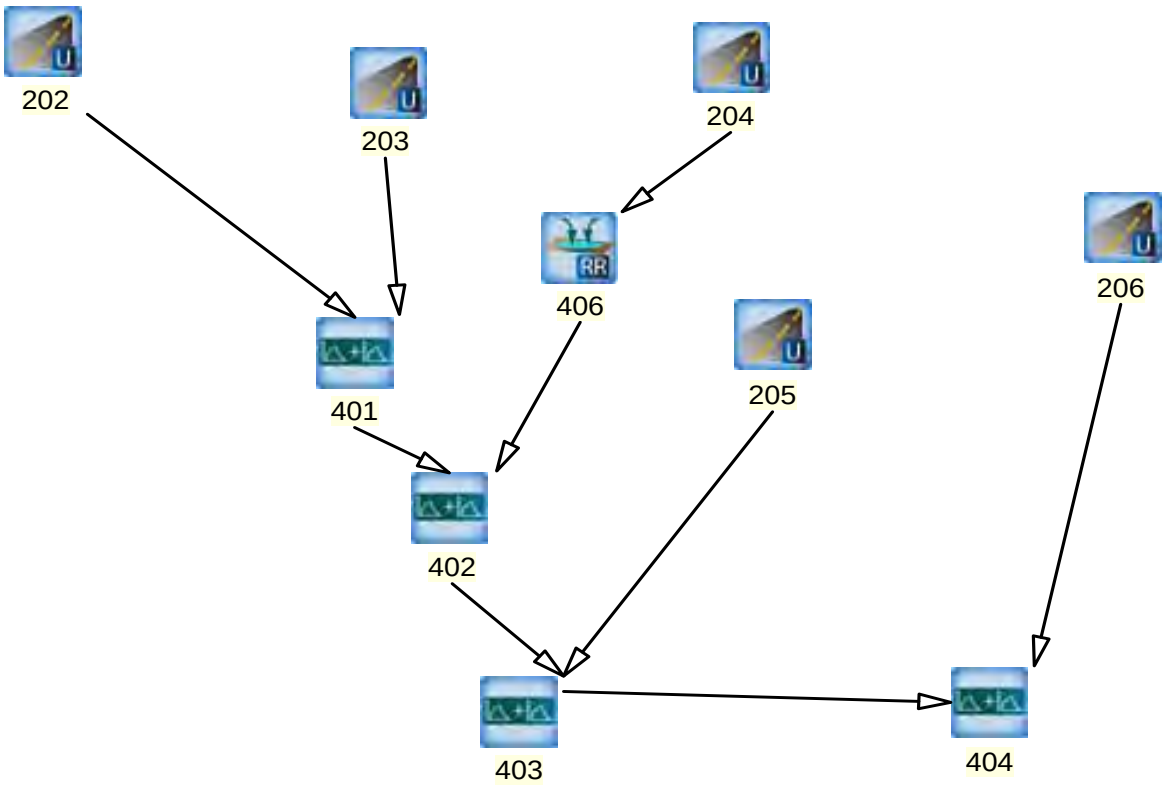
Site Area (Catchment 203)	=	18,300.0	sq.m	
Impervious Area	=	6,500.0	sq.m	(Asphalt, Driveways, Houses, etc.)
Pervious Area	=	11,800.0	sq.m	
Directly Connected Area	=	6,500.0	sq.m	(Asphalt, Driveways, Houses, etc.)
% Impervious	=	35.5		
% Directly Connected	=	35.5		

Site Area (Catchment 204)	=	8,180.0	sq.m	
Impervious Area	=	2,730.0	sq.m	(Asphalt, Driveways, Houses, etc.)
Pervious Area	=	5,450.0	sq.m	
Directly Connected Area	=	818.0	sq.m	(Asphalt, Driveways, Houses, etc.)
% Impervious	=	33.4		
% Directly Connected	=	10.0		

Site Area (Catchment 205)	=	1,590.0	sq.m	
Impervious Area	=	250.0	sq.m	(Asphalt, Driveways, Houses, etc.)
Pervious Area	=	1,340.0	sq.m	
Directly Connected Area	=	250.0	sq.m	(Asphalt, Driveways, Houses, etc.)
% Impervious	=	15.7		
% Directly Connected	=	15.7		

Site Area (Catchment 206)	=	4,950.0	sq.m	
Impervious Area	=	700.0	sq.m	(Asphalt, Driveways, Houses, etc.)
Pervious Area	=	4,250.0	sq.m	
Directly Connected Area	=	495.0	sq.m	(Asphalt, Driveways, Houses, etc.)
% Impervious	=	14.1		
% Directly Connected	=	10.0		

Wasaga Shores Subdivision
PROPOSED CONDITIONS



Nashyd		Route Pipe		Duhyd	
Standhyd		Route Channel		Diverthyd	
Addhyd		Route Reservoir			

C.C. TATHAM & ASSOCIATES LTD.
Consulting Engineers

Project:	Wasaga Shores
File No.:	116028
Subject:	Otthymo Flow Schematic
Date:	July 2017 **Figure:** 2

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

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

        OOO     T      T    H   H    Y    M   M   OOO


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


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Design\OTTHYMO\SCS Post-Development.out
  Summary filename: I:\2016 Projects\116028 - Wasaga Shores Subdivision\Design\Storm
Design\OTTHYMO\SCS Post-Development.sum


DATE: 7/5/2017                            TIME: 4:37:26 PM

USER:


COMMENTS: _____________________________________________________________


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

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| MASS STORM       |    Filename: I:\2016 Projects\116
|                  |              028 - Wasaga Shores Subdivision\Design\
|                  |              Storm Design\OTTHYMO\SCS24H.MST
| Ptotal= 54.90 mm |    Comments: SCS Type II 24 HR MASS CURVE
--------------------
                       Duration of storm    = 23.75 hrs
                       Mass curve time step = 15.00 min
                       New Storm time step  =  5.00 min

                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .08     .22 |  6.08     .95 | 12.08    7.91 | 18.08    1.02
                 .17     .44 |  6.17    1.02 | 12.17    7.91 | 18.17     .95
                 .25     .66 |  6.25    1.10 | 12.25    7.91 | 18.25     .88
                                      Page 1
```


.33	.59	6.33	1.02	12.33	6.66	18.33	.95
.42	.51	6.42	.95	12.42	5.42	18.42	1.02
.50	.44	6.50	.88	12.50	4.17	18.50	1.10
.58	.51	6.58	.95	12.58	4.10	18.58	1.02
.67	.59	6.67	1.02	12.67	4.03	18.67	.95
.75	.66	6.75	1.10	12.75	3.95	18.75	.88
.83	.66	6.83	1.10	12.83	3.66	18.83	.95
.92	.66	6.92	1.10	12.92	3.37	18.92	1.02
1.00	.66	7.00	1.10	13.00	3.07	19.00	1.10
1.08	.66	7.08	1.17	13.08	3.00	19.08	1.02
1.17	.66	7.17	1.24	13.17	2.93	19.17	.95
1.25	.66	7.25	1.32	13.25	2.85	19.25	.88
1.33	.59	7.33	1.24	13.33	2.71	19.33	.95
1.42	.51	7.42	1.17	13.42	2.56	19.42	1.02
1.50	.44	7.50	1.10	13.50	2.42	19.50	1.10
1.58	.51	7.58	1.17	13.58	2.34	19.58	1.02
1.67	.59	7.67	1.24	13.67	2.27	19.67	.95
1.75	.66	7.75	1.32	13.75	2.20	19.75	.88
1.83	.66	7.83	1.32	13.83	2.05	19.83	.81
1.92	.66	7.92	1.32	13.92	1.90	19.92	.73
2.00	.66	8.00	1.32	14.00	1.76	20.00	.66
2.08	.73	8.08	1.39	14.08	1.68	20.08	.66
2.17	.81	8.17	1.46	14.17	1.61	20.17	.66
2.25	.88	8.25	1.54	14.25	1.54	20.25	.66
2.33	.81	8.33	1.54	14.33	1.61	20.33	.66
2.42	.73	8.42	1.54	14.42	1.68	20.42	.66
2.50	.66	8.50	1.54	14.50	1.76	20.50	.66
2.58	.66	8.58	1.54	14.58	1.68	20.58	.66
2.67	.66	8.67	1.54	14.67	1.61	20.67	.66
2.75	.66	8.75	1.54	14.75	1.54	20.75	.66
2.83	.66	8.83	1.61	14.83	1.61	20.83	.66
2.92	.66	8.92	1.68	14.92	1.68	20.92	.66
3.00	.66	9.00	1.76	15.00	1.76	21.00	.66
3.08	.73	9.08	1.76	15.08	1.68	21.08	.66
3.17	.81	9.17	1.76	15.17	1.61	21.17	.66
3.25	.88	9.25	1.76	15.25	1.54	21.25	.66
3.33	.81	9.33	1.83	15.33	1.61	21.33	.66
3.42	.73	9.42	1.90	15.42	1.68	21.42	.66
3.50	.66	9.50	1.98	15.50	1.76	21.50	.66
3.58	.66	9.58	1.98	15.58	1.68	21.58	.66
3.67	.66	9.67	1.98	15.67	1.61	21.67	.66
3.75	.66	9.75	1.98	15.75	1.54	21.75	.66
3.83	.73	9.83	2.12	15.83	1.39	21.83	.66
3.92	.81	9.92	2.27	15.92	1.24	21.92	.66
4.00	.88	10.00	2.42	16.00	1.10	22.00	.66
4.08	.88	10.08	2.49	16.08	1.02	22.08	.66
4.17	.88	10.17	2.56	16.17	.95	22.17	.66
4.25	.88	10.25	2.64	16.25	.88	22.25	.66
4.33	.88	10.33	2.85	16.33	.95	22.33	.66
4.42	.88	10.42	3.07	16.42	1.02	22.42	.66
4.50	.88	10.50	3.29	16.50	1.10	22.50	.66
4.58	.88	10.58	3.37	16.58	1.02	22.58	.66
4.67	.88	10.67	3.44	16.67	.95	22.67	.66
4.75	.88	10.75	3.51	16.75	.88	22.75	.66
4.83	.88	10.83	4.10	16.83	.95	22.83	.66
4.92	.88	10.92	4.68	16.92	1.02	22.92	.66
5.00	.88	11.00	5.27	17.00	1.10	23.00	.66
5.08	.88	11.08	5.27	17.08	1.02	23.08	.66
5.17	.88	11.17	5.27	17.17	.95	23.17	.66
5.25	.88	11.25	5.27	17.25	.88	23.25	.66
5.33	.88	11.33	8.93	17.33	.95	23.33	.66
5.42	.88	11.42	12.59	17.42	1.02	23.42	.66
5.50	.88	11.50	16.25	17.50	1.10	23.50	.66

5.58	.88	11.58	33.23	17.58	1.02	23.58	.66
5.67	.88	11.67	50.21	17.67	.95	23.67	.66
5.75	.88	11.75	67.20	17.75	.88	23.75	.66
5.83	.88	11.83	47.44	17.83	.95		
5.92	.88	11.92	27.67	17.92	1.02		
6.00	.88	12.00	7.91	18.00	1.10		

CALIB			
STANDHYD (0206)	Area (ha)=	.50	
ID= 1 DT= 5.0 min	Total Imp(%)=	14.10	Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.07	.43
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	75.00	105.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.22	6.083	.95	12.083	7.91	18.08	1.02
.167	.44	6.167	1.02	12.167	7.91	18.17	.95
.250	.66	6.250	1.10	12.250	7.91	18.25	.88
.333	.59	6.333	1.02	12.333	6.66	18.33	.95
.417	.51	6.417	.95	12.417	5.42	18.42	1.02
.500	.44	6.500	.88	12.500	4.17	18.50	1.10
.583	.51	6.583	.95	12.583	4.10	18.58	1.02
.667	.59	6.667	1.02	12.667	4.03	18.67	.95
.750	.66	6.750	1.10	12.750	3.95	18.75	.88
.833	.66	6.833	1.10	12.833	3.66	18.83	.95
.917	.66	6.917	1.10	12.917	3.37	18.92	1.02
1.000	.66	7.000	1.10	13.000	3.07	19.00	1.10
1.083	.66	7.083	1.17	13.083	3.00	19.08	1.02
1.167	.66	7.167	1.24	13.167	2.93	19.17	.95
1.250	.66	7.250	1.32	13.250	2.85	19.25	.88
1.333	.59	7.333	1.24	13.333	2.71	19.33	.95
1.417	.51	7.417	1.17	13.417	2.56	19.42	1.02
1.500	.44	7.500	1.10	13.500	2.42	19.50	1.10
1.583	.51	7.583	1.17	13.583	2.34	19.58	1.02
1.667	.59	7.667	1.24	13.667	2.27	19.67	.95
1.750	.66	7.750	1.32	13.750	2.20	19.75	.88
1.833	.66	7.833	1.32	13.833	2.05	19.83	.81
1.917	.66	7.917	1.32	13.917	1.90	19.92	.73
2.000	.66	8.000	1.32	14.000	1.76	20.00	.66
2.083	.73	8.083	1.39	14.083	1.68	20.08	.66
2.167	.81	8.167	1.46	14.167	1.61	20.17	.66
2.250	.88	8.250	1.54	14.250	1.54	20.25	.66
2.333	.81	8.333	1.54	14.333	1.61	20.33	.66
2.417	.73	8.417	1.54	14.417	1.68	20.42	.66
2.500	.66	8.500	1.54	14.500	1.76	20.50	.66
2.583	.66	8.583	1.54	14.583	1.68	20.58	.66
2.667	.66	8.667	1.54	14.667	1.61	20.67	.66
2.750	.66	8.750	1.54	14.750	1.54	20.75	.66
2.833	.66	8.833	1.61	14.833	1.61	20.83	.66
2.917	.66	8.917	1.68	14.917	1.68	20.92	.66
3.000	.66	9.000	1.76	15.000	1.76	21.00	.66
3.083	.73	9.083	1.76	15.083	1.68	21.08	.66

3.167	.81	9.167	1.76	15.167	1.61	21.17	.66
3.250	.88	9.250	1.76	15.250	1.54	21.25	.66
3.333	.81	9.333	1.83	15.333	1.61	21.33	.66
3.417	.73	9.417	1.90	15.417	1.68	21.42	.66
3.500	.66	9.500	1.98	15.500	1.76	21.50	.66
3.583	.66	9.583	1.98	15.583	1.68	21.58	.66
3.667	.66	9.667	1.98	15.667	1.61	21.67	.66
3.750	.66	9.750	1.98	15.750	1.54	21.75	.66
3.833	.73	9.833	2.12	15.833	1.39	21.83	.66
3.917	.81	9.917	2.27	15.917	1.24	21.92	.66
4.000	.88	10.000	2.42	16.000	1.10	22.00	.66
4.083	.88	10.083	2.49	16.083	1.02	22.08	.66
4.167	.88	10.167	2.56	16.167	.95	22.17	.66
4.250	.88	10.250	2.64	16.250	.88	22.25	.66
4.333	.88	10.333	2.85	16.333	.95	22.33	.66
4.417	.88	10.417	3.07	16.417	1.02	22.42	.66
4.500	.88	10.500	3.29	16.500	1.10	22.50	.66
4.583	.88	10.583	3.37	16.583	1.02	22.58	.66
4.667	.88	10.667	3.44	16.667	.95	22.67	.66
4.750	.88	10.750	3.51	16.750	.88	22.75	.66
4.833	.88	10.833	4.10	16.833	.95	22.83	.66
4.917	.88	10.917	4.68	16.917	1.02	22.92	.66
5.000	.88	11.000	5.27	17.000	1.10	23.00	.66
5.083	.88	11.083	5.27	17.083	1.02	23.08	.66
5.167	.88	11.167	5.27	17.167	.95	23.17	.66
5.250	.88	11.250	5.27	17.250	.88	23.25	.66
5.333	.88	11.333	8.93	17.333	.95	23.33	.66
5.417	.88	11.417	12.59	17.417	1.02	23.42	.66
5.500	.88	11.500	16.25	17.500	1.10	23.50	.66
5.583	.88	11.583	33.23	17.583	1.02	23.58	.66
5.667	.88	11.667	50.21	17.667	.95	23.67	.66
5.750	.88	11.750	67.19	17.750	.88	23.75	.00
5.833	.88	11.833	47.44	17.833	.95		
5.917	.88	11.917	27.67	17.917	1.02		
6.000	.88	12.000	7.91	18.000	1.10		

Max.Eff.Inten.(mm/hr)=		67.19	31.46	
over (min)		5.00	25.00	
Storage Coeff. (min)=		2.05 (ii)	22.05 (ii)	
Unit Hyd. Tpeak (min)=		5.00	25.00	
Unit Hyd. peak (cms)=		.31	.05	
				TOTALS
PEAK FLOW	(cms)=	.01	.02	.023 (iii)
TIME TO PEAK	(hrs)=	11.75	12.08	12.08
RUNOFF VOLUME	(mm)=	53.63	29.48	31.87
TOTAL RAINFALL	(mm)=	54.63	54.63	54.63
RUNOFF COEFFICIENT	=	.98	.54	.58

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

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

CALIB			
STANDHYD (0204)	Area (ha)=	.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	33.40	Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.27	.54	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	30.00	165.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)	=	67.19	8.22	
over	(min)	5.00	50.00	
Storage Coeff.	(min)=	1.18 (ii)	46.06 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	50.00	
Unit Hyd. peak	(cms)=	.33	.02	
				TOTALS
PEAK FLOW	(cms)=	.02	.01	.017 (iii)
TIME TO PEAK	(hrs)=	11.75	12.58	11.75
RUNOFF VOLUME	(mm)=	53.63	10.52	14.80
TOTAL RAINFALL	(mm)=	54.63	54.63	54.63
RUNOFF COEFFICIENT	=	.98	.19	.27

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0202)	Area	(ha)= .33	
ID= 1 DT= 5.0 min	Total Imp(%)=	10.70	Dir. Conn.(%)= 10.70

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.03	.29	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	100.00	20.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)	=	67.19	8.33	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	2.43 (ii)	15.02 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.30	.07	
				TOTALS
PEAK FLOW	(cms)=	.01	.00	.008 (iii)
TIME TO PEAK	(hrs)=	11.75	12.00	11.75
RUNOFF VOLUME	(mm)=	53.63	7.84	12.72
TOTAL RAINFALL	(mm)=	54.63	54.63	54.63
RUNOFF COEFFICIENT	=	.98	.14	.23

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

CALIB			
STANDHYD (0203)	Area	(ha)= 1.83	
ID= 1 DT= 5.0 min	Total Imp(%)=	35.50	Dir. Conn.(%)= 35.50

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.65	1.18	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	270.00	35.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)	=	67.19	7.61	
over	(min)	5.00	25.00	
Storage Coeff.	(min)=	4.41 (ii)	22.67 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	25.00	
Unit Hyd. peak	(cms)=	.23	.05	
				TOTALS
PEAK FLOW	(cms)=	.11	.01	.112 (iii)
TIME TO PEAK	(hrs)=	11.75	12.17	11.75
RUNOFF VOLUME	(mm)=	53.63	7.84	24.09
TOTAL RAINFALL	(mm)=	54.63	54.63	54.63
RUNOFF COEFFICIENT	=	.98	.14	.44

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0205)	Area	(ha)= .16	
ID= 1 DT= 5.0 min	Total Imp(%)=	15.70	Dir. Conn.(%)= 15.70

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.02	.13	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	15.00	30.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)	=	67.19	7.61	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	.78 (ii)	17.42 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.34	.06	
				TOTALS
PEAK FLOW	(cms)=	.00	.00	.005 (iii)
TIME TO PEAK	(hrs)=	11.75	12.00	11.75
RUNOFF VOLUME	(mm)=	53.63	7.84	14.97
TOTAL RAINFALL	(mm)=	54.63	54.63	54.63
RUNOFF COEFFICIENT	=	.98	.14	.27

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR (0406)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0390	.0012
	.0080	.0002	.0450	.0021
	.0230	.0006	.0470	.0030
	.0320	.0010	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.017	11.75	14.80
OUTFLOW: ID= 1 (0406)	.818	.014	11.83	14.80

PEAK FLOW REDUCTION [Qout/Qin](%)= 85.73
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= .0004

ADD HYD (0401)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0202):	.33	.008	11.75	12.72
+ ID2= 2 (0203):	1.83	.112	11.75	24.09
ID = 3 (0401):	2.16	.120	11.75	22.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0402)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0406):	.82	.014	11.83	14.80
+ ID2= 2 (0401):	2.16	.120	11.75	22.36
ID = 3 (0402):	2.97	.133	11.75	20.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0402):	2.97	.133	11.75	20.28
+ ID2= 2 (0205):	.16	.005	11.75	14.97
ID = 3 (0403):	3.13	.138	11.75	20.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0206):	.50	.023	12.08	31.87
+ ID2= 2 (0403):	3.13	.138	11.75	20.01
ID = 3 (0404):	3.63	.156	11.75	21.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM	Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\SCS24H.MST
Ptotal= 72.60 mm	Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min
New Storm time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	.29	6.08	1.26	12.08	10.45	18.08	1.36
.17	.58	6.17	1.36	12.17	10.45	18.17	1.26
.25	.87	6.25	1.45	12.25	10.45	18.25	1.16
.33	.77	6.33	1.36	12.33	8.81	18.33	1.26
.42	.68	6.42	1.26	12.42	7.16	18.42	1.36
.50	.58	6.50	1.16	12.50	5.52	18.50	1.45
.58	.68	6.58	1.26	12.58	5.42	18.58	1.36
.67	.77	6.67	1.36	12.67	5.32	18.67	1.26
.75	.87	6.75	1.45	12.75	5.23	18.75	1.16
.83	.87	6.83	1.45	12.83	4.84	18.83	1.26
.92	.87	6.92	1.45	12.92	4.45	18.92	1.36
1.00	.87	7.00	1.45	13.00	4.07	19.00	1.45
1.08	.87	7.08	1.55	13.08	3.97	19.08	1.36
1.17	.87	7.17	1.65	13.17	3.87	19.17	1.26
1.25	.87	7.25	1.74	13.25	3.78	19.25	1.16
1.33	.77	7.33	1.65	13.33	3.58	19.33	1.26
1.42	.68	7.42	1.55	13.42	3.39	19.42	1.36
1.50	.58	7.50	1.45	13.50	3.19	19.50	1.45
1.58	.68	7.58	1.55	13.58	3.10	19.58	1.36
1.67	.77	7.67	1.65	13.67	3.00	19.67	1.26
1.75	.87	7.75	1.74	13.75	2.90	19.75	1.16
1.83	.87	7.83	1.74	13.83	2.71	19.83	1.06
1.92	.87	7.92	1.74	13.92	2.52	19.92	.97
2.00	.87	8.00	1.74	14.00	2.32	20.00	.87
2.08	.97	8.08	1.84	14.08	2.23	20.08	.87
2.17	1.06	8.17	1.94	14.17	2.13	20.17	.87
2.25	1.16	8.25	2.03	14.25	2.03	20.25	.87
2.33	1.06	8.33	2.03	14.33	2.13	20.33	.87
2.42	.97	8.42	2.03	14.42	2.23	20.42	.87

2.50	.87	8.50	2.03	14.50	2.32	20.50	.87
2.58	.87	8.58	2.03	14.58	2.23	20.58	.87
2.67	.87	8.67	2.03	14.67	2.13	20.67	.87
2.75	.87	8.75	2.03	14.75	2.03	20.75	.87
2.83	.87	8.83	2.13	14.83	2.13	20.83	.87
2.92	.87	8.92	2.23	14.92	2.23	20.92	.87
3.00	.87	9.00	2.32	15.00	2.32	21.00	.87
3.08	.97	9.08	2.32	15.08	2.23	21.08	.87
3.17	1.06	9.17	2.32	15.17	2.13	21.17	.87
3.25	1.16	9.25	2.32	15.25	2.03	21.25	.87
3.33	1.06	9.33	2.42	15.33	2.13	21.33	.87
3.42	.97	9.42	2.52	15.42	2.23	21.42	.87
3.50	.87	9.50	2.61	15.50	2.32	21.50	.87
3.58	.87	9.58	2.61	15.58	2.23	21.58	.87
3.67	.87	9.67	2.61	15.67	2.13	21.67	.87
3.75	.87	9.75	2.61	15.75	2.03	21.75	.87
3.83	.97	9.83	2.81	15.83	1.84	21.83	.87
3.92	1.06	9.92	3.00	15.92	1.65	21.92	.87
4.00	1.16	10.00	3.19	16.00	1.45	22.00	.87
4.08	1.16	10.08	3.29	16.08	1.36	22.08	.87
4.17	1.16	10.17	3.39	16.17	1.26	22.17	.87
4.25	1.16	10.25	3.48	16.25	1.16	22.25	.87
4.33	1.16	10.33	3.78	16.33	1.26	22.33	.87
4.42	1.16	10.42	4.07	16.42	1.36	22.42	.87
4.50	1.16	10.50	4.36	16.50	1.45	22.50	.87
4.58	1.16	10.58	4.45	16.58	1.36	22.58	.87
4.67	1.16	10.67	4.55	16.67	1.26	22.67	.87
4.75	1.16	10.75	4.65	16.75	1.16	22.75	.87
4.83	1.16	10.83	5.42	16.83	1.26	22.83	.87
4.92	1.16	10.92	6.20	16.92	1.36	22.92	.87
5.00	1.16	11.00	6.97	17.00	1.45	23.00	.87
5.08	1.16	11.08	6.97	17.08	1.36	23.08	.87
5.17	1.16	11.17	6.97	17.17	1.26	23.17	.87
5.25	1.16	11.25	6.97	17.25	1.16	23.25	.87
5.33	1.16	11.33	11.81	17.33	1.26	23.33	.87
5.42	1.16	11.42	16.65	17.42	1.36	23.42	.87
5.50	1.16	11.50	21.49	17.50	1.45	23.50	.87
5.58	1.16	11.58	43.95	17.58	1.36	23.58	.87
5.67	1.16	11.67	66.40	17.67	1.26	23.67	.87
5.75	1.16	11.75	88.86	17.75	1.16	23.75	.87
5.83	1.16	11.83	62.73	17.83	1.26		
5.92	1.16	11.92	36.59	17.92	1.36		
6.00	1.16	12.00	10.46	18.00	1.45		

CALIB			
STANDHYD (0206)	Area (ha)=	.50	
ID= 1 DT= 5.0 min	Total Imp(%)=	14.10	Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.07	.43
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	75.00	105.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

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

.083	.29	6.083	1.26	12.083	10.45	18.08	1.36
.167	.58	6.167	1.36	12.167	10.45	18.17	1.26
.250	.87	6.250	1.45	12.250	10.45	18.25	1.16
.333	.77	6.333	1.36	12.333	8.81	18.33	1.26
.417	.68	6.417	1.26	12.417	7.16	18.42	1.36
.500	.58	6.500	1.16	12.500	5.52	18.50	1.45
.583	.68	6.583	1.26	12.583	5.42	18.58	1.36
.667	.77	6.667	1.36	12.667	5.32	18.67	1.26
.750	.87	6.750	1.45	12.750	5.23	18.75	1.16
.833	.87	6.833	1.45	12.833	4.84	18.83	1.26
.917	.87	6.917	1.45	12.917	4.45	18.92	1.36
1.000	.87	7.000	1.45	13.000	4.07	19.00	1.45
1.083	.87	7.083	1.55	13.083	3.97	19.08	1.36
1.167	.87	7.167	1.65	13.167	3.87	19.17	1.26
1.250	.87	7.250	1.74	13.250	3.78	19.25	1.16
1.333	.77	7.333	1.65	13.333	3.58	19.33	1.26
1.417	.68	7.417	1.55	13.417	3.39	19.42	1.36
1.500	.58	7.500	1.45	13.500	3.19	19.50	1.45
1.583	.68	7.583	1.55	13.583	3.10	19.58	1.36
1.667	.77	7.667	1.65	13.667	3.00	19.67	1.26
1.750	.87	7.750	1.74	13.750	2.90	19.75	1.16
1.833	.87	7.833	1.74	13.833	2.71	19.83	1.06
1.917	.87	7.917	1.74	13.917	2.52	19.92	.97
2.000	.87	8.000	1.74	14.000	2.32	20.00	.87
2.083	.97	8.083	1.84	14.083	2.23	20.08	.87
2.167	1.06	8.167	1.94	14.167	2.13	20.17	.87
2.250	1.16	8.250	2.03	14.250	2.03	20.25	.87
2.333	1.06	8.333	2.03	14.333	2.13	20.33	.87
2.417	.97	8.417	2.03	14.417	2.23	20.42	.87
2.500	.87	8.500	2.03	14.500	2.32	20.50	.87
2.583	.87	8.583	2.03	14.583	2.23	20.58	.87
2.667	.87	8.667	2.03	14.667	2.13	20.67	.87
2.750	.87	8.750	2.03	14.750	2.03	20.75	.87
2.833	.87	8.833	2.13	14.833	2.13	20.83	.87
2.917	.87	8.917	2.23	14.917	2.23	20.92	.87
3.000	.87	9.000	2.32	15.000	2.32	21.00	.87
3.083	.97	9.083	2.32	15.083	2.23	21.08	.87
3.167	1.06	9.167	2.32	15.167	2.13	21.17	.87
3.250	1.16	9.250	2.32	15.250	2.03	21.25	.87
3.333	1.06	9.333	2.42	15.333	2.13	21.33	.87
3.417	.97	9.417	2.52	15.417	2.23	21.42	.87
3.500	.87	9.500	2.61	15.500	2.32	21.50	.87
3.583	.87	9.583	2.61	15.583	2.23	21.58	.87
3.667	.87	9.667	2.61	15.667	2.13	21.67	.87
3.750	.87	9.750	2.61	15.750	2.03	21.75	.87
3.833	.97	9.833	2.81	15.833	1.84	21.83	.87
3.917	1.06	9.917	3.00	15.917	1.65	21.92	.87
4.000	1.16	10.000	3.19	16.000	1.45	22.00	.87
4.083	1.16	10.083	3.29	16.083	1.36	22.08	.87
4.167	1.16	10.167	3.39	16.167	1.26	22.17	.87
4.250	1.16	10.250	3.48	16.250	1.16	22.25	.87
4.333	1.16	10.333	3.78	16.333	1.26	22.33	.87
4.417	1.16	10.417	4.07	16.417	1.36	22.42	.87
4.500	1.16	10.500	4.36	16.500	1.45	22.50	.87
4.583	1.16	10.583	4.45	16.583	1.36	22.58	.87
4.667	1.16	10.667	4.55	16.667	1.26	22.67	.87
4.750	1.16	10.750	4.65	16.750	1.16	22.75	.87
4.833	1.16	10.833	5.42	16.833	1.26	22.83	.87
4.917	1.16	10.917	6.20	16.917	1.36	22.92	.87
5.000	1.16	11.000	6.97	17.000	1.45	23.00	.87
5.083	1.16	11.083	6.97	17.083	1.36	23.08	.87
5.167	1.16	11.167	6.97	17.167	1.26	23.17	.87
5.250	1.16	11.250	6.97	17.250	1.16	23.25	.87

5.333	1.16	11.333	11.81	17.333	1.26	23.33	.87
5.417	1.16	11.417	16.65	17.417	1.36	23.42	.87
5.500	1.16	11.500	21.49	17.500	1.45	23.50	.87
5.583	1.16	11.583	43.94	17.583	1.36	23.58	.87
5.667	1.16	11.667	66.40	17.667	1.26	23.67	.87
5.750	1.16	11.750	88.86	17.750	1.16	23.75	.00
5.833	1.16	11.833	62.73	17.833	1.26		
5.917	1.16	11.917	36.60	17.917	1.36		
6.000	1.16	12.000	10.46	18.000	1.45		

Max.Eff.Inten.(mm/hr)=		88.86	47.04	
over (min)		5.00	20.00	
Storage Coeff. (min)=		1.83 (ii)	18.86 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		.32	.06	
				TOTALS
PEAK FLOW	(cms)=	.01	.04	.039 (iii)
TIME TO PEAK	(hrs)=	11.75	12.00	12.00
RUNOFF VOLUME	(mm)=	71.24	44.14	46.83
TOTAL RAINFALL	(mm)=	72.24	72.24	72.24
RUNOFF COEFFICIENT	=	.99	.61	.65

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

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

CALIB				
STANDHYD (0204)	Area (ha)= .82			
ID= 1 DT= 5.0 min	Total Imp(%)= 33.40	Dir. Conn.(%)= 10.00		

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.27	.54
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	30.00	165.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=		88.86	16.58	
over (min)		5.00	35.00	
Storage Coeff. (min)=		1.06 (ii)	34.95 (ii)	
Unit Hyd. Tpeak (min)=		5.00	35.00	
Unit Hyd. peak (cms)=		.34	.03	
				TOTALS
PEAK FLOW	(cms)=	.02	.02	.024 (iii)
TIME TO PEAK	(hrs)=	11.75	12.33	11.75
RUNOFF VOLUME	(mm)=	71.24	17.78	23.10
TOTAL RAINFALL	(mm)=	72.24	72.24	72.24
RUNOFF COEFFICIENT	=	.99	.25	.32

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD (0202)	Area (ha)= .33			
ID= 1 DT= 5.0 min	Total Imp(%)= 10.70	Dir. Conn.(%)= 10.70		

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.03	.29
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	100.00	20.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=		88.86	16.43	
over (min)		5.00	15.00	
Storage Coeff. (min)=		2.18 (ii)	11.76 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.31	.09	
				TOTALS
PEAK FLOW	(cms)=	.01	.01	.013 (iii)
TIME TO PEAK	(hrs)=	11.75	11.92	11.83
RUNOFF VOLUME	(mm)=	71.24	13.63	19.78
TOTAL RAINFALL	(mm)=	72.24	72.24	72.24
RUNOFF COEFFICIENT	=	.99	.19	.27

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD (0203)	Area (ha)= 1.83			
ID= 1 DT= 5.0 min	Total Imp(%)= 35.50	Dir. Conn.(%)= 35.50		

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.65	1.18
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	270.00	35.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=		88.86	14.65	
over (min)		5.00	20.00	
Storage Coeff. (min)=		3.95 (ii)	17.99 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		.24	.06	
				TOTALS
PEAK FLOW	(cms)=	.14	.03	.157 (iii)
TIME TO PEAK	(hrs)=	11.75	12.00	11.75
RUNOFF VOLUME	(mm)=	71.24	13.63	34.08
TOTAL RAINFALL	(mm)=	72.24	72.24	72.24
RUNOFF COEFFICIENT	=	.99	.19	.47

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0205)	Area (ha)= .16
ID= 1 DT= 5.0 min	Total Imp(%)= 15.70 Dir. Conn.(%)= 15.70

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.02	.13	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	15.00	30.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		88.86	14.65	
over (min)		5.00	15.00	
Storage Coeff. (min)=		.70 (ii)	13.50 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.34	.08	
				TOTALS
PEAK FLOW	(cms)=	.01	.00	.008 (iii)
TIME TO PEAK	(hrs)=	11.75	11.92	11.75
RUNOFF VOLUME	(mm)=	71.24	13.63	22.62
TOTAL RAINFALL	(mm)=	72.24	72.24	72.24
RUNOFF COEFFICIENT	=	.99	.19	.31

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR (0406)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0390	.0012
	.0080	.0002	.0450	.0021
	.0230	.0006	.0470	.0030
	.0320	.0010	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.024	11.75	23.10
OUTFLOW: ID= 1 (0406)	.818	.021	11.83	23.10

PEAK FLOW REDUCTION [Qout/Qin](%)= 87.90
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= .0006

ADD HYD (0401)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0202):	.33	.013	11.83	19.78
	+ ID2= 2 (0203):	1.83	.157	11.75	34.08
	ID = 3 (0401):	2.16	.170	11.75	31.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0402)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0406):	.82	.021	11.83	23.10
	+ ID2= 2 (0401):	2.16	.170	11.75	31.91
	ID = 3 (0402):	2.97	.189	11.75	29.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0402):	2.97	.189	11.75	29.49
	+ ID2= 2 (0205):	.16	.008	11.75	22.62
	ID = 3 (0403):	3.13	.197	11.75	29.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0206):	.50	.039	12.00	46.83
	+ ID2= 2 (0403):	3.13	.197	11.75	29.14
	ID = 3 (0404):	3.63	.227	11.75	31.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM	Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\SCS24H.MST
Ptotal= 84.30 mm	Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min
New Storm time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	.34	6.08	1.46	12.08	12.14	18.08	1.57
.17	.67	6.17	1.57	12.17	12.14	18.17	1.46
.25	1.01	6.25	1.69	12.25	12.14	18.25	1.35
.33	.90	6.33	1.57	12.33	10.23	18.33	1.46
.42	.79	6.42	1.46	12.42	8.32	18.42	1.57
.50	.67	6.50	1.35	12.50	6.41	18.50	1.69
.58	.79	6.58	1.46	12.58	6.29	18.58	1.57
.67	.90	6.67	1.57	12.67	6.18	18.67	1.46
.75	1.01	6.75	1.69	12.75	6.07	18.75	1.35
.83	1.01	6.83	1.69	12.83	5.62	18.83	1.46
.92	1.01	6.92	1.69	12.92	5.17	18.92	1.57
1.00	1.01	7.00	1.69	13.00	4.72	19.00	1.69
1.08	1.01	7.08	1.80	13.08	4.61	19.08	1.57
1.17	1.01	7.17	1.91	13.17	4.50	19.17	1.46
1.25	1.01	7.25	2.02	13.25	4.38	19.25	1.35
1.33	.90	7.33	1.91	13.33	4.16	19.33	1.46
1.42	.79	7.42	1.80	13.42	3.93	19.42	1.57
1.50	.67	7.50	1.69	13.50	3.71	19.50	1.69
1.58	.79	7.58	1.80	13.58	3.60	19.58	1.57
1.67	.90	7.67	1.91	13.67	3.48	19.67	1.46
1.75	1.01	7.75	2.02	13.75	3.37	19.75	1.35
1.83	1.01	7.83	2.02	13.83	3.15	19.83	1.24
1.92	1.01	7.92	2.02	13.92	2.92	19.92	1.12
2.00	1.01	8.00	2.02	14.00	2.70	20.00	1.01
2.08	1.12	8.08	2.14	14.08	2.59	20.08	1.01
2.17	1.24	8.17	2.25	14.17	2.47	20.17	1.01
2.25	1.35	8.25	2.36	14.25	2.36	20.25	1.01
2.33	1.24	8.33	2.36	14.33	2.47	20.33	1.01
2.42	1.12	8.42	2.36	14.42	2.59	20.42	1.01
2.50	1.01	8.50	2.36	14.50	2.70	20.50	1.01
2.58	1.01	8.58	2.36	14.58	2.59	20.58	1.01
2.67	1.01	8.67	2.36	14.67	2.47	20.67	1.01
2.75	1.01	8.75	2.36	14.75	2.36	20.75	1.01
2.83	1.01	8.83	2.47	14.83	2.47	20.83	1.01
2.92	1.01	8.92	2.59	14.92	2.59	20.92	1.01
3.00	1.01	9.00	2.70	15.00	2.70	21.00	1.01
3.08	1.12	9.08	2.70	15.08	2.59	21.08	1.01
3.17	1.24	9.17	2.70	15.17	2.47	21.17	1.01
3.25	1.35	9.25	2.70	15.25	2.36	21.25	1.01
3.33	1.24	9.33	2.81	15.33	2.47	21.33	1.01
3.42	1.12	9.42	2.92	15.42	2.59	21.42	1.01
3.50	1.01	9.50	3.03	15.50	2.70	21.50	1.01
3.58	1.01	9.58	3.03	15.58	2.59	21.58	1.01
3.67	1.01	9.67	3.03	15.67	2.47	21.67	1.01
3.75	1.01	9.75	3.03	15.75	2.36	21.75	1.01
3.83	1.12	9.83	3.26	15.83	2.14	21.83	1.01
3.92	1.24	9.92	3.48	15.92	1.91	21.92	1.01
4.00	1.35	10.00	3.71	16.00	1.69	22.00	1.01
4.08	1.35	10.08	3.82	16.08	1.57	22.08	1.01
4.17	1.35	10.17	3.93	16.17	1.46	22.17	1.01
4.25	1.35	10.25	4.05	16.25	1.35	22.25	1.01
4.33	1.35	10.33	4.38	16.33	1.46	22.33	1.01
4.42	1.35	10.42	4.72	16.42	1.57	22.42	1.01
4.50	1.35	10.50	5.06	16.50	1.69	22.50	1.01
4.58	1.35	10.58	5.17	16.58	1.57	22.58	1.01

4.67	1.35	10.67	5.28	16.67	1.46	22.67	1.01
4.75	1.35	10.75	5.40	16.75	1.35	22.75	1.01
4.83	1.35	10.83	6.29	16.83	1.46	22.83	1.01
4.92	1.35	10.92	7.19	16.92	1.57	22.92	1.01
5.00	1.35	11.00	8.09	17.00	1.69	23.00	1.01
5.08	1.35	11.08	8.09	17.08	1.57	23.08	1.01
5.17	1.35	11.17	8.09	17.17	1.46	23.17	1.01
5.25	1.35	11.25	8.09	17.25	1.35	23.25	1.01
5.33	1.35	11.33	13.71	17.33	1.46	23.33	1.01
5.42	1.35	11.42	19.33	17.42	1.57	23.42	1.01
5.50	1.35	11.50	24.95	17.50	1.69	23.50	1.01
5.58	1.35	11.58	51.03	17.58	1.57	23.58	1.01
5.67	1.35	11.67	77.10	17.67	1.46	23.67	1.01
5.75	1.35	11.75	103.18	17.75	1.35	23.75	1.01
5.83	1.35	11.83	72.84	17.83	1.46		
5.92	1.35	11.92	42.49	17.92	1.57		
6.00	1.35	12.00	12.14	18.00	1.69		

CALIB
STANDHYD (0206)
ID= 1 DT= 5.0 min

Area (ha)= .50
Total Imp(%)= 14.10 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.07	.43
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	75.00	105.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.34	6.083	1.46	12.083	12.14	18.08	1.57
.167	.67	6.167	1.57	12.167	12.14	18.17	1.46
.250	1.01	6.250	1.69	12.250	12.14	18.25	1.35
.333	.90	6.333	1.57	12.333	10.23	18.33	1.46
.417	.79	6.417	1.46	12.417	8.32	18.42	1.57
.500	.67	6.500	1.35	12.500	6.41	18.50	1.69
.583	.79	6.583	1.46	12.583	6.29	18.58	1.57
.667	.90	6.667	1.57	12.667	6.18	18.67	1.46
.750	1.01	6.750	1.69	12.750	6.07	18.75	1.35
.833	1.01	6.833	1.69	12.833	5.62	18.83	1.46
.917	1.01	6.917	1.69	12.917	5.17	18.92	1.57
1.000	1.01	7.000	1.69	13.000	4.72	19.00	1.69
1.083	1.01	7.083	1.80	13.083	4.61	19.08	1.57
1.167	1.01	7.167	1.91	13.167	4.50	19.17	1.46
1.250	1.01	7.250	2.02	13.250	4.38	19.25	1.35
1.333	.90	7.333	1.91	13.333	4.16	19.33	1.46
1.417	.79	7.417	1.80	13.417	3.93	19.42	1.57
1.500	.67	7.500	1.69	13.500	3.71	19.50	1.69
1.583	.79	7.583	1.80	13.583	3.60	19.58	1.57
1.667	.90	7.667	1.91	13.667	3.48	19.67	1.46
1.750	1.01	7.750	2.02	13.750	3.37	19.75	1.35
1.833	1.01	7.833	2.02	13.833	3.15	19.83	1.24
1.917	1.01	7.917	2.02	13.917	2.92	19.92	1.12
2.000	1.01	8.000	2.02	14.000	2.70	20.00	1.01
2.083	1.12	8.083	2.14	14.083	2.59	20.08	1.01
2.167	1.24	8.167	2.25	14.167	2.47	20.17	1.01

2.250	1.35	8.250	2.36	14.250	2.36	20.25	1.01
2.333	1.24	8.333	2.36	14.333	2.47	20.33	1.01
2.417	1.12	8.417	2.36	14.417	2.59	20.42	1.01
2.500	1.01	8.500	2.36	14.500	2.70	20.50	1.01
2.583	1.01	8.583	2.36	14.583	2.59	20.58	1.01
2.667	1.01	8.667	2.36	14.667	2.47	20.67	1.01
2.750	1.01	8.750	2.36	14.750	2.36	20.75	1.01
2.833	1.01	8.833	2.47	14.833	2.47	20.83	1.01
2.917	1.01	8.917	2.59	14.917	2.59	20.92	1.01
3.000	1.01	9.000	2.70	15.000	2.70	21.00	1.01
3.083	1.12	9.083	2.70	15.083	2.59	21.08	1.01
3.167	1.24	9.167	2.70	15.167	2.47	21.17	1.01
3.250	1.35	9.250	2.70	15.250	2.36	21.25	1.01
3.333	1.24	9.333	2.81	15.333	2.47	21.33	1.01
3.417	1.12	9.417	2.92	15.417	2.59	21.42	1.01
3.500	1.01	9.500	3.03	15.500	2.70	21.50	1.01
3.583	1.01	9.583	3.03	15.583	2.59	21.58	1.01
3.667	1.01	9.667	3.03	15.667	2.47	21.67	1.01
3.750	1.01	9.750	3.03	15.750	2.36	21.75	1.01
3.833	1.12	9.833	3.26	15.833	2.14	21.83	1.01
3.917	1.24	9.917	3.48	15.917	1.91	21.92	1.01
4.000	1.35	10.000	3.71	16.000	1.69	22.00	1.01
4.083	1.35	10.083	3.82	16.083	1.57	22.08	1.01
4.167	1.35	10.167	3.93	16.167	1.46	22.17	1.01
4.250	1.35	10.250	4.05	16.250	1.35	22.25	1.01
4.333	1.35	10.333	4.38	16.333	1.46	22.33	1.01
4.417	1.35	10.417	4.72	16.417	1.57	22.42	1.01
4.500	1.35	10.500	5.06	16.500	1.69	22.50	1.01
4.583	1.35	10.583	5.17	16.583	1.57	22.58	1.01
4.667	1.35	10.667	5.28	16.667	1.46	22.67	1.01
4.750	1.35	10.750	5.40	16.750	1.35	22.75	1.01
4.833	1.35	10.833	6.29	16.833	1.46	22.83	1.01
4.917	1.35	10.917	7.19	16.917	1.57	22.92	1.01
5.000	1.35	11.000	8.09	17.000	1.69	23.00	1.01
5.083	1.35	11.083	8.09	17.083	1.57	23.08	1.01
5.167	1.35	11.167	8.09	17.167	1.46	23.17	1.01
5.250	1.35	11.250	8.09	17.250	1.35	23.25	1.01
5.333	1.35	11.333	13.71	17.333	1.46	23.33	1.01
5.417	1.35	11.417	19.33	17.417	1.57	23.42	1.01
5.500	1.35	11.500	24.95	17.500	1.69	23.50	1.01
5.583	1.35	11.583	51.02	17.583	1.57	23.58	1.01
5.667	1.35	11.667	77.10	17.667	1.46	23.67	1.01
5.750	1.35	11.750	103.18	17.750	1.35	23.75	.00
5.833	1.35	11.833	72.84	17.833	1.46		
5.917	1.35	11.917	42.49	17.917	1.57		
6.000	1.35	12.000	12.15	18.000	1.69		

Max.Eff.Inten.(mm/hr)=	103.18	65.05	
over (min)	5.00	20.00	
Storage Coeff. (min)=	1.72 (ii)	16.68 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	.32	.06	
			TOTALS
PEAK FLOW (cms)=	.01	.05	.050 (iii)
TIME TO PEAK (hrs)=	11.75	12.00	12.00
RUNOFF VOLUME (mm)=	82.88	54.28	57.12
TOTAL RAINFALL (mm)=	83.88	83.88	83.88
RUNOFF COEFFICIENT =	.99	.65	.68

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

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

CALIB			
STANDHYD (0204)	Area (ha)= .82		
ID= 1 DT= 5.0 min	Total Imp(%)= 33.40	Dir. Conn.(%)= 10.00	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	.27	.54	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	2.00	2.00	
Length (m)=	30.00	165.00	
Mannings n =	.013	.250	
Max.Eff.Inten.(mm/hr)=	103.18	24.48	
over (min)	5.00	30.00	
Storage Coeff. (min)=	1.00 (ii)	29.99 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	.34	.04	
			TOTALS
PEAK FLOW (cms)=	.02	.02	.031 (iii)
TIME TO PEAK (hrs)=	11.75	12.25	11.75
RUNOFF VOLUME (mm)=	82.88	23.31	29.25
TOTAL RAINFALL (mm)=	83.88	83.88	83.88
RUNOFF COEFFICIENT =	.99	.28	.35

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0202)	Area (ha)= .33		
ID= 1 DT= 5.0 min	Total Imp(%)= 10.70	Dir. Conn.(%)= 10.70	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	.03	.29	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	2.00	2.00	
Length (m)=	100.00	20.00	
Mannings n =	.013	.250	
Max.Eff.Inten.(mm/hr)=	103.18	21.91	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.05 (ii)	10.60 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.31	.09	
			TOTALS
PEAK FLOW (cms)=	.01	.01	.017 (iii)
TIME TO PEAK (hrs)=	11.75	11.92	11.83
RUNOFF VOLUME (mm)=	82.88	18.13	25.03

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     TOTAL RAINFALL   (mm)=     83.88        83.88          83.88
     RUNOFF COEFFICIENT   =       .99          .22            .30

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  49.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (0203) |   Area    (ha)=   1.83
|ID= 1 DT= 5.0 min |   Total Imp(%)=  35.50   Dir. Conn.(%)=  35.50
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .65         1.18
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         2.00
     Length            (m)=    270.00        35.00
     Mannings n            =      .013         .250

     Max.Eff.Inten.(mm/hr)=    103.18        19.61
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      3.72 (ii)   16.22 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=       .25          .06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       .17          .04          .187 (iii)
     TIME TO PEAK    (hrs)=     11.75        12.00        11.75
     RUNOFF VOLUME    (mm)=     82.88        18.13        41.11
     TOTAL RAINFALL   (mm)=     83.88        83.88        83.88
     RUNOFF COEFFICIENT   =       .99          .22          .49

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  49.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0205) |   Area    (ha)=    .16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  15.70   Dir. Conn.(%)=  15.70
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .02          .13
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         2.00
     Length            (m)=     15.00        30.00
     Mannings n            =      .013         .250

     Max.Eff.Inten.(mm/hr)=    103.18        19.61
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       .66 (ii)   12.05 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
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```
     Unit Hyd. peak  (cms)=       .34          .09
                                                        *TOTALS*
     PEAK FLOW       (cms)=       .01          .01          .010 (iii)
     TIME TO PEAK    (hrs)=     11.75        11.92        11.75
     RUNOFF VOLUME    (mm)=     82.88        18.13        28.25
     TOTAL RAINFALL   (mm)=     83.88        83.88        83.88
     RUNOFF COEFFICIENT   =       .99          .22          .34

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  49.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR (0406) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .0390       .0012
                           .0080      .0002    |    .0450       .0021
                           .0230      .0006    |    .0470       .0030
                           .0320      .0010    |    .0000       .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0204)       .818       .031       11.75       29.25
     OUTFLOW: ID= 1 (0406)       .818       .026       11.83       29.24

               PEAK   FLOW   REDUCTION [Qout/Qin](%)= 85.42
               TIME SHIFT OF PEAK FLOW         (min)=  5.00
               MAXIMUM  STORAGE   USED       (ha.m.)=   .0008

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--------------------
| ADD HYD   (0401) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0202):       .33    .017    11.83    25.03
       + ID2= 2 (0203):     1.83    .187    11.75    41.11
         ================================================
         ID = 3 (0401):     2.16    .204    11.75    38.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0402) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0406):       .82    .026    11.83    29.24
       + ID2= 2 (0401):     2.16    .204    11.75    38.67
         ================================================
         ID = 3 (0402):     2.97    .227    11.75    36.08

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

ADD HYD (0403)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0402):	2.97	.227	11.75	36.08
	+ ID2= 2 (0205):	.16	.010	11.75	28.25
	ID = 3 (0403):	3.13	.237	11.75	35.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0206):	.50	.050	12.00	57.12
	+ ID2= 2 (0403):	3.13	.237	11.75	35.68
	ID = 3 (0404):	3.63	.275	11.75	38.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM	Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\SCS24H.MST
Ptotal= 99.20 mm	Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min
New Storm time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	.40	6.08	1.72	12.08	14.28	18.08	1.85
.17	.79	6.17	1.85	12.17	14.28	18.17	1.72
.25	1.19	6.25	1.98	12.25	14.28	18.25	1.59
.33	1.06	6.33	1.85	12.33	12.04	18.33	1.72
.42	.93	6.42	1.72	12.42	9.79	18.42	1.85
.50	.79	6.50	1.59	12.50	7.54	18.50	1.98
.58	.93	6.58	1.72	12.58	7.41	18.58	1.85
.67	1.06	6.67	1.85	12.67	7.27	18.67	1.72
.75	1.19	6.75	1.98	12.75	7.14	18.75	1.59
.83	1.19	6.83	1.98	12.83	6.61	18.83	1.72
.92	1.19	6.92	1.98	12.92	6.08	18.92	1.85
1.00	1.19	7.00	1.98	13.00	5.56	19.00	1.98
1.08	1.19	7.08	2.12	13.08	5.42	19.08	1.85
1.17	1.19	7.17	2.25	13.17	5.29	19.17	1.72
1.25	1.19	7.25	2.38	13.25	5.16	19.25	1.59
1.33	1.06	7.33	2.25	13.33	4.89	19.33	1.72
1.42	.93	7.42	2.12	13.42	4.63	19.42	1.85
1.50	.79	7.50	1.98	13.50	4.36	19.50	1.98

1.58	.93	7.58	2.12	13.58	4.23	19.58	1.85
1.67	1.06	7.67	2.25	13.67	4.10	19.67	1.72
1.75	1.19	7.75	2.38	13.75	3.97	19.75	1.59
1.83	1.19	7.83	2.38	13.83	3.70	19.83	1.45
1.92	1.19	7.92	2.38	13.92	3.44	19.92	1.32
2.00	1.19	8.00	2.38	14.00	3.17	20.00	1.19
2.08	1.32	8.08	2.51	14.08	3.04	20.08	1.19
2.17	1.45	8.17	2.65	14.17	2.91	20.17	1.19
2.25	1.59	8.25	2.78	14.25	2.78	20.25	1.19
2.33	1.45	8.33	2.78	14.33	2.91	20.33	1.19
2.42	1.32	8.42	2.78	14.42	3.04	20.42	1.19
2.50	1.19	8.50	2.78	14.50	3.17	20.50	1.19
2.58	1.19	8.58	2.78	14.58	3.04	20.58	1.19
2.67	1.19	8.67	2.78	14.67	2.91	20.67	1.19
2.75	1.19	8.75	2.78	14.75	2.78	20.75	1.19
2.83	1.19	8.83	2.91	14.83	2.91	20.83	1.19
2.92	1.19	8.92	3.04	14.92	3.04	20.92	1.19
3.00	1.19	9.00	3.17	15.00	3.17	21.00	1.19
3.08	1.32	9.08	3.17	15.08	3.04	21.08	1.19
3.17	1.45	9.17	3.17	15.17	2.91	21.17	1.19
3.25	1.59	9.25	3.17	15.25	2.78	21.25	1.19
3.33	1.45	9.33	3.31	15.33	2.91	21.33	1.19
3.42	1.32	9.42	3.44	15.42	3.04	21.42	1.19
3.50	1.19	9.50	3.57	15.50	3.17	21.50	1.19
3.58	1.19	9.58	3.57	15.58	3.04	21.58	1.19
3.67	1.19	9.67	3.57	15.67	2.91	21.67	1.19
3.75	1.19	9.75	3.57	15.75	2.78	21.75	1.19
3.83	1.32	9.83	3.84	15.83	2.51	21.83	1.19
3.92	1.45	9.92	4.10	15.92	2.25	21.92	1.19
4.00	1.59	10.00	4.36	16.00	1.98	22.00	1.19
4.08	1.59	10.08	4.50	16.08	1.85	22.08	1.19
4.17	1.59	10.17	4.63	16.17	1.72	22.17	1.19
4.25	1.59	10.25	4.76	16.25	1.59	22.25	1.19
4.33	1.59	10.33	5.16	16.33	1.72	22.33	1.19
4.42	1.59	10.42	5.56	16.42	1.85	22.42	1.19
4.50	1.59	10.50	5.95	16.50	1.98	22.50	1.19
4.58	1.59	10.58	6.08	16.58	1.85	22.58	1.19
4.67	1.59	10.67	6.22	16.67	1.72	22.67	1.19
4.75	1.59	10.75	6.35	16.75	1.59	22.75	1.19
4.83	1.59	10.83	7.41	16.83	1.72	22.83	1.19
4.92	1.59	10.92	8.46	16.92	1.85	22.92	1.19
5.00	1.59	11.00	9.52	17.00	1.98	23.00	1.19
5.08	1.59	11.08	9.52	17.08	1.85	23.08	1.19
5.17	1.59	11.17	9.52	17.17	1.72	23.17	1.19
5.25	1.59	11.25	9.52	17.25	1.59	23.25	1.19
5.33	1.59	11.33	16.14	17.33	1.72	23.33	1.19
5.42	1.59	11.42	22.75	17.42	1.85	23.42	1.19
5.50	1.59	11.50	29.36	17.50	1.98	23.50	1.19
5.58	1.59	11.58	60.05	17.58	1.85	23.58	1.19
5.67	1.59	11.67	90.73	17.67	1.72	23.67	1.19
5.75	1.59	11.75	121.42	17.75	1.59	23.75	1.19
5.83	1.59	11.83	85.71	17.83	1.72		
5.92	1.59	11.92	50.00	17.92	1.85		
6.00	1.59	12.00	14.29	18.00	1.98		

CALIB	Area (ha)= .50
STANDHYD (0206)	Total Imp(%)= 14.10 Dir. Conn.(%)= 10.00
ID= 1 DT= 5.0 min	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.07	.43

Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	75.00	105.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.40	6.083	1.72	12.083	14.28	18.08	1.85
.167	.79	6.167	1.85	12.167	14.28	18.17	1.72
.250	1.19	6.250	1.98	12.250	14.28	18.25	1.59
.333	1.06	6.333	1.85	12.333	12.04	18.33	1.72
.417	.93	6.417	1.72	12.417	9.79	18.42	1.85
.500	.79	6.500	1.59	12.500	7.54	18.50	1.98
.583	.93	6.583	1.72	12.583	7.41	18.58	1.85
.667	1.06	6.667	1.85	12.667	7.27	18.67	1.72
.750	1.19	6.750	1.98	12.750	7.14	18.75	1.59
.833	1.19	6.833	1.98	12.833	6.61	18.83	1.72
.917	1.19	6.917	1.98	12.917	6.08	18.92	1.85
1.000	1.19	7.000	1.98	13.000	5.56	19.00	1.98
1.083	1.19	7.083	2.12	13.083	5.42	19.08	1.85
1.167	1.19	7.167	2.25	13.167	5.29	19.17	1.72
1.250	1.19	7.250	2.38	13.250	5.16	19.25	1.59
1.333	1.06	7.333	2.25	13.333	4.89	19.33	1.72
1.417	.93	7.417	2.12	13.417	4.63	19.42	1.85
1.500	.79	7.500	1.98	13.500	4.36	19.50	1.98
1.583	.93	7.583	2.12	13.583	4.23	19.58	1.85
1.667	1.06	7.667	2.25	13.667	4.10	19.67	1.72
1.750	1.19	7.750	2.38	13.750	3.97	19.75	1.59
1.833	1.19	7.833	2.38	13.833	3.70	19.83	1.45
1.917	1.19	7.917	2.38	13.917	3.44	19.92	1.32
2.000	1.19	8.000	2.38	14.000	3.17	20.00	1.19
2.083	1.32	8.083	2.51	14.083	3.04	20.08	1.19
2.167	1.45	8.167	2.65	14.167	2.91	20.17	1.19
2.250	1.59	8.250	2.78	14.250	2.78	20.25	1.19
2.333	1.45	8.333	2.78	14.333	2.91	20.33	1.19
2.417	1.32	8.417	2.78	14.417	3.04	20.42	1.19
2.500	1.19	8.500	2.78	14.500	3.17	20.50	1.19
2.583	1.19	8.583	2.78	14.583	3.04	20.58	1.19
2.667	1.19	8.667	2.78	14.667	2.91	20.67	1.19
2.750	1.19	8.750	2.78	14.750	2.78	20.75	1.19
2.833	1.19	8.833	2.91	14.833	2.91	20.83	1.19
2.917	1.19	8.917	3.04	14.917	3.04	20.92	1.19
3.000	1.19	9.000	3.17	15.000	3.17	21.00	1.19
3.083	1.32	9.083	3.17	15.083	3.04	21.08	1.19
3.167	1.45	9.167	3.17	15.167	2.91	21.17	1.19
3.250	1.59	9.250	3.17	15.250	2.78	21.25	1.19
3.333	1.45	9.333	3.31	15.333	2.91	21.33	1.19
3.417	1.32	9.417	3.44	15.417	3.04	21.42	1.19
3.500	1.19	9.500	3.57	15.500	3.17	21.50	1.19
3.583	1.19	9.583	3.57	15.583	3.04	21.58	1.19
3.667	1.19	9.667	3.57	15.667	2.91	21.67	1.19
3.750	1.19	9.750	3.57	15.750	2.78	21.75	1.19
3.833	1.32	9.833	3.84	15.833	2.51	21.83	1.19
3.917	1.45	9.917	4.10	15.917	2.25	21.92	1.19
4.000	1.59	10.000	4.36	16.000	1.98	22.00	1.19
4.083	1.59	10.083	4.50	16.083	1.85	22.08	1.19
4.167	1.59	10.167	4.63	16.167	1.72	22.17	1.19
4.250	1.59	10.250	4.76	16.250	1.59	22.25	1.19
4.333	1.59	10.333	5.16	16.333	1.72	22.33	1.19

4.417	1.59	10.417	5.56	16.417	1.85	22.42	1.19
4.500	1.59	10.500	5.95	16.500	1.98	22.50	1.19
4.583	1.59	10.583	6.08	16.583	1.85	22.58	1.19
4.667	1.59	10.667	6.22	16.667	1.72	22.67	1.19
4.750	1.59	10.750	6.35	16.750	1.59	22.75	1.19
4.833	1.59	10.833	7.41	16.833	1.72	22.83	1.19
4.917	1.59	10.917	8.46	16.917	1.85	22.92	1.19
5.000	1.59	11.000	9.52	17.000	1.98	23.00	1.19
5.083	1.59	11.083	9.52	17.083	1.85	23.08	1.19
5.167	1.59	11.167	9.52	17.167	1.72	23.17	1.19
5.250	1.59	11.250	9.52	17.250	1.59	23.25	1.19
5.333	1.59	11.333	16.14	17.333	1.72	23.33	1.19
5.417	1.59	11.417	22.75	17.417	1.85	23.42	1.19
5.500	1.59	11.500	29.36	17.500	1.98	23.50	1.19
5.583	1.59	11.583	60.04	17.583	1.85	23.58	1.19
5.667	1.59	11.667	90.73	17.667	1.72	23.67	1.19
5.750	1.59	11.750	121.41	17.750	1.59	23.75	.00
5.833	1.59	11.833	85.72	17.833	1.72		
5.917	1.59	11.917	50.00	17.917	1.85		
6.000	1.59	12.000	14.29	18.000	1.98		

Max.Eff.Inten.(mm/hr)=	121.41	80.82	
over (min)	5.00	20.00	
Storage Coeff. (min)=	1.62 (ii)	15.33 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	.32	.07	
			TOTALS
PEAK FLOW (cms)=	.02	.06	.065 (iii)
TIME TO PEAK (hrs)=	11.75	12.00	12.00
RUNOFF VOLUME (mm)=	97.70	67.56	70.55
TOTAL RAINFALL (mm)=	98.70	98.70	98.70
RUNOFF COEFFICIENT =	.99	.68	.71

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

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

CALIB
STANDHYD (0204) | Area (ha)= .82
ID= 1 DT= 5.0 min | Total Imp(%)= 33.40 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.27	.54	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	30.00	165.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		121.41	37.60	
over (min)		5.00	30.00	
Storage Coeff. (min)=		.93 (ii)	25.36 (ii)	
Unit Hyd. Tpeak (min)=		5.00	30.00	
Unit Hyd. peak (cms)=		.34	.04	
				TOTALS
PEAK FLOW (cms)=		.03	.03	.038 (iii)

TIME TO PEAK (hrs)=	11.75	12.17	11.75
RUNOFF VOLUME (mm)=	97.70	31.06	37.70
TOTAL RAINFALL (mm)=	98.70	98.70	98.70
RUNOFF COEFFICIENT =	.99	.31	.38

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0202)	Area (ha)= .33
ID= 1 DT= 5.0 min	Total Imp(%)= 10.70 Dir. Conn.(%)= 10.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.03	.29
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	100.00	20.00
Mannings n	=	.013	.250
Max.Eff.Inten.(mm/hr)=		121.41	29.74
over (min)		5.00	10.00
Storage Coeff.	(min)=	1.92 (ii)	9.48 (ii)
Unit Hyd. Tpeak	(min)=	5.00	10.00
Unit Hyd. peak	(cms)=	.31	.12

				TOTALS
PEAK FLOW	(cms)=	.01	.02	.026 (iii)
TIME TO PEAK	(hrs)=	11.75	11.92	11.83
RUNOFF VOLUME	(mm)=	97.70	24.52	32.34
TOTAL RAINFALL	(mm)=	98.70	98.70	98.70
RUNOFF COEFFICIENT	=	.99	.25	.33

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0203)	Area (ha)= 1.83
ID= 1 DT= 5.0 min	Total Imp(%)= 35.50 Dir. Conn.(%)= 35.50

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.65	1.18
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	270.00	35.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=	121.41	26.71	
over (min)	5.00	15.00	
Storage Coeff. (min)=	3.48 (ii)	14.53 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.26	.08	

				TOTALS
PEAK FLOW	(cms)=	.20	.06	.234 (iii)
TIME TO PEAK	(hrs)=	11.75	11.92	11.75
RUNOFF VOLUME	(mm)=	97.70	24.52	50.50
TOTAL RAINFALL	(mm)=	98.70	98.70	98.70
RUNOFF COEFFICIENT	=	.99	.25	.51

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0205)	Area (ha)= .16
ID= 1 DT= 5.0 min	Total Imp(%)= 15.70 Dir. Conn.(%)= 15.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.02	.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	15.00	30.00
Mannings n	=	.013	.250
Max.Eff.Inten.(mm/hr)=		121.41	29.74
over (min)		5.00	15.00
Storage Coeff.	(min)=	.62 (ii)	10.26 (ii)
Unit Hyd. Tpeak	(min)=	5.00	15.00
Unit Hyd. peak	(cms)=	.34	.09

				TOTALS
PEAK FLOW	(cms)=	.01	.01	.013 (iii)
TIME TO PEAK	(hrs)=	11.75	11.92	11.75
RUNOFF VOLUME	(mm)=	97.70	24.52	35.97
TOTAL RAINFALL	(mm)=	98.70	98.70	98.70
RUNOFF COEFFICIENT	=	.99	.25	.36

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR (0406)					
IN= 2---> OUT= 1					
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
	.0000	.0000	.0390	.0012	
	.0080	.0002	.0450	.0021	

.0230 .0006 | .0470 .0030
.0320 .0010 | .0000 .0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.038	11.75	37.70
OUTFLOW: ID= 1 (0406)	.818	.036	12.25	37.70

PEAK FLOW REDUCTION [Qout/Qin](%)= 93.75
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= .0011

ADD HYD (0401)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0202):	.33	.026	11.83	32.34
+ ID2= 2 (0203):	1.83	.234	11.75	50.50
ID = 3 (0401):	2.16	.259	11.75	47.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0402)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0406):	.82	.036	12.25	37.70
+ ID2= 2 (0401):	2.16	.259	11.75	47.74
ID = 3 (0402):	2.97	.286	11.75	44.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0402):	2.97	.286	11.75	44.98
+ ID2= 2 (0205):	.16	.013	11.75	35.97
ID = 3 (0403):	3.13	.299	11.75	44.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0206):	.50	.065	12.00	70.55
+ ID2= 2 (0403):	3.13	.299	11.75	44.53
ID = 3 (0404):	3.63	.347	11.75	48.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

** SIMULATION NUMBER: 5 **

MASS STORM
Ptotal=110.10 mm

Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\SCS24H.MST
Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min
New Storm time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	.44	6.08	1.91	12.08	15.85	18.08	2.06
.17	.88	6.17	2.06	12.17	15.85	18.17	1.91
.25	1.32	6.25	2.20	12.25	15.85	18.25	1.76
.33	1.17	6.33	2.06	12.33	13.36	18.33	1.91
.42	1.03	6.42	1.91	12.42	10.86	18.42	2.06
.50	.88	6.50	1.76	12.50	8.37	18.50	2.20
.58	1.03	6.58	1.91	12.58	8.22	18.58	2.06
.67	1.17	6.67	2.06	12.67	8.07	18.67	1.91
.75	1.32	6.75	2.20	12.75	7.93	18.75	1.76
.83	1.32	6.83	2.20	12.83	7.34	18.83	1.91
.92	1.32	6.92	2.20	12.92	6.75	18.92	2.06
1.00	1.32	7.00	2.20	13.00	6.17	19.00	2.20
1.08	1.32	7.08	2.35	13.08	6.02	19.08	2.06
1.17	1.32	7.17	2.50	13.17	5.87	19.17	1.91
1.25	1.32	7.25	2.64	13.25	5.73	19.25	1.76
1.33	1.17	7.33	2.50	13.33	5.43	19.33	1.91
1.42	1.03	7.42	2.35	13.42	5.14	19.42	2.06
1.50	.88	7.50	2.20	13.50	4.84	19.50	2.20
1.58	1.03	7.58	2.35	13.58	4.70	19.58	2.06
1.67	1.17	7.67	2.50	13.67	4.55	19.67	1.91
1.75	1.32	7.75	2.64	13.75	4.40	19.75	1.76
1.83	1.32	7.83	2.64	13.83	4.11	19.83	1.61
1.92	1.32	7.92	2.64	13.92	3.82	19.92	1.47
2.00	1.32	8.00	2.64	14.00	3.52	20.00	1.32
2.08	1.47	8.08	2.79	14.08	3.38	20.08	1.32
2.17	1.61	8.17	2.94	14.17	3.23	20.17	1.32
2.25	1.76	8.25	3.08	14.25	3.08	20.25	1.32
2.33	1.61	8.33	3.08	14.33	3.23	20.33	1.32
2.42	1.47	8.42	3.08	14.42	3.38	20.42	1.32
2.50	1.32	8.50	3.08	14.50	3.52	20.50	1.32
2.58	1.32	8.58	3.08	14.58	3.38	20.58	1.32
2.67	1.32	8.67	3.08	14.67	3.23	20.67	1.32
2.75	1.32	8.75	3.08	14.75	3.08	20.75	1.32
2.83	1.32	8.83	3.23	14.83	3.23	20.83	1.32
2.92	1.32	8.92	3.38	14.92	3.38	20.92	1.32
3.00	1.32	9.00	3.52	15.00	3.52	21.00	1.32
3.08	1.47	9.08	3.52	15.08	3.38	21.08	1.32
3.17	1.61	9.17	3.52	15.17	3.23	21.17	1.32
3.25	1.76	9.25	3.52	15.25	3.08	21.25	1.32
3.33	1.61	9.33	3.67	15.33	3.23	21.33	1.32
3.42	1.47	9.42	3.82	15.42	3.38	21.42	1.32
3.50	1.32	9.50	3.96	15.50	3.52	21.50	1.32
3.58	1.32	9.58	3.96	15.58	3.38	21.58	1.32
3.67	1.32	9.67	3.96	15.67	3.23	21.67	1.32

3.75	1.32	9.75	3.96	15.75	3.08	21.75	1.32
3.83	1.47	9.83	4.26	15.83	2.79	21.83	1.32
3.92	1.61	9.92	4.55	15.92	2.50	21.92	1.32
4.00	1.76	10.00	4.84	16.00	2.20	22.00	1.32
4.08	1.76	10.08	4.99	16.08	2.06	22.08	1.32
4.17	1.76	10.17	5.14	16.17	1.91	22.17	1.32
4.25	1.76	10.25	5.28	16.25	1.76	22.25	1.32
4.33	1.76	10.33	5.73	16.33	1.91	22.33	1.32
4.42	1.76	10.42	6.17	16.42	2.06	22.42	1.32
4.50	1.76	10.50	6.61	16.50	2.20	22.50	1.32
4.58	1.76	10.58	6.75	16.58	2.06	22.58	1.32
4.67	1.76	10.67	6.90	16.67	1.91	22.67	1.32
4.75	1.76	10.75	7.05	16.75	1.76	22.75	1.32
4.83	1.76	10.83	8.22	16.83	1.91	22.83	1.32
4.92	1.76	10.92	9.40	16.92	2.06	22.92	1.32
5.00	1.76	11.00	10.57	17.00	2.20	23.00	1.32
5.08	1.76	11.08	10.57	17.08	2.06	23.08	1.32
5.17	1.76	11.17	10.57	17.17	1.91	23.17	1.32
5.25	1.76	11.25	10.57	17.25	1.76	23.25	1.32
5.33	1.76	11.33	17.91	17.33	1.91	23.33	1.32
5.42	1.76	11.42	25.25	17.42	2.06	23.42	1.32
5.50	1.76	11.50	32.59	17.50	2.20	23.50	1.32
5.58	1.76	11.58	66.64	17.58	2.06	23.58	1.32
5.67	1.76	11.67	100.70	17.67	1.91	23.67	1.32
5.75	1.76	11.75	134.76	17.75	1.76	23.75	1.32
5.83	1.76	11.83	95.13	17.83	1.91		
5.92	1.76	11.92	55.49	17.92	2.06		
6.00	1.76	12.00	15.86	18.00	2.20		

CALIB			
STANDHYD (0206)	Area (ha)=	.50	
ID= 1 DT= 5.0 min	Total Imp(%)=	14.10	Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.07	.43
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	75.00	105.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.44	6.083	1.91	12.083	15.85	18.08	2.06
.167	.88	6.167	2.06	12.167	15.85	18.17	1.91
.250	1.32	6.250	2.20	12.250	15.85	18.25	1.76
.333	1.17	6.333	2.06	12.333	13.36	18.33	1.91
.417	1.03	6.417	1.91	12.417	10.86	18.42	2.06
.500	.88	6.500	1.76	12.500	8.37	18.50	2.20
.583	1.03	6.583	1.91	12.583	8.22	18.58	2.06
.667	1.17	6.667	2.06	12.667	8.07	18.67	1.91
.750	1.32	6.750	2.20	12.750	7.93	18.75	1.76
.833	1.32	6.833	2.20	12.833	7.34	18.83	1.91
.917	1.32	6.917	2.20	12.917	6.75	18.92	2.06
1.000	1.32	7.000	2.20	13.000	6.17	19.00	2.20
1.083	1.32	7.083	2.35	13.083	6.02	19.08	2.06
1.167	1.32	7.167	2.50	13.167	5.87	19.17	1.91
1.250	1.32	7.250	2.64	13.250	5.73	19.25	1.76

1.333	1.17	7.333	2.50	13.333	5.43	19.33	1.91
1.417	1.03	7.417	2.35	13.417	5.14	19.42	2.06
1.500	.88	7.500	2.20	13.500	4.84	19.50	2.20
1.583	1.03	7.583	2.35	13.583	4.70	19.58	2.06
1.667	1.17	7.667	2.50	13.667	4.55	19.67	1.91
1.750	1.32	7.750	2.64	13.750	4.40	19.75	1.76
1.833	1.32	7.833	2.64	13.833	4.11	19.83	1.61
1.917	1.32	7.917	2.64	13.917	3.82	19.92	1.47
2.000	1.32	8.000	2.64	14.000	3.52	20.00	1.32
2.083	1.47	8.083	2.79	14.083	3.38	20.08	1.32
2.167	1.61	8.167	2.94	14.167	3.23	20.17	1.32
2.250	1.76	8.250	3.08	14.250	3.08	20.25	1.32
2.333	1.61	8.333	3.08	14.333	3.23	20.33	1.32
2.417	1.47	8.417	3.08	14.417	3.38	20.42	1.32
2.500	1.32	8.500	3.08	14.500	3.52	20.50	1.32
2.583	1.32	8.583	3.08	14.583	3.38	20.58	1.32
2.667	1.32	8.667	3.08	14.667	3.23	20.67	1.32
2.750	1.32	8.750	3.08	14.750	3.08	20.75	1.32
2.833	1.32	8.833	3.23	14.833	3.23	20.83	1.32
2.917	1.32	8.917	3.38	14.917	3.38	20.92	1.32
3.000	1.32	9.000	3.52	15.000	3.52	21.00	1.32
3.083	1.47	9.083	3.52	15.083	3.38	21.08	1.32
3.167	1.61	9.167	3.52	15.167	3.23	21.17	1.32
3.250	1.76	9.250	3.52	15.250	3.08	21.25	1.32
3.333	1.61	9.333	3.67	15.333	3.23	21.33	1.32
3.417	1.47	9.417	3.82	15.417	3.38	21.42	1.32
3.500	1.32	9.500	3.96	15.500	3.52	21.50	1.32
3.583	1.32	9.583	3.96	15.583	3.38	21.58	1.32
3.667	1.32	9.667	3.96	15.667	3.23	21.67	1.32
3.750	1.32	9.750	3.96	15.750	3.08	21.75	1.32
3.833	1.47	9.833	4.26	15.833	2.79	21.83	1.32
3.917	1.61	9.917	4.55	15.917	2.50	21.92	1.32
4.000	1.76	10.000	4.84	16.000	2.20	22.00	1.32
4.083	1.76	10.083	4.99	16.083	2.06	22.08	1.32
4.167	1.76	10.167	5.14	16.167	1.91	22.17	1.32
4.250	1.76	10.250	5.28	16.250	1.76	22.25	1.32
4.333	1.76	10.333	5.73	16.333	1.91	22.33	1.32
4.417	1.76	10.417	6.17	16.417	2.06	22.42	1.32
4.500	1.76	10.500	6.61	16.500	2.20	22.50	1.32
4.583	1.76	10.583	6.75	16.583	2.06	22.58	1.32
4.667	1.76	10.667	6.90	16.667	1.91	22.67	1.32
4.750	1.76	10.750	7.05	16.750	1.76	22.75	1.32
4.833	1.76	10.833	8.22	16.833	1.91	22.83	1.32
4.917	1.76	10.917	9.40	16.917	2.06	22.92	1.32
5.000	1.76	11.000	10.57	17.000	2.20	23.00	1.32
5.083	1.76	11.083	10.57	17.083	2.06	23.08	1.32
5.167	1.76	11.167	10.57	17.167	1.91	23.17	1.32
5.250	1.76	11.250	10.57	17.250	1.76	23.25	1.32
5.333	1.76	11.333	17.91	17.333	1.91	23.33	1.32
5.417	1.76	11.417	25.25	17.417	2.06	23.42	1.32
5.500	1.76	11.500	32.59	17.500	2.20	23.50	1.32
5.583	1.76	11.583	66.64	17.583	2.06	23.58	1.32
5.667	1.76	11.667	100.70	17.667	1.91	23.67	1.32
5.750	1.76	11.750	134.76	17.750	1.76	23.75	.00
5.833	1.76	11.833	95.14	17.833	1.91		
5.917	1.76	11.917	55.50	17.917	2.06		
6.000	1.76	12.000	15.86	18.000	2.20		

Max.Eff.Inten.(mm/hr)=		134.76	92.50
over (min)		5.00	15.00
Storage Coeff. (min)=		1.55 (ii)	14.54 (ii)
Unit Hyd. Tpeak (min)=		5.00	15.00
Unit Hyd. peak (cms)=		.33	.08

				TOTALS
PEAK FLOW	(cms)=	.02	.08	.084 (iii)
TIME TO PEAK	(hrs)=	11.75	11.92	11.92
RUNOFF VOLUME	(mm)=	108.55	77.47	80.56
TOTAL RAINFALL	(mm)=	109.55	109.55	109.55
RUNOFF COEFFICIENT	=	.99	.71	.74

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

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

CALIB			
STANDHYD (0204)	Area (ha)=	.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	33.40	Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.27	.54
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	30.00	165.00
Mannings n	=	.013	.250
Max.Eff.Inten.(mm/hr)=		134.76	45.19
over (min)		5.00	25.00
Storage Coeff.	(min)=	.89 (ii)	23.59 (ii)
Unit Hyd. Tpeak	(min)=	5.00	25.00
Unit Hyd. peak	(cms)=	.34	.05

				TOTALS
PEAK FLOW	(cms)=	.03	.04	.047 (iii)
TIME TO PEAK	(hrs)=	11.75	12.08	11.75
RUNOFF VOLUME	(mm)=	108.55	37.16	44.29
TOTAL RAINFALL	(mm)=	109.55	109.55	109.55
RUNOFF COEFFICIENT	=	.99	.34	.40

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0202)	Area (ha)=	.33	
ID= 1 DT= 5.0 min	Total Imp(%)=	10.70	Dir. Conn.(%)= 10.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.03	.29
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	100.00	20.00

Mannings n	=	.013	.250
Max.Eff.Inten.(mm/hr)=		134.76	36.00
over (min)		5.00	10.00
Storage Coeff.	(min)=	1.84 (ii)	8.85 (ii)
Unit Hyd. Tpeak	(min)=	5.00	10.00
Unit Hyd. peak	(cms)=	.32	.12

				TOTALS
PEAK FLOW	(cms)=	.01	.02	.032 (iii)
TIME TO PEAK	(hrs)=	11.75	11.83	11.83
RUNOFF VOLUME	(mm)=	108.55	29.63	38.06
TOTAL RAINFALL	(mm)=	109.55	109.55	109.55
RUNOFF COEFFICIENT	=	.99	.27	.35

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0203)	Area (ha)=	1.83	
ID= 1 DT= 5.0 min	Total Imp(%)=	35.50	Dir. Conn.(%)= 35.50

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.65	1.18
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	270.00	35.00
Mannings n	=	.013	.250
Max.Eff.Inten.(mm/hr)=		134.76	36.00
over (min)		5.00	15.00
Storage Coeff.	(min)=	3.34 (ii)	13.14 (ii)
Unit Hyd. Tpeak	(min)=	5.00	15.00
Unit Hyd. peak	(cms)=	.26	.08

				TOTALS
PEAK FLOW	(cms)=	.23	.08	.267 (iii)
TIME TO PEAK	(hrs)=	11.75	11.92	11.75
RUNOFF VOLUME	(mm)=	108.55	29.63	57.64
TOTAL RAINFALL	(mm)=	109.55	109.55	109.55
RUNOFF COEFFICIENT	=	.99	.27	.53

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0205)	Area (ha)=	.16	
ID= 1 DT= 5.0 min	Total Imp(%)=	15.70	Dir. Conn.(%)= 15.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.02	.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	15.00	30.00
Mannings n	=	.013	.250
Max.Eff.Inten.(mm/hr)	=	134.76	36.00
over (min)		5.00	10.00
Storage Coeff.	(min)=	.59 (ii)	9.53 (ii)
Unit Hyd. Tpeak	(min)=	5.00	10.00
Unit Hyd. peak	(cms)=	.34	.12

				TOTALS
PEAK FLOW	(cms)=	.01	.01	.017 (iii)
TIME TO PEAK	(hrs)=	11.75	11.92	11.75
RUNOFF VOLUME	(mm)=	108.55	29.63	41.99
TOTAL RAINFALL	(mm)=	109.55	109.55	109.55
RUNOFF COEFFICIENT	=	.99	.27	.38

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR (0406)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0390	.0012
	.0080	.0002	.0450	.0021
	.0230	.0006	.0470	.0030
	.0320	.0010	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.047	11.75	44.29
OUTFLOW: ID= 1 (0406)	.818	.043	12.25	44.28

PEAK FLOW REDUCTION [Qout/Qin](%)= 92.04
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= .0018

ADD HYD (0401)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0202):	.33	.032	11.83	38.06
	+ ID2= 2 (0203):	1.83	.267	11.75	57.64
	ID = 3 (0401):	2.16	.296	11.75	54.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0402)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0406):	.82	.043	12.25	44.28
	+ ID2= 2 (0401):	2.16	.296	11.75	54.67
	ID = 3 (0402):	2.97	.328	11.75	51.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0402):	2.97	.328	11.75	51.82
	+ ID2= 2 (0205):	.16	.017	11.75	41.99
	ID = 3 (0403):	3.13	.345	11.75	51.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0206):	.50	.084	11.92	80.56
	+ ID2= 2 (0403):	3.13	.345	11.75	51.32
	ID = 3 (0404):	3.63	.411	11.83	55.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 6 **
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MASS STORM	Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\ Storm Design\OTTHYMO\SCS24H.MST
Ptotal=121.00 mm	Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min
New Storm time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	.48	6.08	2.10	12.08	17.42	18.08	2.26
.17	.97	6.17	2.26	12.17	17.42	18.17	2.10
.25	1.45	6.25	2.42	12.25	17.42	18.25	1.94
.33	1.29	6.33	2.26	12.33	14.68	18.33	2.10
.42	1.13	6.42	2.10	12.42	11.94	18.42	2.26
.50	.97	6.50	1.94	12.50	9.20	18.50	2.42
.58	1.13	6.58	2.10	12.58	9.03	18.58	2.26

.67	1.29	6.67	2.26	12.67	8.87	18.67	2.10
.75	1.45	6.75	2.42	12.75	8.71	18.75	1.94
.83	1.45	6.83	2.42	12.83	8.07	18.83	2.10
.92	1.45	6.92	2.42	12.92	7.42	18.92	2.26
1.00	1.45	7.00	2.42	13.00	6.78	19.00	2.42
1.08	1.45	7.08	2.58	13.08	6.61	19.08	2.26
1.17	1.45	7.17	2.74	13.17	6.45	19.17	2.10
1.25	1.45	7.25	2.90	13.25	6.29	19.25	1.94
1.33	1.29	7.33	2.74	13.33	5.97	19.33	2.10
1.42	1.13	7.42	2.58	13.42	5.65	19.42	2.26
1.50	.97	7.50	2.42	13.50	5.32	19.50	2.42
1.58	1.13	7.58	2.58	13.58	5.16	19.58	2.26
1.67	1.29	7.67	2.74	13.67	5.00	19.67	2.10
1.75	1.45	7.75	2.90	13.75	4.84	19.75	1.94
1.83	1.45	7.83	2.90	13.83	4.52	19.83	1.77
1.92	1.45	7.92	2.90	13.92	4.19	19.92	1.61
2.00	1.45	8.00	2.90	14.00	3.87	20.00	1.45
2.08	1.61	8.08	3.07	14.08	3.71	20.08	1.45
2.17	1.77	8.17	3.23	14.17	3.55	20.17	1.45
2.25	1.94	8.25	3.39	14.25	3.39	20.25	1.45
2.33	1.77	8.33	3.39	14.33	3.55	20.33	1.45
2.42	1.61	8.42	3.39	14.42	3.71	20.42	1.45
2.50	1.45	8.50	3.39	14.50	3.87	20.50	1.45
2.58	1.45	8.58	3.39	14.58	3.71	20.58	1.45
2.67	1.45	8.67	3.39	14.67	3.55	20.67	1.45
2.75	1.45	8.75	3.39	14.75	3.39	20.75	1.45
2.83	1.45	8.83	3.55	14.83	3.55	20.83	1.45
2.92	1.45	8.92	3.71	14.92	3.71	20.92	1.45
3.00	1.45	9.00	3.87	15.00	3.87	21.00	1.45
3.08	1.61	9.08	3.87	15.08	3.71	21.08	1.45
3.17	1.77	9.17	3.87	15.17	3.55	21.17	1.45
3.25	1.94	9.25	3.87	15.25	3.39	21.25	1.45
3.33	1.77	9.33	4.03	15.33	3.55	21.33	1.45
3.42	1.61	9.42	4.19	15.42	3.71	21.42	1.45
3.50	1.45	9.50	4.36	15.50	3.87	21.50	1.45
3.58	1.45	9.58	4.36	15.58	3.71	21.58	1.45
3.67	1.45	9.67	4.36	15.67	3.55	21.67	1.45
3.75	1.45	9.75	4.36	15.75	3.39	21.75	1.45
3.83	1.61	9.83	4.68	15.83	3.07	21.83	1.45
3.92	1.77	9.92	5.00	15.92	2.74	21.92	1.45
4.00	1.94	10.00	5.32	16.00	2.42	22.00	1.45
4.08	1.94	10.08	5.49	16.08	2.26	22.08	1.45
4.17	1.94	10.17	5.65	16.17	2.10	22.17	1.45
4.25	1.94	10.25	5.81	16.25	1.94	22.25	1.45
4.33	1.94	10.33	6.29	16.33	2.10	22.33	1.45
4.42	1.94	10.42	6.78	16.42	2.26	22.42	1.45
4.50	1.94	10.50	7.26	16.50	2.42	22.50	1.45
4.58	1.94	10.58	7.42	16.58	2.26	22.58	1.45
4.67	1.94	10.67	7.58	16.67	2.10	22.67	1.45
4.75	1.94	10.75	7.74	16.75	1.94	22.75	1.45
4.83	1.94	10.83	9.03	16.83	2.10	22.83	1.45
4.92	1.94	10.92	10.33	16.92	2.26	22.92	1.45
5.00	1.94	11.00	11.62	17.00	2.42	23.00	1.45
5.08	1.94	11.08	11.62	17.08	2.26	23.08	1.45
5.17	1.94	11.17	11.62	17.17	2.10	23.17	1.45
5.25	1.94	11.25	11.62	17.25	1.94	23.25	1.45
5.33	1.94	11.33	19.68	17.33	2.10	23.33	1.45
5.42	1.94	11.42	27.75	17.42	2.26	23.42	1.45
5.50	1.94	11.50	35.82	17.50	2.42	23.50	1.45
5.58	1.94	11.58	73.24	17.58	2.26	23.58	1.45
5.67	1.94	11.67	110.67	17.67	2.10	23.67	1.45
5.75	1.94	11.75	148.10	17.75	1.94	23.75	1.45
5.83	1.94	11.83	104.55	17.83	2.10		

5.92	1.94	11.92	60.99	17.92	2.26		
6.00	1.94	12.00	17.43	18.00	2.42		

CALIB
STANDHYD (0206)
ID= 1 DT= 5.0 min

Area (ha)= .50
Total Imp(%)= 14.10 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.07	.43
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	75.00	105.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.48	6.083	2.10	12.083	17.42	18.08	2.26
.167	.97	6.167	2.26	12.167	17.42	18.17	2.10
.250	1.45	6.250	2.42	12.250	17.42	18.25	1.94
.333	1.29	6.333	2.26	12.333	14.68	18.33	2.10
.417	1.13	6.417	2.10	12.417	11.94	18.42	2.26
.500	.97	6.500	1.94	12.500	9.20	18.50	2.42
.583	1.13	6.583	2.10	12.583	9.03	18.58	2.26
.667	1.29	6.667	2.26	12.667	8.87	18.67	2.10
.750	1.45	6.750	2.42	12.750	8.71	18.75	1.94
.833	1.45	6.833	2.42	12.833	8.07	18.83	2.10
.917	1.45	6.917	2.42	12.917	7.42	18.92	2.26
1.000	1.45	7.000	2.42	13.000	6.78	19.00	2.42
1.083	1.45	7.083	2.58	13.083	6.61	19.08	2.26
1.167	1.45	7.167	2.74	13.167	6.45	19.17	2.10
1.250	1.45	7.250	2.90	13.250	6.29	19.25	1.94
1.333	1.29	7.333	2.74	13.333	5.97	19.33	2.10
1.417	1.13	7.417	2.58	13.417	5.65	19.42	2.26
1.500	.97	7.500	2.42	13.500	5.32	19.50	2.42
1.583	1.13	7.583	2.58	13.583	5.16	19.58	2.26
1.667	1.29	7.667	2.74	13.667	5.00	19.67	2.10
1.750	1.45	7.750	2.90	13.750	4.84	19.75	1.94
1.833	1.45	7.833	2.90	13.833	4.52	19.83	1.77
1.917	1.45	7.917	2.90	13.917	4.19	19.92	1.61
2.000	1.45	8.000	2.90	14.000	3.87	20.00	1.45
2.083	1.61	8.083	3.07	14.083	3.71	20.08	1.45
2.167	1.77	8.167	3.23	14.167	3.55	20.17	1.45
2.250	1.94	8.250	3.39	14.250	3.39	20.25	1.45
2.333	1.77	8.333	3.39	14.333	3.55	20.33	1.45
2.417	1.61	8.417	3.39	14.417	3.71	20.42	1.45
2.500	1.45	8.500	3.39	14.500	3.87	20.50	1.45
2.583	1.45	8.583	3.39	14.583	3.71	20.58	1.45
2.667	1.45	8.667	3.39	14.667	3.55	20.67	1.45
2.750	1.45	8.750	3.39	14.750	3.39	20.75	1.45
2.833	1.45	8.833	3.55	14.833	3.55	20.83	1.45
2.917	1.45	8.917	3.71	14.917	3.71	20.92	1.45
3.000	1.45	9.000	3.87	15.000	3.87	21.00	1.45
3.083	1.61	9.083	3.87	15.083	3.71	21.08	1.45
3.167	1.77	9.167	3.87	15.167	3.55	21.17	1.45
3.250	1.94	9.250	3.87	15.250	3.39	21.25	1.45
3.333	1.77	9.333	4.03	15.333	3.55	21.33	1.45
3.417	1.61	9.417	4.19	15.417	3.71	21.42	1.45

3.500	1.45	9.500	4.36	15.500	3.87	21.50	1.45
3.583	1.45	9.583	4.36	15.583	3.71	21.58	1.45
3.667	1.45	9.667	4.36	15.667	3.55	21.67	1.45
3.750	1.45	9.750	4.36	15.750	3.39	21.75	1.45
3.833	1.61	9.833	4.68	15.833	3.07	21.83	1.45
3.917	1.77	9.917	5.00	15.917	2.74	21.92	1.45
4.000	1.94	10.000	5.32	16.000	2.42	22.00	1.45
4.083	1.94	10.083	5.49	16.083	2.26	22.08	1.45
4.167	1.94	10.167	5.65	16.167	2.10	22.17	1.45
4.250	1.94	10.250	5.81	16.250	1.94	22.25	1.45
4.333	1.94	10.333	6.29	16.333	2.10	22.33	1.45
4.417	1.94	10.417	6.78	16.417	2.26	22.42	1.45
4.500	1.94	10.500	7.26	16.500	2.42	22.50	1.45
4.583	1.94	10.583	7.42	16.583	2.26	22.58	1.45
4.667	1.94	10.667	7.58	16.667	2.10	22.67	1.45
4.750	1.94	10.750	7.74	16.750	1.94	22.75	1.45
4.833	1.94	10.833	9.03	16.833	2.10	22.83	1.45
4.917	1.94	10.917	10.33	16.917	2.26	22.92	1.45
5.000	1.94	11.000	11.62	17.000	2.42	23.00	1.45
5.083	1.94	11.083	11.62	17.083	2.26	23.08	1.45
5.167	1.94	11.167	11.62	17.167	2.10	23.17	1.45
5.250	1.94	11.250	11.62	17.250	1.94	23.25	1.45
5.333	1.94	11.333	19.68	17.333	2.10	23.33	1.45
5.417	1.94	11.417	27.75	17.417	2.26	23.42	1.45
5.500	1.94	11.500	35.81	17.500	2.42	23.50	1.45
5.583	1.94	11.583	73.24	17.583	2.26	23.58	1.45
5.667	1.94	11.667	110.67	17.667	2.10	23.67	1.45
5.750	1.94	11.750	148.10	17.750	1.94	23.75	.00
5.833	1.94	11.833	104.55	17.833	2.10		
5.917	1.94	11.917	60.99	17.917	2.26		
6.000	1.94	12.000	17.43	18.000	2.42		

Max.Eff.Inten.(mm/hr)=	148.10	104.26	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.49 (ii)	13.88 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.33	.08	
			TOTALS
PEAK FLOW (cms)=	.02	.09	.096 (iii)
TIME TO PEAK (hrs)=	11.75	11.92	11.92
RUNOFF VOLUME (mm)=	119.40	87.50	90.67
TOTAL RAINFALL (mm)=	120.40	120.40	120.40
RUNOFF COEFFICIENT =	.99	.73	.75

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

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

CALIB			
STANDHYD (0204)	Area (ha)=	.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	33.40	Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=		.27	.54
Dep. Storage (mm)=		1.00	5.00

Average Slope (%)=	2.00	2.00	
Length (m)=	30.00	165.00	
Mannings n =	.013	.250	
Max.Eff.Inten.(mm/hr)=	148.10	53.21	
over (min)	5.00	25.00	
Storage Coeff. (min)=	.86 (ii)	22.12 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	.34	.05	
			TOTALS
PEAK FLOW (cms)=	.03	.05	.056 (iii)
TIME TO PEAK (hrs)=	11.75	12.08	12.08
RUNOFF VOLUME (mm)=	119.40	43.60	51.17
TOTAL RAINFALL (mm)=	120.40	120.40	120.40
RUNOFF COEFFICIENT =	.99	.36	.42

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0202)	Area (ha)=	.33	
ID= 1 DT= 5.0 min	Total Imp(%)=	10.70	Dir. Conn.(%)= 10.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=		.03	.29
Dep. Storage (mm)=		1.00	5.00
Average Slope (%)=		2.00	2.00
Length (m)=		100.00	20.00
Mannings n =		.013	.250
Max.Eff.Inten.(mm/hr)=		148.10	42.69
over (min)		5.00	10.00
Storage Coeff. (min)=		1.77 (ii)	8.32 (ii)
Unit Hyd. Tpeak (min)=		5.00	10.00
Unit Hyd. peak (cms)=		.32	.13
			TOTALS
PEAK FLOW (cms)=		.01	.03	.037 (iii)
TIME TO PEAK (hrs)=		11.75	11.83	11.83
RUNOFF VOLUME (mm)=		119.39	35.06	44.07
TOTAL RAINFALL (mm)=		120.40	120.40	120.40
RUNOFF COEFFICIENT =		.99	.29	.37

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD (0203)	Area (ha)= 1.83			
ID= 1 DT= 5.0 min	Total Imp(%)= 35.50	Dir. Conn.(%)= 35.50		

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.65	1.18	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	270.00	35.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)	=	148.10	42.69	
over (min)		5.00	15.00	
Storage Coeff.	(min)=	3.22 (ii)	12.38 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	.27	.08	
				TOTALS
PEAK FLOW	(cms)=	.25	.09	.301 (iii)
TIME TO PEAK	(hrs)=	11.75	11.92	11.75
RUNOFF VOLUME	(mm)=	119.39	35.06	65.00
TOTAL RAINFALL	(mm)=	120.40	120.40	120.40
RUNOFF COEFFICIENT	=	.99	.29	.54

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD (0205)	Area (ha)= .16			
ID= 1 DT= 5.0 min	Total Imp(%)= 15.70	Dir. Conn.(%)= 15.70		

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.02	.13	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	15.00	30.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)	=	148.10	42.69	
over (min)		5.00	10.00	
Storage Coeff.	(min)=	.57 (ii)	8.92 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	.34	.12	
				TOTALS
PEAK FLOW	(cms)=	.01	.01	.019 (iii)
TIME TO PEAK	(hrs)=	11.75	11.83	11.83
RUNOFF VOLUME	(mm)=	119.40	35.06	48.27
TOTAL RAINFALL	(mm)=	120.40	120.40	120.40
RUNOFF COEFFICIENT	=	.99	.29	.40

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR (0406)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0390	.0012
	.0080	.0002	.0450	.0021
	.0230	.0006	.0470	.0030
	.0320	.0010	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.056	12.08	51.17
OUTFLOW: ID= 1 (0406)	.818	.047	12.33	51.16

PEAK FLOW REDUCTION [Qout/Qin](%)= 83.14
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .0029

ADD HYD (0401)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0202):	.33	.037	11.83	44.07
+ ID2= 2 (0203):	1.83	.301	11.75	65.00
ID = 3 (0401):	2.16	.335	11.75	61.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0402)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0406):	.82	.047	12.33	51.16
+ ID2= 2 (0401):	2.16	.335	11.75	61.83
ID = 3 (0402):	2.97	.372	11.75	58.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0402):	2.97	.372	11.75	58.89
+ ID2= 2 (0205):	.16	.019	11.83	48.27
ID = 3 (0403):	3.13	.391	11.75	58.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0404) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0206):       .50    .096    11.92    90.67
        + ID2= 2 (0403):     3.13    .391    11.75    58.36
          ================================================
          ID = 3 (0404):     3.63    .466    11.75    62.76

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

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

        OOO     T      T    H   H    Y    M   M   OOO


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.2\voin.dat

  Output  filename: I:\2016 Projects\116028 - Wasaga Shores Subdivision\Design\Storm
Design\OTTHYMO\CHI Post-Development.out
  Summary filename: I:\2016 Projects\116028 - Wasaga Shores Subdivision\Design\Storm
Design\OTTHYMO\CHI Post-Development.sum

DATE: 7/5/2017                            TIME: 4:34:05 PM

USER:


COMMENTS: _____________________________________________________________

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


--------------------
|    READ STORM    |    Filename: I:\2016 Projects\116
|                  |              028 - Wasaga Shores Subdivision\Design\
|                  |              Storm Design\OTTHYMO\CHIC25MM.4HR
| Ptotal= 24.97 mm |    Comments: OWEN SOUND 25 mm (from a 2 year-4hr stor
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .10    1.29 |  1.10    2.81 |  2.10   13.05 |  3.10    2.04
                .20    1.36 |  1.20    3.22 |  2.20    8.44 |  3.20    1.89
                .30    1.44 |  1.30    3.77 |  2.30    6.21 |  3.30    1.76
                .40    1.53 |  1.40    4.55 |  2.40    4.91 |  3.40    1.65
                .50    1.63 |  1.50    5.77 |  2.50    4.06 |  3.50    1.55
                .60    1.75 |  1.60    7.86 |  2.60    3.47 |  3.60    1.46
                .70    1.89 |  1.70   12.27 |  2.70    3.03 |  3.70    1.39
```



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                .80    2.06 |  1.80   26.17 |  2.80    2.70 |  3.80    1.32
                .90    2.26 |  1.90   72.58 |  2.90    2.43 |  3.90    1.26
               1.00    2.50 |  2.00   26.96 |  3.00    2.22 |  4.00    1.20

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| CALIB            |
| STANDHYD  (0205) |   Area    (ha)=    .16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  15.70   Dir. Conn.(%)=  15.70
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .02           .13
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=      15.00         30.00
     Mannings n           =       .013          .250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
               .167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
               .250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
               .333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
               .417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
               .500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
               .583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
               .667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
               .750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
               .833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
               .917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
              1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Max.Eff.Inten.(mm/hr)=      63.46          1.75
               over (min)         5.00         35.00
     Storage Coeff.  (min)=        .80 (ii)    30.72 (ii)
     Unit Hyd. Tpeak (min)=       5.00         35.00
     Unit Hyd. peak  (cms)=        .34           .04
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .00           .00          .004 (iii)
     TIME TO PEAK    (hrs)=       1.92          2.50          1.92
     RUNOFF VOLUME    (mm)=      23.97          1.40          4.79
     TOTAL RAINFALL   (mm)=      24.97         24.97         24.97
     RUNOFF COEFFICIENT   =        .96           .06           .19

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  49.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (0202) |   Area    (ha)=    .33
```

|ID= 1 DT= 5.0 min | Total Imp(%)= 10.70 Dir. Conn.(%)= 10.70

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.03	.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	100.00	20.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	63.46	1.95
over (min)	5.00	25.00
Storage Coeff. (min)=	2.49 (ii)	24.97 (ii)
Unit Hyd. Tpeak (min)=	5.00	25.00
Unit Hyd. peak (cms)=	.29	.05
		TOTALS
PEAK FLOW (cms)=	.01	.00 .006 (iii)
TIME TO PEAK (hrs)=	1.92	2.33 1.92
RUNOFF VOLUME (mm)=	23.97	1.40 3.78
TOTAL RAINFALL (mm)=	24.97	24.97 24.97
RUNOFF COEFFICIENT =	.96	.06 .15

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0203) | Area (ha)= 1.83
ID= 1 DT= 5.0 min | Total Imp(%)= 35.50 Dir. Conn.(%)= 35.50

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.65	1.18
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	270.00	35.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	63.46	1.59
over (min)	5.00	40.00
Storage Coeff. (min)=	4.52 (ii)	38.62 (ii)
Unit Hyd. Tpeak (min)=	5.00	40.00
Unit Hyd. peak (cms)=	.23	.03
		TOTALS
PEAK FLOW (cms)=	.10	.00 .098 (iii)
TIME TO PEAK (hrs)=	1.92	2.58 1.92
RUNOFF VOLUME (mm)=	23.97	1.40 9.40
TOTAL RAINFALL (mm)=	24.97	24.97 24.97
RUNOFF COEFFICIENT =	.96	.06 .38

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0204) | Area (ha)= .82
ID= 1 DT= 5.0 min | Total Imp(%)= 33.40 Dir. Conn.(%)= 10.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.27	.54
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	30.00	165.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	63.46	2.23
over (min)	5.00	80.00
Storage Coeff. (min)=	1.21 (ii)	76.87 (ii)
Unit Hyd. Tpeak (min)=	5.00	80.00
Unit Hyd. peak (cms)=	.33	.01
		TOTALS
PEAK FLOW (cms)=	.01	.00 .014 (iii)
TIME TO PEAK (hrs)=	1.92	3.25 1.92
RUNOFF VOLUME (mm)=	23.97	2.09 4.22
TOTAL RAINFALL (mm)=	24.97	24.97 24.97
RUNOFF COEFFICIENT =	.96	.08 .17

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0206) | Area (ha)= .50
ID= 1 DT= 5.0 min | Total Imp(%)= 14.10 Dir. Conn.(%)= 10.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.07	.43
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	2.00	2.00
Length (m)=	75.00	105.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	63.46	10.27
over (min)	5.00	35.00
Storage Coeff. (min)=	2.09 (ii)	33.40 (ii)
Unit Hyd. Tpeak (min)=	5.00	35.00
Unit Hyd. peak (cms)=	.31	.03
		TOTALS
PEAK FLOW (cms)=	.01	.01 .010 (iii)
TIME TO PEAK (hrs)=	1.92	2.42 1.92
RUNOFF VOLUME (mm)=	23.97	8.35 9.88
TOTAL RAINFALL (mm)=	24.97	24.97 24.97
RUNOFF COEFFICIENT =	.96	.33 .40

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

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

ADD HYD (0401)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0202):	.33	.006	1.92	3.78
	+ ID2= 2 (0203):	1.83	.098	1.92	9.40
	ID = 3 (0401):	2.16	.104	1.92	8.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0406)	OUTFLOW	STORAGE	OUTFLOW	STORAGE
IN= 2---> OUT= 1	(cms)	(ha.m.)	(cms)	(ha.m.)
DT= 5.0 min	.0000	.0000	.0390	.0012
	.0080	.0002	.0450	.0021
	.0230	.0006	.0470	.0030
	.0320	.0010	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.014	1.92	4.22
OUTFLOW: ID= 1 (0406)	.818	.011	1.92	4.22

PEAK FLOW REDUCTION [Qout/Qin](%)= 73.97
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)= .0003

ADD HYD (0402)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0401):	2.16	.104	1.92	8.55
	+ ID2= 2 (0406):	.82	.011	1.92	4.22
	ID = 3 (0402):	2.97	.115	1.92	7.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0205):	.16	.004	1.92	4.79
	+ ID2= 2 (0402):	2.97	.115	1.92	7.36
	ID = 3 (0403):	3.13	.119	1.92	7.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0403):	3.13	.119	1.92	7.23
	+ ID2= 2 (0206):	.50	.010	1.92	9.88
	ID = 3 (0404):	3.63	.129	1.92	7.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM	IDF curve parameters: A= 433.495
Ptotal= 32.45 mm	B= 1.500
	C= .725

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .33

The CORRELATION coefficient is = .9997

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	119.80	111.59
10.	73.80	73.79
15.	55.60	56.79
30.	34.30	35.54
60.	21.10	21.88
120.	13.00	13.36
360.	6.00	6.06
720.	3.70	3.67
1440.	2.30	2.22

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.55	1.17	14.20	2.17	5.28	3.17	2.96
.33	2.87	1.33	73.79	2.33	4.62	3.33	2.78
.50	3.30	1.50	17.95	2.50	4.12	3.50	2.62
.67	3.93	1.67	10.46	2.67	3.74	3.67	2.48
.83	4.95	1.83	7.72	2.83	3.43	3.83	2.36
1.00	6.97	2.00	6.23	3.00	3.18	4.00	2.25

CALIB	
STANDHYD (0205)	Area (ha)= .16
ID= 1 DT= 5.0 min	Total Imp(%)= 15.70 Dir. Conn.(%)= 15.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.02	.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	15.00	30.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	2.55	1.083	14.20	2.083	5.28	3.08	2.96
.167	2.55	1.167	14.20	2.167	5.28	3.17	2.96
.250	2.87	1.250	73.79	2.250	4.62	3.25	2.78
.333	2.87	1.333	73.79	2.333	4.62	3.33	2.78
.417	3.30	1.417	17.95	2.417	4.12	3.42	2.62
.500	3.30	1.500	17.95	2.500	4.12	3.50	2.62
.583	3.93	1.583	10.46	2.583	3.74	3.58	2.48
.667	3.93	1.667	10.46	2.667	3.74	3.67	2.48
.750	4.95	1.750	7.72	2.750	3.43	3.75	2.36
.833	4.95	1.833	7.72	2.833	3.43	3.83	2.36
.917	6.97	1.917	6.23	2.917	3.18	3.92	2.25
1.000	6.97	2.000	6.23	3.000	3.18	4.00	2.25

				TOTALS
Max.Eff.Inten.(mm/hr)=		73.79	2.40	
over (min)		5.00	30.00	
Storage Coeff. (min)=		.75 (ii)	27.14 (ii)	
Unit Hyd. Tpeak (min)=		5.00	30.00	
Unit Hyd. peak (cms)=		.34	.04	
PEAK FLOW	(cms)=	.01	.00	.005 (iii)
TIME TO PEAK	(hrs)=	1.33	1.83	1.33
RUNOFF VOLUME	(mm)=	31.45	2.58	7.01
TOTAL RAINFALL	(mm)=	32.45	32.45	32.45
RUNOFF COEFFICIENT	=	.97	.08	.22

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0202)	Area (ha)= .33
ID= 1 DT= 5.0 min	Total Imp(%)= 10.70 Dir. Conn.(%)= 10.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.03	.29
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	100.00	20.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=		73.79	2.97
over (min)		5.00	25.00

Storage Coeff. (min)=		2.34 (ii)	21.35 (ii)
Unit Hyd. Tpeak (min)=		5.00	25.00
Unit Hyd. peak (cms)=		.30	.05
PEAK FLOW	(cms)=	.01	.00	*TOTALS* .007 (iii)
TIME TO PEAK	(hrs)=	1.33	1.67	1.33
RUNOFF VOLUME	(mm)=	31.45	2.58	5.63
TOTAL RAINFALL	(mm)=	32.45	32.45	32.45
RUNOFF COEFFICIENT	=	.97	.08	.17

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0203)	Area (ha)= 1.83
ID= 1 DT= 5.0 min	Total Imp(%)= 35.50 Dir. Conn.(%)= 35.50

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.65	1.18
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	270.00	35.00
Mannings n	=	.013	.250

				TOTALS
Max.Eff.Inten.(mm/hr)=		73.79	2.40	
over (min)		5.00	35.00	
Storage Coeff. (min)=		4.25 (ii)	33.20 (ii)	
Unit Hyd. Tpeak (min)=		5.00	35.00	
Unit Hyd. peak (cms)=		.23	.03	
PEAK FLOW	(cms)=	.12	.00	.123 (iii)
TIME TO PEAK	(hrs)=	1.33	1.92	1.33
RUNOFF VOLUME	(mm)=	31.45	2.58	12.82
TOTAL RAINFALL	(mm)=	32.45	32.45	32.45
RUNOFF COEFFICIENT	=	.97	.08	.40

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0204)	Area (ha)= .82
ID= 1 DT= 5.0 min	Total Imp(%)= 33.40 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.27	.54
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00

Length	(m)=	30.00	165.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		73.79	3.22	
over (min)		5.00	70.00	
Storage Coeff. (min)=		1.14 (ii)	66.44 (ii)	
Unit Hyd. Tpeak (min)=		5.00	70.00	
Unit Hyd. peak (cms)=		.34	.02	
				TOTALS
PEAK FLOW	(cms)=	.02	.00	.017 (iii)
TIME TO PEAK	(hrs)=	1.33	2.58	1.33
RUNOFF VOLUME	(mm)=	31.45	3.68	6.42
TOTAL RAINFALL	(mm)=	32.45	32.45	32.45
RUNOFF COEFFICIENT	=	.97	.11	.20

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0206)	Area (ha)= .50
ID= 1 DT= 5.0 min	Total Imp(%)= 14.10 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.07	.43	
Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	75.00	105.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		73.79	14.62	
over (min)		5.00	30.00	
Storage Coeff. (min)=		1.97 (ii)	29.15 (ii)	
Unit Hyd. Tpeak (min)=		5.00	30.00	
Unit Hyd. peak (cms)=		.31	.04	
				TOTALS
PEAK FLOW	(cms)=	.01	.01	.012 (iii)
TIME TO PEAK	(hrs)=	1.33	1.75	1.33
RUNOFF VOLUME	(mm)=	31.45	13.04	14.85
TOTAL RAINFALL	(mm)=	32.45	32.45	32.45
RUNOFF COEFFICIENT	=	.97	.40	.46

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

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

ADD HYD (0401)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0202):		.33	.007	1.33	5.63
+ ID2= 2 (0203):		1.83	.123	1.33	12.82
ID = 3 (0401):		2.16	.131	1.33	11.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0406)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0390	.0012
	.0080	.0002	.0450	.0021
	.0230	.0006	.0470	.0030
	.0320	.0010	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.017	1.33	6.42
OUTFLOW: ID= 1 (0406)	.818	.014	1.33	6.41

PEAK FLOW REDUCTION [Qout/Qin](%)= 85.01
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)= .0004

ADD HYD (0402)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0401):		2.16	.131	1.33	11.73
+ ID2= 2 (0406):		.82	.014	1.33	6.41
ID = 3 (0402):		2.97	.145	1.33	10.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0205):		.16	.005	1.33	7.01
+ ID2= 2 (0402):		2.97	.145	1.33	10.27
ID = 3 (0403):		3.13	.150	1.33	10.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0403):		3.13	.150	1.33	10.10

```
       + ID2= 2 (0206):      .50    .012     1.33    14.85
         ==================================================
         ID = 3 (0404):     3.63    .163     1.33    10.75

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 575.484
| Ptotal= 42.85 mm |                          B=   1.509
--------------------                          C=    .726
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  4.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =   .33

                    The CORRELATION coefficient is =  .9997

                     TIME       INPUT INT.           TAB. INT.
                    (min)        (mm/hr)              (mm/hr)
                       5.         158.50               147.71
                      10.          97.60                97.66
                      15.          73.50                75.16
                      30.          45.30                47.01
                      60.          27.90                28.92
                     120.          17.20                17.64
                     360.           8.00                 8.00
                     720.           4.90                 4.84
                    1440.           3.00                 2.93


                  TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                   .17    3.35 |  1.17   18.75 |  2.17    6.96 |  3.17    3.90
                   .33    3.77 |  1.33   97.66 |  2.33    6.08 |  3.33    3.66
                   .50    4.34 |  1.50   23.71 |  2.50    5.43 |  3.50    3.45
                   .67    5.17 |  1.67   13.81 |  2.67    4.92 |  3.67    3.27
                   .83    6.51 |  1.83   10.17 |  2.83    4.52 |  3.83    3.11
                  1.00    9.18 |  2.00    8.21 |  3.00    4.18 |  4.00    2.96


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--------------------
| CALIB            |
| STANDHYD  (0205) |   Area    (ha)=    .16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  15.70   Dir. Conn.(%)=  15.70
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .02           .13
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=      15.00         30.00
     Mannings n             =     .013          .250

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

                          ---- TRANSFORMED HYETOGRAPH ----
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```
                  TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .083    3.35 | 1.083   18.75 | 2.083    6.96 |  3.08    3.90
                  .167    3.35 | 1.167   18.75 | 2.167    6.96 |  3.17    3.90
                  .250    3.77 | 1.250   97.66 | 2.250    6.08 |  3.25    3.66
                  .333    3.77 | 1.333   97.66 | 2.333    6.08 |  3.33    3.66
                  .417    4.34 | 1.417   23.71 | 2.417    5.43 |  3.42    3.45
                  .500    4.34 | 1.500   23.71 | 2.500    5.43 |  3.50    3.45
                  .583    5.17 | 1.583   13.81 | 2.583    4.92 |  3.58    3.27
                  .667    5.17 | 1.667   13.81 | 2.667    4.92 |  3.67    3.27
                  .750    6.51 | 1.750   10.17 | 2.750    4.52 |  3.75    3.11
                  .833    6.51 | 1.833   10.17 | 2.833    4.52 |  3.83    3.11
                  .917    9.18 | 1.917    8.21 | 2.917    4.18 |  3.92    2.96
                 1.000    9.18 | 2.000    8.21 | 3.000    4.18 |  4.00    2.96

     Max.Eff.Inten.(mm/hr)=      97.66         5.73
               over (min)         5.00        20.00
     Storage Coeff.  (min)=        .67 (ii)   19.31 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .34          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .01          .00          .007 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58          1.33
     RUNOFF VOLUME    (mm)=      41.85         4.74         10.49
     TOTAL RAINFALL   (mm)=      42.85        42.85         42.85
     RUNOFF COEFFICIENT   =        .98          .11           .24

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  49.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (0202) |   Area    (ha)=    .33
|ID= 1 DT= 5.0 min |   Total Imp(%)=  10.70   Dir. Conn.(%)=  10.70
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .03           .29
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     100.00         20.00
     Mannings n             =     .013          .250

     Max.Eff.Inten.(mm/hr)=      97.66         6.44
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       2.09 (ii)   16.04 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .31          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .01          .00          .010 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58          1.33
     RUNOFF VOLUME    (mm)=      41.85         4.74          8.68
     TOTAL RAINFALL   (mm)=      42.85        42.85         42.85
     RUNOFF COEFFICIENT   =        .98          .11           .20

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0203)	Area (ha)= 1.83		
ID= 1 DT= 5.0 min	Total Imp(%)= 35.50	Dir. Conn.(%)= 35.50	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.65	1.18	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	270.00	35.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		97.66	5.03	
over (min)		5.00	30.00	
Storage Coeff.	(min)=	3.80 (ii)	25.34 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	30.00	
Unit Hyd. peak	(cms)=	.25	.04	
				TOTALS
PEAK FLOW	(cms)=	.17	.01	.167 (iii)
TIME TO PEAK	(hrs)=	1.33	1.75	1.33
RUNOFF VOLUME	(mm)=	41.85	4.74	17.90
TOTAL RAINFALL	(mm)=	42.85	42.85	42.85
RUNOFF COEFFICIENT	=	.98	.11	.42

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0204)	Area (ha)= .82		
ID= 1 DT= 5.0 min	Total Imp(%)= 33.40	Dir. Conn.(%)= 10.00	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.27	.54	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	30.00	165.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		97.66	6.45	
over (min)		5.00	55.00	
Storage Coeff.	(min)=	1.02 (ii)	50.47 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	55.00	
Unit Hyd. peak	(cms)=	.34	.02	
				TOTALS
PEAK FLOW	(cms)=	.02	.01	.023 (iii)
TIME TO PEAK	(hrs)=	1.33	2.25	1.33

RUNOFF VOLUME	(mm)=	41.85	6.53	10.02
TOTAL RAINFALL	(mm)=	42.85	42.85	42.85
RUNOFF COEFFICIENT	=	.98	.15	.23

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0206)	Area (ha)= .50		
ID= 1 DT= 5.0 min	Total Imp(%)= 14.10	Dir. Conn.(%)= 10.00	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.07	.43	
Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	75.00	105.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		97.66	26.06	
over (min)		5.00	25.00	
Storage Coeff.	(min)=	1.76 (ii)	23.33 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	25.00	
Unit Hyd. peak	(cms)=	.32	.05	
				TOTALS
PEAK FLOW	(cms)=	.01	.02	.021 (iii)
TIME TO PEAK	(hrs)=	1.33	1.67	1.67
RUNOFF VOLUME	(mm)=	41.85	20.37	22.49
TOTAL RAINFALL	(mm)=	42.85	42.85	42.85
RUNOFF COEFFICIENT	=	.98	.48	.52

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

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

ADD HYD (0401)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0202):	.33	.010	1.33	8.68
	+ ID2= 2 (0203):	1.83	.167	1.33	17.90
	ID = 3 (0401):	2.16	.178	1.33	16.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0406)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0390	.0012
	.0080	.0002	.0450	.0021
	.0230	.0006	.0470	.0030
	.0320	.0010	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.023	1.33	10.02
OUTFLOW: ID= 1 (0406)	.818	.019	1.33	10.02

PEAK FLOW REDUCTION [Qout/Qin](%)= 84.69
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)= .0005

ADD HYD (0402)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0401):	2.16	.178	1.33	16.51
+ ID2= 2 (0406):	.82	.019	1.33	10.02
ID = 3 (0402):	2.97	.197	1.33	14.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0205):	.16	.007	1.33	10.49
+ ID2= 2 (0402):	2.97	.197	1.33	14.72
ID = 3 (0403):	3.13	.204	1.33	14.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0403):	3.13	.204	1.33	14.51
+ ID2= 2 (0206):	.50	.021	1.67	22.49
ID = 3 (0404):	3.63	.223	1.33	15.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

**** SIMULATION NUMBER: 4 **

CHICAGO STORM	IDF curve parameters: A= 666.560
Ptotal= 49.63 mm	B= 1.500
	C= .726

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .33

The CORRELATION coefficient is = .9997

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	184.00	171.26
10.	113.40	113.18
15.	85.40	87.09
30.	52.60	54.46
60.	32.40	33.51
120.	20.00	20.44
360.	9.30	9.26
720.	5.70	5.61
1440.	3.50	3.39

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.89	1.17	21.70	2.17	8.06	3.17	4.51
.33	4.37	1.33	113.18	2.33	7.04	3.33	4.24
.50	5.03	1.50	27.45	2.50	6.29	3.50	3.99
.67	5.99	1.67	15.98	2.67	5.70	3.67	3.78
.83	7.54	1.83	11.78	2.83	5.23	3.83	3.60
1.00	10.63	2.00	9.51	3.00	4.84	4.00	3.43

CALIB			
STANDHYD (0205)	Area (ha)= .16		
ID= 1 DT= 5.0 min	Total Imp(%)= 15.70	Dir. Conn.(%)= 15.70	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.02	.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	15.00	30.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	3.89	1.083	21.70	2.083	8.06	3.08	4.51
.167	3.89	1.167	21.70	2.167	8.06	3.17	4.51
.250	4.37	1.250	113.18	2.250	7.04	3.25	4.24
.333	4.37	1.333	113.18	2.333	7.04	3.33	4.24
.417	5.03	1.417	27.45	2.417	6.29	3.42	3.99
.500	5.03	1.500	27.45	2.500	6.29	3.50	3.99
.583	5.99	1.583	15.98	2.583	5.70	3.58	3.78
.667	5.99	1.667	15.98	2.667	5.70	3.67	3.78
.750	7.54	1.750	11.78	2.750	5.23	3.75	3.60

.833	7.54	1.833	11.78	2.833	5.23	3.83	3.60
.917	10.63	1.917	9.51	2.917	4.84	3.92	3.43
1.000	10.63	2.000	9.51	3.000	4.84	4.00	3.43

Max.Eff.Inten.(mm/hr)=	113.18	7.95		
over (min)	5.00	20.00		
Storage Coeff. (min)=	.63 (ii)	16.99 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	.34	.06		
			TOTALS	
PEAK FLOW (cms)=	.01	.00	.008	(iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33	
RUNOFF VOLUME (mm)=	48.63	6.45	13.01	
TOTAL RAINFALL (mm)=	49.63	49.63	49.63	
RUNOFF COEFFICIENT =	.98	.13	.26	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0202)	Area (ha)=	.33			
ID= 1 DT= 5.0 min	Total Imp(%)=	10.70	Dir. Conn.(%)=	10.70	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.03	.29	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	100.00	20.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		113.18	8.97	
over (min)		5.00	15.00	
Storage Coeff. (min)=		1.97 (ii)	14.19 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.31	.08	
			TOTALS	
PEAK FLOW (cms)=		.01	.00	.013 (iii)
TIME TO PEAK (hrs)=		1.33	1.50	1.33
RUNOFF VOLUME (mm)=		48.63	6.45	10.94
TOTAL RAINFALL (mm)=		49.63	49.63	49.63
RUNOFF COEFFICIENT =		.98	.13	.22

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0203)	Area (ha)=	1.83			
ID= 1 DT= 5.0 min	Total Imp(%)=	35.50	Dir. Conn.(%)=	35.50	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.65	1.18	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	270.00	35.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		113.18	7.95	
over (min)		5.00	25.00	
Storage Coeff. (min)=		3.58 (ii)	21.52 (ii)	
Unit Hyd. Tpeak (min)=		5.00	25.00	
Unit Hyd. peak (cms)=		.26	.05	
			TOTALS	
PEAK FLOW (cms)=		.19	.01	.197 (iii)
TIME TO PEAK (hrs)=		1.33	1.67	1.33
RUNOFF VOLUME (mm)=		48.63	6.45	21.41
TOTAL RAINFALL (mm)=		49.63	49.63	49.63
RUNOFF COEFFICIENT =		.98	.13	.43

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0204)	Area (ha)=	.82			
ID= 1 DT= 5.0 min	Total Imp(%)=	33.40	Dir. Conn.(%)=	10.00	

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.27	.54	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	30.00	165.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		113.18	9.24	
over (min)		5.00	45.00	
Storage Coeff. (min)=		.96 (ii)	43.78 (ii)	
Unit Hyd. Tpeak (min)=		5.00	45.00	
Unit Hyd. peak (cms)=		.34	.03	
			TOTALS	
PEAK FLOW (cms)=		.03	.01	.027 (iii)
TIME TO PEAK (hrs)=		1.33	2.08	1.33
RUNOFF VOLUME (mm)=		48.63	8.73	12.69
TOTAL RAINFALL (mm)=		49.63	49.63	49.63
RUNOFF COEFFICIENT =		.98	.18	.26

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0206)	Area (ha)= .50
ID= 1 DT= 5.0 min	Total Imp(%)= 14.10 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.07	.43	
Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	75.00	105.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)	=	113.18	38.40	
over	(min)	5.00	25.00	
Storage Coeff.	(min)=	1.66 (ii)	20.13 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	25.00	
Unit Hyd. peak	(cms)=	.32	.05	
				TOTALS
PEAK FLOW	(cms)=	.02	.03	.029 (iii)
TIME TO PEAK	(hrs)=	1.33	1.67	1.67
RUNOFF VOLUME	(mm)=	48.63	25.53	27.82
TOTAL RAINFALL	(mm)=	49.63	49.63	49.63
RUNOFF COEFFICIENT	=	.98	.51	.56

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

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

ADD HYD (0401)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0202):		.33	.013	1.33	10.94
+ ID2= 2 (0203):		1.83	.197	1.33	21.41
ID = 3 (0401):		2.16	.210	1.33	19.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0406)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0390	.0012
	.0080	.0002	.0450	.0021
	.0230	.0006	.0470	.0030
	.0320	.0010	.0000	.0000

AREA QPEAK TPEAK R.V.

	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0204)	.818	.027	1.33	12.69
OUTFLOW: ID= 1 (0406)	.818	.022	1.33	12.69

PEAK FLOW REDUCTION [Qout/Qin](%)= 84.26
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)= .0006

ADD HYD (0402)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0401):		2.16	.210	1.33	19.83
+ ID2= 2 (0406):		.82	.022	1.33	12.69
ID = 3 (0402):		2.97	.233	1.33	17.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0205):		.16	.008	1.33	13.01
+ ID2= 2 (0402):		2.97	.233	1.33	17.86
ID = 3 (0403):		3.13	.241	1.33	17.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0403):		3.13	.241	1.33	17.62
+ ID2= 2 (0206):		.50	.029	1.67	27.82
ID = 3 (0404):		3.63	.265	1.33	19.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM	
Ptotal= 58.46 mm	

IDF curve parameters: A= 785.167
B= 1.500
C= .726
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .33

The CORRELATION coefficient is = .9997

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	216.40	201.74
10.	133.30	133.32
15.	100.40	102.58
30.	61.90	64.15
60.	38.10	39.47
120.	23.50	24.07
360.	10.90	10.91
720.	6.70	6.61
1440.	4.10	4.00

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	4.58	1.17	25.57	2.17	9.49	3.17	5.32
.33	5.15	1.33	133.32	2.33	8.30	3.33	4.99
.50	5.92	1.50	32.33	2.50	7.41	3.50	4.71
.67	7.05	1.67	18.83	2.67	6.72	3.67	4.46
.83	8.89	1.83	13.87	2.83	6.16	3.83	4.24
1.00	12.53	2.00	11.20	3.00	5.70	4.00	4.04

CALIB
STANDHYD (0205) | Area (ha)= .16
ID= 1 DT= 5.0 min | Total Imp(%)= 15.70 Dir. Conn.(%)= 15.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.02	.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	15.00	30.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	4.58	1.083	25.57	2.083	9.49	3.08	5.32
.167	4.58	1.167	25.57	2.167	9.49	3.17	5.32
.250	5.15	1.250	133.32	2.250	8.30	3.25	4.99
.333	5.15	1.333	133.32	2.333	8.30	3.33	4.99
.417	5.92	1.417	32.33	2.417	7.41	3.42	4.71
.500	5.92	1.500	32.33	2.500	7.41	3.50	4.71
.583	7.05	1.583	18.83	2.583	6.72	3.58	4.46
.667	7.05	1.667	18.83	2.667	6.72	3.67	4.46
.750	8.89	1.750	13.87	2.750	6.16	3.75	4.24
.833	8.89	1.833	13.87	2.833	6.16	3.83	4.24
.917	12.53	1.917	11.20	2.917	5.70	3.92	4.04
1.000	12.53	2.000	11.20	3.000	5.70	4.00	4.04

Max.Eff.Inten.	(mm/hr)=	133.32	12.79	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	.59 (ii)	14.11 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	.34	.08	
				TOTALS
PEAK FLOW	(cms)=	.01	.00	.011 (iii)

TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	57.46	8.99	16.55
TOTAL RAINFALL	(mm)=	58.46	58.46	58.46
RUNOFF COEFFICIENT	=	.98	.15	.28

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0202) | Area (ha)= .33
ID= 1 DT= 5.0 min | Total Imp(%)= 10.70 Dir. Conn.(%)= 10.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.03	.29
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	100.00	20.00
Mannings n	=	.013	.250

Max.Eff.Inten.	(mm/hr)=	133.32	16.04	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	1.85 (ii)	11.53 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	.32	.09	
				TOTALS
PEAK FLOW	(cms)=	.01	.01	.016 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	57.46	8.99	14.16
TOTAL RAINFALL	(mm)=	58.46	58.46	58.46
RUNOFF COEFFICIENT	=	.98	.15	.24

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0203) | Area (ha)= 1.83
ID= 1 DT= 5.0 min | Total Imp(%)= 35.50 Dir. Conn.(%)= 35.50

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.65	1.18
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	270.00	35.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=		133.32	12.79	
over (min)		5.00	20.00	
Storage Coeff. (min)=		3.36 (ii)	18.19 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		.26	.06	
				TOTALS
PEAK FLOW	(cms)=	.23	.02	.238 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.33
RUNOFF VOLUME	(mm)=	57.46	8.99	26.19
TOTAL RAINFALL	(mm)=	58.46	58.46	58.46
RUNOFF COEFFICIENT	=	.98	.15	.45

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0204)	Area (ha)= .82
ID= 1 DT= 5.0 min	Total Imp(%)= 33.40 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.27	.54
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	30.00	165.00
Mannings n	=	.013	.250
Max.Eff.Inten.(mm/hr)=		133.32	13.76
over (min)		5.00	40.00
Storage Coeff. (min)=		.90 (ii)	37.41 (ii)
Unit Hyd. Tpeak (min)=		5.00	40.00
Unit Hyd. peak (cms)=		.34	.03
			TOTALS
PEAK FLOW	(cms)=	.03	.01 .032 (iii)
TIME TO PEAK	(hrs)=	1.33	1.92 1.33
RUNOFF VOLUME	(mm)=	57.46	11.98 16.50
TOTAL RAINFALL	(mm)=	58.46	58.46 58.46
RUNOFF COEFFICIENT	=	.98	.20 .28

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0206)	Area (ha)= .50
ID= 1 DT= 5.0 min	Total Imp(%)= 14.10 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.07	.43

Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	2.00	2.00
Length	(m)=	75.00	105.00
Mannings n	=	.013	.250
Max.Eff.Inten.(mm/hr)=		133.32	49.56
over (min)		5.00	20.00
Storage Coeff. (min)=		1.56 (ii)	18.23 (ii)
Unit Hyd. Tpeak (min)=		5.00	20.00
Unit Hyd. peak (cms)=		.33	.06
			TOTALS
PEAK FLOW	(cms)=	.02	.04 .040 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58 1.58
RUNOFF VOLUME	(mm)=	57.46	32.59 35.05
TOTAL RAINFALL	(mm)=	58.46	58.46 58.46
RUNOFF COEFFICIENT	=	.98	.56 .60

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

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

ADD HYD (0401)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0202):	.33	.016	1.33	14.16
	+ ID2= 2 (0203):	1.83	.238	1.33	26.19
	ID = 3 (0401):	2.16	.254	1.33	24.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0406)					
IN= 2---> OUT= 1					
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
	.0000	.0000	.0390	.0012	
	.0080	.0002	.0450	.0021	
	.0230	.0006	.0470	.0030	
	.0320	.0010	.0000	.0000	

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)		.818	.032	1.33	16.50
OUTFLOW: ID= 1 (0406)		.818	.026	1.33	16.50

PEAK FLOW REDUCTION [Qout/Qin](%)= 80.18
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)= .0008

ADD HYD (0402)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0401):	2.16	.254	1.33	24.37
+	ID2= 2 (0406):	.82	.026	1.33	16.50
	ID = 3 (0402):	2.97	.280	1.33	22.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0205):	.16	.011	1.33	16.55
+	ID2= 2 (0402):	2.97	.280	1.33	22.20
	ID = 3 (0403):	3.13	.290	1.33	21.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0403):	3.13	.290	1.33	21.92
+	ID2= 2 (0206):	.50	.040	1.58	35.05
	ID = 3 (0404):	3.63	.324	1.33	23.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

**** SIMULATION NUMBER: 6 **

CHICAGO STORM	IDF curve parameters: A= 869.905
Ptotal= 64.77 mm	B= 1.500
	C= .726

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .33

The CORRELATION coefficient is = .9997

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	240.30	223.51
10.	148.00	147.71
15.	111.50	113.65
30.	68.70	71.07
60.	42.30	43.73
120.	26.10	26.67
360.	12.10	12.09
720.	7.40	7.32

1440. 4.60 4.43

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	5.07	1.17	28.33	2.17	10.52	3.17	5.89
.33	5.70	1.33	147.71	2.33	9.19	3.33	5.53
.50	6.56	1.50	35.82	2.50	8.21	3.50	5.21
.67	7.82	1.67	20.86	2.67	7.44	3.67	4.94
.83	9.85	1.83	15.37	2.83	6.82	3.83	4.70
1.00	13.88	2.00	12.41	3.00	6.32	4.00	4.48

CALIB	
STANDHYD (0205)	Area (ha)= .16
ID= 1 DT= 5.0 min	Total Imp(%)= 15.70 Dir. Conn.(%)= 15.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.02	.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	15.00	30.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	5.07	1.083	28.33	2.083	10.52	3.08	5.89
.167	5.07	1.167	28.33	2.167	10.52	3.17	5.89
.250	5.70	1.250	147.71	2.250	9.19	3.25	5.53
.333	5.70	1.333	147.71	2.333	9.19	3.33	5.53
.417	6.56	1.417	35.82	2.417	8.21	3.42	5.21
.500	6.56	1.500	35.82	2.500	8.21	3.50	5.21
.583	7.82	1.583	20.86	2.583	7.44	3.58	4.94
.667	7.82	1.667	20.86	2.667	7.44	3.67	4.94
.750	9.85	1.750	15.37	2.750	6.82	3.75	4.70
.833	9.85	1.833	15.37	2.833	6.82	3.83	4.70
.917	13.88	1.917	12.41	2.917	6.32	3.92	4.48
1.000	13.88	2.000	12.41	3.000	6.32	4.00	4.48

Max.Eff.Inten.(mm/hr)=		147.71	15.88	
over (min)		5.00	15.00	
Storage Coeff. (min)=		.57 (ii)	12.97 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.34	.08	
				TOTALS
PEAK FLOW	(cms)=	.01	.00	.012 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	63.77	11.02	19.25
TOTAL RAINFALL	(mm)=	64.77	64.77	64.77
RUNOFF COEFFICIENT	=	.98	.17	.30

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0202)	Area (ha)= .33				
ID= 1 DT= 5.0 min	Total Imp(%)= 10.70	Dir. Conn.(%)= 10.70			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.03	.29	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	100.00	20.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		147.71	19.97	
over (min)		5.00	15.00	
Storage Coeff.	(min)=	1.78 (ii)	10.65 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	.32	.09	
				TOTALS
PEAK FLOW	(cms)=	.01	.01	.019 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	63.77	11.02	16.64
TOTAL RAINFALL	(mm)=	64.77	64.77	64.77
RUNOFF COEFFICIENT	=	.98	.17	.26

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0203)	Area (ha)= 1.83				
ID= 1 DT= 5.0 min	Total Imp(%)= 35.50	Dir. Conn.(%)= 35.50			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.65	1.18	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	270.00	35.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		147.71	15.88	
over (min)		5.00	20.00	
Storage Coeff.	(min)=	3.22 (ii)	16.82 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.27	.06	
				TOTALS
PEAK FLOW	(cms)=	.26	.03	.266 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.33
RUNOFF VOLUME	(mm)=	63.77	11.02	29.74
TOTAL RAINFALL	(mm)=	64.77	64.77	64.77
RUNOFF COEFFICIENT	=	.98	.17	.46

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0204)	Area (ha)= .82				
ID= 1 DT= 5.0 min	Total Imp(%)= 33.40	Dir. Conn.(%)= 10.00			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.27	.54	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	30.00	165.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		147.71	18.16	
over (min)		5.00	35.00	
Storage Coeff.	(min)=	.86 (ii)	33.54 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	35.00	
Unit Hyd. peak	(cms)=	.34	.03	
				TOTALS
PEAK FLOW	(cms)=	.03	.02	.036 (iii)
TIME TO PEAK	(hrs)=	1.33	1.83	1.33
RUNOFF VOLUME	(mm)=	63.77	14.53	19.43
TOTAL RAINFALL	(mm)=	64.77	64.77	64.77
RUNOFF COEFFICIENT	=	.98	.22	.30

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0206)	Area (ha)= .50				
ID= 1 DT= 5.0 min	Total Imp(%)= 14.10	Dir. Conn.(%)= 10.00			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.07	.43	
Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	75.00	105.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		147.71	67.95	
over (min)		5.00	20.00	
Storage Coeff.	(min)=	1.49 (ii)	16.19 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.33	.06	
				TOTALS

```
     PEAK FLOW       (cms)=        .02          .05           .049 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58          1.58
     RUNOFF VOLUME    (mm)=      63.77        37.80         40.38
     TOTAL RAINFALL   (mm)=      64.77        64.77         64.77
     RUNOFF COEFFICIENT   =        .98          .58           .62

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

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

ADD HYD (0401)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0202):	.33	.019	1.33	16.64
	+ ID2= 2 (0203):	1.83	.266	1.33	29.74
	ID = 3 (0401):	2.16	.285	1.33	27.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0406)					
IN= 2---> OUT= 1					
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0390	.0012
	.0080	.0002	.0450	.0021
	.0230	.0006	.0470	.0030
	.0320	.0010	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.036	1.33	19.43
OUTFLOW: ID= 1 (0406)	.818	.028	1.33	19.43

```
               PEAK   FLOW   REDUCTION [Qout/Qin](%)= 77.18
               TIME SHIFT OF PEAK FLOW         (min)=   .00
               MAXIMUM  STORAGE   USED       (ha.m.)=   .0009
```

ADD HYD (0402)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0401):	2.16	.285	1.33	27.76
	+ ID2= 2 (0406):	.82	.028	1.33	19.43
	ID = 3 (0402):	2.97	.313	1.33	25.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0205):	.16	.012	1.33	19.25
	+ ID2= 2 (0402):	2.97	.313	1.33	25.47
	ID = 3 (0403):	3.13	.325	1.33	25.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0403):	3.13	.325	1.33	25.15
	+ ID2= 2 (0206):	.50	.049	1.58	40.38
	ID = 3 (0404):	3.63	.365	1.33	27.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ***************************
  ** SIMULATION NUMBER:   7 **
  ***************************
```

CHICAGO STORM	IDF curve parameters:	A= 957.619
Ptotal= 71.30 mm		B= 1.500
		C= .726

```
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  4.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =   .33

                    The CORRELATION coefficient is =  .9997
```

TIME (min)	INPUT INT. (mm/hr)	TAB. INT. (mm/hr)
5.	264.10	246.05
10.	162.70	162.60
15.	122.50	125.11
30.	75.50	78.24
60.	46.50	48.14
120.	28.60	29.36
360.	13.30	13.30
720.	8.20	8.06
1440.	5.00	4.87

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	5.58	1.17	31.18	2.17	11.58	3.17	6.49
.33	6.28	1.33	162.60	2.33	10.12	3.33	6.09
.50	7.23	1.50	39.44	2.50	9.04	3.50	5.74
.67	8.60	1.67	22.96	2.67	8.19	3.67	5.44
.83	10.84	1.83	16.92	2.83	7.51	3.83	5.17
1.00	15.28	2.00	13.66	3.00	6.95	4.00	4.93

CALIB / STANDHYD (0205)	Area (ha)= .16	Total Imp(%)= 15.70	Dir. Conn.(%)= 15.70
ID= 1 DT= 5.0 min			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.02	.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	15.00	30.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	5.58	1.083	31.18	2.083	11.58	3.08	6.49
.167	5.58	1.167	31.18	2.167	11.58	3.17	6.49
.250	6.28	1.250	162.60	2.250	10.12	3.25	6.09
.333	6.28	1.333	162.60	2.333	10.12	3.33	6.09
.417	7.23	1.417	39.44	2.417	9.04	3.42	5.74
.500	7.23	1.500	39.44	2.500	9.04	3.50	5.74
.583	8.60	1.583	22.96	2.583	8.19	3.58	5.44
.667	8.60	1.667	22.96	2.667	8.19	3.67	5.44
.750	10.84	1.750	16.92	2.750	7.51	3.75	5.17
.833	10.84	1.833	16.92	2.833	7.51	3.83	5.17
.917	15.28	1.917	13.66	2.917	6.95	3.92	4.93
1.000	15.28	2.000	13.66	3.000	6.95	4.00	4.93

				TOTALS
Max.Eff.Inten.(mm/hr)	=	162.60	19.36	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	.55 (ii)	12.00 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	.34	.09	
PEAK FLOW	(cms)=	.01	.01	.014 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	70.30	13.29	22.19
TOTAL RAINFALL	(mm)=	71.30	71.30	71.30
RUNOFF COEFFICIENT	=	.99	.19	.31

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB / STANDHYD (0202)	Area (ha)= .33	Total Imp(%)= 10.70	Dir. Conn.(%)= 10.70
ID= 1 DT= 5.0 min			

		IMPERVIOUS	PERVIOUS (i)

Surface Area	(ha)=	.03	.29
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	100.00	20.00
Mannings n	=	.013	.250

				TOTALS
Max.Eff.Inten.(mm/hr)	=	162.60	24.41	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	1.71 (ii)	9.89 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	.32	.11	
PEAK FLOW	(cms)=	.02	.01	.025 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	70.30	13.29	19.37
TOTAL RAINFALL	(mm)=	71.30	71.30	71.30
RUNOFF COEFFICIENT	=	.99	.19	.27

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB / STANDHYD (0203)	Area (ha)= 1.83	Total Imp(%)= 35.50	Dir. Conn.(%)= 35.50
ID= 1 DT= 5.0 min			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.65	1.18
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	270.00	35.00
Mannings n	=	.013	.250

				TOTALS
Max.Eff.Inten.(mm/hr)	=	162.60	19.36	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	3.10 (ii)	15.66 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.27	.07	
PEAK FLOW	(cms)=	.28	.04	.296 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.33
RUNOFF VOLUME	(mm)=	70.30	13.29	33.53
TOTAL RAINFALL	(mm)=	71.30	71.30	71.30
RUNOFF COEFFICIENT	=	.99	.19	.47

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0204)	Area (ha)= .82
ID= 1 DT= 5.0 min	Total Imp(%)= 33.40 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.27	.54	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	30.00	165.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		162.60	24.09	
over (min)		5.00	35.00	
Storage Coeff. (min)=		.83 (ii)	30.02 (ii)	
Unit Hyd. Tpeak (min)=		5.00	35.00	
Unit Hyd. peak (cms)=		.34	.04	
				TOTALS
PEAK FLOW	(cms)=	.04	.02	.041 (iii)
TIME TO PEAK	(hrs)=	1.33	1.83	1.33
RUNOFF VOLUME	(mm)=	70.30	17.36	22.63
TOTAL RAINFALL	(mm)=	71.30	71.30	71.30
RUNOFF COEFFICIENT	=	.99	.24	.32

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0206)	Area (ha)= .50
ID= 1 DT= 5.0 min	Total Imp(%)= 14.10 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.07	.43	
Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	75.00	105.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		162.60	78.47	
over (min)		5.00	20.00	
Storage Coeff. (min)=		1.44 (ii)	15.31 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		.33	.07	
				TOTALS
PEAK FLOW	(cms)=	.02	.05	.058 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.58
RUNOFF VOLUME	(mm)=	70.30	43.34	46.02
TOTAL RAINFALL	(mm)=	71.30	71.30	71.30
RUNOFF COEFFICIENT	=	.99	.61	.65

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

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

ADD HYD (0401)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0202):		.33	.025	1.33	19.37
+ ID2= 2 (0203):		1.83	.296	1.33	33.53
ID = 3 (0401):		2.16	.322	1.33	31.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0406)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0390	.0012
	.0080	.0002	.0450	.0021
	.0230	.0006	.0470	.0030
	.0320	.0010	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.041	1.33	22.63
OUTFLOW: ID= 1 (0406)	.818	.030	1.33	22.63

PEAK FLOW REDUCTION [Qout/Qin](%)= 74.93
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)= .0011

ADD HYD (0402)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0401):		2.16	.322	1.33	31.38
+ ID2= 2 (0406):		.82	.030	1.33	22.63
ID = 3 (0402):		2.97	.352	1.33	28.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0205):		.16	.014	1.33	22.19
+ ID2= 2 (0402):		2.97	.352	1.33	28.98
ID = 3 (0403):		3.13	.366	1.33	28.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0403):	3.13	.366	1.33	28.63
	+ ID2= 2 (0206):	.50	.058	1.58	46.02
	ID = 3 (0404):	3.63	.411	1.33	31.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 8 **
****

READ STORM | Filename: I:\2016 Projects\116 028 - Wasaga Shores Subdivision\Design\Storm Design\OTTHYMO\TIMMINS.12
Ptotal=193.00 mm | Comments: TIMMINS REGIONAL 12 HOUR DURATION STORM

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.20	15.00	3.20	3.00	6.20	43.00	9.20	13.00
.40	15.00	3.40	3.00	6.40	43.00	9.40	13.00
.60	15.00	3.60	3.00	6.60	43.00	9.60	13.00
.80	15.00	3.80	3.00	6.80	43.00	9.80	13.00
1.00	15.00	4.00	3.00	7.00	43.00	10.00	13.00
1.20	20.00	4.20	5.00	7.20	20.00	10.20	13.00
1.40	20.00	4.40	5.00	7.40	20.00	10.40	13.00
1.60	20.00	4.60	5.00	7.60	20.00	10.60	13.00
1.80	20.00	4.80	5.00	7.80	20.00	10.80	13.00
2.00	20.00	5.00	5.00	8.00	20.00	11.00	13.00
2.20	10.00	5.20	20.00	8.20	23.00	11.20	8.00
2.40	10.00	5.40	20.00	8.40	23.00	11.40	8.00
2.60	10.00	5.60	20.00	8.60	23.00	11.60	8.00
2.80	10.00	5.80	20.00	8.80	23.00	11.80	8.00
3.00	10.00	6.00	20.00	9.00	23.00	12.00	8.00

CALIB | STANDHYD (0205) | ID= 1 DT= 5.0 min | Area (ha)= .16 Total Imp(%)= 15.70 Dir. Conn.(%)= 15.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.02	.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	15.00	30.00
Mannings n	=	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	15.00	3.083	3.00	6.083	43.00	9.08	13.00
.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

			TOTALS
Max.Eff.Inten.(mm/hr)=	43.00	21.04	
over (min)	5.00	15.00	
Storage Coeff. (min)=	.93 (ii)	12.01 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.34	.09	
PEAK FLOW (cms)=	.00	.01	.010 (iii)
TIME TO PEAK (hrs)=	6.25	7.00	7.00
RUNOFF VOLUME (mm)=	192.00	78.13	95.96
TOTAL RAINFALL (mm)=	193.00	193.00	193.00
RUNOFF COEFFICIENT =	.99	.40	.50

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB |

| STANDHYD (0202) | Area (ha)= .33
|ID= 1 DT= 5.0 min | Total Imp(%)= 10.70 Dir. Conn.(%)= 10.70

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.03	.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	100.00	20.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	43.00	21.26
over (min)	5.00	15.00
Storage Coeff. (min)=	2.91 (ii)	11.56 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	.28	.09

		TOTALS
PEAK FLOW (cms)=	.00	.020 (iii)
TIME TO PEAK (hrs)=	6.58	7.00	7.00
RUNOFF VOLUME (mm)=	192.00	78.13	90.29
TOTAL RAINFALL (mm)=	193.00	193.00	193.00
RUNOFF COEFFICIENT =	.99	.40	.47

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0203) | Area (ha)= 1.83
|ID= 1 DT= 5.0 min | Total Imp(%)= 35.50 Dir. Conn.(%)= 35.50

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.65	1.18
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	270.00	35.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	43.00	21.04
over (min)	5.00	20.00
Storage Coeff. (min)=	5.28 (ii)	17.43 (ii)
Unit Hyd. Tpeak (min)=	5.00	20.00
Unit Hyd. peak (cms)=	.21	.06

		TOTALS
PEAK FLOW (cms)=	.08	.06	.140 (iii)
TIME TO PEAK (hrs)=	6.92	7.08	7.00
RUNOFF VOLUME (mm)=	192.00	78.13	118.55
TOTAL RAINFALL (mm)=	193.00	193.00	193.00
RUNOFF COEFFICIENT =	.99	.40	.61

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0204) | Area (ha)= .82
|ID= 1 DT= 5.0 min | Total Imp(%)= 33.40 Dir. Conn.(%)= 10.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.27	.54
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	30.00	165.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	43.00	32.89
over (min)	5.00	30.00
Storage Coeff. (min)=	1.41 (ii)	27.18 (ii)
Unit Hyd. Tpeak (min)=	5.00	30.00
Unit Hyd. peak (cms)=	.33	.04

		TOTALS
PEAK FLOW (cms)=	.01	.04	.050 (iii)
TIME TO PEAK (hrs)=	6.42	7.17	7.00
RUNOFF VOLUME (mm)=	192.00	93.09	102.96
TOTAL RAINFALL (mm)=	193.00	193.00	193.00
RUNOFF COEFFICIENT =	.99	.48	.53

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0206) | Area (ha)= .50
|ID= 1 DT= 5.0 min | Total Imp(%)= 14.10 Dir. Conn.(%)= 10.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.07	.43
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	2.00	2.00
Length (m)=	75.00	105.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	43.00	41.39
over (min)	5.00	25.00
Storage Coeff. (min)=	2.45 (ii)	20.37 (ii)
Unit Hyd. Tpeak (min)=	5.00	25.00
Unit Hyd. peak (cms)=	.30	.05

		TOTALS
PEAK FLOW (cms)=	.01	.05	.051 (iii)
TIME TO PEAK (hrs)=	6.58	7.00	7.00
RUNOFF VOLUME (mm)=	192.00	156.60	160.11
TOTAL RAINFALL (mm)=	193.00	193.00	193.00
RUNOFF COEFFICIENT =	.99	.81	.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

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

ADD HYD (0401)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0202):	.33	.020	7.00	90.29
	+ ID2= 2 (0203):	1.83	.140	7.00	118.55
	ID = 3 (0401):	2.16	.160	7.00	114.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0406)					
IN= 2---> OUT= 1					
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
	.0000	.0000	.0390	.0012	
	.0080	.0002	.0450	.0021	
	.0230	.0006	.0470	.0030	
	.0320	.0010	.0000	.0000	

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0204)	.818	.050	7.00	102.96
OUTFLOW: ID= 1 (0406)	.818	.045	7.33	102.96

PEAK FLOW REDUCTION [Qout/Qin](%)= 89.38
TIME SHIFT OF PEAK FLOW (min)= 20.00
MAXIMUM STORAGE USED (ha.m.)= .0021

ADD HYD (0402)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0401):	2.16	.160	7.00	114.26
	+ ID2= 2 (0406):	.82	.045	7.33	102.96
	ID = 3 (0402):	2.97	.204	7.00	111.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0403)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0205):	.16	.010	7.00	95.96
	+ ID2= 2 (0402):	2.97	.204	7.00	111.16
	ID = 3 (0403):	3.13	.214	7.00	110.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0404)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0403):	3.13	.214	7.00	110.39
	+ ID2= 2 (0206):	.50	.051	7.00	160.11
	ID = 3 (0404):	3.63	.265	7.00	117.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

APPENDIX C:
SUPPORTING CALCULATIONS

Manning's Equation

Rear Yard Swale

Manning's n	0.04	
Slope	0.01	m/m
Bottom Width	0	m
Side Slopes	3	:1
Depth	0.3	m
Slope Width	0.9	
Area	0.27	m2
Perimeter	1.897367	m
Hydraulic Radius	0.142302	m

Flow **0.184**

$$Q = \frac{1}{n} \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

Flow Required:	0.037 cu.m
Flow Capacity:	0.184 cu.m

WASAGA SHORES (Catchment 204)

GRASSED-SWALE VOLUME

Designed: AS

Checked:

Date: Feb./17

Bio-swale Discharge Table:

Orifice #1:		**Orifice #2:**			Overflow Weir:		
Diameter:	150	Diameter:	0	mm	Bottom Length:	0	m
Area:	0.0177	Area:	0.0000	m^2	Sill Elevation:	101	m
C:	0.63	C:	0.63		D/S Weir Length:	0	m
Invert:	100.0	Invert:	100	m	Side Slopes (H:V)	0	:1

	Orifice #1		Orifice #2		Overflow Weir			
Elevation (m)	Head (m)	Discharge (m)	Head (m)	Discharge (m)	Head (m)	Discharge (m)	Hydraulic Control	Discharge (m^3/s)
100.00	0.000	0.000	0.000	0.000	0	0	Orifice	0.000
100.10	0.025	0.008	0.100	0.000	0	0	Orifice	0.008
100.20	0.125	0.017	0.200	0.000	0	0	Orifice	0.017
100.30	0.225	0.023	0.300	0.000	0	0	Orifice	0.023
100.40	0.325	0.028	0.400	0.000	0	0	Orifice	0.028
100.50	0.425	0.032	0.500	0.000	0	0	Orifice	0.032
100.60	0.525	0.036	0.600	0.000	0	0	Orifice	0.036
100.70	0.625	0.039	0.700	0.000	0	0	Orifice	0.039
100.80	0.725	0.042	0.800	0.000	0	0	Orifice	0.042
100.90	0.825	0.045	0.900	0.000	0	0	Orifice	0.045
101.00	0.925	0.047	1.000	0.000	0	0	Orifice	0.047

Comments:

1 0.15 - Calculation based on prefered weir flow spreadsheet

2 N/A - Not Applicable

3 Orifice Equation is: $Q = C \times A \times (2gH)^{0.5}$

Where:
- Q = flow rate (cms)
- C = constant
- A = area of opening(sq. m)
- H = net head on the orifice
- g = Acceleration due to gravity

WASAGA SHORES (Catchment 204)
GRASSED-SWALE VOLUME

Side Slope	3.00	H:1 V	Void Ratio	
Bottom Length	50.00	m	Gravel	0.4
Bottom Width	1.00	m	Engineering soil	0.25
Bottom Elev.	100.00	m		
Stage	0.1	m		

Elev. (m)	Depth (m)	Area (m^2)	Volume (m^3)	Accum. Total (m^3)	Accum. Total (ha-m)
100.00	0.00	50	0.00	0.00	0.0000
100.10	0.10	50	2.00	2.00	0.0002
100.20	0.20	50	2.00	4.00	0.0004
100.30	0.30	50	2.00	6.00	0.0006
100.40	0.40	50	2.00	8.00	0.0008
100.50	0.50	50	2.00	10.00	0.0010
100.60	0.60	50	2.00	12.00	0.0012
100.70	0.70	0	0.00	12.00	0.0012
100.80	0.80	30	3.00	15.00	0.0015
100.90	0.90	60	6.00	21.00	0.0021
101.00	1.00	90	9.00	30.00	0.0030

WASAGA SHORES (Catchment 204)
GRASSED-SWALE STAGE-STORAGE-DISCHARGE TABLE

Designed: AS
Checked:
Date:

Stormwater Management Bio-swale							
Bio-swale Geometry				Bio-swale Volume (m^3)			Discharge
Elevation (m)	Depth (m)	Area (m^2)	Avg. Area (m)	Dead	Live	Acc. Total	(m^3/s)
100.00	0.00	50.00	50.00	0.00	0.00	0.00	0.000
100.10	0.10	50.00	50.00	0.00	2.00	2.00	0.008
100.20	0.20	50.00	50.00	0.00	2.00	4.00	0.017
100.30	0.30	50.00	50.00	0.00	2.00	6.00	0.023
100.40	0.40	50.00	50.00	0.00	2.00	8.00	0.028
100.50	0.50	50.00	50.00	0.00	2.00	10.00	0.032
100.60	0.60	50.00	50.00	0.00	2.00	12.00	0.036
100.70	0.70	0.00	0.00	0.00	0.00	12.00	0.039
100.80	0.80	30.00	15.00	0.00	3.00	15.00	0.042
100.90	0.90	60.00	45.00	0.00	6.00	21.00	0.045
101.00	1.00	90.00	75.00	0.00	9.00	30.00	0.047

Detailed Stormceptor Sizing Report – Wasaga Shores

Project Information & Location			
Project Name	Wasaga Shores	**Project Number**	116028
City	Wasaga Beach	**State/ Province**	Ontario
Country	Canada	**Date**	4/7/2017
Designer Information		**EOR Information (optional)**	
Name	Andrew Schoof	**Name**	
Company	C.C. Tatham & Associates Ltd.	**Company**	
Phone #	705-444-2565	**Phone #**	
Email	aschoof@cctatham.com	**Email**	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Wasaga Shores
Recommended Stormceptor Model	STC 1000
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	Fine Distribution
Rainfall Station	OWEN SOUND MOE

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary		
Stormceptor Model	**% TSS Removal Provided**	**% Runoff Volume Captured Provided**
STC 300	69	84
STC 750	79	93
STC 1000	80	93
STC 1500	81	93
STC 2000	84	97
STC 3000	86	97
STC 4000	88	99
STC 5000	89	99
STC 6000	91	100
STC 9000	93	100
STC 10000	93	100
STC 14000	95	100
StormceptorMAX	Custom	Custom

Stormceptor

The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for each rainfall event, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.
Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Design Methodology

Stormceptor is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology using local historical rainfall data and specified site parameters. With US EPA SWMM's precision, every Stormceptor unit is designed to achieve a defined water quality objective. The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. The Stormceptor's unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing:

- Site parameters
- Continuous historical rainfall data, including duration, distribution, peaks & inter-event dry periods
- Particle size distribution, and associated settling velocities (Stokes Law, corrected for drag)
- TSS load
- Detention time of the system

Hydrology Analysis
PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of Stormceptor are based on the average annual removal of TSS for the selected site parameters. The Stormceptor is engineered to capture sediment particles by treating the required average annual runoff volume, ensuring positive removal efficiency is maintained during each rainfall event, and preventing negative removal efficiency (scour). Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

Rainfall Station			
State/Province	Ontario	**Total Number of Rainfall Events**	4492
Rainfall Station Name	OWEN SOUND MOE	**Total Rainfall (mm)**	18531.0
Station ID #	6132	**Average Annual Rainfall (mm)**	463.3
Coordinates	44°35'N, 80°56'W	**Total Evaporation (mm)**	551.4
Elevation (ft)	580	**Total Infiltration (mm)**	12680.2
Years of Rainfall Data	40	**Total Rainfall that is Runoff (mm)**	5299.4

Notes
• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules. • Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed. • For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

Drainage Area	
Total Area (ha)	1.51
Imperviousness %	31.3

Up Stream Storage	
Storage (ha-m)	Discharge (cms)
0.000	0.000

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	90.00
Oil Spill Capture Volume (L)	
Peak Conveyed Flow Rate (L/s)	
Water Quality Flow Rate (L/s)	

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cms)	

Design Details	
Stormceptor Inlet Invert Elev (m)	
Stormceptor Outlet Invert Elev (m)	
Stormceptor Rim Elev (m)	
Normal Water Level Elevation (m)	
Pipe Diameter (mm)	
Pipe Material	
Multiple Inlets (Y/N)	No
Grate Inlet (Y/N)	No

Particle Size Distribution (PSD)

Removing the smallest fraction of particulates from runoff ensures the majority of pollutants, such as metals, hydrocarbons and nutrients are captured. The table below identifies the Particle Size Distribution (PSD) that was selected to define TSS removal for the Stormceptor design.

Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Site Name	Wasaga Shores

Site Details

Drainage Area

Total Area (ha)	1.51
Imperviousness %	31.3

Surface Characteristics

Width (m)	246.00
Slope %	2
Impervious Depression Storage (mm)	0.508
Pervious Depression Storage (mm)	5.08
Impervious Manning's n	0.015
Pervious Manning's n	0.25

Maintenance Frequency

Maintenance Frequency (months) >	12

Infiltration Parameters

Horton's equation is used to estimate infiltration

Max. Infiltration Rate (mm/hr)	61.98
Min. Infiltration Rate (mm/hr)	10.16
Decay Rate (1/sec)	0.00055
Regeneration Rate (1/sec)	0.01

Evaporation

Daily Evaporation Rate (mm/day)	2.54

Dry Weather Flow

Dry Weather Flow (lps)	0

Winter Months

Winter Infiltration	0

TSS Loading Parameters

TSS Loading Function	

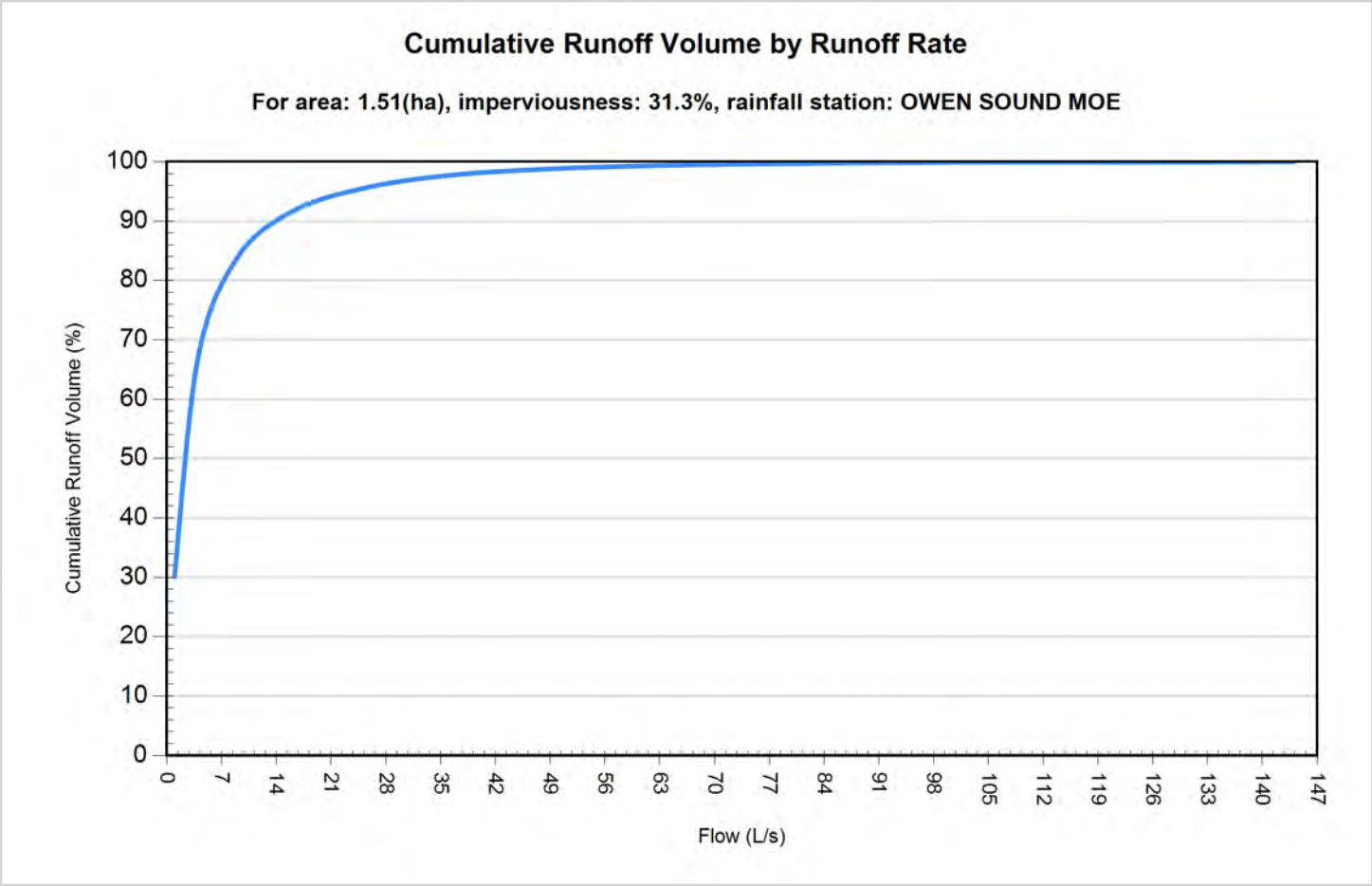
Buildup/Wash-off Parameters

Target Event Mean Conc. (EMC) mg/L	
Exponential Buildup Power	
Exponential Washoff Exponent	

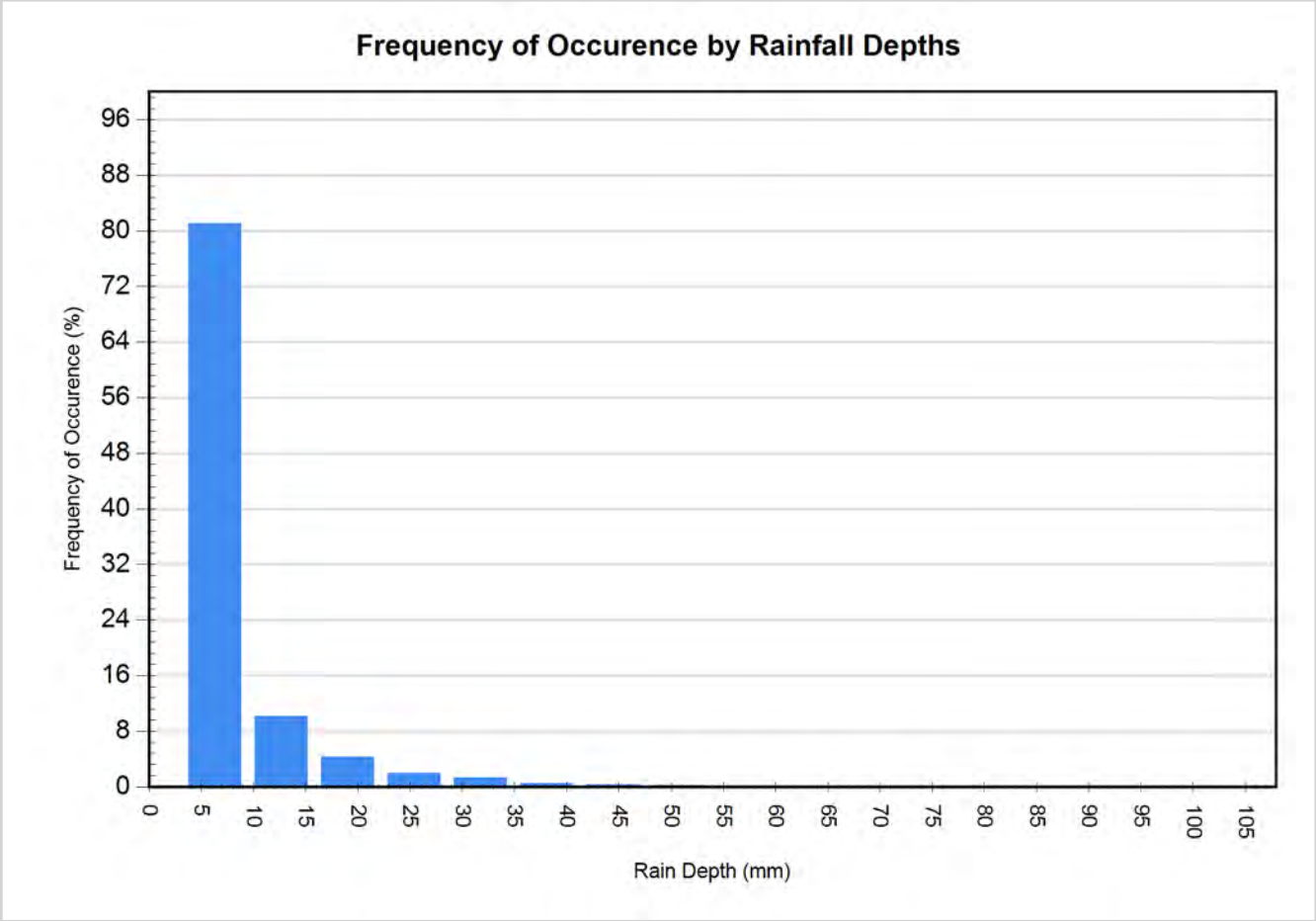
TSS Availability Parameters

Availability Constant A	
Availability Factor B	
Availability Exponent C	
Min. Particle Size Affected by Availability (micron)	

Cumulative Runoff Volume by Runoff Rate			
Runoff Rate (L/s)	**Runoff Volume (m³)**	**Volume Over (m³)**	**Cumulative Runoff Volume (%)**
1	24252	56323	30.1
4	53961	26612	67.0
9	67516	13055	83.8
16	73767	6804	91.6
25	76986	3586	95.5
36	78758	1814	97.7
49	79634	937	98.8
64	80064	508	99.4
81	80350	222	99.7
100	80471	100	99.9
121	80517	55	99.9
144	80547	25	100.0



Rainfall Event Analysis				
Rainfall Depth (mm)	**No. of Events**	**Percentage of Total Events (%)**	**Total Volume (mm)**	**Percentage of Annual Volume (%)**
6.35	3645	81.1	5719	30.9
12.70	458	10.2	4102	22.1
19.05	191	4.3	2957	16.0
25.40	89	2.0	1936	10.5
31.75	57	1.3	1599	8.6
38.10	23	0.5	800	4.3
44.45	12	0.3	501	2.7
50.80	10	0.2	472	2.5
57.15	4	0.1	219	1.2
63.50	1	0.0	63	0.3
69.85	0	0.0	0	0.0
76.20	0	0.0	0	0.0
82.55	1	0.0	79	0.4
88.90	1	0.0	84	0.5
95.25	0	0.0	0	0.0
101.60	0	0.0	0	0.0



For Stormceptor Specifications and Drawings Please Visit:
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