C.C. Tatham & Associates Ltd.
Consulting Engineers

CUMAC SUBDIVISION – PHASE II

Township of Adjala-Tosorontio

Preliminary Stormwater Management Report

prepared by:

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prepared for

Mr. Alvin Young

April 28, 2017

CCTA File 116238-2

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1 Introduction

C.C. Tatham & Associates Ltd. (CCTA) has been retained by Mr. Alvin Young to prepare a Stormwater Management Report in support of the proposed Cumac Phase II Residential Development within the Township of Adjala-Tosorontio. This report has been prepared to address the Stormwater Management Criteria requirements for the proposed development.

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), the Everett Secondary Plan Master Servicing Plan report (January 2013) and The NVCA Development Review Guidelines (December 2013).

1.1 Site Description

The 4.33 Ha development site is located within the Town of Everett, and is bounded by Pine Park Boulevard to the Northwest, Burbank Circle to the South and Concession 6 to the east. We have enclosed Figure 1.0 - Site Location Plan in overleaf for reference. The legal description of the property is Part Lot 11 of Concession 5 in the Township of Adjala-Tosorontio; being Part 1 of Plan 51R-18023.

The site is well vegetated forestlands with mature trees and underbrush. The land consists of rolling terrain and low-lying marsh areas with a drainage course traversing the landscape.

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

CUMAC SUBDIVISION
SITE LOCATION PLAN

DWG. No.
FIG. 1

SCALE: NTS	DATE: MARCH 2017	JOB NO. 116238

1.2 Existing Natural Hazards

A Natural Hazard Assessment has previously been submitted to the Nottawasaga Valley Conservation Authority (NVCA) which has established the flood and erosion hazard limits associated with the channel across the site. As per Provincial Policy Statement 3.1, development is restricted to areas outside the natural hazards. As such, development of the subject property is restricted to the area outside the flood and erosion hazard limits. The NVCA has acknowledged and approved the hazard limits as defined in the assessment in a letter dated March 6, 2017. We have enclosed a copy of the letter in Appendix A and approved Natural Hazard Mapping Plan (FM-1) at the rear of the report. To adequately address the natural hazards moving forward, the hazard assessment concludes that the proposed channel cleanout/improvements be applied prior to construction to reinstate the channel to original grade.

1.3 Geotechnical Report

A preliminary Geotechnical investigation of the site has been completed by GeoPro Consulting Ltd. in support of the development. The geotechnical recommendations will be taken into account during final design. Below is a summary of the findings contained in the geotechnical report.

GeoPro completed 4 boreholes at various locations throughout the development site. Each borehole identified the soil stratification as follows:

- topsoil occurred from 0 – 0.3 m in depth;
- fill material (silty sand and sand) occurred in borehole 1 to a depth of 1.40 m below existing ground surface;
- reworked fill material (silty sand) occurred in borehole 3 to a depth of 0.80 m below existing ground surface;
- sand to fine sand deposits were encountered in all boreholes and extended to depths ranging from 4.60 m to 8.10 m below the existing ground surface;
- ground water during drilling was encountered in borehole 2 and borehole 3; and
- monitoring wells were installed in each borehole and were monitored on March 7, 2017; groundwater was encountered between 0.80 m to 2.74 m below ground surface in all boreholes.

For the purpose of our preliminary calculations we reviewed the Simcoe County Soils Map and Report No. 29 for information relating to the typical soil classifications in the area. The map indicates that the soil on site is classified as Tioga Sand Loam – Bondhead Loam. This formation is found throughout South Simcoe County primarily in the Adjala & Tecumseth Townships. This classification is categorized as having a Hydrological Soil Group A-AB; having generally good drainage and is stone-free to moderately stony which is consistent with the findings of the preliminary geotechnical report.

The stormwater management design should utilize low impact development (LID) and infiltration techniques where possible and will be analysed in conjunction with the geotechnical recommendations during final design.

1.4 Proposed Land Use

Under the 2017 development concept prepared by Jones Consulting, 45 residential lots will be developed utilizing 4.33 Ha. We have enclosed a copy of the current plan provided.

1.5 Existing Services

Development on this site has been expected and planned for years. Currently, Phase I of the Cumac Subdivision is serviced with private septic systems, rural road ditches and Municipal water servicing.

2 Post-Development Stormwater Management Plan

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), the Everett Secondary Plan Master Servicing Plan report (January 2013) and The NVCA Development Review Guidelines (December 2013).

This will be accomplished by evaluating the effect of expansion on the local drainage conditions, review of recommendations set-forth in the Master Servicing Study report for stormwater quality and quantity 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:

- Nottawasaga Valley Conservation Authority Technical Guidelines, Nottawasaga Valley Conservation Authority (December 2013);
- Design Criteria for the Township of Adjala-Tosorontio , Township of Adjala-Tosorontio (January 2006);
- Stormwater Management Planning and Design Manual, Ministry of the Environment, (March 2003); and
- Everett Secondary Master Servicing Plan, Class Environmental Assessment Study Report; Greenland Consulting Engineers, (January 2013).

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:

- SWM plan must attenuate post development peak flow rates off-site to existing levels for the 2 year through 100 year design storms;
- Achieve Level 1 'Enhanced' stormwater runoff treatment including 80% removal of Total Suspended Solids (TSS);
- No development is permitted within the Natural Hazard setback limit of the on-site drainage course buffer zone in accordance with Provincial Policy Statement 3.1;

- Roadside ditches to be designed to convey the 100-year runoff flow rate from the upstream catchments;
- Safe conveyance of the Regional design storm through the site; and
- Promote groundwater recharge and infiltration where possible.

3 Post-Development Water Quantity Control

3.1 Everett Secondary Plan Master Servicing Plan Background Summary

This report will focus on the viability of the conclusions and recommendations set-forth in the Everett Secondary Plan Master Servicing Plan Class Environmental Assessment Study report (MSP) and Master Drainage report (MDP) prepared by Greenland Consulting Engineers.

The MDP report recommends a Regional approach for stormwater quantity control. This approach will allow for the post-development stormwater directed to the Pine River to be controlled to pre-development levels at key nodes in the river system, without controlling site specific runoff from each development within the Secondary Plan Area.

The Cumac Phase II development is located within Catchment 7 (56.32 Ha) of the Pine River Tributary Node 100 as demonstrated in the recommended MDP Option 3. Based on the MDP Study report the total catchment area draining to Node 100 under existing conditions is 584.24 Ha. Under post-development conditions, the total catchment area increases by 31.76 Ha to 616.00 Ha. A copy of the MDP Option 3 drainage catchment area plan prepared by Greenland Consulting Engineers is enclosed in Appendix B.

A Visual OTTHYMO model was developed for the MDP report to analyze the ultimate buildout of the Everett Secondary Plan Area on a regional scale. This model utilized the MOE Owen Sound Intensity-Duration-Frequency (IDF) rainfall data for the period from 1965 to 2003.

The model utilizes eight (8) stormwater management facilities (SWMF) in key developments within the Secondary Plan Area to control the pre-to-post peak runoff flow rate matching in a regional scale. Three (3) of the SWMF are existing while five (5) are proposed to be constructed as development of the Secondary Plan Area occurs. For preliminary pond sizing please refer to Volume 3 of the MDP report. The pre-to-post peak runoff flow rate outflow at each node is summarized in Table 1 below.

Table 1: Pre-to-Post Development Peak Runoff Flow Rate m³/s (MDP Option 3)

	Pine River Tributary (100)		Pine River Main Branch (200)		Boyne River Tributary (300)	
Design Criteria	CHI	SCS	CHI	SCS	CHI	SCS
25mm	2.84 (2.81)	-	0.48 (0.51)	-	0.64 (0.64)	-
2-Year	4.52 (4.47)	3.79 (3.71)	1.12 (1.17)	1.73 (1.83)	1.40 (1.43)	2.07 (2.24)
5-Year	7.00 (6.92)	5.43 (5.40)	2.34 (2.45)	3.02 (3.20)	2.81 (2.88)	3.50 (3.81)
25-Year	11.96 (12.31)	8.26 (8.35)	4.97 (5.19)	5.45 (5.76)	5.63 (5.88)	6.04 (6.69)
100-Year	14.96 (14.93)	11.17 (11.38)	7.18 (7.50)	8.02 (8.49)	8.13 (8.39)	8.92 (9.66)
Regional (Timmins)	17.28 (18.36)	-	15.47 16.45)	-	16.07(18.47)	-

*Based on Everett Secondary Plan Master Drainage Plan report (November 2012); (0.64) Pre-development Peak Runoff Flow Rate (m³/s)

As noted in the MDP Study report, the post peak runoff flow rate analysis in MDP Option 3 closely mimics the pre-development runoff flow rates. MDP Option 3 over-controls the post-development flow rates draining into Node 100. We have enclosed the Visual OTTHYMO output from the Greenland model in Appendix B.

3.2 Cumac Phase II Stormwater Management

To further demonstrate the pre-to-post development peak runoff flow rate matching, we have prorated the runoff flow rate from Catchment 7 as noted in the MDP Option 3 based on the Cumac Phase II development area of 4.33 Ha. Table 2 below summarizes the allowable post-development peak runoff flow for the development site.

Table 2: Allowable Post-Development Peak Runoff Flow Rate m³/s (MDP Option 3)

Design Criteria	MDP Catchment 7*		Cumac Phase II	
	CHI	SCS	CHI	SCS
25mm	2.18	-	0.168	-
2-Year	3.03	1.08	0.233	0.083
5-Year	4.66	1.42	0.358	0.109
25-Year	6.62	1.92	0.509	0.148
100-Year	8.29	2.37	0.637	0.182
Regional (Timmins)	2.51	-	0.193	-

*Based on Everett Secondary Plan Master Drainage Plan report (November 2012); (0.64) Pre-development Peak Runoff Flow Rate (m³/s)

Detailed allowable post-development peak runoff flow rate calculations are enclosed in Appendix A.

3.3 Post-Development Visual OTTHYMO Analysis

A post-development Visual OTTHYMO model has been developed to quantify the post-development peak runoff flow rates from the site. The model has been developed utilizing the rainfall data consistent with the MDP Option 3 and prepared by Greenland. The rainfall data is derived from the Intensity-Duration-Frequency Curves (IDF Curve) from the Owen Sound MOE Rain Gauge for the period from 1965 to 2003.

The site is divided into six separate catchment areas identified on the Post-Development Drainage Plan (DP-2) as Catchment 200 through Catchment 206 enclosed. The catchments were developed based on the preliminary site grading and a rural road cross-section. In general, we have assumed that each development lot will contain 50% impervious area including dwelling, driveway and hard landscaping features. A typical 20 m rural right-of-way has been assumed for the purposes of quantifying the post-development peak runoff flow rate from all catchments that contain a portion of the proposed road. Detailed impervious calculations for each catchment are enclosed in Appendix A. Table 3 below summarizes the post-development catchment parameters.

Table 3: Post-Development Catchment Parameters

Catchment ID	Catchment Area (Ha)	SCS Curve Number (CN)	% Impervious	% Impervious Directly Connect
Catchment 200	1.14	-	43.0 %	15.3%
Catchment 201	0.62	57.4	-	-
Catchment 202	0.18		46.6 %	40.9 %
Catchment 203	1.22		52.3 %	19.3 %
Catchment 204	0.71		48.7 %	23.9 %
Catchment 205	0.02	49.0	-	-
Catchment 206	0.44	49.5	-	-

Each roadside ditch will contain permanent rock check dams designed in accordance with the NVCA BSD-24 Draft. Each check dam will be spaced at a maximum separation distance of 120 m and placed prior to the ditch outlet into the existing watercourse. Maximum spacing calculations are enclosed in Appendix A.

Table 4 below summarizes the post-development peak runoff flow rates from each catchment and the total peak runoff flow rate from the development site. We have enclosed the Post-development Drainage Plan (DP-2) for reference.

Table 4: Post-Development Peak Runoff Flow Rate m^3/s

Design Criteria	Cumac Phase II	
	CHI	SCS
25mm	0.023 (0.168)	-
2-Year	0.033 (0.233)	0.036 (0.083)
5-Year	0.039 (0.358)	0.044 (0.109)
25-Year	0.051 (0.509)	0.058 (0.148)
100-Year	0.065 (0.637)	0.073 (0.182)
Regional (Timmins)	0.100 (0.193)	-

(0.64) Allowable Pre-development Peak Runoff Flow Rate (m^3/s) per MDP Option 3

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

3.4 Roadside Ditch and Bio-swale Function

The Visual OTTHYMO hydrologic model has also been used to evaluate the function of the storage within the proposed roadside ditches and bio-swales. A summary of the storage volumes and water levels are provided in Table 5 below.

Table 5: Post-Development Storage Volume Summary

Design Storm	Storage Volume Used (m^3)	Storage Depth (m)
25 mm	73	0.30
2 Year	110	0.46
5 Year	209	1.03
25 Year	424	1.45
100 Year	655	1.54
Regional (Timmins)	1932	1.90

The 25 mm to 10-year design storm runoff volume will be contained in the filter media of the bio-swales, while the 25-year to Regional runoff volume will pond behind the permanent rock check dams to a depth of 0.60 m and will dissipate by infiltration over time. The roadside ditches have been sized to convey the 100-year peak runoff flow rate from each catchment. Detailed calculations are enclosed in Appendix A.

4 Water Quality Control

Water quality control for the site will be maintained by roadside ditches designed as bio-swales, permanent rock check dams, property line swales and lot level controls. Preliminary water quality calculations have been developed based on the MOECC guidelines for the overall post-development.

4.1 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 implementation of LID techniques will be analyzed during final design and may include:

- individual soak-away pits on each lot;
- enhanced roadside ditches and bio-swales; and
- property line swales and lot level controls.

4.2 Water Quality Storage Volume

Water quality storage volumes have been calculated based on the MOECC guidelines for the overall post-development. The post-development site area is 4.33 Ha with an overall average impervious area of 39.6 %. Based on Table 3.2 of the guidelines, the water quality storage volume required to achieve Level 1 'Enhanced' treatment is 112.51 m^3, while the proposed bio-swales can provide approximately 240 m^3 of storage within the filter media. Detailed calculations are enclosed in Appendix A.

5 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 outlines an inspection and maintenance plan for the development.

6 Siltation and Erosion Control

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 deleterious materials offsite.

7 Conclusions & Recommendations

The conclusions and recommendations contained herein are based on the preferred recommended options analyzed by Greenland Consulting Engineers contained in the Everett Secondary Plan Master Servicing Plan study reports Volume 1 through Volume 3 which has been accepted by the Township of Adjala-Tosorontio.

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 the Pine River.

Water quantity control in the form of post to pre-development peak flow matching will be provided through permanent rock check dams in the roadside ditches and infiltration in the bio-swales. Sediment and erosion control measures will be implemented during and after construction to prevent the transport of deleterious materials downstream.

Water Quality for the site will be in accordance with MOECC Guidelines. Level 1 'Enhanced' water quality control in the form of 80% TSS removal will be satisfied utilizing the roadside ditch's design as bioswales in accordance with the MOECC Guidelines. Bioswales will be incorporated into the design upstream of the existing drainage course to reduce the pollutant transport and sediment downstream.

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.

Authored by: Darren D. Hewgill, B.Eng., P.Eng.
Intermediate Engineer

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

APPENDIX A:
SUPPORTING CALCULATIONS

Nottawasaga Valley
Conservation Authority

6 March 2017

Ms. Jacquie Tschekalin MCIP, RPP
Director of Planning
Township of Adjala-Tosorontio
7855 30th Sideroad
Alliston, ON L9R 1V1

email: jtschekalin@adjtos.ca

Dear Ms. Tschekalin,

Re: Natural Hazard Study (Flood Hazard and Erosion Hazard)
Winzen Property – Alvin Young
Part Lot 11, Concession 5 (Everett)
Township of Adjala-Tosorontio
NVCA ID # 29957

Nottawasaga Valley Conservation Authority [NVCA] staff has been provided with a revised Natural Hazard Study prepared in support of a proposed residential development north of Burbank Circle in the community of Everett in the Township of Adjala-Tosorontio.

NVCA staff has reviewed the information presented in the following document:

- C. C. Tatham Letter Report "Natural Hazard Study" dated January 17, 2017
- C. C. Tatham drawing entitled "Natural Hazards Mapping Plan" signed and sealed January 17, 2017

Based on our review of the above noted documents, NVCA staff provides the following comments:

1. The submission has satisfied all outstanding comments and presents an accurate representation of the flooding and erosion hazard limits for the property.

Please feel free to contact the undersigned at extension 231 should you require any further information or clarification on any matters contained herein.

Sincerely,

Lee J. Bull, MCIP, RPP
Manager, Planning Services

Copies:
Mr. Alvin Young - Winzen
Ms. Amanda West – C. C Tatham & Associates
Ms. Brandi Clement – Jones Consulting Group

C.C. Tatham & Associates Ltd. Consulting Engineers Collingwood Bracebridge Orillia Barrie	Project: Cumac Subdivision Phase II	Date: January 2017
	File No.: 116238	Designed: DDH
	Subject: Allowable Flow Calculations	Checked: AS

Allowable Peak Runoff Flow Rate Calculations

Total Catchment Area (Node 100) = 616.00 Ha
Catchment Area (CA7) = 56.32 Ha
Site Area = 4.33 Ha

Post Development Peak Runoff Flow Rates Pine River Tributary (Catchment 7)		
Design Storm	**4-Hr Chicago**	**SCS 24-Hr**
25 mm	2.18	-
2-Year	3.03	1.080
5-Year	4.66	1.420
25-Year	6.62	1.920
100-Year	8.29	2.370
Regional (Timmins)	2.51	-

* Option 3 OTTHYMO Model - Everett Secondary Plan MDR

Post Development Peak Runoff Flow Rates Allowable Peak Runoff Flow Rate (Cumac II)		
Design Storm	**4-Hr Chicago**	**SCS 24-Hr**
25 mm	0.168	-
2-Year	0.233	0.083
5-Year	0.358	0.109
25-Year	0.509	0.148
100-Year	0.637	0.182
Regional (Timmins)	0.193	-

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

Project: Cumac Subdivision - Phase II		Date: January 2017
File No.: 116238-2		Designed: DDH
Subject: Impervious Area Calculations		Checked AS

Site Area (Catchment 200)	=	11,445.2	sq.m	
Lot Area	=	8,457.2	sq.m	
Lot Impervious Area	=	4,228.6	sq.m	(50 % Lot Coverage)
Lot Pervious Area	=	4,228.6	sq.m	(50 % Lot Coverage)
Road Surface	=	695.0	sq.m	
Wetland/Bio-swale/Roadside Ditch	=	2,293.0	sq.m	
Directly Connected Area	=	1,752.1	sq.m	(Road, 25% Building Area)
% Impervious	=	43.0%		
% Directly Connected	=	15.3%		

Site Area (Catchment 202)	=	1,783.2	sq.m	
Road Surface	=	695.0	sq.m	
Lot Area	=	272.5	sq.m	
Lot Impervious Area	=	136.3		
Lot Pervious Area	=	136.3		
Wetland/Bio-swale/Roadside Ditch	=	1,088.2	sq.m	
Directly Connected Area	=	729.1	sq.m	(Road, 25% Building Area)
% Impervious	=	46.6%		
% Directly Connected	=	40.9%		

Site Area (Catchment 203)	=	12,247.2	sq.m	
Lot Area	=	9,670.4	sq.m	
Lot Impervious Area	=	4,835.2	sq.m	(50 % Lot Coverage)
Lot Pervious Area	=	4,835.2	sq.m	(50 % Lot Coverage)
Road Surface	=	1,153.6	sq.m	
Roadside Ditch/Bio-swale	=	1,423.2	sq.m	
Directly Connected Area	=	2,362.4	sq.m	(Road, 25% Building Area)
% Impervious	=	52.3%		
% Directly Connected	=	19.3%		

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

Project: Cumac Subdivision - Phase II		Date: January 2017
File No.: 116238-2		Designed: DDH
Subject: Impervious Area Calculations		Checked AS

Site Area (Catchment 204)	=	7,090.3	sq.m	
Lot Area	=	4,678.0	sq.m	
Lot Impervious Area	=	2,339.0	sq.m	(50 % Lot Coverage)
Lot Pervious Area	=	2,339.0	sq.m	(50 % Lot Coverage)
Road Surface	=	1,112.1	sq.m	
Wetland/Bio-swale/Roadside Ditch	=	1,300.2	sq.m	
Directly Connected Area	=	1,696.9	sq.m	(Road, 25% Building Area)
% Impervious	=	48.7%		
% Directly Connected	=	23.9%		

C.C. Tatham & Associates Ltd. Consulting Engineers — Collingwood Bracebridge Orillia Barrie		
	Project:	Cumac Subdivision Phase II
	File No.:	116238-2
	Date:	March 20, 2017
	Designed By:	DDH
	Checked By:	AS
	Subject:	CN Calculator

CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment 201 **Area** 0.62 ha

WEIGHTED CN VALUE																									
Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			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	
Tis	TIOGA	A	Sand Loam	1	0.62	1	0		32	0.0763	0.123	49	0		38	0		62	0.093	0.15	100	0.4507	0.727	50	57.377
	#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	**0.62**	**1**	**0**	**0**		**0.07626**	**0.123**		**0**	**0**		**0**	**0**		**0.093**	**0.15**		**0.45074**	**0.727**		**57.4**

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	239	m
Minimum Catchment Elevation	237	m
Catchment length	240	m
Catchment Slope	1%	
Catchment Area	0.62	ha
Time of Concentration (Minutes)	**14.88**	
Time of Concentration (Hours)	**0.25**	
Time to Peak (2/3 x Time of Concentration)	**0.17**	

Time to Peak	**0.54 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	239	m
Minimum Catchment Elevation	237	m
Catchment length	240	m
Catchment Slope	1%	
Catchment Area	0.62	ha
Time of Concentration (Minutes)	**48.75**	
Time of Concentration (Hours)	**0.81**	
Time to Peak (2/3 x Time of Concentration)	**0.54**	

Initial Abstraction	**9.639 mm**
Runoff Coefficient	**0.19**

Wetlands	12
Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

Landuse Type	Soil Series				
	Tis	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
Cultivated	0.22	#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	0.1912	#N/A	#N/A	#N/A	#N/A

C.C. Tatham & Associates Ltd. Consulting Engineers — Collingwood, Bracebridge, Orillia, Barrie		
	Project:	Cumac Subdivision Phase II
	File No.:	116238-2
	Date:	March 20, 2017
	Designed By:	DDH
	Checked By:	AS
	Subject:	CN Calculator

CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment 205 **Area** 0.02 ha

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient Type	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
					Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
Tis	TIOGA	A	Sand Loam	1	0.02	1	0		32	0.02	1	49	0		38	0		62	0		100	0	0	50	49
	#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	**0.02**	**1**	**0**	**0**		**0.02**	**1**		**0**	**0**		**0**	**0**		**0**	**0**		**0**	**0**		**49.0**

Time of Concentration Calculations

Initial Abstraction	**5 mm**

Wetlands	12
Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	239	m
Minimum Catchment Elevation	238.2	m
Catchment length	14	m
Catchment Slope	6%	
Catchment Area	0.02	ha
Time of Concentration (Minutes)	**0.83**	
Time of Concentration (Hours)	**0.01**	
Time to Peak (2/3 x Time of Concentration)	**0.01**	

Time to Peak	**0.07 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	239	m
Minimum Catchment Elevation	238.2	m
Catchment length	14	m
Catchment Slope	6%	
Catchment Area	0.02	ha
Time of Concentration (Minutes)	**6.52**	
Time of Concentration (Hours)	**0.11**	
Time to Peak (2/3 x Time of Concentration)	**0.07**	

Runoff Coefficient	**0.15**

Landuse Type	Soil Series				
	Tis	0	0	0	0
	1	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.12	#N/A	#N/A	#N/A	#N/A
Cultivated	0.3	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.15	#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	0.14	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.15	#N/A	#N/A	#N/A	#N/A

C.C. Tatham & Associates Ltd. Consulting Engineers Collingwood Bracebridge Orillia Barrie	
Project:	Cumac Subdivision Phase II
File No.:	116238-2
Date:	March 20, 2017
Designed By:	DDH
Checked By:	AS
Subject:	CN Calculator

CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment 206 **Area** 0.44 ha

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			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	
Tis	TIOGA	A	Sand Loam	1	0.44	1	0		32	0.22	0.5	49	0		38	0		62	0		100	0.22	0.5	50	49.5
	#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	**0.44**	**1**	**0**	**0**		**0.22**	**0.5**		**0**	**0**		**0**	**0**		**0**	**0**		**0.22**	**0.5**		**49.5**

Time of Concentration Calculations

Initial Abstraction	**8.5 mm**

Wetlands	12
Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	240.5	m
Minimum Catchment Elevation	238.3	m
Catchment length	450	m
Catchment Slope	0.5%	
Catchment Area	0.44	ha
Time of Concentration (Minutes)	**32.13**	
Time of Concentration (Hours)	**0.54**	
Time to Peak (2/3 x Time of Concentration)	**0.36**	

Time to Peak	**1.00 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	240.5	m
Minimum Catchment Elevation	238.3	m
Catchment length	450	m
Catchment Slope	0%	
Catchment Area	0.44	ha
Time of Concentration (Minutes)	**89.77**	
Time of Concentration (Hours)	**1.50**	
Time to Peak (2/3 x Time of Concentration)	**1.00**	

Runoff Coefficient	**0.08**

Landuse Type	Soil Series				
	Tis	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
Cultivated	0.22	#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	0.075	#N/A	#N/A	#N/A	#N/A

C.C. Tatham & Associates Ltd. Consulting Engineers Collingwood Bracebridge Orillia Barrie	Project: Cumac Subdivision - Phase II	Date: March 2017
	File No.: 116238-2	Designed: DDH
	Subject: Rock Check Dam Spacing	Checked: AS

Maximum Post-Development Rock Check Dam Spacing

Ditch Slope (m/m)	=	0.005
Depth of Ponding (m)	=	0.6
Rock Check Dam Spacing (m)	=	120

$$L = \frac{\Delta y}{Slope}$$

Manning's Equation

Channel

Manning's n	0.04	
Slope	0.005	m/m
Bottom Width	0.5	m
Side Slopes	3	:1
Depth	0.6	m
Slope Width	1.8	
Area	1.38	m2
Perimeter	4.294733	m
Hydraulic Radius	0.321324	m

Flow **1.144457** cms

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

CUMAC PHASE II
BIO-SWALE VOLUME

Side Slope	3.00	H:1 V	Void Ratio	
Bottom Length	600.00	m	Gravel	0.4
			Engineering soil	0.25
Bottom Width	1.00	m		
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	600	0.00	0.00	0.0000
100.10	0.10	600	24.00	24.00	0.0024
100.20	0.20	600	24.00	48.00	0.0048
100.30	0.30	600	24.00	72.00	0.0072
100.40	0.40	600	24.00	96.00	0.0096
100.50	0.50	600	24.00	120.00	0.0120
100.60	0.60	600	24.00	144.00	0.0144
100.70	0.70	600	15.00	159.00	0.0159
100.80	0.80	600	15.00	174.00	0.0174
100.90	0.90	600	15.00	189.00	0.0189
101.00	1.00	600	15.00	204.00	0.0204
101.10	1.10	600	15.00	219.00	0.0219
101.20	1.20	600	15.00	234.00	0.0234
101.30	1.30	300	7.50	241.50	0.0241
101.40	1.40	908	90.83	332.33	0.0332
101.50	1.50	2036	203.57	535.90	0.0536
101.60	1.60	2945	294.50	830.40	0.0830
101.70	1.70	3280	328.00	1158.40	0.1158
101.80	1.80	3615	361.50	1519.90	0.1520
101.90	1.90	3950	790.00	1948.40	0.1948

CUMAC PHASE II

BIO-SWALE DISCHARGE

Designed: DDH
Checked: AS
Date: Feb./17

Bio-swale Discharge Table:

Orifice #1:		**Orifice #2:**			Overflow Weir:		
Diameter:	150	Diameter:	0	mm	Bottom Length:	6.5	m
Area:	0.0177	Area:	0.0000	m^2	Sill Elevation:	101.9	m
C:	0.63	C:	0.63		D/S Weir Length:	10	m
Invert:	100.0	Invert:	100	m	Side Slopes (H:V)	3	: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
101.10	1.025	0.050	1.100	0.000	0	0	Orifice	0.050
101.20	1.125	0.052	1.200	0.000	0	0	Orifice	0.052
101.30	1.225	0.055	1.300	0.000	0	0	Orifice	0.055
101.40	1.325	0.057	1.400	0.000	0	0	Orifice	0.057
101.50	1.425	0.059	1.500	0.000	0	0	Orifice	0.059
101.60	1.525	0.061	1.600	0.000	0	0	Orifice	0.061
101.70	1.625	0.063	1.700	0.000	0	0	Orifice	0.063
101.90	1.825	0.067	1.900	0.000	0	0	Orifice	0.067

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

CUMAC PHASE II
BIO-SWALE STAGE-STORAGE-DISCHARGE TABLE

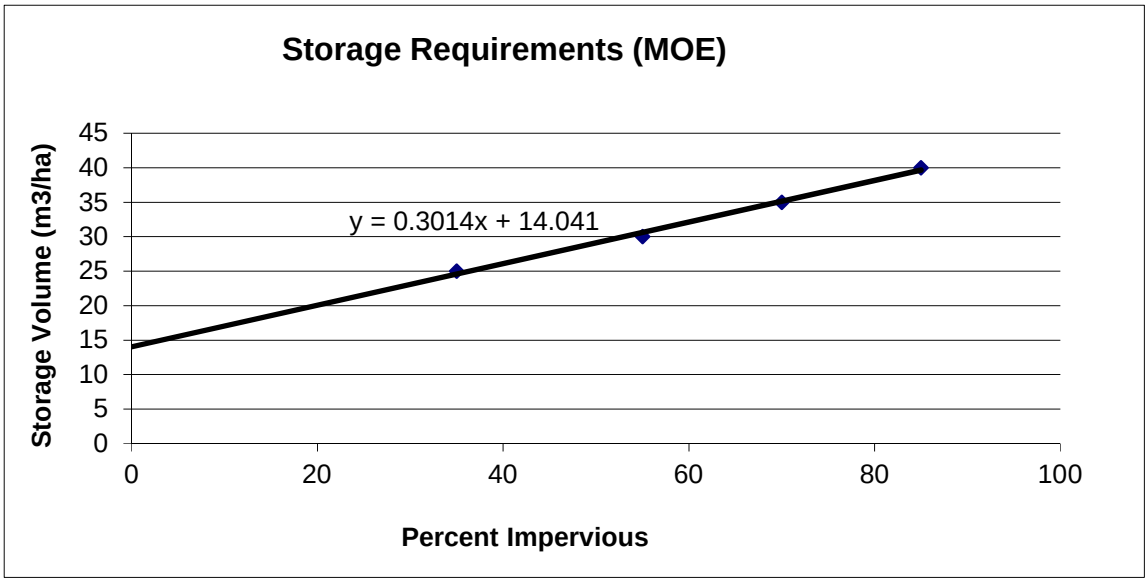
Designed:	DDH
Checked:	AS
Date:	Feb./17

Stormwater Management Bio-swale							
Bio-swale Geometry				Bio-swale Volume (m^3)			Discharge (m^3/s)
Elevation (m)	Depth (m)	Area (m^2)	Avg. Area (m)	Dead	Live	Acc. Total	
100.00	0.00	600.00	600.00	0.00	0.00	0.00	0.000
100.10	0.10	600.00	600.00	0.00	24.00	24.00	0.008
100.20	0.20	600.00	600.00	0.00	24.00	48.00	0.017
100.30	0.30	600.00	600.00	0.00	24.00	72.00	0.023
100.40	0.40	600.00	600.00	0.00	24.00	96.00	0.028
100.50	0.50	600.00	600.00	0.00	24.00	120.00	0.032
100.60	0.60	600.00	600.00	0.00	24.00	144.00	0.036
100.70	0.70	600.00	600.00	0.00	15.00	159.00	0.039
100.80	0.80	600.00	600.00	0.00	15.00	174.00	0.042
100.90	0.90	600.00	600.00	0.00	15.00	189.00	0.045
101.00	1.00	600.00	600.00	0.00	15.00	204.00	0.047
101.10	1.10	600.00	600.00	0.00	15.00	219.00	0.050
101.20	1.20	600.00	600.00	0.00	15.00	234.00	0.052
101.30	1.30	300.00	450.00	0.00	7.50	241.50	0.055
101.40	1.40	908.33	604.17	0.00	90.83	332.33	0.057
101.50	1.50	2035.71	1472.02	0.00	203.57	535.90	0.059
101.60	1.60	2945.00	2490.36	0.00	294.50	830.40	0.061
101.70	1.70	3280.00	3112.50	0.00	328.00	1158.40	0.063
101.90	1.90	3950.00	3615.00	0.00	790.00	1948.40	0.067

Cumac Subdivision - Phase 2
MOE Water Quality Storage Volumes
Combined Bio-swale (Entire Development)

Table 3.2 Values (MOE Drainage Manual)

% imp	storage (m^3/ha)
35	25
55	30
70	35
85	40

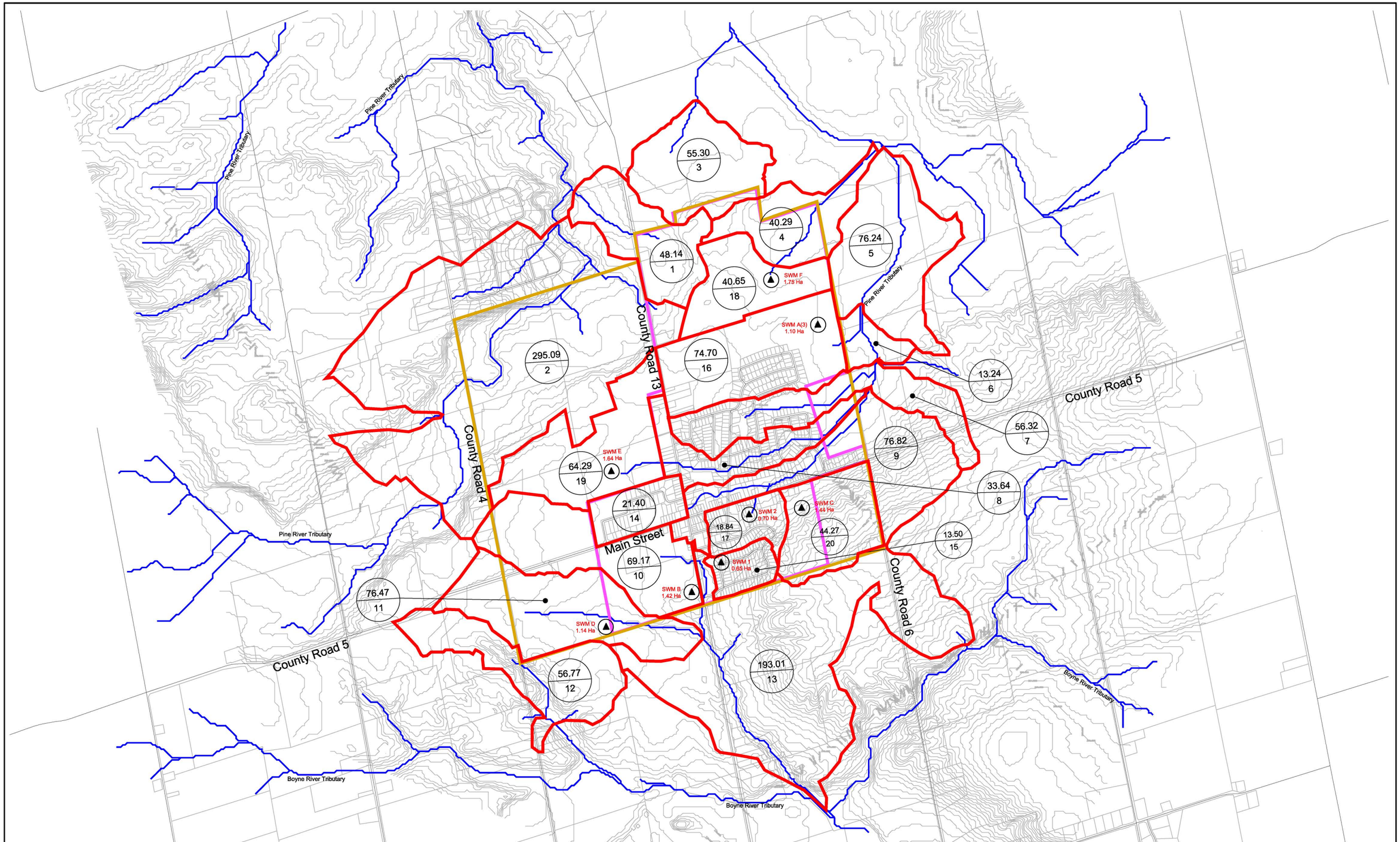


Contributing Areas

Catchment	200	Area	1.14	ha	%Impervious	48.7
Catchment	201	Area	0.62	ha	%Impervious	15
Catchment	202	Area	0.18	ha	%Impervious	46.6
Catchment	203	Area	1.22	ha	%Impervious	52.3
Catchment	204	Area	0.71	ha	%Impervious	48.7
Catchment	205	Area	0.02	ha	%Impervious	0
Catchment	206	Area	0.44	ha	%Impervious	0
Catchment		Area		ha	%Impervious	
TOTAL AREA			**4.33**	**ha**	**%Impervious**	**39.6**

% Impervious	39.6
Storage Volume (m^3/ha)	26.0
Drainage Area (ha)	4.33
Storage Volume (m^3)	**112.51**

APPENDIX B:
MASTER DRAINIAGE PLAN OPTION 3 VISUAL OTTHYMO OUTPUT



1. This drawing is the exclusive property of Greenland Consulting Engineers and the reproduction of any part without prior written consent of this office is strictly prohibited.

2. Do not scale the drawings.

NOTES:

LEGEND:

- 244.000 — CONTOURS ELEVATIONS
- WATERCOURSE
- CATCHMENT BOUNDARY
- 55.30 / 3 — AREA (Ha) / CATCHMENT ID
- ROADS
- SECONDARY BOUNDARY
- POND LOCATION

N

No.	REVISION	DATE	INIT.
3.			
2.			
1.			

APPROVED

PROJECT TITLE

EVERETT SECONDARY PLAN
MASTER DRAIN PLAN

DRAWING TITLE

MDP OPTION 3
STORMWATER MANAGEMENT

GREENLAND® Consulting Engineers
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Collingwood, Ontario, L9Y 1V5
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Website: www.grnland.com

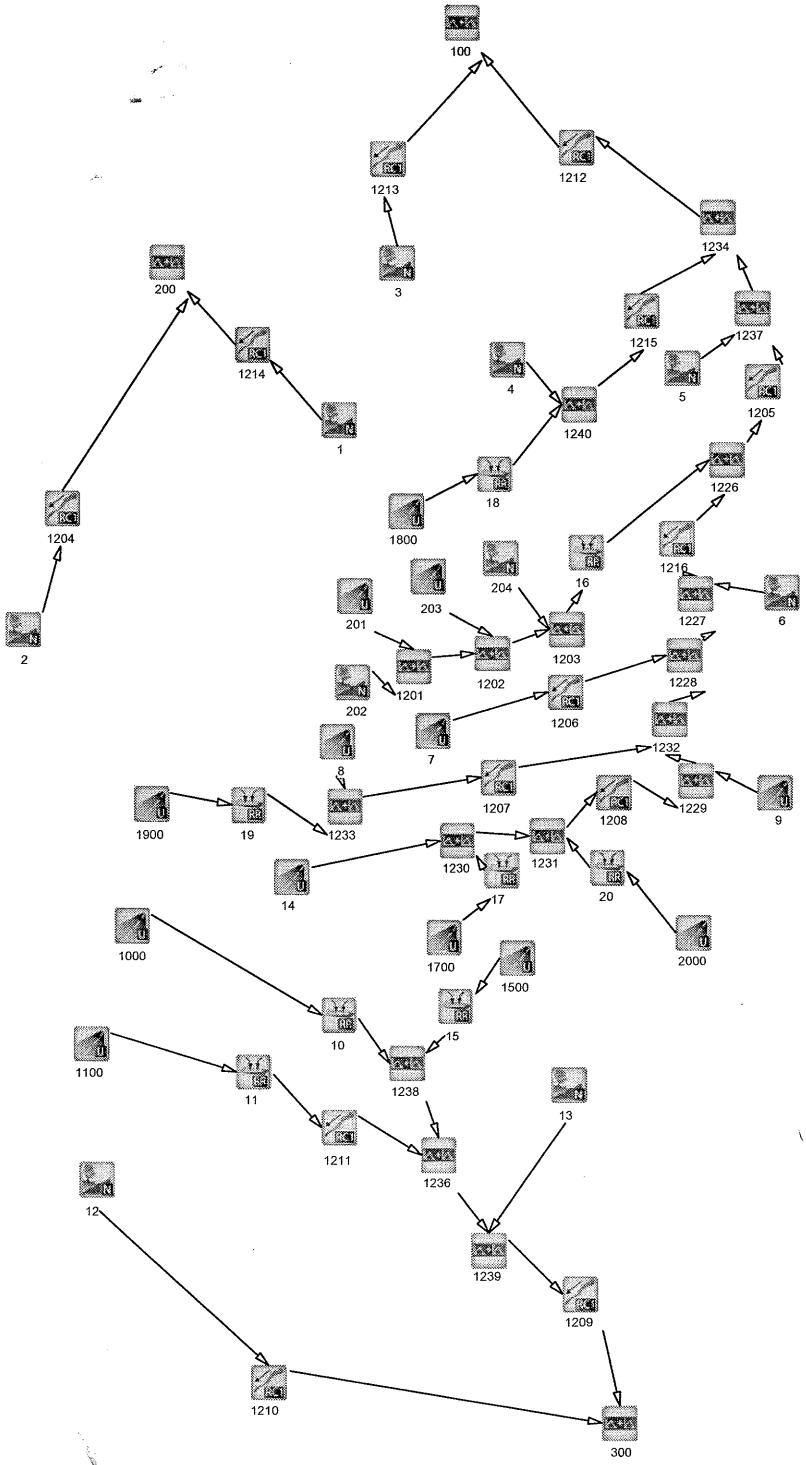
SCALE: 1:11,250 @ 24x36; 1:25,000 @ 11x17			PROJECT No.: 12-G-2804
DESIGN: J.M.	CHECKED: J. HARTMAN		DWG No. FIGURE A6 -3
DRAWN: K.L.	DATE: OCT. 2012		

T:\2804_Everett MSP\MSP In Progress\Report Figures\Figure Option 1-4&Existing.dwg

MDP OPTION 3

(POST - DEVELOPMENT)

MDP OPTION 3 VO2 MODEL SCHEMATIC



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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    TM, Version 2.1
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
```


***** S U M M A R Y O U T P U T *****

Input filename: C:\Program Files\Visual OTTHYMO 2.3.1\voin.dat
Output filename: T:\2804_Everett MSP\SWM Assessment\Everett_VO2_Model_WithChecks\Option 3 Full Development with Local and Regional SWMFs.
Summary filename: T:\2804_Everett MSP\SWM Assessment\Everett_VO2_Model_WithChecks\Option 3 Full Development with Local and Regional SWMFs.

DATE: 27/11/2012 TIME: 3:27:29 PM

USER:

COMMENTS: _____

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

W/E	COMMAND	HYD	ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ .00 hrs									
	READ STORM			60.0						
	[Ptot=193.00 mm]									
	fname : T:\2804_Everett MSP\SWM Assessment\Everett_VO2_Model\Storms\Timmins Storm.stm									
	remark: Timmins Storm									
*										
**	CALIB NASHYD	0204	1	8.0	10.89	.49	7.47	84.40	.44	.000
	[CN=54.3]									
	[N = 3.0:Tp .73]									
*										
**	CALIB STANDHYD	0203	1	5.0	14.52	1.07	7.00	114.72	.59	.000
	[I%=25.0:S%= 2.00]									
*										
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*										
**	CALIB NASHYD	0202	1	5.0	1.87	.09	7.17	78.13	.40	.000
	[CN=49.0]									
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*										
*	CALIB STANDHYD	0009	1	5.0	76.82	2.41	7.00	50.42	.26	.000
	[I%=26.4:S%= 1.34]									
*										
*	CALIB STANDHYD	0014	1	5.0	21.40	1.03	7.00	84.27	.44	.000
	[I%=40.1:S%= 1.16]									
*										
*	CALIB STANDHYD	1700	1	5.0	18.84	.78	7.00	76.01	.39	.000
	[I%=33.5:S%= 2.02]									
*										
*	CALIB STANDHYD	2000	1	5.0	44.27	1.29	7.00	63.73	.33	.000
	[I%=23.1:S%= 5.00]									
*										
*	CALIB STANDHYD	1900	1	5.0	64.29	2.00	7.00	56.39	.29	.000
	[I%=26.0:S%= 2.02]									
*										
*	CALIB STANDHYD	0008	1	5.0	33.64	1.66	7.00	83.46	.43	.000
	[I%=41.3:S%= 1.34]									
*										
*	CALIB STANDHYD	0007	1	5.0	56.32	2.51	7.00	71.24	.37	.000
	[I%=37.3:S%= 1.34]									
*										
*	CALIB NASHYD	0006	1	10.0	13.24	.78	7.00	79.87	.41	.000
	[CN=51.9]									
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TIMMINS REGIONAL.

```
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  *   CALIB NASHYD       0001  1 10.0   48.14    2.87  7.17 101.95  .53    .000
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  *   CALIB NASHYD       0002  1 10.0  295.09   12.70  7.50  82.04  .43    .000
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  *   CALIB NASHYD       0012  1 10.0   56.77    3.22  7.17  91.85  .48    .000
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      [ N = 3.0:Tp  .50]
*
  *   CALIB NASHYD       0013  1 10.0  193.01   10.66  7.50 105.34  .55    .000
      [CN=64.2         ]
      [ N = 3.0:Tp  .80]
*
  *   CALIB STANDHYD     1000  1  5.0   69.17    2.19  7.00  56.59  .29    .000
      [I%=26.6:S%= 2.02]
*
  *   CALIB STANDHYD     1500  1  5.0   13.50    1.01  7.00 114.62  .59    .000
      [I%=40.0:S%= 2.02]
*
  *   CALIB STANDHYD     1100  1  5.0   76.47    1.54  7.00  32.47  .17    .000
      [I%=17.0:S%= 2.02]
*
      ADD [0201 + 0202]  1201  3  5.0   49.28    3.87  7.00 124.83  n/a    .000
*
      RESRVR [ 2 : 1700] 0017  1  5.0   18.84     .53  7.17  75.98  n/a    .000
      {ST=   .37 ha.m }
*
      RESRVR [ 2 : 2000] 0020  1  5.0   44.27     .19 12.42  45.69  n/a    .000
      {ST=  2.49 ha.m }
*
      RESRVR [ 2 : 1900] 0019  1  5.0   64.29     .26 12.33  56.38  n/a    .000
      {ST=  2.83 ha.m }
*
      ADD [0019 + 0008]  1233  3  5.0   97.93    1.81  7.00  65.68  n/a    .000
*
      CHANNEL[ 2 : 0007] 1206  1  5.0   56.32    2.50  7.00  71.24  n/a    .000
*
      RESRVR [ 2 : 1800] 0018  1  5.0   40.65     .25 12.17  80.46  n/a    .000
      {ST=  2.75 ha.m }
*
      ADD [0018 + 0004]  1240  3  5.0   80.94    1.92  7.33  79.23  n/a    .000
*
      CHANNEL[ 2 : 0003] 1213  1  5.0   55.30    3.07  7.25  90.95  n/a    .000
*
      CHANNEL[ 2 : 0001] 1214  1  5.0   48.14    2.87  7.25 101.95  n/a    .000
*
      CHANNEL[ 2 : 0002] 1204  1  5.0  295.09   12.68  7.50  82.03  n/a    .000
*
      CHANNEL[ 2 : 0012] 1210  1  5.0   56.77    2.94  7.42  91.84  n/a    .000
*
      RESRVR [ 2 : 1000] 0010  1  5.0   69.17    1.42  7.25  56.57  n/a    .000
      {ST=  1.21 ha.m }
*
      RESRVR [ 2 : 1500] 0015  1  5.0   13.50     .59  9.08 114.60  n/a    .000
      {ST=   .56 ha.m }
*
      RESRVR [ 2 : 1100] 0011  1  5.0   76.47     .81  7.58  32.45  n/a    .000
      {ST=   .87 ha.m }
*
      ADD [0203 + 1201]  1202  3  5.0   63.80    4.93  7.00 122.53  n/a    .000
*
      ADD [0014 + 0017]  1230  3  5.0   40.24    1.54  7.00  80.39  n/a    .000
*
      ADD [1230 + 0020]  1231  3  5.0   84.51    1.56  7.00  62.21  n/a    .000
*
      CHANNEL[ 2 : 1233] 1207  1  5.0   97.93    1.80  7.00  65.68  n/a    .000
*
      CHANNEL[ 2 : 1240] 1215  1  5.0   80.94    1.89  7.42  79.22  n/a    .000
*
      ADD [1214 + 1204]  0200  3  5.0  343.23   15.47  7.42  84.83  n/a    .000
```

```
*
      ADD [0010 + 0015]  1238  3  5.0   82.67    1.84  9.00  66.05  n/a    .000
*
      CHANNEL[ 2 : 0011] 1211  1  5.0   76.47     .80  7.83  32.45  n/a    .000
*
      ADD [0204 + 1202]  1203  3  5.0   74.69    5.36  7.00 116.97  n/a    .000
*
      CHANNEL[ 2 : 1231] 1208  1  5.0   84.51    1.52  7.00  62.19  n/a    .000
*
      ADD [1238 + 1211]  1236  3  5.0  159.14    2.64  9.08  49.90  n/a    .000
*
      RESRVR [ 2 : 1203] 0016  1  5.0   74.69    3.37  9.08 116.91  n/a    .000
      {ST=  3.68 ha.m }
*
      ADD [0009 + 1208]  1229  3  5.0  161.33    3.93  7.00  56.59  n/a    .000
*
      ADD [0013 + 1236]  1239  3  5.0  352.15   13.28  7.50  80.29  n/a    .000
*
      ADD [1229 + 1207]  1232  3  5.0  259.26    5.73  7.00  60.02  n/a    .000
*
      CHANNEL[ 2 : 1239] 1209  1  5.0  352.15   13.19  7.58  80.29  n/a    .000
*
      ADD [1232 + 1206]  1228  3  5.0  315.58    8.23  7.00  62.02  n/a    .000
*
      ADD [1210 + 1209]  0300  3  5.0  408.92   16.07  7.58  81.89  n/a    .000
*
      ADD [1228 + 0006]  1227  3  5.0  328.82    9.01  7.00  62.74  n/a    .000
*
      CHANNEL[ 2 : 1227] 1216  1  5.0  328.82    8.97  7.00  62.74  n/a    .000
*
      ADD [0016 + 1216]  1226  3  5.0  403.52    9.83  7.00  72.77  n/a    .000
*
      CHANNEL[ 2 : 1226] 1205  1  5.0  403.52    9.61  7.08  72.75  n/a    .000
*
      ADD [1205 + 0005]  1237  3  5.0  479.76   13.34  7.08  73.98  n/a    .000
*
      ADD [1237 + 1215]  1234  3  5.0  560.70   15.11  7.17  74.74  n/a    .000
*
      CHANNEL[ 2 : 1234] 1212  1  5.0  560.70   14.29  7.33  74.72  n/a    .000
*
      ADD [1212 + 1213]  0100  3  5.0  616.00   17.32  7.33  76.18  n/a    .000
*
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************

  W/E COMMAND              HYD ID   DT     AREA    Qpeak  Tpeak   R.V. R.C.   Qbase
                                    min      ha      cms    hrs      mm         cms

      START @   .00 hrs
      ---------------------
      MASS STORM                   10.0
      [ Ptot=105.16 mm ]
*
  **  CALIB NASHYD       0204  1  8.0   10.89     .25 13.07  29.31  .28    .000
      [CN=54.3        ]
      [ N = 3.0:Tp  .73]
*
  **  CALIB STANDHYD     0203  1  5.0   14.52     .68 12.25  50.22  .48    .000
      [I%=25.0:S%= 2.00]
*
  **  CALIB STANDHYD     0201  1  5.0   47.41    2.55 12.25  58.23  .55    .000
      [I%=35.0:S%= 2.00]
*
  **  CALIB NASHYD       0202  1  5.0    1.87     .05 12.75  27.52  .26    .000
      [CN=49.0        ]
      [ N = 3.0:Tp  .48]
*
  *   CALIB STANDHYD     0009  1  5.0   76.82    2.25 12.08  27.23  .26    .000
      [I%=26.4:S%= 1.34]
*
  *   CALIB STANDHYD     0014  1  5.0   21.40     .99 12.08  41.37  .39    .000
      [I%=40.1:S%= 1.16]
*
  *   CALIB STANDHYD     1700  1  5.0   18.84     .73 12.08  34.56  .33    .000
      [I%=33.5:S%= 2.02]
*
  *   CALIB STANDHYD     2000  1  5.0   44.27    1.20 12.00  23.83  .23    .000
      [I%=23.1:S%= 5.00]
*
  *   CALIB STANDHYD     1900  1  5.0   64.29    1.83 12.08  26.82  .26    .000
      [I%=26.0:S%= 2.02]
*
  *   CALIB STANDHYD     0008  1  5.0   33.64    1.58 12.08  42.60  .41    .000
      [I%=41.3:S%= 1.34]
*
  *   CALIB STANDHYD     0007  1  5.0   56.32    2.37 12.08  38.48  .37    .000
      [I%=37.3:S%= 1.34]
*
```

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```
  *   CALIB NASHYD       0006  1 10.0   13.24     .41 12.33  28.03  .27    .000
      [CN=51.9         ]
      [ N = 3.0:Tp  .20]
*
  *   CALIB NASHYD       0005  1 10.0   76.24    1.95 12.67  28.01  .27    .000
      [CN=51.4         ]
      [ N = 3.0:Tp  .49]
*
  *   CALIB STANDHYD     1800  1  5.0   40.65    1.93 12.08  43.84  .42    .000
      [I%=42.5:S%= 2.02]
*
  *   CALIB NASHYD       0004  1 10.0   40.29     .91 12.83  26.86  .26    .000
      [CN=50.1         ]
      [ N = 3.0:Tp  .61]
*
  *   CALIB NASHYD       0003  1 10.0   55.30    1.67 12.67  32.78  .31    .000
      [CN=57.0         ]
      [ N = 3.0:Tp  .50]
*
  *   CALIB NASHYD       0001  1 10.0   48.14    1.61 12.83  38.25  .36    .000
      [CN=62.5         ]
      [ N = 3.0:Tp  .60]
*
  *   CALIB NASHYD       0002  1 10.0  295.09    6.50 13.00  28.58  .27    .000
      [CN=52.4         ]
      [ N = 3.0:Tp  .76]
*
  *   CALIB NASHYD       0012  1 10.0   56.77    1.74 12.67  33.35  .32    .000
      [CN=57.2         ]
      [ N = 3.0:Tp  .50]
*
  *   CALIB NASHYD       0013  1 10.0  193.01    5.92 13.00  39.98  .38    .000
      [CN=64.2         ]
      [ N = 3.0:Tp  .80]
*
  *   CALIB STANDHYD     1000  1  5.0   69.17    2.01 12.08  27.44  .26    .000
      [I%=26.6:S%= 2.02]
*
  *   CALIB STANDHYD     1500  1  5.0   13.50     .65 12.00  43.58  .41    .000
      [I%=40.0:S%= 2.02]
*
  *   CALIB STANDHYD     1100  1  5.0   76.47    1.41 12.17  17.54  .17    .000
      [I%=17.0:S%= 2.02]
*
      ADD [0201 + 0202]  1201  3  5.0   49.28    2.58 12.25  57.06  n/a    .000
*
      RESRVR [ 2 : 1700] 0017  1  5.0   18.84     .35 12.83  34.53  n/a    .000
      {ST=   .29 ha.m }
*
      RESRVR [ 2 : 2000] 0020  1  5.0   44.27     .01 24.08  11.80  n/a    .000
      {ST=  1.00 ha.m }
*
      RESRVR [ 2 : 1900] 0019  1  5.0   64.29     .13 16.50  26.80  n/a    .000
      {ST=  1.21 ha.m }
*
      ADD [0019 + 0008]  1233  3  5.0   97.93    1.67 12.08  32.23  n/a    .000
*
      CHANNEL[ 2 : 0007] 1206  1  5.0   56.32    2.31 12.17  38.48  n/a    .000
*
      RESRVR [ 2 : 1800] 0018  1  5.0   40.65     .09 17.25  43.30  n/a    .000
      {ST=  1.35 ha.m }
*
      ADD [0018 + 0004]  1240  3  5.0   80.94    1.00 12.83  35.12  n/a    .000
*
      CHANNEL[ 2 : 0003] 1213  1  5.0   55.30    1.64 12.83  32.77  n/a    .000
*
      CHANNEL[ 2 : 0001] 1214  1  5.0   48.14    1.60 12.92  38.25  n/a    .000
*
      CHANNEL[ 2 : 0002] 1204  1  5.0  295.09    6.47 13.08  28.58  n/a    .000
*
      CHANNEL[ 2 : 0012] 1210  1  5.0   56.77    1.53 13.00  33.34  n/a    .000
*
      RESRVR [ 2 : 1000] 0010  1  5.0   69.17     .89 13.00  27.42  n/a    .000
      {ST=   .98 ha.m }
*
      RESRVR [ 2 : 1500] 0015  1  5.0   13.50     .18 13.17  43.55  n/a    .000
      {ST=   .27 ha.m }
*
      RESRVR [ 2 : 1100] 0011  1  5.0   76.47     .54 13.17  17.52  n/a    .000
      {ST=   .68 ha.m }
*
      ADD [0203 + 1201]  1202  3  5.0   63.80    3.26 12.25  55.50  n/a    .000
*
      ADD [0014 + 0017]  1230  3  5.0   40.24    1.17 12.17  38.17  n/a    .000
*
      ADD [1230 + 0020]  1231  3  5.0   84.51    1.18 12.17  24.35  n/a    .000
*
      CHANNEL[ 2 : 1233] 1207  1  5.0   97.93    1.60 12.25  32.23  n/a    .000
*
```

```
      CHANNEL[ 2 : 1240] 1215  1  5.0   80.94     .98 13.00  35.11  n/a    .000
*
      ADD [1214 + 1204]  0200  3  5.0  343.23    8.02 13.08  29.94  n/a    .000
*
      ADD [0010 + 0015]  1238  3  5.0   82.67    1.06 13.00  30.06  n/a    .000
*
      CHANNEL[ 2 : 0011] 1211  1  5.0   76.47     .53 13.33  17.52  n/a    .000
*
      ADD [0204 + 1202]  1203  3  5.0   74.69    3.41 12.33  51.69  n/a    .000
*
      CHANNEL[ 2 : 1231] 1208  1  5.0   84.51    1.14 12.33  24.34  n/a    .000
*
      ADD [1238 + 1211]  1236  3  5.0  159.14    1.57 13.08  24.03  n/a    .000
*
      RESRVR [ 2 : 1203] 0016  1  5.0   74.69     .70 14.58  51.62  n/a    .000
      {ST=  2.28 ha.m }
*
      ADD [0009 + 1208]  1229  3  5.0  161.33    3.33 12.17  25.72  n/a    .000
*
      ADD [0013 + 1236]  1239  3  5.0  352.15    7.49 13.00  32.77  n/a    .000
*
      ADD [1229 + 1207]  1232  3  5.0  259.26    4.92 12.17  28.18  n/a    .000
*
      CHANNEL[ 2 : 1239] 1209  1  5.0  352.15    7.41 13.17  32.77  n/a    .000
*
      ADD [1232 + 1206]  1228  3  5.0  315.58    7.23 12.17  30.02  n/a    .000
*
      ADD [1210 + 1209]  0300  3  5.0  408.92    8.92 13.17  32.85  n/a    .000
*
      ADD [1228 + 0006]  1227  3  5.0  328.82    7.63 12.17  29.94  n/a    .000
*
      CHANNEL[ 2 : 1227] 1216  1  5.0  328.82    7.61 12.25  29.93  n/a    .000
*
      ADD [0016 + 1216]  1226  3  5.0  403.52    7.83 12.25  33.95  n/a    .000
*
      CHANNEL[ 2 : 1226] 1205  1  5.0  403.52    7.41 12.42  33.94  n/a    .000
*
      ADD [1205 + 0005]  1237  3  5.0  479.76    9.23 12.50  33.00  n/a    .000
*
      ADD [1237 + 1215]  1234  3  5.0  560.70    9.99 12.50  33.30  n/a    .000
*
      CHANNEL[ 2 : 1234] 1212  1  5.0  560.70    9.55 12.75  33.29  n/a    .000
*
      ADD [1212 + 1213]  0100  3  5.0  616.00   11.18 12.75  33.24  n/a    .000
*
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************

  W/E COMMAND              HYD ID   DT     AREA    Qpeak  Tpeak   R.V. R.C.   Qbase
                                    min      ha      cms    hrs      mm         cms

      START @   .00 hrs
      ---------------------
      MASS STORM                   10.0
      [ Ptot= 86.04 mm ]
*
  **  CALIB NASHYD       0204  1  8.0   10.89     .17 13.07  19.95  .23    .000
      [CN=54.3          ]
      [ N = 3.0:Tp  .73]
*
  **  CALIB STANDHYD     0203  1  5.0   14.52     .49 12.25  38.06  .44    .000
      [I%=25.0:S%= 2.00]
*
  **  CALIB STANDHYD     0201  1  5.0   47.41    1.95 12.25  44.94  .52    .000
      [I%=35.0:S%= 2.00]
*
  **  CALIB NASHYD       0202  1  5.0    1.87     .03 12.75  19.01  .22    .000
      [CN=49.0          ]
      [ N = 3.0:Tp  .48]
*
  *   CALIB STANDHYD     0009  1  5.0   76.82    1.82 12.08  22.19  .26    .000
      [I%=26.4:S%= 1.34]
*
  *   CALIB STANDHYD     0014  1  5.0   21.40     .80 12.08  33.70  .39    .000
      [I%=40.1:S%= 1.16]
*
  *   CALIB STANDHYD     1700  1  5.0   18.84     .59 12.08  28.15  .33    .000
      [I%=33.5:S%= 2.02]
*
  *   CALIB STANDHYD     2000  1  5.0   44.27     .96 12.08  19.41  .23    .000
      [I%=23.1:S%= 5.00]
*
  *   CALIB STANDHYD     1900  1  5.0   64.29    1.48 12.17  21.85  .25    .000
      [I%=26.0:S%= 2.02]
*
  *   CALIB STANDHYD     0008  1  5.0   33.64    1.28 12.08  34.71  .40    .000
      [I%=41.3:S%= 1.34]
*
```

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```
*   CALIB STANDHYD     0007  1  5.0   56.32    1.92 12.08  31.35  .36    .000
    [I%=37.3:S%= 1.34]
*
*   CALIB NASHYD       0006  1 10.0   13.24     .28 12.33  19.25  .22    .000
    [CN=51.9         ]
    [ N = 3.0:Tp  .20]
*
*   CALIB NASHYD       0005  1 10.0   76.24    1.32 12.67  19.17  .22    .000
    [CN=51.4         ]
    [ N = 3.0:Tp  .49]
*
*   CALIB STANDHYD     1800  1  5.0   40.65    1.56 12.08  35.72  .42    .000
    [I%=42.5:S%= 2.02]
*
*   CALIB NASHYD       0004  1 10.0   40.29     .61 12.83  18.31  .21    .000
    [CN=50.1         ]
    [ N = 3.0:Tp  .61]
*
*   CALIB NASHYD       0003  1 10.0   55.30    1.14 12.67  22.67  .26    .000
    [CN=57.0         ]
    [ N = 3.0:Tp  .50]
*
*   CALIB NASHYD       0001  1 10.0   48.14    1.12 12.83  26.81  .31    .000
    [CN=62.5         ]
    [ N = 3.0:Tp  .60]
*
*   CALIB NASHYD       0002  1 10.0  295.09    4.39 13.00  19.54  .23    .000
    [CN=52.4         ]
    [ N = 3.0:Tp  .76]
*
*   CALIB NASHYD       0012  1 10.0   56.77    1.19 12.67  23.15  .27    .000
    [CN=57.2         ]
    [ N = 3.0:Tp  .50]
*
*   CALIB NASHYD       0013  1 10.0  193.01    4.11 13.00  28.13  .33    .000
    [CN=64.2         ]
    [ N = 3.0:Tp  .80]
*
*   CALIB STANDHYD     1000  1  5.0   69.17    1.62 12.17  22.35  .26    .000
    [I%=26.6:S%= 2.02]
*
*   CALIB STANDHYD     1500  1  5.0   13.50     .53 12.00  33.62  .39    .000
    [I%=40.0:S%= 2.02]
*
*   CALIB STANDHYD     1100  1  5.0   76.47    1.14 12.17  14.29  .17    .000
    [I%=17.0:S%= 2.02]
*
    ADD [0201 + 0202]  1201  3  5.0   49.28    1.98 12.25  43.96  n/a    .000
*
    RESRVR [ 2 : 1700] 0017  1  5.0   18.84     .26 12.92  28.12  n/a    .000
    {ST=   .25 ha.m }
*
    RESRVR [ 2 : 2000] 0020  1  5.0   44.27     .01 24.17   9.23  n/a    .000
    {ST=   .82 ha.m }
*
    RESRVR [ 2 : 1900] 0019  1  5.0   64.29     .11 16.33  21.83  n/a    .000
    {ST=   .97 ha.m }
*
    ADD [0019 + 0008]  1233  3  5.0   97.93    1.37 12.08  26.26  n/a    .000
*
    CHANNEL[ 2 : 0007] 1206  1  5.0   56.32    1.87 12.17  31.34  n/a    .000
*
    RESRVR [ 2 : 1800] 0018  1  5.0   40.65     .09 17.08  35.25  n/a    .000
    {ST=  1.08 ha.m }
*
    ADD [0018 + 0004]  1240  3  5.0   80.94     .69 12.83  26.82  n/a    .000
*
    CHANNEL[ 2 : 0003] 1213  1  5.0   55.30    1.12 12.83  22.66  n/a    .000
*
    CHANNEL[ 2 : 0001] 1214  1  5.0   48.14    1.11 12.92  26.81  n/a    .000
*
    CHANNEL[ 2 : 0002] 1204  1  5.0  295.09    4.37 13.17  19.54  n/a    .000
*
    CHANNEL[ 2 : 0012] 1210  1  5.0   56.77    1.03 13.08  23.14  n/a    .000
*
    RESRVR [ 2 : 1000] 0010  1  5.0   69.17     .46 13.42  22.34  n/a    .000
    {ST=   .86 ha.m }
*
    RESRVR [ 2 : 1500] 0015  1  5.0   13.50     .14 13.08  33.59  n/a    .000
    {ST=   .22 ha.m }
*
    RESRVR [ 2 : 1100] 0011  1  5.0   76.47     .41 13.25  14.27  n/a    .000
    {ST=   .57 ha.m }
*
    ADD [0203 + 1201]  1202  3  5.0   63.80    2.47 12.25  42.61  n/a    .000
*
    ADD [0014 + 0017]  1230  3  5.0   40.24     .90 12.25  31.09  n/a    .000
*
    ADD [1230 + 0020]  1231  3  5.0   84.51     .90 12.25  19.64  n/a    .000
```

```
*
      CHANNEL[ 2 : 1233] 1207  1  5.0   97.93    1.30 12.25  26.26  n/a    .000
*
      CHANNEL[ 2 : 1240] 1215  1  5.0   80.94     .68 13.00  26.82  n/a    .000
*
      ADD [1214 + 1204]  0200  3  5.0  343.23    5.45 13.08  20.56  n/a    .000
*
      ADD [0010 + 0015]  1238  3  5.0   82.67     .61 13.42  24.18  n/a    .000
*
      CHANNEL[ 2 : 0011] 1211  1  5.0   76.47     .40 13.50  14.27  n/a    .000
*
      ADD [0204 + 1202]  1203  3  5.0   74.69    2.56 12.33  39.33  n/a    .000
*
      CHANNEL[ 2 : 1231] 1208  1  5.0   84.51     .88 12.33  19.62  n/a    .000
*
      ADD [1238 + 1211]  1236  3  5.0  159.14    1.01 13.42  19.42  n/a    .000
*
      RESRVR [ 2 : 1203] 0016  1  5.0   74.69     .53 14.67  39.26  n/a    .000
      {ST=  1.77 ha.m }
*
      ADD [0009 + 1208]  1229  3  5.0  161.33    2.65 12.17  20.84  n/a    .000
*
      ADD [0013 + 1236]  1239  3  5.0  352.15    5.10 13.17  24.19  n/a    .000
*
      ADD [1229 + 1207]  1232  3  5.0  259.26    3.94 12.17  22.89  n/a    .000
*
      CHANNEL[ 2 : 1239] 1209  1  5.0  352.15    5.04 13.25  24.19  n/a    .000
*
      ADD [1232 + 1206]  1228  3  5.0  315.58    5.81 12.17  24.40  n/a    .000
*
      ADD [1210 + 1209]  0300  3  5.0  408.92    6.04 13.25  24.04  n/a    .000
*
      ADD [1228 + 0006]  1227  3  5.0  328.82    6.08 12.17  24.19  n/a    .000
*
      CHANNEL[ 2 : 1227] 1216  1  5.0  328.82    6.08 12.25  24.19  n/a    .000
*
      ADD [0016 + 1216]  1226  3  5.0  403.52    6.20 12.25  26.98  n/a    .000
*
      CHANNEL[ 2 : 1226] 1205  1  5.0  403.52    5.84 12.42  26.97  n/a    .000
*
      ADD [1205 + 0005]  1237  3  5.0  479.76    7.08 12.50  25.75  n/a    .000
*
      ADD [1237 + 1215]  1234  3  5.0  560.70    7.60 12.50  25.90  n/a    .000
*
      CHANNEL[ 2 : 1234] 1212  1  5.0  560.70    7.16 12.75  25.89  n/a    .000
*
      ADD [1212 + 1213]  0100  3  5.0  616.00    8.27 12.75  25.60  n/a    .000
*
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************

  W/E COMMAND              HYD ID   DT     AREA    Qpeak Tpeak   R.V. R.C.   Qbase
                                    min      ha     cms   hrs      mm         cms

      START @   .00 hrs
      --------------------
      MASS STORM                   10.0
      [ Ptot= 64.53 mm ]
*
  **  CALIB NASHYD       0204  1  8.0   10.89     .09 13.07  11.08  .17    .000
      [CN=54.3         ]
      [ N = 3.0:Tp  .73]
*
  **  CALIB STANDHYD     0203  1  5.0   14.52     .32 12.25  25.57  .40    .000
      [I%=25.0:S%= 2.00]
*
  **  CALIB STANDHYD     0201  1  5.0   47.41    1.33 12.33  31.02  .48    .000
      [I%=35.0:S%= 2.00]
*
  **  CALIB NASHYD       0202  1  5.0    1.87     .02 12.75  10.94  .17    .000
      [CN=49.0         ]
      [ N = 3.0:Tp  .48]
*
   *  CALIB STANDHYD     0009  1  5.0   76.82    1.34 12.17  16.51  .26    .000
      [I%=26.4:S%= 1.34]
*
   *  CALIB STANDHYD     0014  1  5.0   21.40     .60 12.08  25.07  .39    .000
      [I%=40.1:S%= 1.16]
*
   *  CALIB STANDHYD     1700  1  5.0   18.84     .44 12.08  20.95  .32    .000
      [I%=33.5:S%= 2.02]
*
   *  CALIB STANDHYD     2000  1  5.0   44.27     .72 12.08  14.44  .22    .000
      [I%=23.1:S%= 5.00]
*
   *  CALIB STANDHYD     1900  1  5.0   64.29    1.09 12.17  16.26  .25    .000
      [I%=26.0:S%= 2.02]
*
```

```
   *    CALIB STANDHYD      0008  1  5.0    33.64     .95 12.08  25.82  .40    .000
        [I%=41.3:S%= 1.34]
   *
   *    CALIB STANDHYD      0007  1  5.0    56.32    1.42 12.08  23.32  .36    .000
        [I%=37.3:S%= 1.34]
   *
   *    CALIB NASHYD        0006  1 10.0    13.24     .15 12.33  10.92  .17    .000
        [CN=51.9          ]
        [ N = 3.0:Tp  .20]
   *
   *    CALIB NASHYD        0005  1 10.0    76.24     .73 12.83  10.80  .17    .000
        [CN=51.4          ]
        [ N = 3.0:Tp  .49]
   *
   *    CALIB STANDHYD      1800  1  5.0    40.65    1.15 12.17  26.58  .41    .000
        [I%=42.5:S%= 2.02]
   *
   *    CALIB NASHYD        0004  1 10.0    40.29     .34 12.83  10.25  .16    .000
        [CN=50.1          ]
        [ N = 3.0:Tp  .61]
   *
   *    CALIB NASHYD        0003  1 10.0    55.30     .64 12.83  12.95  .20    .000
        [CN=57.0          ]
        [ N = 3.0:Tp  .50]
   *
   *    CALIB NASHYD        0001  1 10.0    48.14     .64 12.83  15.62  .24    .000
        [CN=62.5          ]
        [ N = 3.0:Tp  .60]
   *
   *    CALIB NASHYD        0002  1 10.0   295.09    2.41 13.17  10.98  .17    .000
        [CN=52.4          ]
        [ N = 3.0:Tp  .76]
   *
   *    CALIB NASHYD        0012  1 10.0    56.77     .68 12.83  13.32  .21    .000
        [CN=57.2          ]
        [ N = 3.0:Tp  .50]
   *
   *    CALIB NASHYD        0013  1 10.0   193.01    2.37 13.17  16.47  .26    .000
        [CN=64.2          ]
        [ N = 3.0:Tp  .80]
   *
   *    CALIB STANDHYD      1000  1  5.0    69.17    1.19 12.17  16.63  .26    .000
        [I%=26.6:S%= 2.02]
   *
   *    CALIB STANDHYD      1500  1  5.0    13.50     .39 12.00  25.01  .39    .000
        [I%=40.0:S%= 2.02]
   *
   *    CALIB STANDHYD      1100  1  5.0    76.47     .84 12.17  10.63  .16    .000
        [I%=17.0:S%= 2.02]
   *
        ADD [0201 + 0202]   1201  3  5.0    49.28    1.35 12.33  30.26  n/a    .000
   *
        RESRVR [ 2 : 1700] 0017  1  5.0    18.84     .15 13.08  20.92  n/a    .000
        {ST=   .20 ha.m }
   *
        RESRVR [ 2 : 2000] 0020  1  5.0    44.27     .01 24.17   6.77  n/a    .000
        {ST=   .61 ha.m }
   *
        RESRVR [ 2 : 1900] 0019  1  5.0    64.29     .10 15.17  16.24  n/a    .000
        {ST=   .71 ha.m }
   *
        ADD [0019 + 0008]   1233  3  5.0    97.93    1.02 12.08  19.53  n/a    .000
   *
        CHANNEL[ 2 : 0007] 1206  1  5.0    56.32    1.38 12.25  23.32  n/a    .000
   *
        RESRVR [ 2 : 1800] 0018  1  5.0    40.65     .08 16.75  26.19  n/a    .000
        {ST=   .79 ha.m }
   *
        ADD [0018 + 0004]   1240  3  5.0    80.94     .41 13.00  18.26  n/a    .000
   *
        CHANNEL[ 2 : 0003] 1213  1  5.0    55.30     .63 12.92  12.95  n/a    .000
   *
        CHANNEL[ 2 : 0001] 1214  1  5.0    48.14     .63 12.92  15.62  n/a    .000
   *
        CHANNEL[ 2 : 0002] 1204  1  5.0   295.09    2.41 13.17  10.98  n/a    .000
   *
        CHANNEL[ 2 : 0012] 1210  1  5.0    56.77     .56 13.17  13.31  n/a    .000
   *
        RESRVR [ 2 : 1000] 0010  1  5.0    69.17     .30 13.67  16.62  n/a    .000
        {ST=   .67 ha.m }
   *
        RESRVR [ 2 : 1500] 0015  1  5.0    13.50     .11 13.08  24.98  n/a    .000
        {ST=   .16 ha.m }
   *
        RESRVR [ 2 : 1100] 0011  1  5.0    76.47     .27 13.42  10.61  n/a    .000
        {ST=   .45 ha.m }
   *
        ADD [0203 + 1201]   1202  3  5.0    63.80    1.67 12.33  29.19  n/a    .000
   *
```

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	ADD [0014 + 0017]	1230	3	5.0	40.24	.65	12.08	23.13	n/a	.000
*											
	ADD [1230 + 0020]	1231	3	5.0	84.51	.65	12.08	14.56	n/a	.000
*											
	CHANNEL[2 : 1233]	1207	1	5.0	97.93	.97	12.25	19.53	n/a	.000
*											
	CHANNEL[2 : 1240]	1215	1	5.0	80.94	.40	13.08	18.26	n/a	.000
*											
	ADD [1214 + 1204]	0200	3	5.0	343.23	3.02	13.08	11.63	n/a	.000
*											
	ADD [0010 + 0015]	1238	3	5.0	82.67	.41	13.58	17.98	n/a	.000
*											
	CHANNEL[2 : 0011]	1211	1	5.0	76.47	.27	13.58	10.61	n/a	.000
*											
	ADD [0204 + 1202]	1203	3	5.0	74.69	1.72	12.33	26.55	n/a	.000
*											
	CHANNEL[2 : 1231]	1208	1	5.0	84.51	.62	12.25	14.55	n/a	.000
*											
	ADD [1238 + 1211]	1236	3	5.0	159.14	.67	13.58	14.44	n/a	.000
*											
	RESRVR [2 : 1203]	0016	1	5.0	74.69	.25	15.33	26.49	n/a	.000
	{ST= 1.28 ha.m }										
*											
	ADD [0009 + 1208]	1229	3	5.0	161.33	1.94	12.17	15.48	n/a	.000
*											
	ADD [0013 + 1236]	1239	3	5.0	352.15	3.02	13.17	15.56	n/a	.000
*											
	ADD [1229 + 1207]	1232	3	5.0	259.26	2.92	12.25	17.01	n/a	.000
*											
	CHANNEL[2 : 1239]	1209	1	5.0	352.15	2.96	13.33	15.56	n/a	.000
*											
	ADD [1232 + 1206]	1228	3	5.0	315.58	4.30	12.25	18.14	n/a	.000
*											
	ADD [1210 + 1209]	0300	3	5.0	408.92	3.50	13.33	15.25	n/a	.000
*											
	ADD [1228 + 0006]	1227	3	5.0	328.82	4.45	12.25	17.85	n/a	.000
*											
	CHANNEL[2 : 1227]	1216	1	5.0	328.82	4.42	12.33	17.85	n/a	.000
*											
	ADD [0016 + 1216]	1226	3	5.0	403.52	4.48	12.33	19.45	n/a	.000
*											
	CHANNEL[2 : 1226]	1205	1	5.0	403.52	4.20	12.50	19.44	n/a	.000
*											
	ADD [1205 + 0005]	1237	3	5.0	479.76	4.88	12.50	18.07	n/a	.000
*											
	ADD [1237 + 1215]	1234	3	5.0	560.70	5.18	12.58	18.09	n/a	.000
*											
	CHANNEL[2 : 1234]	1212	1	5.0	560.70	4.82	12.83	18.09	n/a	.000
*											
	ADD [1212 + 1213]	0100	3	5.0	616.00	5.44	12.83	17.63	n/a	.000
*											

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

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ .00 hrs								

	MASS STORM		10.0						
	[Ptot= 50.19 mm]								
*									
**	CALIB NASHYD	0204 1	8.0	10.89	.05	13.20	6.36	.13	.000
	[CN=54.3]								
	[N = 3.0:Tp .73]								
*									
**	CALIB STANDHYD	0203 1	5.0	14.52	.23	12.17	18.10	.36	.000
	[I%=25.0:S%= 2.00]								
*									
**	CALIB STANDHYD	0201 1	5.0	47.41	.95	12.33	22.48	.45	.000
	[I%=35.0:S%= 2.00]								
*									
**	CALIB NASHYD	0202 1	5.0	1.87	.01	12.75	6.60	.13	.000
	[CN=49.0]								
	[N = 3.0:Tp .48]								
*									
*	CALIB STANDHYD	0009 1	5.0	76.82	1.02	12.17	12.72	.25	.000
	[I%=26.4:S%= 1.34]								
*									
*	CALIB STANDHYD	0014 1	5.0	21.40	.46	12.08	19.32	.39	.000
	[I%=40.1:S%= 1.16]								
*									
*	CALIB STANDHYD	1700 1	5.0	18.84	.34	12.08	16.14	.32	.000
	[I%=33.5:S%= 2.02]								
*									
*	CALIB STANDHYD	2000 1	5.0	44.27	.55	12.08	11.13	.22	.000
	[I%=23.1:S%= 5.00]								
*									

```
   *   CALIB STANDHYD     1900  1  5.0   64.29     .83 12.25  12.53  .25    .000
       [I%=26.0:S%= 2.02]
   *
   *   CALIB STANDHYD     0008  1  5.0   33.64     .73 12.08  19.90  .40    .000
       [I%=41.3:S%= 1.34]
   *
   *   CALIB STANDHYD     0007  1  5.0   56.32    1.08 12.17  17.97  .36    .000
       [I%=37.3:S%= 1.34]
   *
   *   CALIB NASHYD       0006  1 10.0   13.24     .09 12.33   6.45  .13    .000
       [CN=51.9         ]
       [ N = 3.0:Tp  .20]
   *
   *   CALIB NASHYD       0005  1 10.0   76.24     .42 12.83   6.33  .13    .000
       [CN=51.4         ]
       [ N = 3.0:Tp  .49]
   *
   *   CALIB STANDHYD     1800  1  5.0   40.65     .88 12.17  20.48  .41    .000
       [I%=42.5:S%= 2.02]
   *
   *   CALIB NASHYD       0004  1 10.0   40.29     .19 13.00   5.98  .12    .000
       [CN=50.1         ]
       [ N = 3.0:Tp  .61]
   *
   *   CALIB NASHYD       0003  1 10.0   55.30     .37 12.83   7.67  .15    .000
       [CN=57.0         ]
       [ N = 3.0:Tp  .50]
   *
   *   CALIB NASHYD       0001  1 10.0   48.14     .38 12.83   9.42  .19    .000
       [CN=62.5         ]
       [ N = 3.0:Tp  .60]
   *
   *   CALIB NASHYD       0002  1 10.0  295.09    1.38 13.17   6.41  .13    .000
       [CN=52.4         ]
       [ N = 3.0:Tp  .76]
   *
   *   CALIB NASHYD       0012  1 10.0   56.77     .40 12.83   7.96  .16    .000
       [CN=57.2         ]
       [ N = 3.0:Tp  .50]
   *
   *   CALIB NASHYD       0013  1 10.0  193.01    1.41 13.17   9.97  .20    .000
       [CN=64.2         ]
       [ N = 3.0:Tp  .80]
   *
   *   CALIB STANDHYD     1000  1  5.0   69.17     .91 12.25  12.82  .26    .000
       [I%=26.6:S%= 2.02]
   *
   *   CALIB STANDHYD     1500  1  5.0   13.50     .30 12.00  19.28  .38    .000
       [I%=40.0:S%= 2.02]
   *
   *   CALIB STANDHYD     1100  1  5.0   76.47     .64 12.25   8.19  .16    .000
       [I%=17.0:S%= 2.02]
   *
       ADD [0201 + 0202]  1201  3  5.0   49.28     .96 12.33  21.88  n/a    .000
   *
       RESRVR [ 2 : 1700] 0017  1  5.0   18.84     .07 13.67  16.11  n/a    .000
       {ST=   .17 ha.m }
   *
       RESRVR [ 2 : 2000] 0020  1  5.0   44.27     .01 24.25   5.22  n/a    .000
       {ST=   .47 ha.m }
   *
       RESRVR [ 2 : 1900] 0019  1  5.0   64.29     .09 14.92  12.51  n/a    .000
       {ST=   .54 ha.m }
   *
       ADD [0019 + 0008]  1233  3  5.0   97.93     .79 12.08  15.05  n/a    .000
   *
       CHANNEL[ 2 : 0007] 1206  1  5.0   56.32    1.05 12.33  17.97  n/a    .000
   *
       RESRVR [ 2 : 1800] 0018  1  5.0   40.65     .07 16.25  20.15  n/a    .000
       {ST=   .60 ha.m }
   *
       ADD [0018 + 0004]  1240  3  5.0   80.94     .26 13.00  13.09  n/a    .000
   *
       CHANNEL[ 2 : 0003] 1213  1  5.0   55.30     .36 12.92   7.67  n/a    .000
   *
       CHANNEL[ 2 : 0001] 1214  1  5.0   48.14     .37 13.00   9.41  n/a    .000
   *
       CHANNEL[ 2 : 0002] 1204  1  5.0  295.09    1.37 13.25   6.41  n/a    .000
   *
       CHANNEL[ 2 : 0012] 1210  1  5.0   56.77     .31 13.25   7.95  n/a    .000
   *
       RESRVR [ 2 : 1000] 0010  1  5.0   69.17     .19 13.92  12.80  n/a    .000
       {ST=   .54 ha.m }
   *
       RESRVR [ 2 : 1500] 0015  1  5.0   13.50     .08 13.17  19.25  n/a    .000
       {ST=   .13 ha.m }
   *
       RESRVR [ 2 : 1100] 0011  1  5.0   76.47     .18 13.67   8.18  n/a    .000
       {ST=   .37 ha.m }
```

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```
*
      ADD [0203 + 1201]  1202  3  5.0   63.80    1.18 12.25  21.02  n/a    .000
*
      ADD [0014 + 0017]  1230  3  5.0   40.24     .50 12.08  17.82  n/a    .000
*
      ADD [1230 + 0020]  1231  3  5.0   84.51     .50 12.08  11.22  n/a    .000
*
      CHANNEL[ 2 : 1233] 1207  1  5.0   97.93     .75 12.33  15.05  n/a    .000
*
      CHANNEL[ 2 : 1240] 1215  1  5.0   80.94     .25 13.17  13.09  n/a    .000
*
      ADD [1214 + 1204]  0200  3  5.0  343.23    1.73 13.17   6.83  n/a    .000
*
      ADD [0010 + 0015]  1238  3  5.0   82.67     .27 13.75  13.85  n/a    .000
*
      CHANNEL[ 2 : 0011] 1211  1  5.0   76.47     .17 13.92   8.17  n/a    .000
*
      ADD [0204 + 1202]  1203  3  5.0   74.69    1.20 12.33  18.88  n/a    .000
*
      CHANNEL[ 2 : 1231] 1208  1  5.0   84.51     .48 12.33  11.21  n/a    .000
*
      ADD [1238 + 1211]  1236  3  5.0  159.14     .45 13.83  11.13  n/a    .000
*
      RESRVR [ 2 : 1203] 0016  1  5.0   74.69     .15 16.50  18.83  n/a    .000
      {ST=   .96 ha.m }
*
      ADD [0009 + 1208]  1229  3  5.0  161.33    1.49 12.25  11.93  n/a    .000
*
      ADD [0013 + 1236]  1239  3  5.0  352.15    1.81 13.17  10.49  n/a    .000
*
      ADD [1229 + 1207]  1232  3  5.0  259.26    2.24 12.25  13.11  n/a    .000
*
      CHANNEL[ 2 : 1239] 1209  1  5.0  352.15    1.77 13.42  10.49  n/a    .000
*
      ADD [1232 + 1206]  1228  3  5.0  315.58    3.30 12.25  13.98  n/a    .000
*
      ADD [1210 + 1209]  0300  3  5.0  408.92    2.07 13.42  10.14  n/a    .000
*
      ADD [1228 + 0006]  1227  3  5.0  328.82    3.38 12.25  13.67  n/a    .000
*
      CHANNEL[ 2 : 1227] 1216  1  5.0  328.82    3.37 12.33  13.67  n/a    .000
*
      ADD [0016 + 1216]  1226  3  5.0  403.52    3.42 12.33  14.63  n/a    .000
*
      CHANNEL[ 2 : 1226] 1205  1  5.0  403.52    3.16 12.58  14.62  n/a    .000
*
      ADD [1205 + 0005]  1237  3  5.0  479.76    3.56 12.58  13.30  n/a    .000
*
      ADD [1237 + 1215]  1234  3  5.0  560.70    3.75 12.58  13.27  n/a    .000
*
      CHANNEL[ 2 : 1234] 1212  1  5.0  560.70    3.45 12.83  13.27  n/a    .000
*
      ADD [1212 + 1213]  0100  3  5.0  616.00    3.81 12.83  12.77  n/a    .000
*
  ****************************
  ** SIMULATION NUMBER:   6 **
  ****************************

  W/E COMMAND              HYD ID   DT     AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM               10.0
      [ Ptot= 77.31 mm ]
*
  **  CALIB NASHYD       0204  1  8.0   10.89     .22  2.27  16.12  .21    .000
      [CN=54.3         ]
      [ N = 3.0:Tp  .73]
*
  *   CALIB STANDHYD     0203  1  5.0   14.52    1.68  1.33  32.83  .42    .000
      [I%=25.0:S%= 2.00]
*
  *   CALIB STANDHYD     0201  1  5.0   47.41    6.79  1.33  39.15  .51    .000
      [I%=35.0:S%= 2.00]
*
  *   CALIB NASHYD       0202  1  5.0    1.87     .05  1.92  15.53  .20    .000
      [CN=49.0         ]
      [ N = 3.0:Tp  .48]
*
  *   CALIB STANDHYD     0009  1  5.0   76.82    7.68  1.33  19.88  .26    .000
      [I%=26.4:S%= 1.34]
*
  *   CALIB STANDHYD     0014  1  5.0   21.40    3.59  1.33  31.63  .41    .000
      [I%=40.1:S%= 1.16]
*
  *   CALIB STANDHYD     1700  1  5.0   18.84    2.64  1.33  28.09  .36    .000
      [I%=33.5:S%= 2.02]
*
```

```
   *   CALIB STANDHYD     2000  1  5.0   44.27    4.34  1.33  19.96  .26    .000
       [I%=23.1:S%= 5.00]
   *
   *   CALIB STANDHYD     1900  1  5.0   64.29    6.17  1.33  20.96  .27    .000
       [I%=26.0:S%= 2.02]
   *
   *   CALIB STANDHYD     0008  1  5.0   33.64    5.64  1.33  31.52  .41    .000
       [I%=41.3:S%= 1.34]
   *
   *   CALIB STANDHYD     0007  1  5.0   56.32    8.29  1.33  28.09  .36    .000
       [I%=37.3:S%= 1.34]
   *
   *   CALIB NASHYD       0006  1 10.0   13.24     .57  1.50  15.36  .20    .000
       [CN=51.9         ]
       [ N = 3.0:Tp  .20]
   *
   *   CALIB NASHYD       0005  1 10.0   76.24    1.92  1.83  15.26  .20    .000
       [CN=51.4         ]
       [ N = 3.0:Tp  .49]
   *
   *   CALIB STANDHYD     1800  1  5.0   40.65    6.67  1.33  32.01  .41    .000
       [I%=42.5:S%= 2.02]
   *
   *   CALIB NASHYD       0004  1 10.0   40.29     .84  2.00  14.54  .19    .000
       [CN=50.1         ]
       [ N = 3.0:Tp  .61]
   *
   *   CALIB NASHYD       0003  1 10.0   55.30    1.65  1.83  18.15  .24    .000
       [CN=57.0         ]
       [ N = 3.0:Tp  .50]
   *
   *   CALIB NASHYD       0001  1 10.0   48.14    1.56  2.00  21.64  .28    .000
       [CN=62.5         ]
       [ N = 3.0:Tp  .60]
   *
   *   CALIB NASHYD       0002  1 10.0  295.09    5.73  2.33  15.55  .20    .000
       [CN=52.4         ]
       [ N = 3.0:Tp  .76]
   *
   *   CALIB NASHYD       0012  1 10.0   56.77    1.74  1.83  18.58  .24    .000
       [CN=57.2         ]
       [ N = 3.0:Tp  .50]
   *
   *   CALIB NASHYD       0013  1 10.0  193.01    5.41  2.33  22.75  .30    .000
       [CN=64.2         ]
       [ N = 3.0:Tp  .80]
   *
   *   CALIB STANDHYD     1000  1  5.0   69.17    6.73  1.33  21.13  .27    .000
       [I%=26.6:S%= 2.02]
   *
   *   CALIB STANDHYD     1500  1  5.0   13.50    2.39  1.33  37.62  .49    .000
       [I%=40.0:S%= 2.02]
   *
   *   CALIB STANDHYD     1100  1  5.0   76.47    4.71  1.33  12.80  .17    .000
       [I%=17.0:S%= 2.02]
   *
       ADD [0201 + 0202]  1201  3  5.0   49.28    6.80  1.33  38.25  n/a    .000
   *
       RESRVR [ 2 : 1700] 0017  1  5.0   18.84     .38  1.83  28.06  n/a    .000
       {ST=   .30 ha.m }
   *
       RESRVR [ 2 : 2000] 0020  1  5.0   44.27     .01  9.92   9.99  n/a    .000
       {ST=   .84 ha.m }
   *
       RESRVR [ 2 : 1900] 0019  1  5.0   64.29     .13  4.08  20.94  n/a    .000
       {ST=  1.15 ha.m }
   *
       ADD [0019 + 0008]  1233  3  5.0   97.93    5.72  1.33  24.58  n/a    .000
   *
       CHANNEL[ 2 : 0007] 1206  1  5.0   56.32    6.68  1.42  28.09  n/a    .000
   *
       RESRVR [ 2 : 1800] 0018  1  5.0   40.65     .09  4.08  31.65  n/a    .000
       {ST=  1.21 ha.m }
   *
       ADD [0018 + 0004]  1240  3  5.0   80.94     .92  2.00  23.13  n/a    .000
   *
       CHANNEL[ 2 : 0003] 1213  1  5.0   55.30    1.61  2.00  18.15  n/a    .000
   *
       CHANNEL[ 2 : 0001] 1214  1  5.0   48.14    1.55  2.08  21.64  n/a    .000
   *
       CHANNEL{ 2 : 0002] 1204  1  5.0  295.09    5.72  2.33  15.55  n/a    .000
   *
       CHANNEL[ 2 : 0012] 1210  1  5.0   56.77    1.39  2.33  18.57  n/a    .000
   *
       RESRVR [ 2 : 1000] 0010  1  5.0   69.17     .79  2.08  21.11  n/a    .000
       {ST=   .96 ha.m }
   *
       RESRVR [ 2 : 1500] 0015  1  5.0   13.50     .21  2.83  37.59  n/a    .000
       {ST=   .32 ha.m }
```

100-YEAR CH1

```
*
      RESRVR [ 2 : 1100] 0011  1  5.0   76.47     .52  2.08  12.79  n/a    .000
      {ST=   .66 ha.m }
*
      ADD [0203 + 1201]  1202  3  5.0   63.80    8.48  1.33  37.01  n/a    .000
*
      ADD [0014 + 0017]  1230  3  5.0   40.24    3.68  1.33  29.96  n/a    .000
*
      ADD [1230 + 0020]  1231  3  5.0   84.51    3.68  1.33  19.50  n/a    .000
*
      CHANNEL[ 2 : 1233] 1207  1  5.0   97.93    4.22  1.42  24.58  n/a    .000
*
      CHANNEL[ 2 : 1240] 1215  1  5.0   80.94     .89  2.25  23.13  n/a    .000
*
      ADD [1214 + 1204]  0200  3  5.0  343.23    7.18  2.25  16.40  n/a    .000
*
      ADD [0010 + 0015]  1238  3  5.0   82.67     .99  2.08  23.80  n/a    .000
*
      CHANNEL[ 2 : 0011] 1211  1  5.0   76.47     .51  2.33  12.79  n/a    .000
*
      ADD [0204 + 1202]  1203  3  5.0   74.69    8.50  1.33  33.97  n/a    .000
*
      CHANNEL[ 2 : 1231] 1208  1  5.0   84.51    2.71  1.42  19.48  n/a    .000
*
      ADD [1238 + 1211]  1236  3  5.0  159.14    1.49  2.17  18.51  n/a    .000
*
      RESRVR [ 2 : 1203] 0016  1  5.0   74.69     .61  4.00  33.93  n/a    .000
      {ST=  1.99 ha.m }
*
      ADD [0009 + 1208]  1229  3  5.0  161.33   10.04  1.33  19.67  n/a    .000
*
      ADD [0013 + 1236]  1239  3  5.0  352.15    6.87  2.33  20.83  n/a    .000
*
      ADD [1229 + 1207]  1232  3  5.0  259.26   13.76  1.33  21.53  n/a    .000
*
      CHANNEL[ 2 : 1239] 1209  1  5.0  352.15    6.76  2.42  20.83  n/a    .000
*
      ADD [1232 + 1206]  1228  3  5.0  315.58   20.39  1.33  22.70  n/a    .000
*
      ADD [1210 + 1209]  0300  3  5.0  408.92    8.13  2.42  20.52  n/a    .000
*
      ADD [1228 + 0006]  1227  3  5.0  328.82   20.84  1.33  22.40  n/a    .000
*
      CHANNEL[ 2 : 1227] 1216  1  5.0  328.82   19.41  1.50  22.40  n/a    .000
*
      ADD [0016 + 1216]  1226  3  5.0  403.52   19.55  1.50  24.53  n/a    .000
*
      CHANNEL[ 2 : 1226] 1205  1  5.0  403.52   15.19  1.67  24.53  n/a    .000
*
      ADD [1205 + 0005]  1237  3  5.0  479.76   16.90  1.67  23.05  n/a    .000
*
      ADD [1237 + 1215]  1234  3  5.0  560.70   17.36  1.67  23.06  n/a    .000
*
      CHANNEL[ 2 : 1234] 1212  1  5.0  560.70   13.38  2.08  23.06  n/a    .000
*
      ADD [1212 + 1213]  0100  3  5.0  616.00   14.98  2.08  22.62  n/a    .000
*
  ****************************
  ** SIMULATION NUMBER:   7 **
  ****************************

  W/E COMMAND              HYD ID   DT     AREA    Qpeak Tpeak   R.V. R.C.   Qbase
                                    min      ha      cms   hrs     mm          cms

      START @   .00 hrs
      ---------------------
      CHIC STORM                  10.0
      [ Ptot= 63.96 mm ]
*
  **  CALIB NASHYD       0204  1  8.0   10.89     .15  2.27  10.87  .17    .000
      [CN=54.3         ]
      [ N = 3.0:Tp  .73]
*
  *   CALIB STANDHYD     0203  1  5.0   14.52    1.31  1.33  25.26  .39    .000
      [I%=25.0:S%= 2.00]
*
  *   CALIB STANDHYD     0201  1  5.0   47.41    5.32  1.33  30.67  .48    .000
      [I%=35.0:S%= 2.00]
*
  *   CALIB NASHYD       0202  1  5.0    1.87     .03  1.92  10.75  .17    .000
      [CN=49.0         ]
      [ N = 3.0:Tp  .48]
*
  *   CALIB STANDHYD     0009  1  5.0   76.82    6.11  1.33  16.36  .26    .000
      [I%=26.4:S%= 1.34]
*
  *   CALIB STANDHYD     0014  1  5.0   21.40    2.88  1.33  24.84  .39    .000
      [I%=40.1:S%= 1.16]
*
```

*	CALIB STANDHYD [I%=33.5:S%= 2.02]	1700	1	5.0	18.84	2.12	1.33	20.76	.32	.000
*	CALIB STANDHYD [I%=23.1:S%= 5.00]	2000	1	5.0	44.27	3.49	1.33	14.31	.22	.000
*	CALIB STANDHYD [I%=26.0:S%= 2.02]	1900	1	5.0	64.29	4.39	1.42	16.11	.25	.000
*	CALIB STANDHYD [I%=41.3:S%= 1.34]	0008	1	5.0	33.64	4.52	1.33	25.59	.40	.000
*	CALIB STANDHYD [I%=37.3:S%= 1.34]	0007	1	5.0	56.32	6.62	1.33	23.11	.36	.000
*	CALIB NASHYD [CN=51.9] [N = 3.0:Tp .20]	0006	1	10.0	13.24	.39	1.50	10.53	.17	.000
*	CALIB NASHYD [CN=51.4] [N = 3.0:Tp .49]	0005	1	10.0	76.24	1.32	2.00	10.41	.16	.000
*	CALIB STANDHYD [I%=42.5:S%= 2.02]	1800	1	5.0	40.65	5.31	1.33	26.33	.41	.000
*	CALIB NASHYD [CN=50.1] [N = 3.0:Tp .61]	0004	1	10.0	40.29	.58	2.17	9.89	.16	.000
*	CALIB NASHYD [CN=57.0] [N = 3.0:Tp .50]	0003	1	10.0	55.30	1.15	2.00	12.50	.20	.000
*	CALIB NASHYD [CN=62.5] [N = 3.0:Tp .60]	0001	1	10.0	48.14	1.10	2.00	15.09	.24	.000
*	CALIB NASHYD [CN=52.4] [N = 3.0:Tp .76]	0002	1	10.0	295.09	3.96	2.33	10.59	.17	.000
*	CALIB NASHYD [CN=57.2] [N = 3.0:Tp .50]	0012	1	10.0	56.77	1.21	2.00	12.86	.20	.000
*	CALIB NASHYD [CN=64.2] [N = 3.0:Tp .80]	0013	1	10.0	193.01	3.82	2.33	15.92	.25	.000
*	CALIB STANDHYD [I%=26.6:S%= 2.02]	1000	1	5.0	69.17	4.80	1.42	16.48	.26	.000
*	CALIB STANDHYD [I%=40.0:S%= 2.02]	1500	1	5.0	13.50	1.92	1.33	28.84	.45	.000
*	CALIB STANDHYD [I%=17.0:S%= 2.02]	1100	1	5.0	76.47	3.36	1.42	10.53	.16	.000
	ADD [0201 + 0202]	1201	3	5.0	49.28	5.33	1.33	29.91	n/a	.000
	RESRVR [2 : 1700] {ST= .26 ha.m }	0017	1	5.0	18.84	.28	1.92	20.73	n/a	.000
	RESRVR [2 : 2000] {ST= .63 ha.m }	0020	1	5.0	44.27	.01	4.17	7.05	n/a	.000
	RESRVR [2 : 1900] {ST= .92 ha.m }	0019	1	5.0	64.29	.11	4.08	16.09	n/a	.000
	ADD [0019 + 0008]	1233	3	5.0	97.93	4.58	1.33	19.35	n/a	.000
	CHANNEL[2 : 0007]	1206	1	5.0	56.32	5.42	1.42	23.11	n/a	.000
	RESRVR [2 : 1800] {ST= .99 ha.m }	0018	1	5.0	40.65	.08	4.08	26.02	n/a	.000
	ADD [0018 + 0004]	1240	3	5.0	80.94	.65	2.17	17.99	n/a	.000
	CHANNEL[2 : 0003]	1213	1	5.0	55.30	1.11	2.08	12.49	n/a	.000
	CHANNEL[2 : 0001]	1214	1	5.0	48.14	1.09	2.08	15.09	n/a	.000
	CHANNEL[2 : 0002]	1204	1	5.0	295.09	3.93	2.33	10.59	n/a	.000
	CHANNEL[2 : 0012]	1210	1	5.0	56.77	.94	2.33	12.85	n/a	.000
	RESRVR [2 : 1000] {ST= .84 ha.m }	0010	1	5.0	69.17	.45	2.42	16.46	n/a	.000

25-YEAR CH1

```
*
      RESRVR [ 2 : 1500] 0015  1  5.0   13.50     .16  2.67  28.81  n/a    .000
      {ST=   .24 ha.m }
*
      RESRVR [ 2 : 1100] 0011  1  5.0   76.47     .40  2.25  10.52  n/a    .000
      {ST=   .56 ha.m }
*
      ADD [0203 + 1201]  1202  3  5.0   63.80    6.64  1.33  28.85  n/a    .000
*
      ADD [0014 + 0017]  1230  3  5.0   40.24    2.95  1.33  22.92  n/a    .000
*
      ADD [1230 + 0020]  1231  3  5.0   84.51    2.95  1.33  14.61  n/a    .000
*
      CHANNEL[ 2 : 1233] 1207  1  5.0   97.93    3.38  1.42  19.35  n/a    .000
*
      CHANNEL[ 2 : 1240] 1215  1  5.0   80.94     .63  2.25  17.98  n/a    .000
*
      ADD [1214 + 1204]  0200  3  5.0  343.23    4.96  2.33  11.22  n/a    .000
*
      ADD [0010 + 0015]  1238  3  5.0   82.67     .61  2.50  18.48  n/a    .000
*
      CHANNEL[ 2 : 0011] 1211  1  5.0   76.47     .39  2.50  10.52  n/a    .000
*
      ADD [0204 + 1202]  1203  3  5.0   74.69    6.65  1.33  26.23  n/a    .000
*
      CHANNEL[ 2 : 1231] 1208  1  5.0   84.51    2.15  1.42  14.60  n/a    .000
*
      ADD [1238 + 1211]  1236  3  5.0  159.14    1.00  2.50  14.65  n/a    .000
*
      RESRVR [ 2 : 1203] 0016  1  5.0   74.69     .43  4.00  26.20  n/a    .000
      {ST=  1.59 ha.m }
*
      ADD [0009 + 1208]  1229  3  5.0  161.33    7.96  1.33  15.43  n/a    .000
*
      ADD [0013 + 1236]  1239  3  5.0  352.15    4.82  2.33  15.35  n/a    .000
*
      ADD [1229 + 1207]  1232  3  5.0  259.26   10.86  1.33  16.91  n/a    .000
*
      CHANNEL[ 2 : 1239] 1209  1  5.0  352.15    4.72  2.50  15.35  n/a    .000
*
      ADD [1232 + 1206]  1228  3  5.0  315.58   16.05  1.33  18.02  n/a    .000
*
      ADD [1210 + 1209]  0300  3  5.0  408.92    5.63  2.50  15.00  n/a    .000
*
      ADD [1228 + 0006]  1227  3  5.0  328.82   16.33  1.33  17.72  n/a    .000
*
      CHANNEL[ 2 : 1227] 1216  1  5.0  328.82   16.17  1.42  17.72  n/a    .000
*
      ADD [0016 + 1216]  1226  3  5.0  403.52   16.23  1.42  19.29  n/a    .000
*
      CHANNEL[ 2 : 1226] 1205  1  5.0  403.52   12.18  1.67  19.28  n/a    .000
*
      ADD [1205 + 0005]  1237  3  5.0  479.76   13.33  1.67  17.87  n/a    .000
*
      ADD [1237 + 1215]  1234  3  5.0  560.70   13.62  1.67  17.89  n/a    .000
*
      CHANNEL[ 2 : 1234] 1212  1  5.0  560.70   10.87  2.00  17.88  n/a    .000
*
      ADD [1212 + 1213]  0100  3  5.0  616.00   11.98  2.00  17.40  n/a    .000
*
  ****************************
  ** SIMULATION NUMBER:   8 **
  ****************************

  W/E COMMAND              HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                    min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      CHIC STORM                   10.0
      [ Ptot= 45.63 mm ]
*
  **  CALIB NASHYD       0204  1  8.0   10.89     .07  2.40   5.09  .11    .000
      [CN=54.3         ]
      [ N = 3.0:Tp  .73]
*
  **  CALIB STANDHYD     0203  1  5.0   14.52     .89  1.33  15.89  .35    .000
      [I%=25.0:S%= 2.00]
*
  **  CALIB STANDHYD     0201  1  5.0   47.41    3.31  1.42  19.92  .44    .000
      [I%=35.0:S%= 2.00]
*
  **  CALIB NASHYD       0202  1  5.0    1.87     .02  1.92   5.41  .12    .000
      [CN=49.0         ]
      [ N = 3.0:Tp  .48]
*
  *   CALIB STANDHYD     0009  1  5.0   76.82    3.84  1.42  11.52  .25    .000
      [I%=26.4:S%= 1.34]
*
```

```
*   CALIB STANDHYD     0014  1  5.0   21.40    2.05  1.33  17.50  .38    .000
    [I%=40.1:S%= 1.16]
*
*   CALIB STANDHYD     1700  1  5.0   18.84    1.51  1.33  14.62  .32    .000
    [I%=33.5:S%= 2.02]
*
*   CALIB STANDHYD     2000  1  5.0   44.27    2.49  1.33  10.08  .22    .000
    [I%=23.1:S%= 5.00]
*
*   CALIB STANDHYD     1900  1  5.0   64.29    3.09  1.42  11.34  .25    .000
    [I%=26.0:S%= 2.02]
*
*   CALIB STANDHYD     0008  1  5.0   33.64    3.20  1.33  18.02  .39    .000
    [I%=41.3:S%= 1.34]
*
*   CALIB STANDHYD     0007  1  5.0   56.32    4.66  1.33  16.28  .36    .000
    [I%=37.3:S%= 1.34]
*
*   CALIB NASHYD       0006  1 10.0   13.24     .18  1.50   5.14  .11    .000
    [CN=51.9         ]
    [ N = 3.0:Tp  .20]
*
*   CALIB NASHYD       0005  1 10.0   76.24     .62  2.00   5.02  .11    .000
    [CN=51.4         ]
    [ N = 3.0:Tp  .49]
*
*   CALIB STANDHYD     1800  1  5.0   40.65    3.32  1.42  18.54  .41    .000
    [I%=42.5:S%= 2.02]
*
*   CALIB NASHYD       0004  1 10.0   40.29     .27  2.17   4.73  .10    .000
    [CN=50.1         ]
    [ N = 3.0:Tp  .61]
*
*   CALIB NASHYD       0003  1 10.0   55.30     .55  2.00   6.12  .14    .000
    [CN=57.0         ]
    [ N = 3.0:Tp  .50]
*
*   CALIB NASHYD       0001  1 10.0   48.14     .53  2.00   7.56  .17    .000
    [CN=62.5         ]
    [ N = 3.0:Tp  .60]
*
*   CALIB NASHYD       0002  1 10.0  295.09    1.86  2.33   5.07  .11    .000
    [CN=52.4         ]
    [ N = 3.0:Tp  .76]
*
*   CALIB NASHYD       0012  1 10.0   56.77     .59  2.00   6.37  .14    .000
    [CN=57.2         ]
    [ N = 3.0:Tp  .50]
*
*   CALIB NASHYD       0013  1 10.0  193.01    1.89  2.33   8.02  .18    .000
    [CN=64.2         ]
    [ N = 3.0:Tp  .80]
*
*   CALIB STANDHYD     1000  1  5.0   69.17    3.38  1.42  11.61  .25    .000
    [I%=26.6:S%= 2.02]
*
*   CALIB STANDHYD     1500  1  5.0   13.50    1.38  1.33  17.45  .38    .000
    [I%=40.0:S%= 2.02]
*
*   CALIB STANDHYD     1100  1  5.0   76.47    2.36  1.42   7.42  .16    .000
    [I%=17.0:S%= 2.02]
*
    ADD [0201 + 0202]  1201  3  5.0   49.28    3.32  1.42  19.37  n/a    .000
*
    RESRVR [ 2 : 1700] 0017  1  5.0   18.84     .13  2.17  14.59  n/a    .000
    {ST=   .20 ha.m }
*
    RESRVR [ 2 : 2000] 0020  1  5.0   44.27     .01  4.25   4.97  n/a    .000
    {ST=   .44 ha.m }
*
    RESRVR [ 2 : 1900] 0019  1  5.0   64.29     .09  4.08  11.33  n/a    .000
    {ST=   .63 ha.m }
*
    ADD [0019 + 0008]  1233  3  5.0   97.93    3.24  1.33  13.63  n/a    .000
*
    CHANNEL[ 2 : 0007] 1206  1  5.0   56.32    3.79  1.42  16.27  n/a    .000
*
    RESRVR [ 2 : 1800] 0018  1  5.0   40.65     .07  4.08  18.28  n/a    .000
    {ST=   .68 ha.m }
*
    ADD [0018 + 0004]  1240  3  5.0   80.94     .34  2.17  11.54  n/a    .000
*
    CHANNEL[ 2 : 0003] 1213  1  5.0   55.30     .52  2.08   6.11  n/a    .000
*
    CHANNEL[ 2 : 0001] 1214  1  5.0   48.14     .53  2.17   7.56  n/a    .000
*
    CHANNEL[ 2 : 0002] 1204  1  5.0  295.09    1.84  2.42   5.07  n/a    .000
*
    CHANNEL[ 2 : 0012] 1210  1  5.0   56.77     .42  2.42   6.36  n/a    .000
```

5-YEAR CHI

```
*
      RESRVR [ 2 : 1000] 0010  1  5.0   69.17     .26  2.67  11.59  n/a    .000
      {ST=   .61 ha.m }
*
      RESRVR [ 2 : 1500] 0015  1  5.0   13.50     .11  2.17  17.43  n/a    .000
      {ST=   .16 ha.m }
*
      RESRVR [ 2 : 1100] 0011  1  5.0   76.47     .23  2.42   7.40  n/a    .000
      {ST=   .42 ha.m }
*
      ADD [0203 + 1201]  1202  3  5.0   63.80    3.98  1.33  18.58  n/a    .000
*
      ADD [0014 + 0017]  1230  3  5.0   40.24    2.10  1.33  16.14  n/a    .000
*
      ADD [1230 + 0020]  1231  3  5.0   84.51    2.10  1.33  10.28  n/a    .000
*
      CHANNEL[ 2 : 1233] 1207  1  5.0   97.93    2.33  1.42  13.63  n/a    .000
*
      CHANNEL[ 2 : 1240] 1215  1  5.0   80.94     .32  2.33  11.54  n/a    .000
*
      ADD [1214 + 1204]  0200  3  5.0  343.23    2.34  2.33   5.42  n/a    .000
*
      ADD [0010 + 0015]  1238  3  5.0   82.67     .36  2.58  12.54  n/a    .000
*
      CHANNEL[ 2 : 0011] 1211  1  5.0   76.47     .23  2.75   7.40  n/a    .000
*
      ADD [0204 + 1202]  1203  3  5.0   74.69    3.98  1.33  16.61  n/a    .000
*
      CHANNEL[ 2 : 1231] 1208  1  5.0   84.51    1.48  1.42  10.28  n/a    .000
*
      ADD [1238 + 1211]  1236  3  5.0  159.14     .59  2.67  10.07  n/a    .000
*
      RESRVR [ 2 : 1203] 0016  1  5.0   74.69     .18  4.17  16.58  n/a    .000
      {ST=  1.08 ha.m }
*
      ADD [0009 + 1208]  1229  3  5.0  161.33    5.31  1.42  10.87  n/a    .000
*
      ADD [0013 + 1236]  1239  3  5.0  352.15    2.46  2.33   8.95  n/a    .000
*
      ADD [1229 + 1207]  1232  3  5.0  259.26    7.64  1.42  11.91  n/a    .000
*
      CHANNEL[ 2 : 1239] 1209  1  5.0  352.15    2.40  2.58   8.95  n/a    .000
*
      ADD [1232 + 1206]  1228  3  5.0  315.58   11.43  1.42  12.69  n/a    .000
*
      ADD [1210 + 1209]  0300  3  5.0  408.92    2.81  2.58   8.59  n/a    .000
*
      ADD [1228 + 0006]  1227  3  5.0  328.82   11.58  1.42  12.38  n/a    .000
*
      CHANNEL[ 2 : 1227] 1216  1  5.0  328.82   10.97  1.42  12.38  n/a    .000
*
      ADD [0016 + 1216]  1226  3  5.0  403.52   11.01  1.42  13.16  n/a    .000
*
      CHANNEL[ 2 : 1226] 1205  1  5.0  403.52    8.22  1.58  13.16  n/a    .000
*
      ADD [1205 + 0005]  1237  3  5.0  479.76    8.66  1.58  11.88  n/a    .000
*
      ADD [1237 + 1215]  1234  3  5.0  560.70    8.73  1.58  11.83  n/a    .000
*
      CHANNEL[ 2 : 1234] 1212  1  5.0  560.70    6.58  1.83  11.83  n/a    .000
*
      ADD [1212 + 1213]  0100  3  5.0  616.00    7.01  1.83  11.31  n/a    .000
*
  ****************************
  ** SIMULATION NUMBER:   9 **
  ****************************

  W/E COMMAND              HYD ID   DT     AREA    Qpeak  Tpeak   R.V. R.C.   Qbase
                                    min      ha      cms    hrs      mm         cms

      START @   .00 hrs
      ---------------------
      CHIC STORM                  10.0
      [ Ptot= 33.77 mm ]
*
  **  CALIB NASHYD       0204  1  8.0   10.89     .03  2.40   2.38  .07    .000
      [CN=54.3         ]
      [ N = 3.0:Tp  .73]
*
  **  CALIB STANDHYD     0203  1  5.0   14.52     .65  1.33  10.57  .31    .000
      [I%=25.0:S%= 2.00]
*
  **  CALIB STANDHYD     0201  1  5.0   47.41    2.35  1.42  13.61  .40    .000
      [I%=35.0:S%= 2.00]
*
  **  CALIB NASHYD       0202  1  5.0    1.87     .01  1.92   2.82  .08    .000
      [CN=49.0         ]
      [ N = 3.0:Tp  .48]
*
```

```
*   CALIB STANDHYD     0009  1  5.0   76.82    2.81  1.42   8.39  .25    .000
    [I%=26.4:S%= 1.34]
*
*   CALIB STANDHYD     0014  1  5.0   21.40    1.52  1.33  12.74  .38    .000
    [I%=40.1:S%= 1.16]
*
*   CALIB STANDHYD     1700  1  5.0   18.84    1.11  1.33  10.64  .32    .000
    [I%=33.5:S%= 2.02]
*
*   CALIB STANDHYD     2000  1  5.0   44.27    1.84  1.33   7.34  .22    .000
    [I%=23.1:S%= 5.00]
*
*   CALIB STANDHYD     1900  1  5.0   64.29    2.26  1.42   8.26  .24    .000
    [I%=26.0:S%= 2.02]
*
*   CALIB STANDHYD     0008  1  5.0   33.64    2.35  1.33  13.12  .39    .000
    [I%=41.3:S%= 1.34]
*
*   CALIB STANDHYD     0007  1  5.0   56.32    3.03  1.42  11.85  .35    .000
    [I%=37.3:S%= 1.34]
*
*   CALIB NASHYD       0006  1 10.0   13.24     .09  1.50   2.56  .08    .000
    [CN=51.9        ]
    [ N = 3.0:Tp  .20]
*
*   CALIB NASHYD       0005  1 10.0   76.24     .30  2.00   2.46  .07    .000
    [CN=51.4        ]
    [ N = 3.0:Tp  .49]
*
*   CALIB STANDHYD     1800  1  5.0   40.65    2.44  1.42  13.50  .40    .000
    [I%=42.5:S%= 2.02]
*
*   CALIB NASHYD       0004  1 10.0   40.29     .13  2.17   2.30  .07    .000
    [CN=50.1        ]
    [ N = 3.0:Tp  .61]
*
*   CALIB NASHYD       0003  1 10.0   55.30     .26  2.00   3.03  .09    .000
    [CN=57.0        ]
    [ N = 3.0:Tp  .50]
*
*   CALIB NASHYD       0001  1 10.0   48.14     .26  2.17   3.84  .11    .000
    [CN=62.5        ]
    [ N = 3.0:Tp  .60]
*
*   CALIB NASHYD       0002  1 10.0  295.09     .88  2.33   2.46  .07    .000
    [CN=52.4        ]
    [ N = 3.0:Tp  .76]
*
*   CALIB NASHYD       0012  1 10.0   56.77     .29  2.00   3.21  .10    .000
    [CN=57.2        ]
    [ N = 3.0:Tp  .50]
*
*   CALIB NASHYD       0013  1 10.0  193.01     .94  2.33   4.09  .12    .000
    [CN=64.2        ]
    [ N = 3.0:Tp  .80]
*
*   CALIB STANDHYD     1000  1  5.0   69.17    2.46  1.42   8.45  .25    .000
    [I%=26.6:S%= 2.02]
*
*   CALIB STANDHYD     1500  1  5.0   13.50    1.03  1.33  12.71  .38    .000
    [I%=40.0:S%= 2.02]
*
*   CALIB STANDHYD     1100  1  5.0   76.47    1.72  1.42   5.40  .16    .000
    [I%=17.0:S%= 2.02]
*
    ADD [0201 + 0202]  1201  3  5.0   49.28    2.36  1.42  13.20  n/a    .000
*
    RESRVR [ 2 : 1700] 0017  1  5.0   18.84     .06  2.50  10.61  n/a    .000
    {ST=   .15 ha.m }
*
    RESRVR [ 2 : 2000] 0020  1  5.0   44.27     .00  4.25   3.62  n/a    .000
    {ST=   .32 ha.m }
*
    RESRVR [ 2 : 1900] 0019  1  5.0   64.29     .08  4.00   8.24  n/a    .000
    {ST=   .45 ha.m }
*
    ADD [0019 + 0008]  1233  3  5.0   97.93    2.37  1.33   9.92  n/a    .000
*
    CHANNEL[ 2 : 0007] 1206  1  5.0   56.32    2.58  1.50  11.85  n/a    .000
*
    RESRVR [ 2 : 1800] 0018  1  5.0   40.65     .07  4.08  13.28  n/a    .000
    {ST=   .48 ha.m }
*
    ADD [0018 + 0004]  1240  3  5.0   80.94     .19  2.17   7.81  n/a    .000
*
    CHANNEL[ 2 : 0003] 1213  1  5.0   55.30     .24  2.17   3.03  n/a    .000
*
    CHANNEL[ 2 : 0001] 1214  1  5.0   48.14     .26  2.25   3.84  n/a    .000
*
```

2-YEAR CHI

```
      CHANNEL[ 2 : 0002] 1204  1  5.0  295.09     .87  2.50   2.46  n/a    .000
*
      CHANNEL[ 2 : 0012] 1210  1  5.0   56.77     .19  2.58   3.20  n/a    .000
*
      RESRVR [ 2 : 1000] 0010  1  5.0   69.17     .14  3.08   8.44  n/a    .000
      {ST=   .47 ha.m }
*
      RESRVR [ 2 : 1500] 0015  1  5.0   13.50     .03  2.17  12.68  n/a    .000
      {ST=   .12 ha.m }
*
      RESRVR [ 2 : 1100] 0011  1  5.0   76.47     .13  2.75   5.38  n/a    .000
      {ST=   .32 ha.m }
*
      ADD [0203 + 1201]  1202  3  5.0   63.80    2.83  1.33  12.60  n/a    .000
*
      ADD [0014 + 0017]  1230  3  5.0   40.24    1.55  1.33  11.74  n/a    .000
*
      ADD [1230 + 0020]  1231  3  5.0   84.51    1.55  1.33   7.49  n/a    .000
*
      CHANNEL[ 2 : 1233] 1207  1  5.0   97.93    1.65  1.42   9.92  n/a    .000
*
      CHANNEL[ 2 : 1240] 1215  1  5.0   80.94     .18  2.50   7.81  n/a    .000
*
      ADD [1214 + 1204]  0200  3  5.0  343.23    1.12  2.42   2.65  n/a    .000
*
      ADD [0010 + 0015]  1238  3  5.0   82.67     .21  2.83   9.13  n/a    .000
*
      CHANNEL[ 2 : 0011] 1211  1  5.0   76.47     .12  3.00   5.38  n/a    .000
*
      ADD [0204 + 1202]  1203  3  5.0   74.69    2.83  1.33  11.11  n/a    .000
*
      CHANNEL[ 2 : 1231] 1208  1  5.0   84.51    1.05  1.42   7.48  n/a    .000
*
      ADD [1238 + 1211]  1236  3  5.0  159.14     .34  2.92   7.33  n/a    .000
*
      RESRVR [ 2 : 1203] 0016  1  5.0   74.69     .07  4.33  11.08  n/a    .000
      {ST=   .75 ha.m }
*
      ADD [0009 + 1208]  1229  3  5.0  161.33    3.86  1.42   7.91  n/a    .000
*
      ADD [0013 + 1236]  1239  3  5.0  352.15    1.26  2.50   5.55  n/a    .000
*
      ADD [1229 + 1207]  1232  3  5.0  259.26    5.51  1.42   8.67  n/a    .000
*
      CHANNEL[ 2 : 1239] 1209  1  5.0  352.15    1.21  2.75   5.55  n/a    .000
*
      ADD [1232 + 1206]  1228  3  5.0  315.58    8.07  1.42   9.24  n/a    .000
*
      ADD [1210 + 1209]  0300  3  5.0  408.92    1.40  2.75   5.23  n/a    .000
*
      ADD [1228 + 0006]  1227  3  5.0  328.82    8.14  1.42   8.97  n/a    .000
*
      CHANNEL[ 2 : 1227] 1216  1  5.0  328.82    7.83  1.50   8.97  n/a    .000
*
      ADD [0016 + 1216]  1226  3  5.0  403.52    7.87  1.50   9.36  n/a    .000
*
      CHANNEL[ 2 : 1226] 1205  1  5.0  403.52    5.60  1.67   9.36  n/a    .000
*
      ADD [1205 + 0005]  1237  3  5.0  479.76    5.84  1.67   8.26  n/a    .000
*
      ADD [1237 + 1215]  1234  3  5.0  560.70    5.89  1.67   8.20  n/a    .000
*
      CHANNEL[ 2 : 1234] 1212  1  5.0  560.70    4.33  1.92   8.19  n/a    .000
*
      ADD [1212 + 1213]  0100  3  5.0  616.00    4.53  1.92   7.73  n/a    .000
*
  ***************************
  ** SIMULATION NUMBER:  10 **
  ***************************

  W/E COMMAND              HYD ID   DT     AREA    Qpeak  Tpeak   R.V. R.C.   Qbase
                                   min      ha      cms    hrs      mm          cms

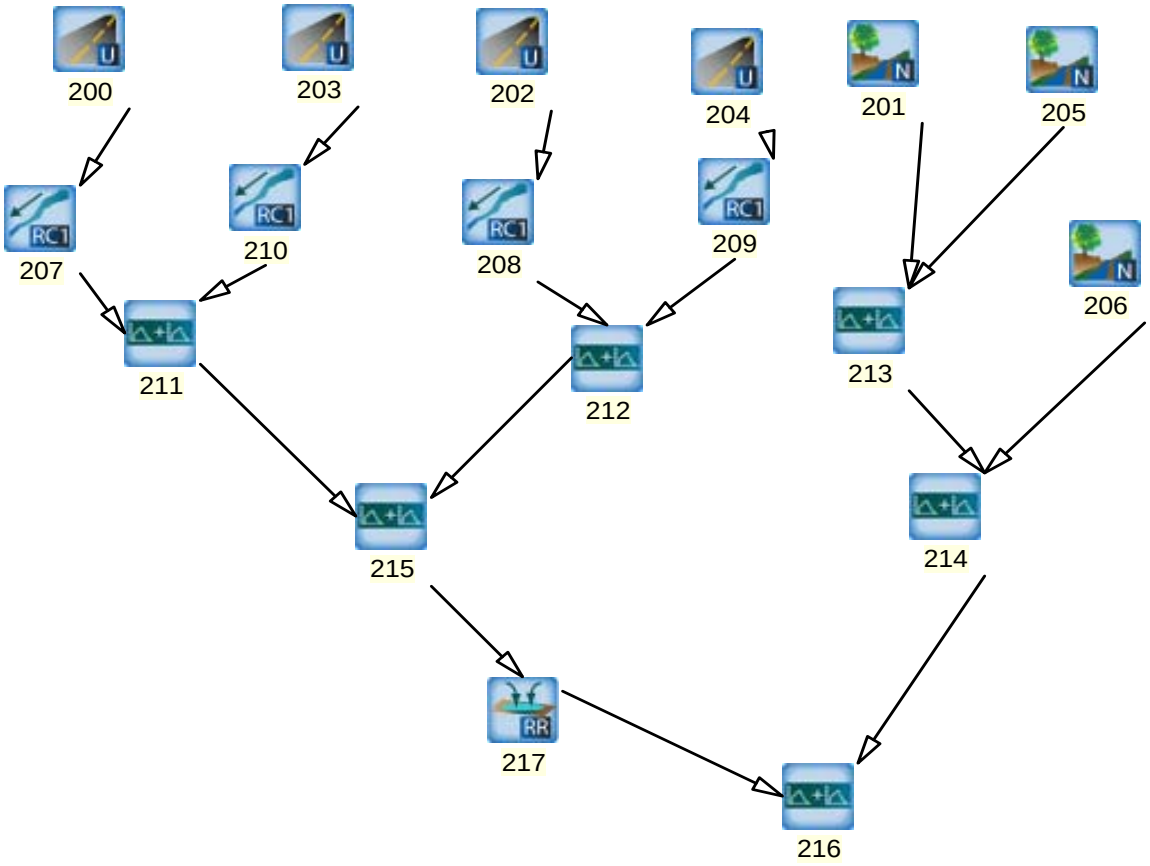
      START @   .00 hrs
      ---------------------
      READ STORM                  10.0
      [ Ptot= 24.99 mm ]
      fname : T:\2804_Everett MSP\SWM Assessment\Everett_VO2_Model\Storms\Owen-4hrC25mm.stm
      remark: 25mm - 4hr CHICAGO STORM - OWEN SOUND RAINFALL
*
  **  CALIB NASHYD       0204  1  8.0   10.89     .01  2.53    .98  .04    .000
      [CN=54.3         ]
      [ N = 3.0:Tp  .73]
*
  **  CALIB STANDHYD     0203  1  5.0   14.52     .46  1.33   7.06  .28    .000
      [I%=25.0:S%= 2.00]
*
  **  CALIB STANDHYD     0201  1  5.0   47.41    1.66  1.42   9.33  .37    .000
      [I%=35.0:S%= 2.00]
```

```
*
  **  CALIB NASHYD       0202  1  5.0    1.87     .00  2.00   1.41  .06    .000
      [CN=49.0         ]
      [ N = 3.0:Tp  .48]
*
   *  CALIB STANDHYD     0009  1  5.0   76.82    2.01  1.42   6.07  .24    .000
      [I%=26.4:S%= 1.34]
*
   *  CALIB STANDHYD     0014  1  5.0   21.40    1.09  1.33   9.22  .37    .000
      [I%=40.1:S%= 1.16]
*
   *  CALIB STANDHYD     1700  1  5.0   18.84     .80  1.33   7.70  .31    .000
      [I%=33.5:S%= 2.02]
*
   *  CALIB STANDHYD     2000  1  5.0   44.27    1.33  1.33   5.31  .21    .000
      [I%=23.1:S%= 5.00]
*
   *  CALIB STANDHYD     1900  1  5.0   64.29    1.61  1.42   5.98  .24    .000
      [I%=26.0:S%= 2.02]
*
   *  CALIB STANDHYD     0008  1  5.0   33.64    1.49  1.42   9.50  .38    .000
      [I%=41.3:S%= 1.34]
*
   *  CALIB STANDHYD     0007  1  5.0   56.32    2.18  1.42   8.58  .34    .000   25 mm
      [I%=37.3:S%= 1.34]
*
   *  CALIB NASHYD       0006  1 10.0   13.24     .04  1.50   1.18  .05    .000
      [CN=51.9         ]
      [ N = 3.0:Tp  .20]
*
   *  CALIB NASHYD       0005  1 10.0   76.24     .13  2.00   1.11  .04    .000
      [CN=51.4         ]
      [ N = 3.0:Tp  .49]
*
   *  CALIB STANDHYD     1800  1  5.0   40.65    1.75  1.42   9.77  .39    .000
      [I%=42.5:S%= 2.02]
*
   *  CALIB NASHYD       0004  1 10.0   40.29     .05  2.17   1.02  .04    .000
      [CN=50.1         ]
      [ N = 3.0:Tp  .61]
*
   *  CALIB NASHYD       0003  1 10.0   55.30     .12  2.00   1.38  .06    .000
      [CN=57.0         ]
      [ N = 3.0:Tp  .50]
*
   *  CALIB NASHYD       0001  1 10.0   48.14     .12  2.17   1.80  .07    .000
      [CN=62.5         ]
      [ N = 3.0:Tp  .60]
*
   *  CALIB NASHYD       0002  1 10.0  295.09     .38  2.50   1.09  .04    .000
      [CN=52.4         ]
      [ N = 3.0:Tp  .76]
*
   *  CALIB NASHYD       0012  1 10.0   56.77     .13  2.00   1.51  .06    .000
      [CN=57.2         ]
      [ N = 3.0:Tp  .50]
*
   *  CALIB NASHYD       0013  1 10.0  193.01     .43  2.50   1.92  .08    .000
      [CN=64.2         ]
      [ N = 3.0:Tp  .80]
*
   *  CALIB STANDHYD     1000  1  5.0   69.17    1.75  1.42   6.12  .24    .000
      [I%=26.6:S%= 2.02]
*
   *  CALIB STANDHYD     1500  1  5.0   13.50     .75  1.33   9.20  .37    .000
      [I%=40.0:S%= 2.02]
*
   *  CALIB STANDHYD     1100  1  5.0   76.47    1.11  1.50   3.91  .16    .000
      [I%=17.0:S%= 2.02]
*
      ADD [0201 + 0202]  1201  3  5.0   49.28    1.66  1.42   9.03  n/a    .000
*
      RESRVR [ 2 : 1700] 0017  1  5.0   18.84     .05  2.50   7.67  n/a    .000
      {ST=   .11 ha.m }
*
      RESRVR [ 2 : 2000] 0020  1  5.0   44.27     .00  4.25   2.62  n/a    .000
      {ST=   .23 ha.m }
*
      RESRVR [ 2 : 1900] 0019  1  5.0   64.29     .07  3.67   5.96  n/a    .000
      {ST=   .32 ha.m }
*
      ADD [0019 + 0008]  1233  3  5.0   97.93    1.52  1.42   7.18  n/a    .000
*
      CHANNEL[ 2 : 0007] 1206  1  5.0   56.32    1.85  1.50   8.57  n/a    .000
*
      RESRVR [ 2 : 1800] 0018  1  5.0   40.65     .06  4.00   9.57  n/a    .000
      {ST=   .34 ha.m }
*
      ADD [0018 + 0004]  1240  3  5.0   80.94     .11  2.33   5.31  n/a    .000
```

```
*
      CHANNEL[ 2 : 0003] 1213  1  5.0   55.30     .10  2.33   1.38  n/a    .000
*
      CHANNEL[ 2 : 0001] 1214  1  5.0   48.14     .12  2.33   1.80  n/a    .000
*
      CHANNEL[ 2 : 0002] 1204  1  5.0  295.09     .37  2.58   1.09  n/a    .000
*
      CHANNEL[ 2 : 0012] 1210  1  5.0   56.77     .06  2.92   1.49  n/a    .000
*
      RESRVR [ 2 : 1000] 0010  1  5.0   69.17     .08  3.50   6.10  n/a    .000
      {ST=   .35 ha.m }
*
      RESRVR [ 2 : 1500] 0015  1  5.0   13.50     .06  2.17   9.17  n/a    .000
      {ST=   .09 ha.m }
*
      RESRVR [ 2 : 1100] 0011  1  5.0   76.47     .05  3.83   3.89  n/a    .000
      {ST=   .25 ha.m }
*
      ADD [0203 + 1201]  1202  3  5.0   63.80    1.99  1.42   8.58  n/a    .000
*
      ADD [0014 + 0017]  1230  3  5.0   40.24    1.11  1.33   8.50  n/a    .000
*
      ADD [1230 + 0020]  1231  3  5.0   84.51    1.11  1.33   5.42  n/a    .000
*
      CHANNEL[ 2 : 1233] 1207  1  5.0   97.93    1.12  1.50   7.17  n/a    .000
*
      CHANNEL[ 2 : 1240] 1215  1  5.0   80.94     .11  2.58   5.31  n/a    .000
*
      ADD [1214 + 1204]  0200  3  5.0  343.23     .48  2.50   1.19  n/a    .000
*
      ADD [0010 + 0015]  1238  3  5.0   82.67     .13  2.67   6.60  n/a    .000
*
      CHANNEL[ 2 : 0011] 1211  1  5.0   76.47     .05  4.17   3.89  n/a    .000
*
      ADD [0204 + 1202]  1203  3  5.0   74.69    1.99  1.42   7.47  n/a    .000
*
      CHANNEL[ 2 : 1231] 1208  1  5.0   84.51     .70  1.42   5.41  n/a    .000
*
      ADD [1238 + 1211]  1236  3  5.0  159.14     .18  3.50   5.30  n/a    .000
*
      RESRVR [ 2 : 1203] 0016  1  5.0   74.69     .05  4.33   7.44  n/a    .000
      {ST=   .50 ha.m }
*
      ADD [0009 + 1208]  1229  3  5.0  161.33    2.71  1.42   5.73  n/a    .000
*
      ADD [0013 + 1236]  1239  3  5.0  352.15     .60  2.50   3.45  n/a    .000
*
      ADD [1229 + 1207]  1232  3  5.0  259.26    3.65  1.42   6.27  n/a    .000
*
      CHANNEL[ 2 : 1239] 1209  1  5.0  352.15     .57  2.83   3.45  n/a    .000
*
      ADD [1232 + 1206]  1228  3  5.0  315.58    5.41  1.42   6.68  n/a    .000
*
      ADD [1210 + 1209]  0300  3  5.0  408.92     .64  2.83   3.18  n/a    .000
*
      ADD [1228 + 0006]  1227  3  5.0  328.82    5.44  1.42   6.46  n/a    .000
*
      CHANNEL[ 2 : 1227] 1216  1  5.0  328.82    5.32  1.50   6.46  n/a    .000
*
      ADD [0016 + 1216]  1226  3  5.0  403.52    5.35  1.50   6.64  n/a    .000
*
      CHANNEL[ 2 : 1226] 1205  1  5.0  403.52    3.73  1.67   6.64  n/a    .000
*
      ADD [1205 + 0005]  1237  3  5.0  479.76    3.82  1.67   5.76  n/a    .000
*
      ADD [1237 + 1215]  1234  3  5.0  560.70    3.85  1.67   5.70  n/a    .000
*
      CHANNEL[ 2 : 1234] 1212  1  5.0  560.70    2.78  2.00   5.69  n/a    .000
*
      ADD [1212 + 1213]  0100  3  5.0  616.00    2.85  2.00   5.31  n/a    .000
*
 FINISH
```

APPENDIX C:
CUMAC PHASE II POST-DEVELOPMENT VISUAL OTTHYMO OUTPUT

CUMAC SUBDIVISION (CCTA: 116238-2)
POST 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:	Cumac Subdivision
File No.:	116238-2
Subject:	Otthymo Flow Schematic
Date:	March 31, 2017

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

       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:\2016PR~1\116238~1\Design\CUMACP~1\STORMW~1\Otthymo\CUMACP~1\CHI POST.out

  Summary filename:
I:\2016PR~1\116238~1\Design\CUMACP~1\STORMW~1\Otthymo\CUMACP~1\CHI POST.sum


DATE: 4/27/2017                           TIME: 1:26:43 PM

USER:


COMMENTS: _____________________________________________________________

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


--------------------
|    READ STORM    |    Filename: I:\2016 Projects\116
|                  |              238 - Burbank Circle Natural Hazards Study\
|                  |              Design\Cumac Phase 2\Stormwater\Otthymo\Cumac
| 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
                                      Page 1
```



```
                 .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

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

--------------------
| CALIB            |
| STANDHYD  (0204) |   Area    (ha)=    .71
|ID= 1 DT=10.0 min |   Total Imp(%)=  49.00   Dir. Conn.(%)=  24.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=         .35           .36
     Dep. Storage     (mm)=        1.00          5.00
     Average Slope     (%)=        2.00           .50
     Length            (m)=        4.50        235.00
     Mannings n           =        .013          .250

         NOTE:  RAINFALL WAS TRANSFORMED TO  10.0 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
                .167    1.32 | 1.167    2.97 | 2.167   11.21 |  3.17    1.98
                .333    1.44 | 1.333    3.82 | 2.333    6.40 |  3.33    1.76
                .500    1.59 | 1.500    5.28 | 2.500    4.40 |  3.50    1.59
                .667    1.81 | 1.667    9.62 | 2.667    3.29 |  3.67    1.43
                .833    2.07 | 1.833   32.67 | 2.833    2.71 |  3.83    1.32
               1.000    2.40 | 2.000   45.21 | 3.000    2.30 |  4.00    1.22

     Max.Eff.Inten.(mm/hr)=      45.21          2.77
               over (min)        10.00        140.00
     Storage Coeff.  (min)=        .44 (ii)   130.42 (ii)
     Unit Hyd. Tpeak (min)=      10.00        140.00
     Unit Hyd. peak  (cms)=        .17           .01
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .02           .00           .021 (iii)
     TIME TO PEAK    (hrs)=       2.00          4.17          2.00
     RUNOFF VOLUME    (mm)=      23.97          2.35          7.43
     TOTAL RAINFALL   (mm)=      24.97         24.97         24.97
     RUNOFF COEFFICIENT   =        .96           .09           .30

***** 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  (0202) |   Area    (ha)=    .18
|ID= 1 DT=10.0 min |   Total Imp(%)=  46.60   Dir. Conn.(%)=  41.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=         .08           .10
     Dep. Storage     (mm)=        1.00          5.00
     Average Slope     (%)=        2.00           .50
                                      Page 2
```

Length (m)=	4.50	265.00	
Mannings n =	.013	.250	
Max.Eff.Inten.(mm/hr)=	45.21	1.40	
over (min)	10.00	190.00	
Storage Coeff. (min)=	.44 (ii)	184.08 (ii)	
Unit Hyd. Tpeak (min)=	10.00	190.00	
Unit Hyd. peak (cms)=	.17	.01	
			TOTALS
PEAK FLOW (cms)=	.01	.00	.009 (iii)
TIME TO PEAK (hrs)=	2.00	5.17	2.00
RUNOFF VOLUME (mm)=	23.97	1.61	9.95
TOTAL RAINFALL (mm)=	24.97	24.97	24.97
RUNOFF COEFFICIENT =	.96	.06	.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 (0203)	Area (ha)=	1.22	
ID= 1 DT=10.0 min	Total Imp(%)=	52.00	Dir. Conn.(%)= 19.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.63	.59
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	1.00
Length (m)=	4.50	265.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	45.21	3.62
over (min)	10.00	110.00
Storage Coeff. (min)=	.44 (ii)	102.32 (ii)
Unit Hyd. Tpeak (min)=	10.00	110.00
Unit Hyd. peak (cms)=	.17	.01
		TOTALS
PEAK FLOW (cms)=	.03	.00 .029 (iii)
TIME TO PEAK (hrs)=	2.00	3.67 2.00
RUNOFF VOLUME (mm)=	23.97	2.71 6.70
TOTAL RAINFALL (mm)=	24.97	24.97 24.97
RUNOFF COEFFICIENT =	.96	.11 .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 (0200)	Area (ha)=	1.14	
ID= 1 DT=10.0 min	Total Imp(%)=	43.00	Dir. Conn.(%)= 15.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.49	.65
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	1.00
Length (m)=	4.50	90.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	45.21	2.77
over (min)	10.00	60.00
Storage Coeff. (min)=	.44 (ii)	59.76 (ii)
Unit Hyd. Tpeak (min)=	10.00	60.00
Unit Hyd. peak (cms)=	.17	.02
		TOTALS
PEAK FLOW (cms)=	.02	.00 .022 (iii)
TIME TO PEAK (hrs)=	2.00	2.83 2.00
RUNOFF VOLUME (mm)=	23.97	2.35 5.56
TOTAL RAINFALL (mm)=	24.97	24.97 24.97
RUNOFF COEFFICIENT =	.96	.09 .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			
NASHYD (0205)	Area (ha)=	.02	Curve Number (CN)= 49.0
ID= 1 DT=10.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	.54	

Unit Hyd Qpeak (cms)= .001

PEAK FLOW (cms)=	.000 (i)	
TIME TO PEAK (hrs)=	2.500	
RUNOFF VOLUME (mm)=	1.236	
TOTAL RAINFALL (mm)=	24.971	
RUNOFF COEFFICIENT =	.049	

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

CALIB			
NASHYD (0201)	Area (ha)=	.62	Curve Number (CN)= 57.4
ID= 1 DT=10.0 min	Ia (mm)=	9.64	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	.54	

Unit Hyd Qpeak (cms)= .044

PEAK FLOW (cms)=	.001 (i)	
TIME TO PEAK (hrs)=	2.667	
RUNOFF VOLUME (mm)=	1.150	
TOTAL RAINFALL (mm)=	24.971	
RUNOFF COEFFICIENT =	.046	

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

CALIB					
NASHYD (0206)	Area	(ha)=	.44	Curve Number (CN)=	49.5
ID= 1 DT=10.0 min	Ia	(mm)=	8.50	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.54		

Unit Hyd Qpeak (cms)= .031

PEAK FLOW (cms)= .001 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= .981
TOTAL RAINFALL (mm)= 24.971
RUNOFF COEFFICIENT = .039

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

ROUTE CHN (0209)
IN= 2---> OUT= 1 | Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.900E+01	.0	.42	10.21
.11	99.11	.223E+02	.1	.62	6.97
.16	99.16	.400E+02	.1	.77	5.59
.21	99.21	.619E+02	.2	.91	4.77
.26	99.26	.882E+02	.3	1.03	4.22
.32	99.32	.119E+03	.5	1.14	3.80
.37	99.37	.154E+03	.7	1.25	3.48
.42	99.42	.193E+03	1.0	1.35	3.22
.47	99.47	.237E+03	1.3	1.44	3.01
.53	99.53	.284E+03	1.7	1.53	2.82
.58	99.58	.337E+03	2.1	1.62	2.67
.63	99.63	.393E+03	2.6	1.71	2.53
.68	99.68	.454E+03	3.1	1.80	2.41
.74	99.74	.519E+03	3.8	1.88	2.31
.79	99.79	.589E+03	4.4	1.96	2.21
.84	99.84	.663E+03	5.2	2.04	2.13
.89	99.89	.741E+03	6.0	2.11	2.05
.95	99.95	.823E+03	6.9	2.19	1.98
1.00	100.00	.910E+03	7.9	2.27	1.91

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0204)	.71	.02	2.00	7.43	.06	.45
OUTFLOW: ID= 1 (0209)	.71	.01	2.00	7.42	.05	.43

ROUTE CHN (0208)

IN= 2---> OUT= 1 | Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.242E+01	.0	.42	2.75
.11	99.11	.601E+01	.1	.62	1.88
.16	99.16	.108E+02	.1	.77	1.51
.21	99.21	.167E+02	.2	.91	1.29
.26	99.26	.238E+02	.3	1.03	1.13
.32	99.32	.320E+02	.5	1.14	1.02
.37	99.37	.414E+02	.7	1.25	.94
.42	99.42	.520E+02	1.0	1.35	.87
.47	99.47	.637E+02	1.3	1.44	.81
.53	99.53	.766E+02	1.7	1.53	.76
.58	99.58	.906E+02	2.1	1.62	.72
.63	99.63	.106E+03	2.6	1.71	.68
.68	99.68	.122E+03	3.1	1.80	.65
.74	99.74	.140E+03	3.8	1.88	.62
.79	99.79	.159E+03	4.4	1.96	.60
.84	99.84	.178E+03	5.2	2.04	.57
.89	99.89	.199E+03	6.0	2.11	.55
.95	99.95	.222E+03	6.9	2.19	.53
1.00	100.00	.245E+03	7.9	2.27	.52

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0202)	.18	.01	2.00	9.95	.03	.42
OUTFLOW: ID= 1 (0208)	.18	.01	2.00	9.92	.03	.42

ROUTE CHN (0210)
IN= 2---> OUT= 1 | Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.796E+01	.0	.42	9.03
.11	99.11	.197E+02	.1	.62	6.17
.16	99.16	.354E+02	.1	.77	4.95
.21	99.21	.548E+02	.2	.91	4.22
.26	99.26	.780E+02	.3	1.03	3.73
.32	99.32	.105E+03	.5	1.14	3.36
.37	99.37	.136E+03	.7	1.25	3.08
.42	99.42	.171E+03	1.0	1.35	2.85
.47	99.47	.209E+03	1.3	1.44	2.66

.53	99.53	.252E+03	1.7	1.53	2.50
.58	99.58	.298E+03	2.1	1.62	2.36
.63	99.63	.348E+03	2.6	1.71	2.24
.68	99.68	.402E+03	3.1	1.80	2.14
.74	99.74	.459E+03	3.8	1.88	2.04
.79	99.79	.521E+03	4.4	1.96	1.96
.84	99.84	.586E+03	5.2	2.04	1.88
.89	99.89	.655E+03	6.0	2.11	1.81
.95	99.95	.728E+03	6.9	2.19	1.75
1.00	100.00	.805E+03	7.9	2.27	1.69

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0203)	1.22	.03	2.00	6.70	.07	.48
OUTFLOW: ID= 1 (0210)	1.22	.02	2.00	6.69	.06	.45

ROUTE CHN (0207)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.270E+01	.0	.42	3.06
.11	99.11	.670E+01	.1	.62	2.09
.16	99.16	.120E+02	.1	.77	1.68
.21	99.21	.186E+02	.2	.91	1.43
.26	99.26	.265E+02	.3	1.03	1.26
.32	99.32	.356E+02	.5	1.14	1.14
.37	99.37	.461E+02	.7	1.25	1.04
.42	99.42	.579E+02	1.0	1.35	.97
.47	99.47	.710E+02	1.3	1.44	.90
.53	99.53	.853E+02	1.7	1.53	.85
.58	99.58	.101E+03	2.1	1.62	.80
.63	99.63	.118E+03	2.6	1.71	.76
.68	99.68	.136E+03	3.1	1.80	.72
.74	99.74	.156E+03	3.8	1.88	.69
.79	99.79	.177E+03	4.4	1.96	.66
.84	99.84	.199E+03	5.2	2.04	.64
.89	99.89	.222E+03	6.0	2.11	.61
.95	99.95	.247E+03	6.9	2.19	.59
1.00	100.00	.273E+03	7.9	2.27	.57

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0200)	1.14	.02	2.00	5.56	.06	.45
OUTFLOW: ID= 1 (0207)	1.14	.02	2.00	5.56	.06	.45

ADD HYD (0213)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0205):	.02	.000	2.50	1.24
+ ID2= 2 (0201):	.62	.001	2.67	1.15
ID = 3 (0213):	.64	.001	2.67	1.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0214)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0213):	.64	.001	2.67	1.15
+ ID2= 2 (0206):	.44	.001	2.67	.98
ID = 3 (0214):	1.08	.002	2.67	1.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0212)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0209):	.71	.015	2.00	7.42
+ ID2= 2 (0208):	.18	.009	2.00	9.92
ID = 3 (0212):	.89	.024	2.00	7.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0211)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0210):	1.22	.022	2.00	6.69
+ ID2= 2 (0207):	1.14	.021	2.00	5.56
ID = 3 (0211):	2.36	.043	2.00	6.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0215)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0212):	.89	.024	2.00	7.93
+ ID2= 2 (0211):	2.36	.043	2.00	6.15
ID = 3 (0215):	3.25	.066	2.00	6.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0217)				
IN= 2---> OUT= 1				
DT= 10.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0280	.0100
	.0080	.0020	.0670	.1930

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0215)	3.250	.066	2.00	6.63
OUTFLOW: ID= 1 (0217)	3.250	.023	2.33	6.62

PEAK FLOW REDUCTION [Qout/Qin](%)= 34.17
TIME SHIFT OF PEAK FLOW (min)= 20.00
MAXIMUM STORAGE USED (ha.m.)= .0079

ADD HYD (0216)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0217):	3.25	.023	2.33	6.62
	+ ID2= 2 (0214):	1.08	.002	2.67	1.08
	ID = 3 (0216):	4.33	.024	2.33	5.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

READ STORM	Filename: I:\2016 Projects\116 238 - Burbank Circle Natural Hazards Study\Design\Cumac Phase 2\Stormwater\Otthymo\Cumac
Ptotal= 33.75 mm	Comments: OWEN SOUND 2 YEAR 4 HOUR DURATION CHICAG

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	1.75	1.10	3.80	2.10	17.64	3.10	2.75
.20	1.84	1.20	4.35	2.20	11.41	3.20	2.55
.30	1.95	1.30	5.09	2.30	8.39	3.30	2.38
.40	2.07	1.40	6.16	2.40	6.63	3.40	2.23
.50	2.21	1.50	7.80	2.50	5.49	3.50	2.09
.60	2.37	1.60	10.63	2.60	4.69	3.60	1.98
.70	2.56	1.70	16.59	2.70	4.10	3.70	1.88
.80	2.78	1.80	35.38	2.80	3.65	3.80	1.78
.90	3.05	1.90	98.09	2.90	3.29	3.90	1.70
1.00	3.38	2.00	36.45	3.00	2.99	4.00	1.63

CALIB			
STANDHYD (0204)	Area (ha)=	.71	
ID= 1 DT=10.0 min	Total Imp(%)=	49.00	Dir. Conn.(%)= 24.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.35	.36
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	.50
Length (m)=	4.50	235.00
Mannings n =	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	1.79	1.167	4.02	2.167	15.15	3.17	2.67
.333	1.95	1.333	5.16	2.333	8.64	3.33	2.38
.500	2.15	1.500	7.14	2.500	5.95	3.50	2.15
.667	2.45	1.667	13.01	2.667	4.45	3.67	1.94
.833	2.79	1.833	44.16	2.833	3.67	3.83	1.78
1.000	3.25	2.000	61.11	3.000	3.11	4.00	1.66

Max.Eff.Inten.(mm/hr)=	61.11	5.25	
over (min)	10.00	110.00	
Storage Coeff. (min)=	.39 (ii)	100.99 (ii)	
Unit Hyd. Tpeak (min)=	10.00	110.00	
Unit Hyd. peak (cms)=	.17	.01	
			TOTALS
PEAK FLOW (cms)=	.03	.00	.029 (iii)
TIME TO PEAK (hrs)=	2.00	3.67	2.00
RUNOFF VOLUME (mm)=	32.76	4.45	11.16
TOTAL RAINFALL (mm)=	33.76	33.76	33.76
RUNOFF COEFFICIENT =	.97	.13	.33

***** 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 (0202)	Area (ha)=	.18	
ID= 1 DT=10.0 min	Total Imp(%)=	46.60	Dir. Conn.(%)= 41.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.08	.10
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	.50
Length (m)=	4.50	265.00
Mannings n =	.013	.250

Max.Eff.Inten.(mm/hr)=	61.11	2.78	
over (min)	10.00	140.00	
Storage Coeff. (min)=	.39 (ii)	139.80 (ii)	
Unit Hyd. Tpeak (min)=	10.00	140.00	
Unit Hyd. peak (cms)=	.17	.01	
			TOTALS
PEAK FLOW (cms)=	.01	.00	.013 (iii)
TIME TO PEAK (hrs)=	2.00	4.33	2.00
RUNOFF VOLUME (mm)=	32.76	3.18	14.85
TOTAL RAINFALL (mm)=	33.76	33.76	33.76
RUNOFF COEFFICIENT =	.97	.09	.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  (0203) |   Area    (ha)=   1.22
|ID= 1 DT=10.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  19.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .63          .59
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         1.00
     Length            (m)=      4.50       265.00
     Mannings n            =      .013         .250

     Max.Eff.Inten.(mm/hr)=     61.11         6.76
               over (min)      10.00        80.00
     Storage Coeff.  (min)=       .39 (ii)   79.75 (ii)
     Unit Hyd. Tpeak (min)=     10.00        80.00
     Unit Hyd. peak  (cms)=       .17          .01
                                                      *TOTALS*
     PEAK FLOW       (cms)=       .04          .01          .040 (iii)
     TIME TO PEAK    (hrs)=      2.00         3.17          2.00
     RUNOFF VOLUME    (mm)=     32.76         5.06         10.28
     TOTAL RAINFALL   (mm)=     33.76        33.76         33.76
     RUNOFF COEFFICIENT   =       .97          .15           .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  (0200) |   Area    (ha)=   1.14
|ID= 1 DT=10.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  15.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .49          .65
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         1.00
     Length            (m)=      4.50        90.00
     Mannings n            =      .013         .250

     Max.Eff.Inten.(mm/hr)=     61.11         5.98
               over (min)      10.00        50.00
     Storage Coeff.  (min)=       .39 (ii)   43.99 (ii)
     Unit Hyd. Tpeak (min)=     10.00        50.00
     Unit Hyd. peak  (cms)=       .17          .02
                                                      *TOTALS*
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```
     PEAK FLOW       (cms)=       .03          .01          .030 (iii)
     TIME TO PEAK    (hrs)=      2.00         2.67          2.00
     RUNOFF VOLUME    (mm)=     32.76         4.45          8.68
     TOTAL RAINFALL   (mm)=     33.76        33.76         33.76
     RUNOFF COEFFICIENT   =       .97          .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            |
| NASHYD    (0205) |   Area    (ha)=    .02   Curve Number   (CN)= 49.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .001

     PEAK FLOW       (cms)=    .000 (i)
     TIME TO PEAK    (hrs)=   2.500
     RUNOFF VOLUME    (mm)=   2.671
     TOTAL RAINFALL   (mm)=  33.755
     RUNOFF COEFFICIENT   =    .079

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0201) |   Area    (ha)=    .62   Curve Number   (CN)= 57.4
|ID= 1 DT=10.0 min |   Ia      (mm)=   9.64   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .044

     PEAK FLOW       (cms)=    .003 (i)
     TIME TO PEAK    (hrs)=   2.500
     RUNOFF VOLUME    (mm)=   2.732
     TOTAL RAINFALL   (mm)=  33.755
     RUNOFF COEFFICIENT   =    .081

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0206) |   Area    (ha)=    .44   Curve Number   (CN)= 49.5
|ID= 1 DT=10.0 min |   Ia      (mm)=   8.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .031

     PEAK FLOW       (cms)=    .002 (i)
     TIME TO PEAK    (hrs)=   2.500
     RUNOFF VOLUME    (mm)=   2.239
     TOTAL RAINFALL   (mm)=  33.755
```

RUNOFF COEFFICIENT = .066

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

ROUTE CHN (0209)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.900E+01	.0	.42	10.21
.11	99.11	.223E+02	.1	.62	6.97
.16	99.16	.400E+02	.1	.77	5.59
.21	99.21	.619E+02	.2	.91	4.77
.26	99.26	.882E+02	.3	1.03	4.22
.32	99.32	.119E+03	.5	1.14	3.80
.37	99.37	.154E+03	.7	1.25	3.48
.42	99.42	.193E+03	1.0	1.35	3.22
.47	99.47	.237E+03	1.3	1.44	3.01
.53	99.53	.284E+03	1.7	1.53	2.82
.58	99.58	.337E+03	2.1	1.62	2.67
.63	99.63	.393E+03	2.6	1.71	2.53
.68	99.68	.454E+03	3.1	1.80	2.41
.74	99.74	.519E+03	3.8	1.88	2.31
.79	99.79	.589E+03	4.4	1.96	2.21
.84	99.84	.663E+03	5.2	2.04	2.13
.89	99.89	.741E+03	6.0	2.11	2.05
.95	99.95	.823E+03	6.9	2.19	1.98
1.00	100.00	.910E+03	7.9	2.27	1.91

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0204)	.71	.03	2.00	11.16	.07	.48
OUTFLOW: ID= 1 (0209)	.71	.02	2.00	11.15	.06	.45

ROUTE CHN (0208)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.242E+01	.0	.42	2.75
.11	99.11	.601E+01	.1	.62	1.88

.16	99.16	.108E+02	.1	.77	1.51
.21	99.21	.167E+02	.2	.91	1.29
.26	99.26	.238E+02	.3	1.03	1.13
.32	99.32	.320E+02	.5	1.14	1.02
.37	99.37	.414E+02	.7	1.25	.94
.42	99.42	.520E+02	1.0	1.35	.87
.47	99.47	.637E+02	1.3	1.44	.81
.53	99.53	.766E+02	1.7	1.53	.76
.58	99.58	.906E+02	2.1	1.62	.72
.63	99.63	.106E+03	2.6	1.71	.68
.68	99.68	.122E+03	3.1	1.80	.65
.74	99.74	.140E+03	3.8	1.88	.62
.79	99.79	.159E+03	4.4	1.96	.60
.84	99.84	.178E+03	5.2	2.04	.57
.89	99.89	.199E+03	6.0	2.11	.55
.95	99.95	.222E+03	6.9	2.19	.53
1.00	100.00	.245E+03	7.9	2.27	.52

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0202)	.18	.01	2.00	14.85	.04	.42
OUTFLOW: ID= 1 (0208)	.18	.01	2.00	14.84	.04	.42

ROUTE CHN (0210)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.796E+01	.0	.42	9.03
.11	99.11	.197E+02	.1	.62	6.17
.16	99.16	.354E+02	.1	.77	4.95
.21	99.21	.548E+02	.2	.91	4.22
.26	99.26	.780E+02	.3	1.03	3.73
.32	99.32	.105E+03	.5	1.14	3.36
.37	99.37	.136E+03	.7	1.25	3.08
.42	99.42	.171E+03	1.0	1.35	2.85
.47	99.47	.209E+03	1.3	1.44	2.66
.53	99.53	.252E+03	1.7	1.53	2.50
.58	99.58	.298E+03	2.1	1.62	2.36
.63	99.63	.348E+03	2.6	1.71	2.24
.68	99.68	.402E+03	3.1	1.80	2.14
.74	99.74	.459E+03	3.8	1.88	2.04
.79	99.79	.521E+03	4.4	1.96	1.96
.84	99.84	.586E+03	5.2	2.04	1.88
.89	99.89	.655E+03	6.0	2.11	1.81
.95	99.95	.728E+03	6.9	2.19	1.75
1.00	100.00	.805E+03	7.9	2.27	1.69

<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)

INFLOW : ID= 2 (0203)	1.22	.04	2.00	10.28	.09	.54
OUTFLOW: ID= 1 (0210)	1.22	.03	2.00	10.28	.07	.49

ROUTE CHN (0207)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.270E+01	.0	.42	3.06
.11	99.11	.670E+01	.1	.62	2.09
.16	99.16	.120E+02	.1	.77	1.68
.21	99.21	.186E+02	.2	.91	1.43
.26	99.26	.265E+02	.3	1.03	1.26
.32	99.32	.356E+02	.5	1.14	1.14
.37	99.37	.461E+02	.7	1.25	1.04
.42	99.42	.579E+02	1.0	1.35	.97
.47	99.47	.710E+02	1.3	1.44	.90
.53	99.53	.853E+02	1.7	1.53	.85
.58	99.58	.101E+03	2.1	1.62	.80
.63	99.63	.118E+03	2.6	1.71	.76
.68	99.68	.136E+03	3.1	1.80	.72
.74	99.74	.156E+03	3.8	1.88	.69
.79	99.79	.177E+03	4.4	1.96	.66
.84	99.84	.199E+03	5.2	2.04	.64
.89	99.89	.222E+03	6.0	2.11	.61
.95	99.95	.247E+03	6.9	2.19	.59
1.00	100.00	.273E+03	7.9	2.27	.57

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0200)	1.14	.03	2.00	8.68	.07	.49
OUTFLOW: ID= 1 (0207)	1.14	.03	2.00	8.67	.07	.48

ADD HYD (0213)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0205):	.02	.000	2.50	2.67
+ ID2= 2 (0201):	.62	.003	2.50	2.73
ID = 3 (0213):	.64	.003	2.50	2.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0214)

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0213):	.64	.003	2.50	2.73
+ ID2= 2 (0206):	.44	.002	2.50	2.24
ID = 3 (0214):	1.08	.005	2.50	2.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0212)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0209):	.71	.021	2.00	11.15
+ ID2= 2 (0208):	.18	.012	2.00	14.84
ID = 3 (0212):	.89	.033	2.00	11.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0211)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0210):	1.22	.031	2.00	10.28
+ ID2= 2 (0207):	1.14	.029	2.00	8.67
ID = 3 (0211):	2.36	.060	2.00	9.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0215)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0212):	.89	.033	2.00	11.90
+ ID2= 2 (0211):	2.36	.060	2.00	9.50
ID = 3 (0215):	3.25	.093	2.00	10.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0217)
IN= 2---> OUT= 1
DT= 10.0 min

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0280	.0100
	.0080	.0020	.0670	.1930

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0215)	3.250	.093	2.00	10.16
OUTFLOW: ID= 1 (0217)	3.250	.028	2.33	10.14

PEAK FLOW REDUCTION [Qout/Qin](%)= 30.53

TIME SHIFT OF PEAK FLOW (min)= 20.00
MAXIMUM STORAGE USED (ha.m.)= .0113

ADD HYD (0216)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0217):	3.25	.028	2.33	10.14
	+ ID2= 2 (0214):	1.08	.005	2.50	2.53
	ID = 3 (0216):	4.33	.033	2.50	8.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

** SIMULATION NUMBER: 3 **

READ STORM | Filename: I:\2016 Projects\116 238 - Burbank Circle Natural Hazards Study\Design\Cumac Phase 2\Stormwater\Otthymo\Cumac
Ptotal= 44.07 mm | Comments: OWEN SOUND 5 YEAR 4 HOUR DURATION CHICAG

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	2.16	1.10	4.86	2.10	23.63	3.10	3.47
.20	2.29	1.20	5.59	2.20	15.14	3.20	3.21
.30	2.42	1.30	6.58	2.30	11.03	3.30	2.98
.40	2.58	1.40	8.01	2.40	8.65	3.40	2.78
.50	2.76	1.50	10.23	2.50	7.11	3.50	2.61
.60	2.97	1.60	14.08	2.60	6.04	3.60	2.46
.70	3.22	1.70	22.20	2.70	5.25	3.70	2.33
.80	3.51	1.80	47.44	2.80	4.65	3.80	2.21
.90	3.86	1.90	127.12	2.90	4.17	3.90	2.11
1.00	4.30	2.00	48.87	3.00	3.79	4.00	2.01

CALIB STANDHYD (0204) | Area (ha)= .71
ID= 1 DT=10.0 min | Total Imp(%)= 49.00 Dir. Conn.(%)= 24.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.35	.36
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	.50
Length	(m)=	4.50	235.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	2.21	1.167	5.15	2.167	20.23	3.17	3.37
.333	2.43	1.333	6.67	2.333	11.38	3.33	2.99
.500	2.69	1.500	9.34	2.500	7.73	3.50	2.68
.667	3.07	1.667	17.33	2.667	5.72	3.67	2.41
.833	3.52	1.833	58.33	2.833	4.67	3.83	2.21
1.000	4.12	2.000	80.17	3.000	3.94	4.00	2.05

			TOTALS
Max.Eff.Inten.(mm/hr)=	80.17	9.06	
over (min)	10.00	90.00	
Storage Coeff. (min)=	.35 (ii)	81.24 (ii)	
Unit Hyd. Tpeak (min)=	10.00	90.00	
Unit Hyd. peak (cms)=	.17	.01	
PEAK FLOW (cms)=	.04	.00	.038 (iii)
TIME TO PEAK (hrs)=	2.00	3.33	2.00
RUNOFF VOLUME (mm)=	43.07	7.60	16.04
TOTAL RAINFALL (mm)=	44.07	44.07	44.07
RUNOFF COEFFICIENT =	.98	.17	.36

***** 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 (0202) | Area (ha)= .18
ID= 1 DT=10.0 min | Total Imp(%)= 46.60 Dir. Conn.(%)= 41.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.08	.10
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	.50
Length	(m)=	4.50	265.00
Mannings n	=	.013	.250

			TOTALS
Max.Eff.Inten.(mm/hr)=	80.17	4.96	
over (min)	10.00	120.00	
Storage Coeff. (min)=	.35 (ii)	111.00 (ii)	
Unit Hyd. Tpeak (min)=	10.00	120.00	
Unit Hyd. peak (cms)=	.17	.01	
PEAK FLOW (cms)=	.02	.00	.016 (iii)
TIME TO PEAK (hrs)=	2.00	3.83	2.00
RUNOFF VOLUME (mm)=	43.07	5.61	20.59
TOTAL RAINFALL (mm)=	44.07	44.07	44.07
RUNOFF COEFFICIENT =	.98	.13	.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 (0203) | Area (ha)= 1.22
ID= 1 DT=10.0 min | Total Imp(%)= 52.00 Dir. Conn.(%)= 19.00

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                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .63          .59
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         1.00
     Length            (m)=      4.50       265.00
     Mannings n           =      .013         .250

     Max.Eff.Inten.(mm/hr)=     80.17        11.53
               over (min)      10.00        70.00
     Storage Coeff.  (min)=       .35 (ii)   64.47 (ii)
     Unit Hyd. Tpeak (min)=     10.00        70.00
     Unit Hyd. peak  (cms)=       .17          .02
                                                      *TOTALS*
     PEAK FLOW       (cms)=       .05          .01          .053 (iii)
     TIME TO PEAK    (hrs)=      2.00         3.00          2.00
     RUNOFF VOLUME    (mm)=     43.07         8.54         15.07
     TOTAL RAINFALL   (mm)=     44.07        44.07         44.07
     RUNOFF COEFFICIENT   =       .98          .19           .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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--------------------
| CALIB            |
| STANDHYD  (0200) |   Area    (ha)=   1.14
|ID= 1 DT=10.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  15.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       .49          .65
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         1.00
     Length            (m)=      4.50        90.00
     Mannings n           =      .013         .250

     Max.Eff.Inten.(mm/hr)=     80.17        12.07
               over (min)      10.00        40.00
     Storage Coeff.  (min)=       .35 (ii)   33.28 (ii)
     Unit Hyd. Tpeak (min)=     10.00        40.00
     Unit Hyd. peak  (cms)=       .17          .03
                                                      *TOTALS*
     PEAK FLOW       (cms)=       .04          .01          .042 (iii)
     TIME TO PEAK    (hrs)=      2.00         2.50          2.00
     RUNOFF VOLUME    (mm)=     43.07         7.60         12.91
     TOTAL RAINFALL   (mm)=     44.07        44.07         44.07
     RUNOFF COEFFICIENT   =       .98          .17           .29

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

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| CALIB            |
| NASHYD    (0205) |   Area    (ha)=    .02   Curve Number   (CN)= 49.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .001

     PEAK FLOW       (cms)=    .000 (i)
     TIME TO PEAK    (hrs)=   2.500
     RUNOFF VOLUME    (mm)=   4.893
     TOTAL RAINFALL   (mm)=  44.068
     RUNOFF COEFFICIENT   =    .111

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

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--------------------
| CALIB            |
| NASHYD    (0201) |   Area    (ha)=    .62   Curve Number   (CN)= 57.4
|ID= 1 DT=10.0 min |   Ia      (mm)=   9.64   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .044

     PEAK FLOW       (cms)=    .006 (i)
     TIME TO PEAK    (hrs)=   2.500
     RUNOFF VOLUME    (mm)=   5.312
     TOTAL RAINFALL   (mm)=  44.068
     RUNOFF COEFFICIENT   =    .121

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

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--------------------
| CALIB            |
| NASHYD    (0206) |   Area    (ha)=    .44   Curve Number   (CN)= 49.5
|ID= 1 DT=10.0 min |   Ia      (mm)=   8.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .031

     PEAK FLOW       (cms)=    .003 (i)
     TIME TO PEAK    (hrs)=   2.500
     RUNOFF VOLUME    (mm)=   4.288
     TOTAL RAINFALL   (mm)=  44.068
     RUNOFF COEFFICIENT   =    .097

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

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--------------------
| ROUTE CHN (0209) |
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   .00         100.00          .0400
                  3.00          99.00          .0400
                  3.50          99.00          .0400
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6.50	100.00	.0400			

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.900E+01	.0	.42	10.21
.11	99.11	.223E+02	.1	.62	6.97
.16	99.16	.400E+02	.1	.77	5.59
.21	99.21	.619E+02	.2	.91	4.77
.26	99.26	.882E+02	.3	1.03	4.22
.32	99.32	.119E+03	.5	1.14	3.80
.37	99.37	.154E+03	.7	1.25	3.48
.42	99.42	.193E+03	1.0	1.35	3.22
.47	99.47	.237E+03	1.3	1.44	3.01
.53	99.53	.284E+03	1.7	1.53	2.82
.58	99.58	.337E+03	2.1	1.62	2.67
.63	99.63	.393E+03	2.6	1.71	2.53
.68	99.68	.454E+03	3.1	1.80	2.41
.74	99.74	.519E+03	3.8	1.88	2.31
.79	99.79	.589E+03	4.4	1.96	2.21
.84	99.84	.663E+03	5.2	2.04	2.13
.89	99.89	.741E+03	6.0	2.11	2.05
.95	99.95	.823E+03	6.9	2.19	1.98
1.00	100.00	.910E+03	7.9	2.27	1.91

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0204)	.71	.04	2.00	16.04	.08	.53
OUTFLOW: ID= 1 (0209)	.71	.03	2.00	16.03	.07	.48

ROUTE CHN (0208)	IN= 2---> OUT= 1	Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.242E+01	.0	.42	2.75
.11	99.11	.601E+01	.1	.62	1.88
.16	99.16	.108E+02	.1	.77	1.51
.21	99.21	.167E+02	.2	.91	1.29
.26	99.26	.238E+02	.3	1.03	1.13
.32	99.32	.320E+02	.5	1.14	1.02
.37	99.37	.414E+02	.7	1.25	.94
.42	99.42	.520E+02	1.0	1.35	.87
.47	99.47	.637E+02	1.3	1.44	.81
.53	99.53	.766E+02	1.7	1.53	.76
.58	99.58	.906E+02	2.1	1.62	.72
.63	99.63	.106E+03	2.6	1.71	.68
.68	99.68	.122E+03	3.1	1.80	.65
.74	99.74	.140E+03	3.8	1.88	.62
.79	99.79	.159E+03	4.4	1.96	.60
.84	99.84	.178E+03	5.2	2.04	.57

.89	99.89	.199E+03	6.0	2.11	.55
.95	99.95	.222E+03	6.9	2.19	.53
1.00	100.00	.245E+03	7.9	2.27	.52

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0202)	.18	.02	2.00	20.59	.06	.43
OUTFLOW: ID= 1 (0208)	.18	.02	2.00	20.58	.05	.43

ROUTE CHN (0210)	IN= 2---> OUT= 1	Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.796E+01	.0	.42	9.03
.11	99.11	.197E+02	.1	.62	6.17
.16	99.16	.354E+02	.1	.77	4.95
.21	99.21	.548E+02	.2	.91	4.22
.26	99.26	.780E+02	.3	1.03	3.73
.32	99.32	.105E+03	.5	1.14	3.36
.37	99.37	.136E+03	.7	1.25	3.08
.42	99.42	.171E+03	1.0	1.35	2.85
.47	99.47	.209E+03	1.3	1.44	2.66
.53	99.53	.252E+03	1.7	1.53	2.50
.58	99.58	.298E+03	2.1	1.62	2.36
.63	99.63	.348E+03	2.6	1.71	2.24
.68	99.68	.402E+03	3.1	1.80	2.14
.74	99.74	.459E+03	3.8	1.88	2.04
.79	99.79	.521E+03	4.4	1.96	1.96
.84	99.84	.586E+03	5.2	2.04	1.88
.89	99.89	.655E+03	6.0	2.11	1.81
.95	99.95	.728E+03	6.9	2.19	1.75
1.00	100.00	.805E+03	7.9	2.27	1.69

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0203)	1.22	.05	2.00	15.07	.11	.62
OUTFLOW: ID= 1 (0210)	1.22	.04	2.00	15.07	.09	.55

ROUTE CHN (0207)	IN= 2---> OUT= 1	Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400

6.50 100.00 .0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.270E+01	.0	.42	3.06
.11	99.11	.670E+01	.1	.62	2.09
.16	99.16	.120E+02	.1	.77	1.68
.21	99.21	.186E+02	.2	.91	1.43
.26	99.26	.265E+02	.3	1.03	1.26
.32	99.32	.356E+02	.5	1.14	1.14
.37	99.37	.461E+02	.7	1.25	1.04
.42	99.42	.579E+02	1.0	1.35	.97
.47	99.47	.710E+02	1.3	1.44	.90
.53	99.53	.853E+02	1.7	1.53	.85
.58	99.58	.101E+03	2.1	1.62	.80
.63	99.63	.118E+03	2.6	1.71	.76
.68	99.68	.136E+03	3.1	1.80	.72
.74	99.74	.156E+03	3.8	1.88	.69
.79	99.79	.177E+03	4.4	1.96	.66
.84	99.84	.199E+03	5.2	2.04	.64
.89	99.89	.222E+03	6.0	2.11	.61
.95	99.95	.247E+03	6.9	2.19	.59
1.00	100.00	.273E+03	7.9	2.27	.57

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0200)	1.14	.04	2.00	12.91	.09	.55
OUTFLOW: ID= 1 (0207)	1.14	.04	2.00	12.91	.09	.54

ADD HYD (0213)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0205):	.02	.000	2.50	4.89
	+ ID2= 2 (0201):	.62	.006	2.50	5.31
	ID = 3 (0213):	.64	.006	2.50	5.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0214)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0213):	.64	.006	2.50	5.30
	+ ID2= 2 (0206):	.44	.003	2.50	4.29
	ID = 3 (0214):	1.08	.010	2.50	4.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0212)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0209):	.71	.028	2.00	16.03
	+ ID2= 2 (0208):	.18	.016	2.00	20.58
	ID = 3 (0212):	.89	.044	2.00	16.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0211)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0210):	1.22	.043	2.00	15.07
	+ ID2= 2 (0207):	1.14	.041	2.00	12.91
	ID = 3 (0211):	2.36	.084	2.00	14.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0215)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0212):	.89	.044	2.00	16.95
	+ ID2= 2 (0211):	2.36	.084	2.00	14.02
	ID = 3 (0215):	3.25	.128	2.00	14.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0217)		OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
IN= 2---> OUT= 1					
DT= 10.0 min		.0000	.0000	.0280	.0100
		.0080	.0020	.0670	.1930

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0215)	3.250	.128	2.00	14.82
OUTFLOW: ID= 1 (0217)	3.250	.030	3.17	14.81

PEAK FLOW REDUCTION [Qout/Qin](%)= 23.21
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= .0182

ADD HYD (0216)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0217):	3.25	.030	3.17	14.81
	+ ID2= 2 (0214):	1.08	.010	2.50	4.89
	ID = 3 (0216):	4.33	.039	2.50	12.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

READ STORM	Filename: I:\2016 Projects\116 238 - Burbank Circle Natural Hazards Study\Design\Cumac Phase 2\Stormwater\Otthymo\Cumac
Ptotal= 59.08 mm	Comments: OWEN SOUND 25 YEAR 4 HOUR DURATION CHICA

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	2.69	1.10	6.28	2.10	32.51	3.10	4.41
.20	2.85	1.20	7.27	2.20	20.58	3.20	4.06
.30	3.03	1.30	8.63	2.30	14.82	3.30	3.76
.40	3.24	1.40	10.61	2.40	11.50	3.40	3.50
.50	3.47	1.50	13.69	2.50	9.37	3.50	3.28
.60	3.75	1.60	19.10	2.60	7.89	3.60	3.08
.70	4.07	1.70	30.50	2.70	6.82	3.70	2.91
.80	4.46	1.80	65.56	2.80	6.00	3.80	2.76
.90	4.94	1.90	170.99	2.90	5.35	3.90	2.62
1.00	5.53	2.00	67.54	3.00	4.84	4.00	2.50

CALIB	
STANDHYD (0204)	Area (ha)= .71
ID= 1 DT=10.0 min	Total Imp(%)= 49.00 Dir. Conn.(%)= 24.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.35	.36
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	.50
Length	(m)=	4.50	235.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	2.75	1.167	6.68	2.167	27.74	3.17	4.27
.333	3.04	1.333	8.75	2.333	15.31	3.33	3.77
.500	3.38	1.500	12.46	2.500	10.22	3.50	3.37
.667	3.88	1.667	23.66	2.667	7.46	3.67	3.01
.833	4.48	1.833	79.63	2.833	6.03	3.83	2.76
1.000	5.29	2.000	108.92	3.000	5.04	4.00	2.55

Max.Eff.Inten.(mm/hr)=		108.92	16.07	
over (min)		10.00	70.00	
Storage Coeff. (min)=		.31 (ii)	64.62 (ii)	
Unit Hyd. Tpeak (min)=		10.00	70.00	
Unit Hyd. peak (cms)=		.17	.02	
				TOTALS
PEAK FLOW	(cms)=	.05	.01	.053 (iii)
TIME TO PEAK	(hrs)=	2.00	3.00	2.00
RUNOFF VOLUME	(mm)=	58.08	13.32	24.01

TOTAL RAINFALL (mm)=	59.08	59.08	59.08
RUNOFF COEFFICIENT =	.98	.23	.41

***** 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 (0202)	Area (ha)= .18
ID= 1 DT=10.0 min	Total Imp(%)= 46.60 Dir. Conn.(%)= 41.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.08	.10	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	.50	
Length	(m)=	4.50	265.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		108.92	9.07	
over (min)		10.00	90.00	
Storage Coeff. (min)=		.31 (ii)	87.20 (ii)	
Unit Hyd. Tpeak (min)=		10.00	90.00	
Unit Hyd. peak (cms)=		.17	.01	
				TOTALS
PEAK FLOW	(cms)=	.02	.00	.022 (iii)
TIME TO PEAK	(hrs)=	2.00	3.33	2.00
RUNOFF VOLUME	(mm)=	58.08	10.13	29.51
TOTAL RAINFALL	(mm)=	59.08	59.08	59.08
RUNOFF COEFFICIENT	=	.98	.17	.50

***** 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 (0203)	Area (ha)= 1.22
ID= 1 DT=10.0 min	Total Imp(%)= 52.00 Dir. Conn.(%)= 19.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.63	.59	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	1.00	
Length	(m)=	4.50	265.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		108.92	23.18	
over (min)		10.00	50.00	
Storage Coeff. (min)=		.31 (ii)	48.80 (ii)	
Unit Hyd. Tpeak (min)=		10.00	50.00	
Unit Hyd. peak (cms)=		.17	.02	
				TOTALS

```
     PEAK FLOW      (cms)=        .07          .02          .076 (iii)
     TIME TO PEAK   (hrs)=       2.00         2.67          2.00
     RUNOFF VOLUME   (mm)=      58.08        14.80         23.00
     TOTAL RAINFALL  (mm)=      59.08        59.08         59.08
     RUNOFF COEFFICIENT  =        .98          .25           .39

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  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  (0200) |   Area    (ha)=   1.14
|ID= 1 DT=10.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  15.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .49          .65
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         1.00
     Length            (m)=       4.50        90.00
     Mannings n            =       .013         .250

     Max.Eff.Inten.(mm/hr)=     108.92        25.96
               over (min)       10.00        30.00
     Storage Coeff.  (min)=        .31 (ii)   24.55 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=        .17          .04
                                                        *TOTALS*
     PEAK FLOW      (cms)=        .05          .03           .066 (iii)
     TIME TO PEAK   (hrs)=       2.00         2.33          2.00
     RUNOFF VOLUME   (mm)=      58.08        13.33         20.03
     TOTAL RAINFALL  (mm)=      59.08        59.08         59.08
     RUNOFF COEFFICIENT  =        .98          .23           .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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--------------------
| CALIB            |
| NASHYD    (0205) |   Area    (ha)=    .02   Curve Number   (CN)= 49.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .001

     PEAK FLOW      (cms)=    .000 (i)
     TIME TO PEAK   (hrs)=   2.500
     RUNOFF VOLUME   (mm)=   9.029
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     TOTAL RAINFALL  (mm)=  59.076
     RUNOFF COEFFICIENT  =    .153

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

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--------------------
| CALIB            |
| NASHYD    (0201) |   Area    (ha)=    .62   Curve Number   (CN)= 57.4
|ID= 1 DT=10.0 min |   Ia      (mm)=   9.64   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .044

     PEAK FLOW      (cms)=    .012 (i)
     TIME TO PEAK   (hrs)=   2.500
     RUNOFF VOLUME   (mm)=  10.263
     TOTAL RAINFALL  (mm)=  59.076
     RUNOFF COEFFICIENT  =    .174

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

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--------------------
| CALIB            |
| NASHYD    (0206) |   Area    (ha)=    .44   Curve Number   (CN)= 49.5
|ID= 1 DT=10.0 min |   Ia      (mm)=   8.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .031

     PEAK FLOW      (cms)=    .007 (i)
     TIME TO PEAK   (hrs)=   2.500
     RUNOFF VOLUME   (mm)=   8.252
     TOTAL RAINFALL  (mm)=  59.076
     RUNOFF COEFFICIENT  =    .140

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

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--------------------
| ROUTE CHN (0209) |
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
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              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                  .00         100.00         .0400
                 3.00          99.00         .0400
                 3.50          99.00         .0400
                 6.50         100.00         .0400

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE     VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)         (m/s)      (min)
        .05     99.05    .900E+01         .0           .42       10.21
        .11     99.11    .223E+02         .1           .62        6.97
        .16     99.16    .400E+02         .1           .77        5.59
        .21     99.21    .619E+02         .2           .91        4.77
        .26     99.26    .882E+02         .3          1.03        4.22
        .32     99.32    .119E+03         .5          1.14        3.80
        .37     99.37    .154E+03         .7          1.25        3.48
        .42     99.42    .193E+03        1.0          1.35        3.22
        .47     99.47    .237E+03        1.3          1.44        3.01
```

.53	99.53	.284E+03	1.7	1.53	2.82
.58	99.58	.337E+03	2.1	1.62	2.67
.63	99.63	.393E+03	2.6	1.71	2.53
.68	99.68	.454E+03	3.1	1.80	2.41
.74	99.74	.519E+03	3.8	1.88	2.31
.79	99.79	.589E+03	4.4	1.96	2.21
.84	99.84	.663E+03	5.2	2.04	2.13
.89	99.89	.741E+03	6.0	2.11	2.05
.95	99.95	.823E+03	6.9	2.19	1.98
1.00	100.00	.910E+03	7.9	2.27	1.91

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0204)	.71	.05	2.00	24.01	.10	.62
OUTFLOW: ID= 1 (0209)	.71	.04	2.00	24.00	.09	.54

ROUTE CHN (0208)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.242E+01	.0	.42	2.75
.11	99.11	.601E+01	.1	.62	1.88
.16	99.16	.108E+02	.1	.77	1.51
.21	99.21	.167E+02	.2	.91	1.29
.26	99.26	.238E+02	.3	1.03	1.13
.32	99.32	.320E+02	.5	1.14	1.02
.37	99.37	.414E+02	.7	1.25	.94
.42	99.42	.520E+02	1.0	1.35	.87
.47	99.47	.637E+02	1.3	1.44	.81
.53	99.53	.766E+02	1.7	1.53	.76
.58	99.58	.906E+02	2.1	1.62	.72
.63	99.63	.106E+03	2.6	1.71	.68
.68	99.68	.122E+03	3.1	1.80	.65
.74	99.74	.140E+03	3.8	1.88	.62
.79	99.79	.159E+03	4.4	1.96	.60
.84	99.84	.178E+03	5.2	2.04	.57
.89	99.89	.199E+03	6.0	2.11	.55
.95	99.95	.222E+03	6.9	2.19	.53
1.00	100.00	.245E+03	7.9	2.27	.52

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0202)	.18	.02	2.00	29.51	.06	.45
OUTFLOW: ID= 1 (0208)	.18	.02	2.00	29.50	.06	.45

ROUTE CHN (0210)

IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.796E+01	.0	.42	9.03
.11	99.11	.197E+02	.1	.62	6.17
.16	99.16	.354E+02	.1	.77	4.95
.21	99.21	.548E+02	.2	.91	4.22
.26	99.26	.780E+02	.3	1.03	3.73
.32	99.32	.105E+03	.5	1.14	3.36
.37	99.37	.136E+03	.7	1.25	3.08
.42	99.42	.171E+03	1.0	1.35	2.85
.47	99.47	.209E+03	1.3	1.44	2.66
.53	99.53	.252E+03	1.7	1.53	2.50
.58	99.58	.298E+03	2.1	1.62	2.36
.63	99.63	.348E+03	2.6	1.71	2.24
.68	99.68	.402E+03	3.1	1.80	2.14
.74	99.74	.459E+03	3.8	1.88	2.04
.79	99.79	.521E+03	4.4	1.96	1.96
.84	99.84	.586E+03	5.2	2.04	1.88
.89	99.89	.655E+03	6.0	2.11	1.81
.95	99.95	.728E+03	6.9	2.19	1.75
1.00	100.00	.805E+03	7.9	2.27	1.69

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0203)	1.22	.08	2.00	23.00	.12	.67
OUTFLOW: ID= 1 (0210)	1.22	.06	2.00	22.99	.11	.64

ROUTE CHN (0207)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.270E+01	.0	.42	3.06
.11	99.11	.670E+01	.1	.62	2.09
.16	99.16	.120E+02	.1	.77	1.68
.21	99.21	.186E+02	.2	.91	1.43
.26	99.26	.265E+02	.3	1.03	1.26
.32	99.32	.356E+02	.5	1.14	1.14
.37	99.37	.461E+02	.7	1.25	1.04
.42	99.42	.579E+02	1.0	1.35	.97
.47	99.47	.710E+02	1.3	1.44	.90

.53	99.53	.853E+02	1.7	1.53	.85
.58	99.58	.101E+03	2.1	1.62	.80
.63	99.63	.118E+03	2.6	1.71	.76
.68	99.68	.136E+03	3.1	1.80	.72
.74	99.74	.156E+03	3.8	1.88	.69
.79	99.79	.177E+03	4.4	1.96	.66
.84	99.84	.199E+03	5.2	2.04	.64
.89	99.89	.222E+03	6.0	2.11	.61
.95	99.95	.247E+03	6.9	2.19	.59
1.00	100.00	.273E+03	7.9	2.27	.57

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0200)	1.14	.07	2.00	20.03	.12	.65
OUTFLOW: ID= 1 (0207)	1.14	.06	2.00	20.03	.11	.64

ADD HYD (0213)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0205):	.02	.000	2.50	9.03
+ ID2= 2 (0201):	.62	.012	2.50	10.26
ID = 3 (0213):	.64	.013	2.50	10.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0214)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0213):	.64	.013	2.50	10.22
+ ID2= 2 (0206):	.44	.007	2.50	8.25
ID = 3 (0214):	1.08	.019	2.50	9.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0212)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0209):	.71	.041	2.00	24.00
+ ID2= 2 (0208):	.18	.022	2.00	29.50
ID = 3 (0212):	.89	.063	2.00	25.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0211)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

ID1= 1 (0210):	1.22	.064	2.00	22.99
+ ID2= 2 (0207):	1.14	.064	2.00	20.03
ID = 3 (0211):	2.36	.128	2.00	21.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0215)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0212):	.89	.063	2.00	25.11
+ ID2= 2 (0211):	2.36	.128	2.00	21.56
ID = 3 (0215):	3.25	.191	2.00	22.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0217)				
IN= 2---> OUT= 1				
DT= 10.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0280	.0100
	.0080	.0020	.0670	.1930

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0215)	3.250	.191	2.00	22.53
OUTFLOW: ID= 1 (0217)	3.250	.034	3.67	22.52

PEAK FLOW REDUCTION [Qout/Qin](%)= 17.71
TIME SHIFT OF PEAK FLOW (min)=100.00
MAXIMUM STORAGE USED (ha.m.)= .0374

ADD HYD (0216)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0217):	3.25	.034	3.67	22.52
+ ID2= 2 (0214):	1.08	.019	2.50	9.42
ID = 3 (0216):	4.33	.052	2.50	19.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

READ STORM	Filename: I:\2016 Projects\116 238 - Burbank Circle Natural Hazards Study\Design\Cumac Phase 2\Stormwater\Otthymo\Cumac
Ptotal= 71.77 mm	Comments: OWEN SOUND 100 YEAR 4 HOUR DURATION CHIC

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	3.08	1.10	7.44	2.10	40.41	3.10	5.16
.20	3.27	1.20	8.67	2.20	25.38	3.20	4.73
.30	3.49	1.30	10.36	2.30	18.12	3.30	4.37
.40	3.73	1.40	12.83	2.40	13.95	3.40	4.05
.50	4.02	1.50	16.70	2.50	11.28	3.50	3.79
.60	4.35	1.60	23.51	2.60	9.44	3.60	3.55
.70	4.75	1.70	37.88	2.70	8.10	3.70	3.35
.80	5.22	1.80	81.47	2.80	7.09	3.80	3.16
.90	5.80	1.90	206.92	2.90	6.31	3.90	3.00
1.00	6.52	2.00	83.92	3.00	5.67	4.00	2.85

CALIB
STANDHYD (0204) ID= 1 DT=10.0 min

Area (ha)= .71
Total Imp(%)= 49.00 Dir. Conn.(%)= 24.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.35	.36
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	.50
Length	(m)=	4.50	235.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	3.16	1.167	7.93	2.167	34.40	3.17	4.99
.333	3.49	1.333	10.52	2.333	18.74	3.33	4.38
.500	3.90	1.500	15.15	2.500	12.35	3.50	3.89
.667	4.51	1.667	29.26	2.667	8.90	3.67	3.47
.833	5.24	1.833	97.84	2.833	7.14	3.83	3.17
1.000	6.23	2.000	133.12	3.000	5.93	4.00	2.91

				TOTALS
Max.Eff.Inten.(mm/hr)=		133.12	23.17	
over (min)		10.00	60.00	
Storage Coeff. (min)=		.29 (ii)	55.84 (ii)	
Unit Hyd. Tpeak (min)=		10.00	60.00	
Unit Hyd. peak (cms)=		.17	.02	
PEAK FLOW	(cms)=	.06	.01	.066 (iii)
TIME TO PEAK	(hrs)=	2.00	2.83	2.00
RUNOFF VOLUME	(mm)=	70.77	19.04	31.41
TOTAL RAINFALL	(mm)=	71.77	71.77	71.77
RUNOFF COEFFICIENT	=	.99	.27	.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 (0202) ID= 1 DT=10.0 min

Area (ha)= .18
Total Imp(%)= 46.60 Dir. Conn.(%)= 41.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.08	.10
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	.50
Length	(m)=	4.50	265.00
Mannings n	=	.013	.250

				TOTALS
Max.Eff.Inten.(mm/hr)=		133.12	13.32	
over (min)		10.00	80.00	
Storage Coeff. (min)=		.29 (ii)	74.79 (ii)	
Unit Hyd. Tpeak (min)=		10.00	80.00	
Unit Hyd. peak (cms)=		.17	.01	
PEAK FLOW	(cms)=	.03	.00	.028 (iii)
TIME TO PEAK	(hrs)=	2.00	3.17	2.00
RUNOFF VOLUME	(mm)=	70.77	14.75	37.47
TOTAL RAINFALL	(mm)=	71.77	71.77	71.77
RUNOFF COEFFICIENT	=	.99	.21	.52

***** 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 (0203) ID= 1 DT=10.0 min

Area (ha)= 1.22
Total Imp(%)= 52.00 Dir. Conn.(%)= 19.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.63	.59
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	1.00
Length	(m)=	4.50	265.00
Mannings n	=	.013	.250

				TOTALS
Max.Eff.Inten.(mm/hr)=		133.12	39.06	
over (min)		10.00	40.00	
Storage Coeff. (min)=		.29 (ii)	39.64 (ii)	
Unit Hyd. Tpeak (min)=		10.00	40.00	
Unit Hyd. peak (cms)=		.17	.03	
PEAK FLOW	(cms)=	.09	.04	.098 (iii)
TIME TO PEAK	(hrs)=	2.00	2.50	2.00
RUNOFF VOLUME	(mm)=	70.77	21.00	30.44
TOTAL RAINFALL	(mm)=	71.77	71.77	71.77
RUNOFF COEFFICIENT	=	.99	.29	.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 (0200)	Area (ha)= 1.14				
ID= 1 DT=10.0 min	Total Imp(%)= 43.00	Dir. Conn.(%)= 15.00			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.49	.65	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	1.00	
Length	(m)=	4.50	90.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)	=	133.12	46.12	
over	(min)	10.00	20.00	
Storage Coeff.	(min)=	.29 (ii)	19.55 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	20.00	
Unit Hyd. peak	(cms)=	.17	.06	
				TOTALS
PEAK FLOW	(cms)=	.06	.06	.101 (iii)
TIME TO PEAK	(hrs)=	2.00	2.17	2.00
RUNOFF VOLUME	(mm)=	70.77	19.05	26.80
TOTAL RAINFALL	(mm)=	71.77	71.77	71.77
RUNOFF COEFFICIENT	=	.99	.27	.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					
NASHYD (0205)	Area (ha)= .02	Curve Number (CN)= 49.0			
ID= 1 DT=10.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= .54				

Unit Hyd Qpeak (cms)= .001

PEAK FLOW (cms)= .001 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 13.323
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = .186

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

CALIB					
NASHYD (0201)	Area (ha)= .62	Curve Number (CN)= 57.4			
ID= 1 DT=10.0 min	Ia (mm)= 9.64	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= .54				

Unit Hyd Qpeak (cms)= .044

PEAK FLOW (cms)= .019 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 15.390
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = .214

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

CALIB					
NASHYD (0206)	Area (ha)= .44	Curve Number (CN)= 49.5			
ID= 1 DT=10.0 min	Ia (mm)= 8.50	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= .54				

Unit Hyd Qpeak (cms)= .031

PEAK FLOW (cms)= .011 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 12.405
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = .173

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

ROUTE CHN (0209)		
IN= 2---> OUT= 1	Routing time step (min)'= 10.00	

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.900E+01	.0	.42	10.21
.11	99.11	.223E+02	.1	.62	6.97
.16	99.16	.400E+02	.1	.77	5.59
.21	99.21	.619E+02	.2	.91	4.77
.26	99.26	.882E+02	.3	1.03	4.22
.32	99.32	.119E+03	.5	1.14	3.80
.37	99.37	.154E+03	.7	1.25	3.48
.42	99.42	.193E+03	1.0	1.35	3.22
.47	99.47	.237E+03	1.3	1.44	3.01
.53	99.53	.284E+03	1.7	1.53	2.82
.58	99.58	.337E+03	2.1	1.62	2.67
.63	99.63	.393E+03	2.6	1.71	2.53
.68	99.68	.454E+03	3.1	1.80	2.41
.74	99.74	.519E+03	3.8	1.88	2.31
.79	99.79	.589E+03	4.4	1.96	2.21
.84	99.84	.663E+03	5.2	2.04	2.13
.89	99.89	.741E+03	6.0	2.11	2.05
.95	99.95	.823E+03	6.9	2.19	1.98
1.00	100.00	.910E+03	7.9	2.27	1.91

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

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)

INFLOW : ID= 2 (0204)	.71	.07	2.00	31.41	.12	.65
OUTFLOW: ID= 1 (0209)	.71	.05	2.00	31.40	.10	.62

ROUTE CHN (0208)	IN= 2---> OUT= 1	Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.242E+01	.0	.42	2.75
.11	99.11	.601E+01	.1	.62	1.88
.16	99.16	.108E+02	.1	.77	1.51
.21	99.21	.167E+02	.2	.91	1.29
.26	99.26	.238E+02	.3	1.03	1.13
.32	99.32	.320E+02	.5	1.14	1.02
.37	99.37	.414E+02	.7	1.25	.94
.42	99.42	.520E+02	1.0	1.35	.87
.47	99.47	.637E+02	1.3	1.44	.81
.53	99.53	.766E+02	1.7	1.53	.76
.58	99.58	.906E+02	2.1	1.62	.72
.63	99.63	.106E+03	2.6	1.71	.68
.68	99.68	.122E+03	3.1	1.80	.65
.74	99.74	.140E+03	3.8	1.88	.62
.79	99.79	.159E+03	4.4	1.96	.60
.84	99.84	.178E+03	5.2	2.04	.57
.89	99.89	.199E+03	6.0	2.11	.55
.95	99.95	.222E+03	6.9	2.19	.53
1.00	100.00	.245E+03	7.9	2.27	.52

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0202)	.18	.03	2.00	37.47	.07	.47
OUTFLOW: ID= 1 (0208)	.18	.03	2.00	37.46	.07	.47

ROUTE CHN (0210)	IN= 2---> OUT= 1	Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.796E+01	.0	.42	9.03
.11	99.11	.197E+02	.1	.62	6.17

.16	99.16	.354E+02	.1	.77	4.95	
.21	99.21	.548E+02	.2	.91	4.22	
.26	99.26	.780E+02	.3	1.03	3.73	
.32	99.32	.105E+03	.5	1.14	3.36	
.37	99.37	.136E+03	.7	1.25	3.08	
.42	99.42	.171E+03	1.0	1.35	2.85	
.47	99.47	.209E+03	1.3	1.44	2.66	
.53	99.53	.252E+03	1.7	1.53	2.50	
.58	99.58	.298E+03	2.1	1.62	2.36	
.63	99.63	.348E+03	2.6	1.71	2.24	
.68	99.68	.402E+03	3.1	1.80	2.14	
.74	99.74	.459E+03	3.8	1.88	2.04	
.79	99.79	.521E+03	4.4	1.96	1.96	
.84	99.84	.586E+03	5.2	2.04	1.88	
.89	99.89	.655E+03	6.0	2.11	1.81	
.95	99.95	.728E+03	6.9	2.19	1.75	
1.00	100.00	.805E+03	7.9	2.27	1.69	

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0203)	1.22	.10	2.00	30.44	.14	.72
OUTFLOW: ID= 1 (0210)	1.22	.08	2.00	30.43	.13	.68

ROUTE CHN (0207)	IN= 2---> OUT= 1	Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.270E+01	.0	.42	3.06
.11	99.11	.670E+01	.1	.62	2.09
.16	99.16	.120E+02	.1	.77	1.68
.21	99.21	.186E+02	.2	.91	1.43
.26	99.26	.265E+02	.3	1.03	1.26
.32	99.32	.356E+02	.5	1.14	1.14
.37	99.37	.461E+02	.7	1.25	1.04
.42	99.42	.579E+02	1.0	1.35	.97
.47	99.47	.710E+02	1.3	1.44	.90
.53	99.53	.853E+02	1.7	1.53	.85
.58	99.58	.101E+03	2.1	1.62	.80
.63	99.63	.118E+03	2.6	1.71	.76
.68	99.68	.136E+03	3.1	1.80	.72
.74	99.74	.156E+03	3.8	1.88	.69
.79	99.79	.177E+03	4.4	1.96	.66
.84	99.84	.199E+03	5.2	2.04	.64
.89	99.89	.222E+03	6.0	2.11	.61
.95	99.95	.247E+03	6.9	2.19	.59
1.00	100.00	.273E+03	7.9	2.27	.57

<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)

INFLOW : ID= 2 (0200)	1.14	.10	2.00	26.80	.14	.73
OUTFLOW: ID= 1 (0207)	1.14	.10	2.00	26.80	.14	.72

ADD HYD (0213) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0205):	.02	.001	2.50	13.32
+ ID2= 2 (0201):	.62	.019	2.50	15.39
ID = 3 (0213):	.64	.019	2.50	15.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0214) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0213):	.64	.019	2.50	15.33
+ ID2= 2 (0206):	.44	.011	2.50	12.41
ID = 3 (0214):	1.08	.030	2.50	14.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0212) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0209):	.71	.053	2.00	31.40
+ ID2= 2 (0208):	.18	.027	2.00	37.46
ID = 3 (0212):	.89	.080	2.00	32.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0211) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0210):	1.22	.084	2.00	30.43
+ ID2= 2 (0207):	1.14	.098	2.00	26.80
ID = 3 (0211):	2.36	.183	2.00	28.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0215) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0212):	.89	.080	2.00	32.63

+ ID2= 2 (0211):	2.36	.183	2.00	28.68
ID = 3 (0215):	3.25	.263	2.00	29.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0217) | IN= 2---> OUT= 1 | DT= 10.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0280	.0100
.0080	.0020	.0670	.1930

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0215)	3.250	.263	2.00	29.76
OUTFLOW: ID= 1 (0217)	3.250	.038	3.83	29.74

PEAK FLOW REDUCTION [Qout/Qin](%)= 14.49
TIME SHIFT OF PEAK FLOW (min)=110.00
MAXIMUM STORAGE USED (ha.m.)= .0572

ADD HYD (0216) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0217):	3.25	.038	3.83	29.74
+ ID2= 2 (0214):	1.08	.030	2.50	14.14
ID = 3 (0216):	4.33	.065	2.50	25.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

READ STORM | Ptotal=193.00 mm

Filename: I:\2016 Projects\116 238 - Burbank Circle Natural Hazards Study\Design\Cumac Phase 2\Stormwater\Otthymo\Cumac
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 (0204)	Area (ha)= .71
ID= 1 DT=10.0 min	Total Imp(%)= 49.00 Dir. Conn.(%)= 24.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.35	.36
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	.50
Length	(m)=	4.50	235.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Max.Eff.Inten.(mm/hr)=	43.00	36.73		
over (min)	10.00	50.00		
Storage Coeff. (min)=	.45 (ii)	46.66 (ii)		
Unit Hyd. Tpeak (min)=	10.00	50.00		
Unit Hyd. peak (cms)=	.17	.02		
				TOTALS
PEAK FLOW (cms)=	.02	.03		.044 (iii)
TIME TO PEAK (hrs)=	6.33	7.50		7.00
RUNOFF VOLUME (mm)=	192.00	97.98		120.51
TOTAL RAINFALL (mm)=	193.00	193.00		193.00
RUNOFF COEFFICIENT =	.99	.51		.62

***** 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 (0202)	Area (ha)= .18
ID= 1 DT=10.0 min	Total Imp(%)= 46.60 Dir. Conn.(%)= 41.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.08	.10
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	.50
Length	(m)=	4.50	265.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=	43.00	22.31		
over (min)	10.00	70.00		
Storage Coeff. (min)=	.45 (ii)	61.07 (ii)		
Unit Hyd. Tpeak (min)=	10.00	70.00		
Unit Hyd. peak (cms)=	.17	.02		
				TOTALS
PEAK FLOW (cms)=	.01	.00		.012 (iii)
TIME TO PEAK (hrs)=	6.33	7.83		7.00
RUNOFF VOLUME (mm)=	192.00	83.05		127.53
TOTAL RAINFALL (mm)=	193.00	193.00		193.00
RUNOFF COEFFICIENT =	.99	.43		.66

***** 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 (0203)	Area (ha)= 1.22
ID= 1 DT=10.0 min	Total Imp(%)= 52.00 Dir. Conn.(%)= 19.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.63	.59
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	1.00
Length	(m)=	4.50	265.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=	43.00	45.17		
over (min)	10.00	40.00		
Storage Coeff. (min)=	.45 (ii)	37.59 (ii)		
Unit Hyd. Tpeak (min)=	10.00	40.00		
Unit Hyd. peak (cms)=	.17	.03		
				TOTALS
PEAK FLOW (cms)=	.03	.06		.082 (iii)
TIME TO PEAK (hrs)=	6.33	7.33		7.00
RUNOFF VOLUME (mm)=	192.00	104.17		120.84
TOTAL RAINFALL (mm)=	193.00	193.00		193.00
RUNOFF COEFFICIENT =	.99	.54		.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 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 (0200)	ID= 1 DT=10.0 min

Area (ha)= 1.14
Total Imp(%)= 43.00 Dir. Conn.(%)= 15.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.49	.65	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	1.00	
Length	(m)=	4.50	90.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		43.00	38.23	
over (min)		10.00	30.00	
Storage Coeff. (min)=		.45 (ii)	21.22 (ii)	
Unit Hyd. Tpeak (min)=		10.00	30.00	
Unit Hyd. peak (cms)=		.17	.05	
				TOTALS
PEAK FLOW	(cms)=	.02	.06	.081 (iii)
TIME TO PEAK	(hrs)=	6.33	7.17	7.00
RUNOFF VOLUME	(mm)=	192.00	98.02	112.11
TOTAL RAINFALL	(mm)=	193.00	193.00	193.00
RUNOFF COEFFICIENT	=	.99	.51	.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* = 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	NASHYD (0205)	ID= 1 DT=10.0 min

Area (ha)= .02 Curve Number (CN)= 49.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .54

Unit Hyd Qpeak (cms)= .001

PEAK FLOW (cms)= .001 (i)
TIME TO PEAK (hrs)= 7.167
RUNOFF VOLUME (mm)= 77.855
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = .403

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

CALIB	NASHYD (0201)	ID= 1 DT=10.0 min

Area (ha)= .62 Curve Number (CN)= 57.4
Ia (mm)= 9.64 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .54

Unit Hyd Qpeak (cms)= .044

PEAK FLOW (cms)= .034 (i)
TIME TO PEAK (hrs)= 7.167
RUNOFF VOLUME (mm)= 90.355
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = .468

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

CALIB	NASHYD (0206)	ID= 1 DT=10.0 min

Area (ha)= .44 Curve Number (CN)= 49.5
Ia (mm)= 8.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .54

Unit Hyd Qpeak (cms)= .031

PEAK FLOW (cms)= .020 (i)
TIME TO PEAK (hrs)= 7.167
RUNOFF VOLUME (mm)= 76.683
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = .397

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

ROUTE CHN (0209)	IN= 2---> OUT= 1

Routing time step (min)= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.900E+01	.0	.42	10.21
.11	99.11	.223E+02	.1	.62	6.97
.16	99.16	.400E+02	.1	.77	5.59
.21	99.21	.619E+02	.2	.91	4.77
.26	99.26	.882E+02	.3	1.03	4.22
.32	99.32	.119E+03	.5	1.14	3.80
.37	99.37	.154E+03	.7	1.25	3.48
.42	99.42	.193E+03	1.0	1.35	3.22
.47	99.47	.237E+03	1.3	1.44	3.01
.53	99.53	.284E+03	1.7	1.53	2.82
.58	99.58	.337E+03	2.1	1.62	2.67
.63	99.63	.393E+03	2.6	1.71	2.53
.68	99.68	.454E+03	3.1	1.80	2.41
.74	99.74	.519E+03	3.8	1.88	2.31
.79	99.79	.589E+03	4.4	1.96	2.21
.84	99.84	.663E+03	5.2	2.04	2.13
.89	99.89	.741E+03	6.0	2.11	2.05
.95	99.95	.823E+03	6.9	2.19	1.98
1.00	100.00	.910E+03	7.9	2.27	1.91

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0204)	.71	.04	7.00	120.51	.09	.56
OUTFLOW: ID= 1 (0209)	.71	.04	7.00	120.50	.09	.55

ROUTE CHN (0208)	IN= 2---> OUT= 1	Routing time step (min)'= 10.00

DATA FOR SECTION (1.1)

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

TRAVEL TIME TABLE

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.242E+01	.0	.42	2.75
.11	99.11	.601E+01	.1	.62	1.88
.16	99.16	.108E+02	.1	.77	1.51
.21	99.21	.167E+02	.2	.91	1.29
.26	99.26	.238E+02	.3	1.03	1.13
.32	99.32	.320E+02	.5	1.14	1.02
.37	99.37	.414E+02	.7	1.25	.94
.42	99.42	.520E+02	1.0	1.35	.87
.47	99.47	.637E+02	1.3	1.44	.81
.53	99.53	.766E+02	1.7	1.53	.76
.58	99.58	.906E+02	2.1	1.62	.72
.63	99.63	.106E+03	2.6	1.71	.68
.68	99.68	.122E+03	3.1	1.80	.65
.74	99.74	.140E+03	3.8	1.88	.62
.79	99.79	.159E+03	4.4	1.96	.60
.84	99.84	.178E+03	5.2	2.04	.57
.89	99.89	.199E+03	6.0	2.11	.55
.95	99.95	.222E+03	6.9	2.19	.53
1.00	100.00	.245E+03	7.9	2.27	.52

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0202)	.18	.01	7.00	127.53	.04	.42
OUTFLOW: ID= 1 (0208)	.18	.01	7.00	127.53	.04	.42

ROUTE CHN (0210)	IN= 2---> OUT= 1	Routing time step (min)'= 10.00

DATA FOR SECTION (1.1)

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

TRAVEL TIME TABLE

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME

(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
.05	99.05	.796E+01	.0	.42	9.03
.11	99.11	.197E+02	.1	.62	6.17
.16	99.16	.354E+02	.1	.77	4.95
.21	99.21	.548E+02	.2	.91	4.22
.26	99.26	.780E+02	.3	1.03	3.73
.32	99.32	.105E+03	.5	1.14	3.36
.37	99.37	.136E+03	.7	1.25	3.08
.42	99.42	.171E+03	1.0	1.35	2.85
.47	99.47	.209E+03	1.3	1.44	2.66
.53	99.53	.252E+03	1.7	1.53	2.50
.58	99.58	.298E+03	2.1	1.62	2.36
.63	99.63	.348E+03	2.6	1.71	2.24
.68	99.68	.402E+03	3.1	1.80	2.14
.74	99.74	.459E+03	3.8	1.88	2.04
.79	99.79	.521E+03	4.4	1.96	1.96
.84	99.84	.586E+03	5.2	2.04	1.88
.89	99.89	.655E+03	6.0	2.11	1.81
.95	99.95	.728E+03	6.9	2.19	1.75
1.00	100.00	.805E+03	7.9	2.27	1.69

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0203)	1.22	.08	7.00	120.84	.13	.68
OUTFLOW: ID= 1 (0210)	1.22	.08	7.00	120.83	.13	.67

ROUTE CHN (0207)	IN= 2---> OUT= 1	Routing time step (min)'= 10.00

DATA FOR SECTION (1.1)

Distance	Elevation	Manning
.00	100.00	.0400
3.00	99.00	.0400
3.50	99.00	.0400
6.50	100.00	.0400

TRAVEL TIME TABLE

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.270E+01	.0	.42	3.06
.11	99.11	.670E+01	.1	.62	2.09
.16	99.16	.120E+02	.1	.77	1.68
.21	99.21	.186E+02	.2	.91	1.43
.26	99.26	.265E+02	.3	1.03	1.26
.32	99.32	.356E+02	.5	1.14	1.14
.37	99.37	.461E+02	.7	1.25	1.04
.42	99.42	.579E+02	1.0	1.35	.97
.47	99.47	.710E+02	1.3	1.44	.90
.53	99.53	.853E+02	1.7	1.53	.85
.58	99.58	.101E+03	2.1	1.62	.80
.63	99.63	.118E+03	2.6	1.71	.76
.68	99.68	.136E+03	3.1	1.80	.72
.74	99.74	.156E+03	3.8	1.88	.69
.79	99.79	.177E+03	4.4	1.96	.66
.84	99.84	.199E+03	5.2	2.04	.64
.89	99.89	.222E+03	6.0	2.11	.61
.95	99.95	.247E+03	6.9	2.19	.59
1.00	100.00	.273E+03	7.9	2.27	.57

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0200)	1.14	.08	7.00	112.11	.13	.68
OUTFLOW: ID= 1 (0207)	1.14	.08	7.00	112.11	.13	.68

ADD HYD (0213)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0205):	.02	.001	7.17	77.85
+ ID2= 2 (0201):	.62	.034	7.17	90.36
ID = 3 (0213):	.64	.035	7.17	89.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0214)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0213):	.64	.035	7.17	89.96
+ ID2= 2 (0206):	.44	.020	7.17	76.68
ID = 3 (0214):	1.08	.055	7.17	84.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0212)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0209):	.71	.042	7.00	120.50
+ ID2= 2 (0208):	.18	.012	7.00	127.53
ID = 3 (0212):	.89	.054	7.00	121.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0211)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0210):	1.22	.079	7.00	120.83
+ ID2= 2 (0207):	1.14	.081	7.00	112.11
ID = 3 (0211):	2.36	.160	7.00	116.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0215) |

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0212):	.89	.054	7.00	121.92
+ ID2= 2 (0211):	2.36	.160	7.00	116.61
ID = 3 (0215):	3.25	.214	7.00	118.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0217) / IN= 2---> OUT= 1 / DT= 10.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.0280	.0100
	.0080	.0020	.0670	.1930

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0215)	3.250	.214	7.00	118.07
OUTFLOW: ID= 1 (0217)	3.250	.067	12.00	118.05

PEAK FLOW REDUCTION [Qout/Qin](%)= 31.32
TIME SHIFT OF PEAK FLOW (min)=300.00
MAXIMUM STORAGE USED (ha.m.)= .1933

ADD HYD (0216)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0217):	3.25	.067	12.00	118.05
+ ID2= 2 (0214):	1.08	.055	7.17	84.55
ID = 3 (0216):	4.33	.101	9.17	109.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS 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


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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:\2016PR~1\116238~1\Design\CUMACP~1\STORMW~1\Otthymo\CUMACP~1\SCS POST.out

  Summary filename:
I:\2016PR~1\116238~1\Design\CUMACP~1\STORMW~1\Otthymo\CUMACP~1\SCS POST.sum


DATE: 4/27/2017                           TIME: 1:30:06 PM

USER:


COMMENTS: _____________________________________________________________


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

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| MASS STORM       |    Filename: I:\2016 Projects\116
|                  |              238 - Burbank Circle Natural Hazards Study\
|                  |              Design\Cumac Phase 2\Stormwater\Otthymo\Cumac
| Ptotal= 50.19 mm |    Comments: SCS Type II 24 HR MASS CURVE
--------------------
                       Duration of storm    = 23.75 hrs
                       Mass curve time step = 15.00 min

                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .60 |  6.25    1.00 | 12.25    7.23 | 18.25     .80
                 .50     .40 |  6.50     .80 | 12.50    3.81 | 18.50    1.00
                 .75     .60 |  6.75    1.00 | 12.75    3.61 | 18.75     .80
                                      Page 1
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                1.00     .60 |  7.00    1.00 | 13.00    2.81 | 19.00    1.00
                1.25     .60 |  7.25    1.20 | 13.25    2.61 | 19.25     .80
                1.50     .40 |  7.50    1.00 | 13.50    2.21 | 19.50    1.00
                1.75     .60 |  7.75    1.20 | 13.75    2.01 | 19.75     .80
                2.00     .60 |  8.00    1.20 | 14.00    1.61 | 20.00     .60
                2.25     .80 |  8.25    1.41 | 14.25    1.41 | 20.25     .60
                2.50     .60 |  8.50    1.41 | 14.50    1.61 | 20.50     .60
                2.75     .60 |  8.75    1.41 | 14.75    1.41 | 20.75     .60
                3.00     .60 |  9.00    1.61 | 15.00    1.61 | 21.00     .60
                3.25     .80 |  9.25    1.61 | 15.25    1.41 | 21.25     .60
                3.50     .60 |  9.50    1.81 | 15.50    1.61 | 21.50     .60
                3.75     .60 |  9.75    1.81 | 15.75    1.41 | 21.75     .60
                4.00     .80 | 10.00    2.21 | 16.00    1.00 | 22.00     .60
                4.25     .80 | 10.25    2.41 | 16.25     .80 | 22.25     .60
                4.50     .80 | 10.50    3.01 | 16.50    1.00 | 22.50     .60
                4.75     .80 | 10.75    3.21 | 16.75     .80 | 22.75     .60
                5.00     .80 | 11.00    4.82 | 17.00    1.00 | 23.00     .60
                5.25     .80 | 11.25    4.82 | 17.25     .80 | 23.25     .60
                5.50     .80 | 11.50   14.86 | 17.50    1.00 | 23.50     .60
                5.75     .80 | 11.75   61.43 | 17.75     .80 | 23.75     .60
                6.00     .80 | 12.00    7.23 | 18.00    1.00 |

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--------------------
| CALIB            |
| STANDHYD  (0200) |   Area    (ha)=   1.14
|ID= 1 DT=10.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  15.00
--------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=         .49           .65
     Dep. Storage     (mm)=        1.00          5.00
     Average Slope     (%)=        2.00          1.00
     Length            (m)=        4.50         90.00
     Mannings n           =        .013          .250

         NOTE:  RAINFALL WAS TRANSFORMED TO  10.0 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
              .167     .60 | 6.167    1.00 |12.167    7.23 | 18.17     .80
              .333     .50 | 6.333     .90 |12.333    5.52 | 18.33     .90
              .500     .40 | 6.500     .80 |12.500    3.81 | 18.50    1.00
              .667     .60 | 6.667    1.00 |12.667    3.61 | 18.67     .80
              .833     .60 | 6.833    1.00 |12.833    3.21 | 18.83     .90
             1.000     .60 | 7.000    1.00 |13.000    2.81 | 19.00    1.00
             1.167     .60 | 7.167    1.20 |13.167    2.61 | 19.17     .80
             1.333     .50 | 7.333    1.10 |13.333    2.41 | 19.33     .90
             1.500     .40 | 7.500    1.00 |13.500    2.21 | 19.50    1.00
             1.667     .60 | 7.667    1.20 |13.667    2.01 | 19.67     .80
             1.833     .60 | 7.833    1.20 |13.833    1.81 | 19.83     .70
             2.000     .60 | 8.000    1.20 |14.000    1.61 | 20.00     .60
             2.167     .80 | 8.167    1.41 |14.167    1.41 | 20.17     .60
             2.333     .70 | 8.333    1.41 |14.333    1.51 | 20.33     .60
             2.500     .60 | 8.500    1.41 |14.500    1.61 | 20.50     .60
             2.667     .60 | 8.667    1.41 |14.667    1.41 | 20.67     .60
             2.833     .60 | 8.833    1.51 |14.833    1.51 | 20.83     .60
             3.000     .60 | 9.000    1.61 |15.000    1.61 | 21.00     .60
             3.167     .80 | 9.167    1.61 |15.167    1.41 | 21.17     .60
             3.333     .70 | 9.333    1.71 |15.333    1.51 | 21.33     .60
             3.500     .60 | 9.500    1.81 |15.500    1.61 | 21.50     .60
             3.667     .60 | 9.667    1.81 |15.667    1.41 | 21.67     .60
                                    Page 2
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3.833	.70	9.833	2.01	15.833	1.20	21.83	.60
4.000	.80	10.000	2.21	16.000	1.00	22.00	.60
4.167	.80	10.167	2.41	16.167	.80	22.17	.60
4.333	.80	10.333	2.71	16.333	.90	22.33	.60
4.500	.80	10.500	3.01	16.500	1.00	22.50	.60
4.667	.80	10.667	3.21	16.667	.80	22.67	.60
4.833	.80	10.833	4.02	16.833	.90	22.83	.60
5.000	.80	11.000	4.82	17.000	1.00	23.00	.60
5.167	.80	11.167	4.82	17.167	.80	23.17	.60
5.333	.80	11.333	9.84	17.333	.90	23.33	.60
5.500	.80	11.500	14.86	17.500	1.00	23.50	.60
5.667	.80	11.667	61.43	17.667	.80	23.67	.60
5.833	.80	11.833	34.33	17.833	.90	23.83	.30
6.000	.80	12.000	7.23	18.000	1.00		

Max.Eff.Inten.(mm/hr)=	61.43	9.02	
over (min)	10.00	40.00	
Storage Coeff. (min)=	.39 (ii)	37.39 (ii)	
Unit Hyd. Tpeak (min)=	10.00	40.00	
Unit Hyd. peak (cms)=	.17	.03	
			TOTALS
PEAK FLOW (cms)=	.03	.01	.032 (iii)
TIME TO PEAK (hrs)=	11.67	12.33	11.67
RUNOFF VOLUME (mm)=	49.04	9.73	15.61
TOTAL RAINFALL (mm)=	50.04	50.04	50.04
RUNOFF COEFFICIENT =	.98	.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 (0203)	Area (ha)= 1.22
ID= 1 DT=10.0 min	Total Imp(%)= 52.00 Dir. Conn.(%)= 19.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.63	.59
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	1.00
Length (m)=	4.50	265.00
Mannings n =	.013	.250

Max.Eff.Inten.(mm/hr)=	61.43	8.77	
over (min)	10.00	80.00	
Storage Coeff. (min)=	.39 (ii)	71.94 (ii)	
Unit Hyd. Tpeak (min)=	10.00	80.00	
Unit Hyd. peak (cms)=	.17	.02	
			TOTALS
PEAK FLOW (cms)=	.04	.01	.041 (iii)
TIME TO PEAK (hrs)=	11.67	13.00	11.67
RUNOFF VOLUME (mm)=	49.04	10.88	18.09
TOTAL RAINFALL (mm)=	50.04	50.04	50.04
RUNOFF COEFFICIENT =	.98	.22	.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.

CALIB	
STANDHYD (0202)	Area (ha)= .18
ID= 1 DT=10.0 min	Total Imp(%)= 46.60 Dir. Conn.(%)= 41.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.08	.10
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	.50
Length (m)=	4.50	265.00
Mannings n =	.013	.250

Max.Eff.Inten.(mm/hr)=	61.43	3.79	
over (min)	10.00	130.00	
Storage Coeff. (min)=	.39 (ii)	123.58 (ii)	
Unit Hyd. Tpeak (min)=	10.00	130.00	
Unit Hyd. peak (cms)=	.17	.01	
			TOTALS
PEAK FLOW (cms)=	.01	.00	.013 (iii)
TIME TO PEAK (hrs)=	11.67	13.83	11.67
RUNOFF VOLUME (mm)=	49.04	7.27	24.06
TOTAL RAINFALL (mm)=	50.04	50.04	50.04
RUNOFF COEFFICIENT =	.98	.15	.48

***** 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)= .71
ID= 1 DT=10.0 min	Total Imp(%)= 49.00 Dir. Conn.(%)= 24.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.35	.36
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	.50
Length (m)=	4.50	235.00
Mannings n =	.013	.250

Max.Eff.Inten.(mm/hr)=	61.43	6.90	
over (min)	10.00	100.00	
Storage Coeff. (min)=	.39 (ii)	90.60 (ii)	
Unit Hyd. Tpeak (min)=	10.00	100.00	
Unit Hyd. peak (cms)=	.17	.01	
			TOTALS
PEAK FLOW (cms)=	.03	.00	.029 (iii)
TIME TO PEAK (hrs)=	11.67	13.33	11.67

```
     RUNOFF VOLUME    (mm)=      49.04          9.73          19.09
     TOTAL RAINFALL   (mm)=      50.04         50.04          50.04
     RUNOFF COEFFICIENT   =        .98           .19            .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.

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--------------------
| CALIB            |
| NASHYD    (0206) |   Area    (ha)=    .44   Curve Number   (CN)= 49.5
|ID= 1 DT=10.0 min |   Ia      (mm)=   8.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .031

     PEAK FLOW       (cms)=    .003 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=   5.733
     TOTAL RAINFALL   (mm)=  50.039
     RUNOFF COEFFICIENT   =    .115

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

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--------------------
| CALIB            |
| NASHYD    (0201) |   Area    (ha)=    .62   Curve Number   (CN)= 57.4
|ID= 1 DT=10.0 min |   Ia      (mm)=   9.64   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .044

     PEAK FLOW       (cms)=    .005 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=   7.124
     TOTAL RAINFALL   (mm)=  50.039
     RUNOFF COEFFICIENT   =    .142

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

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--------------------
| CALIB            |
| NASHYD    (0205) |   Area    (ha)=    .02   Curve Number   (CN)= 49.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .001

     PEAK FLOW       (cms)=    .000 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=   5.902
     TOTAL RAINFALL   (mm)=  50.039
     RUNOFF COEFFICIENT   =    .118

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------
| ROUTE CHN (0207) |
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00         100.00         .0400      Main Channel
                   3.00          99.00         .0400      Main Channel
                   3.50          99.00         .0400      Main Channel
                   6.50         100.00         .0400      Main Channel

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       .05    99.05    .270E+01         .0          .21       6.13
       .11    99.11    .670E+01         .0          .31       4.18
       .16    99.16    .120E+02         .1          .39       3.36
       .21    99.21    .186E+02         .1          .45       2.86
       .26    99.26    .265E+02         .2          .51       2.53
       .32    99.32    .356E+02         .3          .57       2.28
       .37    99.37    .461E+02         .4          .62       2.09
       .42    99.42    .579E+02         .5          .67       1.93
       .47    99.47    .710E+02         .7          .72       1.80
       .53    99.53    .853E+02         .8          .77       1.69
       .58    99.58    .101E+03        1.1          .81       1.60
       .63    99.63    .118E+03        1.3          .86       1.52
       .68    99.68    .136E+03        1.6          .90       1.45
       .74    99.74    .156E+03        1.9          .94       1.38
       .79    99.79    .177E+03        2.2          .98       1.33
       .84    99.84    .199E+03        2.6         1.02       1.28
       .89    99.89    .222E+03        3.0         1.06       1.23
       .95    99.95    .247E+03        3.5         1.10       1.19
      1.00   100.00    .273E+03        4.0         1.13       1.15

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.    MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
     INFLOW : ID= 2 (0200)     1.14      .03   11.67  15.61       .11       .32
     OUTFLOW: ID= 1 (0207)     1.14      .03   11.83  15.61       .11       .31

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--------------------
| ROUTE CHN (0210) |
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00         100.00         .0400      Main Channel
                   3.00          99.00         .0400      Main Channel
                   3.50          99.00         .0400      Main Channel
                   6.50         100.00         .0400      Main Channel

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       .05    99.05    .796E+01         .0          .21      18.07
       .11    99.11    .197E+02         .0          .31      12.34
       .16    99.16    .354E+02         .1          .39       9.89
       .21    99.21    .548E+02         .1          .45       8.45
       .26    99.26    .780E+02         .2          .51       7.46
       .32    99.32    .105E+03         .3          .57       6.73
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.37	99.37	.136E+03	.4	.62	6.16
.42	99.42	.171E+03	.5	.67	5.70
.47	99.47	.209E+03	.7	.72	5.32
.53	99.53	.252E+03	.8	.77	5.00
.58	99.58	.298E+03	1.1	.81	4.72
.63	99.63	.348E+03	1.3	.86	4.48
.68	99.68	.402E+03	1.6	.90	4.27
.74	99.74	.459E+03	1.9	.94	4.08
.79	99.79	.521E+03	2.2	.98	3.91
.84	99.84	.586E+03	2.6	1.02	3.76
.89	99.89	.655E+03	3.0	1.06	3.63
.95	99.95	.728E+03	3.5	1.10	3.50
1.00	100.00	.805E+03	4.0	1.13	3.38

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0203)	1.22	.04	11.67	18.09	.13	.34
OUTFLOW: ID= 1 (0210)	1.22	.03	11.83	18.08	.11	.31

ROUTE CHN (0208)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	100.00	.0400	Main Channel
3.00	99.00	.0400	Main Channel
3.50	99.00	.0400	Main Channel
6.50	100.00	.0400	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.242E+01	.0	.21	5.50
.11	99.11	.601E+01	.0	.31	3.76
.16	99.16	.108E+02	.1	.39	3.01
.21	99.21	.167E+02	.1	.45	2.57
.26	99.26	.238E+02	.2	.51	2.27
.32	99.32	.320E+02	.3	.57	2.05
.37	99.37	.414E+02	.4	.62	1.87
.42	99.42	.520E+02	.5	.67	1.73
.47	99.47	.637E+02	.7	.72	1.62
.53	99.53	.766E+02	.8	.77	1.52
.58	99.58	.906E+02	1.1	.81	1.44
.63	99.63	.106E+03	1.3	.86	1.36
.68	99.68	.122E+03	1.6	.90	1.30
.74	99.74	.140E+03	1.9	.94	1.24
.79	99.79	.159E+03	2.2	.98	1.19
.84	99.84	.178E+03	2.6	1.02	1.15
.89	99.89	.199E+03	3.0	1.06	1.10
.95	99.95	.222E+03	3.5	1.10	1.07
1.00	100.00	.245E+03	4.0	1.13	1.03

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0202)	.18	.01	11.67	24.06	.07	.23
OUTFLOW: ID= 1 (0208)	.18	.01	11.83	24.03	.06	.22

ROUTE CHN (0209)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	100.00	.0400	Main Channel
3.00	99.00	.0400	Main Channel
3.50	99.00	.0400	Main Channel
6.50	100.00	.0400	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.900E+01	.0	.21	20.43
.11	99.11	.223E+02	.0	.31	13.95
.16	99.16	.400E+02	.1	.39	11.19
.21	99.21	.619E+02	.1	.45	9.55
.26	99.26	.882E+02	.2	.51	8.43
.32	99.32	.119E+03	.3	.57	7.60
.37	99.37	.154E+03	.4	.62	6.96
.42	99.42	.193E+03	.5	.67	6.44
.47	99.47	.237E+03	.7	.72	6.01
.53	99.53	.284E+03	.8	.77	5.65
.58	99.58	.337E+03	1.1	.81	5.34
.63	99.63	.393E+03	1.3	.86	5.07
.68	99.68	.454E+03	1.6	.90	4.83
.74	99.74	.519E+03	1.9	.94	4.62
.79	99.79	.589E+03	2.2	.98	4.43
.84	99.84	.663E+03	2.6	1.02	4.25
.89	99.89	.741E+03	3.0	1.06	4.10
.95	99.95	.823E+03	3.5	1.10	3.96
1.00	100.00	.910E+03	4.0	1.13	3.83

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0204)	.71	.03	11.67	19.09	.11	.32
OUTFLOW: ID= 1 (0209)	.71	.02	11.83	19.07	.08	.25

ADD HYD (0213)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	.62	.005	12.17	7.12
+ ID2= 2 (0205):	.02	.000	12.17	5.90
ID = 3 (0213):	.64	.005	12.17	7.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0211)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0207):	1.14	.029	11.83	15.61
+ ID2= 2 (0210):	1.22	.028	11.83	18.08

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0208):	.18	.010	11.83	24.03
+ ID2= 2 (0209):	.71	.017	11.83	19.07
ID = 3 (0212):	.89	.027	11.83	20.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0214) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0206):	.44	.003	12.17	5.73
+ ID2= 2 (0213):	.64	.005	12.17	7.09
ID = 3 (0214):	1.08	.008	12.17	6.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0215) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0211):	2.36	.057	11.83	16.89
+ ID2= 2 (0212):	.89	.027	11.83	20.07
ID = 3 (0215):	3.25	.083	11.83	17.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0217) | IN= 2---> OUT= 1 | DT= 10.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0280	.0100
.0080	.0020	.0670	.1930

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0215)	3.250	.083	11.83	17.76
OUTFLOW: ID= 1 (0217)	3.250	.028	12.50	17.74

PEAK FLOW REDUCTION [Qout/Qin](%)= 33.81
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= .0110

ADD HYD (0216) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0217):	3.25	.028	12.50	17.74
+ ID2= 2 (0214):	1.08	.008	12.17	6.53
ID = 3 (0216):	4.33	.036	12.17	14.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM | Ptotal= 64.53 mm

Filename: I:\2016 Projects\116 238 - Burbank Circle Natural Hazards Study\Design\Cumac Phase 2\Stormwater\Otthymo\Cumac
Comments: SCS Type II 24 HR MASS CURVE

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.77	6.25	1.29	12.25	9.29	18.25	1.03
.50	.52	6.50	1.03	12.50	4.90	18.50	1.29
.75	.77	6.75	1.29	12.75	4.65	18.75	1.03
1.00	.77	7.00	1.29	13.00	3.61	19.00	1.29
1.25	.77	7.25	1.55	13.25	3.36	19.25	1.03
1.50	.52	7.50	1.29	13.50	2.84	19.50	1.29
1.75	.77	7.75	1.55	13.75	2.58	19.75	1.03
2.00	.77	8.00	1.55	14.00	2.06	20.00	.77
2.25	1.03	8.25	1.81	14.25	1.81	20.25	.77
2.50	.77	8.50	1.81	14.50	2.06	20.50	.77
2.75	.77	8.75	1.81	14.75	1.81	20.75	.77
3.00	.77	9.00	2.06	15.00	2.06	21.00	.77
3.25	1.03	9.25	2.06	15.25	1.81	21.25	.77
3.50	.77	9.50	2.32	15.50	2.06	21.50	.77
3.75	.77	9.75	2.32	15.75	1.81	21.75	.77
4.00	1.03	10.00	2.84	16.00	1.29	22.00	.77
4.25	1.03	10.25	3.10	16.25	1.03	22.25	.77
4.50	1.03	10.50	3.87	16.50	1.29	22.50	.77
4.75	1.03	10.75	4.13	16.75	1.03	22.75	.77
5.00	1.03	11.00	6.19	17.00	1.29	23.00	.77
5.25	1.03	11.25	6.19	17.25	1.03	23.25	.77
5.50	1.03	11.50	19.10	17.50	1.29	23.50	.77
5.75	1.03	11.75	78.98	17.75	1.03	23.75	.77
6.00	1.03	12.00	9.29	18.00	1.29		

CALIB | STANDHYD (0200) | ID= 1 DT=10.0 min

Area (ha)= 1.14
Total Imp(%)= 43.00 Dir. Conn.(%)= 15.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.49	.65
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	1.00

Length	(m)=	4.50	90.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	.77	6.167	1.29	12.167	9.29	18.17	1.03
.333	.65	6.333	1.16	12.333	7.10	18.33	1.16
.500	.52	6.500	1.03	12.500	4.90	18.50	1.29
.667	.77	6.667	1.29	12.667	4.65	18.67	1.03
.833	.77	6.833	1.29	12.833	4.13	18.83	1.16
1.000	.77	7.000	1.29	13.000	3.61	19.00	1.29
1.167	.77	7.167	1.55	13.167	3.36	19.17	1.03
1.333	.65	7.333	1.42	13.333	3.10	19.33	1.16
1.500	.52	7.500	1.29	13.500	2.84	19.50	1.29
1.667	.77	7.667	1.55	13.667	2.58	19.67	1.03
1.833	.77	7.833	1.55	13.833	2.32	19.83	.90
2.000	.77	8.000	1.55	14.000	2.06	20.00	.77
2.167	1.03	8.167	1.81	14.167	1.81	20.17	.77
2.333	.90	8.333	1.81	14.333	1.94	20.33	.77
2.500	.77	8.500	1.81	14.500	2.06	20.50	.77
2.667	.77	8.667	1.81	14.667	1.81	20.67	.77
2.833	.77	8.833	1.94	14.833	1.94	20.83	.77
3.000	.77	9.000	2.06	15.000	2.06	21.00	.77
3.167	1.03	9.167	2.06	15.167	1.81	21.17	.77
3.333	.90	9.333	2.19	15.333	1.94	21.33	.77
3.500	.77	9.500	2.32	15.500	2.06	21.50	.77
3.667	.77	9.667	2.32	15.667	1.81	21.67	.77
3.833	.90	9.833	2.58	15.833	1.55	21.83	.77
4.000	1.03	10.000	2.84	16.000	1.29	22.00	.77
4.167	1.03	10.167	3.10	16.167	1.03	22.17	.77
4.333	1.03	10.333	3.48	16.333	1.16	22.33	.77
4.500	1.03	10.500	3.87	16.500	1.29	22.50	.77
4.667	1.03	10.667	4.13	16.667	1.03	22.67	.77
4.833	1.03	10.833	5.16	16.833	1.16	22.83	.77
5.000	1.03	11.000	6.19	17.000	1.29	23.00	.77
5.167	1.03	11.167	6.19	17.167	1.03	23.17	.77
5.333	1.03	11.333	12.65	17.333	1.16	23.33	.77
5.500	1.03	11.500	19.10	17.500	1.29	23.50	.77
5.667	1.03	11.667	78.98	17.667	1.03	23.67	.77
5.833	1.03	11.833	44.14	17.833	1.16	23.83	.39
6.000	1.03	12.000	9.29	18.000	1.29		

Max.Eff.Inten.(mm/hr)=		78.98	17.88	
over (min)		10.00	30.00	
Storage Coeff. (min)=		.35 (ii)	28.50 (ii)	
Unit Hyd. Tpeak (min)=		10.00	30.00	
Unit Hyd. peak (cms)=		.17	.04	
				TOTALS
PEAK FLOW	(cms)=	.04	.02	.045 (iii)
TIME TO PEAK	(hrs)=	11.67	12.00	11.67
RUNOFF VOLUME	(mm)=	63.34	15.61	22.75
TOTAL RAINFALL	(mm)=	64.34	64.34	64.34
RUNOFF COEFFICIENT	=	.98	.24	.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)=	1.22	
ID= 1 DT=10.0 min	Total Imp(%)=	52.00	Dir. Conn.(%)= 19.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.63	.59	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	1.00	
Length	(m)=	4.50	265.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		78.98	14.02	
over (min)		10.00	60.00	
Storage Coeff. (min)=		.35 (ii)	59.65 (ii)	
Unit Hyd. Tpeak (min)=		10.00	60.00	
Unit Hyd. peak (cms)=		.17	.02	
				TOTALS
PEAK FLOW	(cms)=	.05	.01	.054 (iii)
TIME TO PEAK	(hrs)=	11.67	12.67	11.67
RUNOFF VOLUME	(mm)=	63.34	17.28	26.00
TOTAL RAINFALL	(mm)=	64.34	64.34	64.34
RUNOFF COEFFICIENT	=	.98	.27	.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)=	.18	
ID= 1 DT=10.0 min	Total Imp(%)=	46.60	Dir. Conn.(%)= 41.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.08	.10	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	.50	
Length	(m)=	4.50	265.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		78.98	6.28	
over (min)		10.00	110.00	
Storage Coeff. (min)=		.35 (ii)	101.01 (ii)	
Unit Hyd. Tpeak (min)=		10.00	110.00	
Unit Hyd. peak (cms)=		.17	.01	
				TOTALS
PEAK FLOW	(cms)=	.02	.00	.016 (iii)
TIME TO PEAK	(hrs)=	11.67	13.50	11.67
RUNOFF VOLUME	(mm)=	63.34	11.96	32.61
TOTAL RAINFALL	(mm)=	64.34	64.34	64.34

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    RUNOFF COEFFICIENT   =        .98          .19           .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.

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| CALIB            |
| STANDHYD  (0204) |   Area    (ha)=    .71
|ID= 1 DT=10.0 min |   Total Imp(%)=  49.00   Dir. Conn.(%)=  24.00
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                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .35          .36
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00          .50
     Length            (m)=       4.50       235.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      78.98        11.14
               over (min)        10.00        80.00
     Storage Coeff.  (min)=        .35 (ii)   74.82 (ii)
     Unit Hyd. Tpeak (min)=      10.00        80.00
     Unit Hyd. peak  (cms)=        .17          .01
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .04          .01          .038 (iii)
     TIME TO PEAK    (hrs)=      11.67        13.00         11.67
     RUNOFF VOLUME    (mm)=      63.34        15.60         27.00
     TOTAL RAINFALL   (mm)=      64.34        64.34         64.34
     RUNOFF COEFFICIENT   =        .98          .24           .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.

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| CALIB            |
| NASHYD    (0206) |   Area    (ha)=    .44   Curve Number   (CN)= 49.5
|ID= 1 DT=10.0 min |   Ia      (mm)=   8.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .031

     PEAK FLOW       (cms)=    .005 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=   9.890
     TOTAL RAINFALL   (mm)=  64.336
     RUNOFF COEFFICIENT   =    .154

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

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| CALIB            |
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| NASHYD    (0201) |   Area    (ha)=    .62   Curve Number   (CN)= 57.4
|ID= 1 DT=10.0 min |   Ia      (mm)=   9.64   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .044

     PEAK FLOW       (cms)=    .009 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=  12.292
     TOTAL RAINFALL   (mm)=  64.336
     RUNOFF COEFFICIENT   =    .191

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

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| CALIB            |
| NASHYD    (0205) |   Area    (ha)=    .02   Curve Number   (CN)= 49.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .54

     Unit Hyd Qpeak  (cms)=    .001

     PEAK FLOW       (cms)=    .000 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=  10.769
     TOTAL RAINFALL   (mm)=  64.336
     RUNOFF COEFFICIENT   =    .167

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

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| ROUTE CHN (0207) |
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
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               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00         100.00         .0400      Main Channel
                   3.00          99.00         .0400      Main Channel
                   3.50          99.00         .0400      Main Channel
                   6.50         100.00         .0400      Main Channel

     <--------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH    ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       .05    99.05    .270E+01        .0          .21        6.13
       .11    99.11    .670E+01        .0          .31        4.18
       .16    99.16    .120E+02        .1          .39        3.36
       .21    99.21    .186E+02        .1          .45        2.86
       .26    99.26    .265E+02        .2          .51        2.53
       .32    99.32    .356E+02        .3          .57        2.28
       .37    99.37    .461E+02        .4          .62        2.09
       .42    99.42    .579E+02        .5          .67        1.93
       .47    99.47    .710E+02        .7          .72        1.80
       .53    99.53    .853E+02        .8          .77        1.69
       .58    99.58    .101E+03       1.1          .81        1.60
       .63    99.63    .118E+03       1.3          .86        1.52
       .68    99.68    .136E+03       1.6          .90        1.45
       .74    99.74    .156E+03       1.9          .94        1.38
       .79    99.79    .177E+03       2.2          .98        1.33
       .84    99.84    .199E+03       2.6         1.02        1.28
       .89    99.89    .222E+03       3.0         1.06        1.23
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.95	99.95	.247E+03	3.5	1.10	1.19
1.00	100.00	.273E+03	4.0	1.13	1.15

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0200)	1.14	.04	11.67	22.75	.13	.35
OUTFLOW: ID= 1 (0207)	1.14	.04	11.83	22.75	.13	.35

ROUTE CHN (0210)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	100.00	.0400	Main Channel
3.00	99.00	.0400	Main Channel
3.50	99.00	.0400	Main Channel
6.50	100.00	.0400	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.796E+01	.0	.21	18.07
.11	99.11	.197E+02	.0	.31	12.34
.16	99.16	.354E+02	.1	.39	9.89
.21	99.21	.548E+02	.1	.45	8.45
.26	99.26	.780E+02	.2	.51	7.46
.32	99.32	.105E+03	.3	.57	6.73
.37	99.37	.136E+03	.4	.62	6.16
.42	99.42	.171E+03	.5	.67	5.70
.47	99.47	.209E+03	.7	.72	5.32
.53	99.53	.252E+03	.8	.77	5.00
.58	99.58	.298E+03	1.1	.81	4.72
.63	99.63	.348E+03	1.3	.86	4.48
.68	99.68	.402E+03	1.6	.90	4.27
.74	99.74	.459E+03	1.9	.94	4.08
.79	99.79	.521E+03	2.2	.98	3.91
.84	99.84	.586E+03	2.6	1.02	3.76
.89	99.89	.655E+03	3.0	1.06	3.63
.95	99.95	.728E+03	3.5	1.10	3.50
1.00	100.00	.805E+03	4.0	1.13	3.38

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0203)	1.22	.05	11.67	26.00	.15	.37
OUTFLOW: ID= 1 (0210)	1.22	.04	11.83	25.99	.12	.34

ROUTE CHN (0208)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	100.00	.0400	Main Channel
3.00	99.00	.0400	Main Channel
3.50	99.00	.0400	Main Channel
6.50	100.00	.0400	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.242E+01	.0	.21	5.50
.11	99.11	.601E+01	.0	.31	3.76
.16	99.16	.108E+02	.1	.39	3.01
.21	99.21	.167E+02	.1	.45	2.57
.26	99.26	.238E+02	.2	.51	2.27
.32	99.32	.320E+02	.3	.57	2.05
.37	99.37	.414E+02	.4	.62	1.87
.42	99.42	.520E+02	.5	.67	1.73
.47	99.47	.637E+02	.7	.72	1.62
.53	99.53	.766E+02	.8	.77	1.52
.58	99.58	.906E+02	1.1	.81	1.44
.63	99.63	.106E+03	1.3	.86	1.36
.68	99.68	.122E+03	1.6	.90	1.30
.74	99.74	.140E+03	1.9	.94	1.24
.79	99.79	.159E+03	2.2	.98	1.19
.84	99.84	.178E+03	2.6	1.02	1.15
.89	99.89	.199E+03	3.0	1.06	1.10
.95	99.95	.222E+03	3.5	1.10	1.07
1.00	100.00	.245E+03	4.0	1.13	1.03

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0202)	.18	.02	11.67	32.61	.08	.25
OUTFLOW: ID= 1 (0208)	.18	.01	11.83	32.58	.07	.23

ROUTE CHN (0209)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	100.00	.0400	Main Channel
3.00	99.00	.0400	Main Channel
3.50	99.00	.0400	Main Channel
6.50	100.00	.0400	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.900E+01	.0	.21	20.43
.11	99.11	.223E+02	.0	.31	13.95
.16	99.16	.400E+02	.1	.39	11.19
.21	99.21	.619E+02	.1	.45	9.55
.26	99.26	.882E+02	.2	.51	8.43
.32	99.32	.119E+03	.3	.57	7.60
.37	99.37	.154E+03	.4	.62	6.96
.42	99.42	.193E+03	.5	.67	6.44
.47	99.47	.237E+03	.7	.72	6.01
.53	99.53	.284E+03	.8	.77	5.65
.58	99.58	.337E+03	1.1	.81	5.34
.63	99.63	.393E+03	1.3	.86	5.07
.68	99.68	.454E+03	1.6	.90	4.83
.74	99.74	.519E+03	1.9	.94	4.62
.79	99.79	.589E+03	2.2	.98	4.43
.84	99.84	.663E+03	2.6	1.02	4.25
.89	99.89	.741E+03	3.0	1.06	4.10

.95	99.95	.823E+03	3.5	1.10	3.96
1.00	100.00	.910E+03	4.0	1.13	3.83

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0204)	.71	.04	11.67	27.00	.12	.33
OUTFLOW: ID= 1 (0209)	.71	.02	11.83	26.97	.10	.29

ADD HYD (0213)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	.62	.009	12.17	12.29
+ ID2= 2 (0205):	.02	.000	12.17	10.77
ID = 3 (0213):	.64	.009	12.17	12.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0211)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0207):	1.14	.044	11.83	22.75
+ ID2= 2 (0210):	1.22	.039	11.83	25.99
ID = 3 (0211):	2.36	.083	11.83	24.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0212)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0208):	.18	.013	11.83	32.58
+ ID2= 2 (0209):	.71	.024	11.83	26.97
ID = 3 (0212):	.89	.037	11.83	28.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0214)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0206):	.44	.005	12.17	9.89
+ ID2= 2 (0213):	.64	.009	12.17	12.24
ID = 3 (0214):	1.08	.014	12.17	11.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0215)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0211):	2.36	.083	11.83	24.42
+ ID2= 2 (0212):	.89	.037	11.83	28.11
ID = 3 (0215):	3.25	.120	11.83	25.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0217)
IN= 2---> OUT= 1
DT= 10.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0280	.0100
.0080	.0020	.0670	.1930

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0215)	3.250	.120	11.83	25.43
OUTFLOW: ID= 1 (0217)	3.250	.030	13.33	25.42

PEAK FLOW REDUCTION [Qout/Qin](%)= 25.27
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= .0209

ADD HYD (0216)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0217):	3.25	.030	13.33	25.42
+ ID2= 2 (0214):	1.08	.014	12.17	11.29
ID = 3 (0216):	4.33	.044	12.17	21.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 86.04 mm

Filename: I:\2016 Projects\116 238 - Burbank Circle Natural Hazards Study\Design\Cumac Phase 2\Stormwater\Otthymo\Cumac
Comments: SCS Type II 24 HR MASS CURVE

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	1.03	6.25	1.72	12.25	12.39	18.25	1.38
.50	.69	6.50	1.38	12.50	6.54	18.50	1.72
.75	1.03	6.75	1.72	12.75	6.19	18.75	1.38
1.00	1.03	7.00	1.72	13.00	4.82	19.00	1.72

1.25	1.03	7.25	2.06	13.25	4.47	19.25	1.38
1.50	.69	7.50	1.72	13.50	3.79	19.50	1.72
1.75	1.03	7.75	2.06	13.75	3.44	19.75	1.38
2.00	1.03	8.00	2.06	14.00	2.75	20.00	1.03
2.25	1.38	8.25	2.41	14.25	2.41	20.25	1.03
2.50	1.03	8.50	2.41	14.50	2.75	20.50	1.03
2.75	1.03	8.75	2.41	14.75	2.41	20.75	1.03
3.00	1.03	9.00	2.75	15.00	2.75	21.00	1.03
3.25	1.38	9.25	2.75	15.25	2.41	21.25	1.03
3.50	1.03	9.50	3.10	15.50	2.75	21.50	1.03
3.75	1.03	9.75	3.10	15.75	2.41	21.75	1.03
4.00	1.38	10.00	3.79	16.00	1.72	22.00	1.03
4.25	1.38	10.25	4.13	16.25	1.38	22.25	1.03
4.50	1.38	10.50	5.16	16.50	1.72	22.50	1.03
4.75	1.38	10.75	5.51	16.75	1.38	22.75	1.03
5.00	1.38	11.00	8.26	17.00	1.72	23.00	1.03
5.25	1.38	11.25	8.26	17.25	1.38	23.25	1.03
5.50	1.38	11.50	25.47	17.50	1.72	23.50	1.03
5.75	1.38	11.75	105.31	17.75	1.38	23.75	1.03
6.00	1.38	12.00	12.39	18.00	1.72		

| CALIB |
| STANDHYD (0200) | Area (ha)= 1.14
|ID= 1 DT=10.0 min | Total Imp(%)= 43.00 Dir. Conn.(%)= 15.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.49	.65
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	1.00
Length	(m)=	4.50	90.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	1.03	6.167	1.72	12.167	12.39	18.17	1.38
.333	.86	6.333	1.55	12.333	9.46	18.33	1.55
.500	.69	6.500	1.38	12.500	6.54	18.50	1.72
.667	1.03	6.667	1.72	12.667	6.19	18.67	1.38
.833	1.03	6.833	1.72	12.833	5.51	18.83	1.55
1.000	1.03	7.000	1.72	13.000	4.82	19.00	1.72
1.167	1.03	7.167	2.06	13.167	4.47	19.17	1.38
1.333	.86	7.333	1.89	13.333	4.13	19.33	1.55
1.500	.69	7.500	1.72	13.500	3.79	19.50	1.72
1.667	1.03	7.667	2.06	13.667	3.44	19.67	1.38
1.833	1.03	7.833	2.06	13.833	3.10	19.83	1.20
2.000	1.03	8.000	2.06	14.000	2.75	20.00	1.03
2.167	1.38	8.167	2.41	14.167	2.41	20.17	1.03
2.333	1.20	8.333	2.41	14.333	2.58	20.33	1.03
2.500	1.03	8.500	2.41	14.500	2.75	20.50	1.03
2.667	1.03	8.667	2.41	14.667	2.41	20.67	1.03
2.833	1.03	8.833	2.58	14.833	2.58	20.83	1.03
3.000	1.03	9.000	2.75	15.000	2.75	21.00	1.03
3.167	1.38	9.167	2.75	15.167	2.41	21.17	1.03
3.333	1.20	9.333	2.93	15.333	2.58	21.33	1.03
3.500	1.03	9.500	3.10	15.500	2.75	21.50	1.03
3.667	1.03	9.667	3.10	15.667	2.41	21.67	1.03
3.833	1.20	9.833	3.44	15.833	2.06	21.83	1.03

4.000	1.38	10.000	3.79	16.000	1.72	22.00	1.03
4.167	1.38	10.167	4.13	16.167	1.38	22.17	1.03
4.333	1.38	10.333	4.65	16.333	1.55	22.33	1.03
4.500	1.38	10.500	5.16	16.500	1.72	22.50	1.03
4.667	1.38	10.667	5.51	16.667	1.38	22.67	1.03
4.833	1.38	10.833	6.88	16.833	1.55	22.83	1.03
5.000	1.38	11.000	8.26	17.000	1.72	23.00	1.03
5.167	1.38	11.167	8.26	17.167	1.38	23.17	1.03
5.333	1.38	11.333	16.86	17.333	1.55	23.33	1.03
5.500	1.38	11.500	25.47	17.500	1.72	23.50	1.03
5.667	1.38	11.667	105.31	17.667	1.38	23.67	1.03
5.833	1.38	11.833	58.85	17.833	1.55	23.83	.52
6.000	1.38	12.000	12.39	18.000	1.72		

Max.Eff.Inten.(mm/hr)=	105.31	30.39	
over (min)	10.00	30.00	
Storage Coeff. (min)=	.32 (ii)	23.08 (ii)	
Unit Hyd. Tpeak (min)=	10.00	30.00	
Unit Hyd. peak (cms)=	.17	.04	
			TOTALS
PEAK FLOW (cms)=	.05	.04	.064 (iii)
TIME TO PEAK (hrs)=	11.67	12.00	11.67
RUNOFF VOLUME (mm)=	84.78	26.16	34.94
TOTAL RAINFALL (mm)=	85.78	85.78	85.78
RUNOFF COEFFICIENT =	.99	.30	.41

***** 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)= 1.22
|ID= 1 DT=10.0 min | Total Imp(%)= 52.00 Dir. Conn.(%)= 19.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.63	.59
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	1.00
Length	(m)=	4.50	265.00
Mannings n	=	.013	.250

Max.Eff.Inten.(mm/hr)=	105.31	26.59	
over (min)	10.00	50.00	
Storage Coeff. (min)=	.32 (ii)	46.22 (ii)	
Unit Hyd. Tpeak (min)=	10.00	50.00	
Unit Hyd. peak (cms)=	.17	.02	
			TOTALS
PEAK FLOW (cms)=	.07	.03	.075 (iii)
TIME TO PEAK (hrs)=	11.67	12.33	11.67
RUNOFF VOLUME (mm)=	84.78	28.64	39.28
TOTAL RAINFALL (mm)=	85.78	85.78	85.78
RUNOFF COEFFICIENT =	.99	.33	.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* = 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)= .18				
ID= 1 DT=10.0 min	Total Imp(%)= 46.60	Dir. Conn.(%)= 41.00			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.08	.10	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	.50	
Length	(m)=	4.50	265.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		105.31	10.90	
over (min)		10.00	90.00	
Storage Coeff.	(min)=	.32 (ii)	81.04 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	90.00	
Unit Hyd. peak	(cms)=	.17	.01	
				TOTALS
PEAK FLOW	(cms)=	.02	.00	.022 (iii)
TIME TO PEAK	(hrs)=	11.67	13.17	11.67
RUNOFF VOLUME	(mm)=	84.78	20.60	46.63
TOTAL RAINFALL	(mm)=	85.78	85.78	85.78
RUNOFF COEFFICIENT	=	.99	.24	.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 (0204)	Area (ha)= .71				
ID= 1 DT=10.0 min	Total Imp(%)= 49.00	Dir. Conn.(%)= 24.00			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.35	.36	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	.50	
Length	(m)=	4.50	235.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		105.31	18.82	
over (min)		10.00	70.00	
Storage Coeff.	(min)=	.32 (ii)	60.69 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	70.00	
Unit Hyd. peak	(cms)=	.17	.02	
				TOTALS
PEAK FLOW	(cms)=	.05	.01	.052 (iii)
TIME TO PEAK	(hrs)=	11.67	12.67	11.67
RUNOFF VOLUME	(mm)=	84.78	26.15	40.17

TOTAL RAINFALL	(mm)=	85.78	85.78	85.78
RUNOFF COEFFICIENT	=	.99	.30	.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					
NASHYD (0206)	Area (ha)= .44	Curve Number (CN)= 49.5			
ID= 1 DT=10.0 min	Ia (mm)= 8.50	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= .54				

Unit Hyd Qpeak (cms)= .031

PEAK FLOW	(cms)=	.009 (i)
TIME TO PEAK	(hrs)=	12.167
RUNOFF VOLUME	(mm)=	17.741
TOTAL RAINFALL	(mm)=	85.782
RUNOFF COEFFICIENT	=	.207

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

CALIB					
NASHYD (0201)	Area (ha)= .62	Curve Number (CN)= 57.4			
ID= 1 DT=10.0 min	Ia (mm)= 9.64	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= .54				

Unit Hyd Qpeak (cms)= .044

PEAK FLOW	(cms)=	.016 (i)
TIME TO PEAK	(hrs)=	12.167
RUNOFF VOLUME	(mm)=	21.892
TOTAL RAINFALL	(mm)=	85.782
RUNOFF COEFFICIENT	=	.255

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

CALIB					
NASHYD (0205)	Area (ha)= .02	Curve Number (CN)= 49.0			
ID= 1 DT=10.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= .54				

Unit Hyd Qpeak (cms)= .001

PEAK FLOW	(cms)=	.000 (i)
TIME TO PEAK	(hrs)=	12.167
RUNOFF VOLUME	(mm)=	18.782
TOTAL RAINFALL	(mm)=	85.782
RUNOFF COEFFICIENT	=	.219

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

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| ROUTE CHN (0207) |
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00         100.00         .0400      Main Channel
                   3.00          99.00         .0400      Main Channel
                   3.50          99.00         .0400      Main Channel
                   6.50         100.00         .0400      Main Channel

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
        .05     99.05    .270E+01         .0          .21       6.13
        .11     99.11    .670E+01         .0          .31       4.18
        .16     99.16    .120E+02         .1          .39       3.36
        .21     99.21    .186E+02         .1          .45       2.86
        .26     99.26    .265E+02         .2          .51       2.53
        .32     99.32    .356E+02         .3          .57       2.28
        .37     99.37    .461E+02         .4          .62       2.09
        .42     99.42    .579E+02         .5          .67       1.93
        .47     99.47    .710E+02         .7          .72       1.80
        .53     99.53    .853E+02         .8          .77       1.69
        .58     99.58    .101E+03        1.1          .81       1.60
        .63     99.63    .118E+03        1.3          .86       1.52
        .68     99.68    .136E+03        1.6          .90       1.45
        .74     99.74    .156E+03        1.9          .94       1.38
        .79     99.79    .177E+03        2.2          .98       1.33
        .84     99.84    .199E+03        2.6         1.02       1.28
        .89     99.89    .222E+03        3.0         1.06       1.23
        .95     99.95    .247E+03        3.5         1.10       1.19
       1.00    100.00    .273E+03        4.0         1.13       1.15

                                  <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
     INFLOW : ID= 2 (0200)    1.14      .06   11.67  34.94       .16       .39
     OUTFLOW: ID= 1 (0207)    1.14      .07   11.83  34.94       .17       .40


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--------------------
| ROUTE CHN (0210) |
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00         100.00         .0400      Main Channel
                   3.00          99.00         .0400      Main Channel
                   3.50          99.00         .0400      Main Channel
                   6.50         100.00         .0400      Main Channel

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
        .05     99.05    .796E+01         .0          .21      18.07
        .11     99.11    .197E+02         .0          .31      12.34
        .16     99.16    .354E+02         .1          .39       9.89
        .21     99.21    .548E+02         .1          .45       8.45
        .26     99.26    .780E+02         .2          .51       7.46
        .32     99.32    .105E+03         .3          .57       6.73
        .37     99.37    .136E+03         .4          .62       6.16
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        .42     99.42    .171E+03         .5          .67       5.70
        .47     99.47    .209E+03         .7          .72       5.32
        .53     99.53    .252E+03         .8          .77       5.00
        .58     99.58    .298E+03        1.1          .81       4.72
        .63     99.63    .348E+03        1.3          .86       4.48
        .68     99.68    .402E+03        1.6          .90       4.27
        .74     99.74    .459E+03        1.9          .94       4.08
        .79     99.79    .521E+03        2.2          .98       3.91
        .84     99.84    .586E+03        2.6         1.02       3.76
        .89     99.89    .655E+03        3.0         1.06       3.63
        .95     99.95    .728E+03        3.5         1.10       3.50
       1.00    100.00    .805E+03        4.0         1.13       3.38

                                  <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
     INFLOW : ID= 2 (0203)    1.22      .07   11.67  39.28       .17       .41
     OUTFLOW: ID= 1 (0210)    1.22      .06   11.83  39.27       .16       .38


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--------------------
| ROUTE CHN (0208) |
| IN= 2---> OUT= 1 |     Routing time step (min)'= 10.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                    .00         100.00         .0400      Main Channel
                   3.00          99.00         .0400      Main Channel
                   3.50          99.00         .0400      Main Channel
                   6.50         100.00         .0400      Main Channel

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
        .05     99.05    .242E+01         .0          .21       5.50
        .11     99.11    .601E+01         .0          .31       3.76
        .16     99.16    .108E+02         .1          .39       3.01
        .21     99.21    .167E+02         .1          .45       2.57
        .26     99.26    .238E+02         .2          .51       2.27
        .32     99.32    .320E+02         .3          .57       2.05
        .37     99.37    .414E+02         .4          .62       1.87
        .42     99.42    .520E+02         .5          .67       1.73
        .47     99.47    .637E+02         .7          .72       1.62
        .53     99.53    .766E+02         .8          .77       1.52
        .58     99.58    .906E+02        1.1          .81       1.44
        .63     99.63    .106E+03        1.3          .86       1.36
        .68     99.68    .122E+03        1.6          .90       1.30
        .74     99.74    .140E+03        1.9          .94       1.24
        .79     99.79    .159E+03        2.2          .98       1.19
        .84     99.84    .178E+03        2.6         1.02       1.15
        .89     99.89    .199E+03        3.0         1.06       1.10
        .95     99.95    .222E+03        3.5         1.10       1.07
       1.00    100.00    .245E+03        4.0         1.13       1.03

                                  <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
     INFLOW : ID= 2 (0202)     .18      .02   11.67  46.63       .09       .28
     OUTFLOW: ID= 1 (0208)     .18      .02   11.83  46.61       .08       .25


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ROUTE CHN (0209)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	100.00	.0400	Main Channel
3.00	99.00	.0400	Main Channel
3.50	99.00	.0400	Main Channel
6.50	100.00	.0400	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.900E+01	.0	.21	20.43
.11	99.11	.223E+02	.0	.31	13.95
.16	99.16	.400E+02	.1	.39	11.19
.21	99.21	.619E+02	.1	.45	9.55
.26	99.26	.882E+02	.2	.51	8.43
.32	99.32	.119E+03	.3	.57	7.60
.37	99.37	.154E+03	.4	.62	6.96
.42	99.42	.193E+03	.5	.67	6.44
.47	99.47	.237E+03	.7	.72	6.01
.53	99.53	.284E+03	.8	.77	5.65
.58	99.58	.337E+03	1.1	.81	5.34
.63	99.63	.393E+03	1.3	.86	5.07
.68	99.68	.454E+03	1.6	.90	4.83
.74	99.74	.519E+03	1.9	.94	4.62
.79	99.79	.589E+03	2.2	.98	4.43
.84	99.84	.663E+03	2.6	1.02	4.25
.89	99.89	.741E+03	3.0	1.06	4.10
.95	99.95	.823E+03	3.5	1.10	3.96
1.00	100.00	.910E+03	4.0	1.13	3.83

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0204)	.71	.05	11.67	40.17	.15	.37
OUTFLOW: ID= 1 (0209)	.71	.04	11.83	40.15	.12	.33

ADD HYD (0213)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	.62	.016	12.17	21.89
+ ID2= 2 (0205):	.02	.000	12.17	18.78
ID = 3 (0213):	.64	.017	12.17	21.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0211)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0207):	1.14	.067	11.83	34.94
+ ID2= 2 (0210):	1.22	.058	11.83	39.27
ID = 3 (0211):	2.36	.126	11.83	37.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0212)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0208):	.18	.018	11.83	46.61
+ ID2= 2 (0209):	.71	.035	11.83	40.15
ID = 3 (0212):	.89	.053	11.83	41.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0214)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0206):	.44	.009	12.17	17.74
+ ID2= 2 (0213):	.64	.017	12.17	21.79
ID = 3 (0214):	1.08	.026	12.17	20.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0215)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0211):	2.36	.126	11.83	37.18
+ ID2= 2 (0212):	.89	.053	11.83	41.46
ID = 3 (0215):	3.25	.178	11.83	38.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0217)
IN= 2---> OUT= 1
DT= 10.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0280	.0100
.0080	.0020	.0670	.1930

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0215)	3.250	.178	11.83	38.35
OUTFLOW: ID= 1 (0217)	3.250	.035	13.83	38.33

PEAK FLOW REDUCTION [Qout/Qin](%)= 19.56
TIME SHIFT OF PEAK FLOW (min)=120.00
MAXIMUM STORAGE USED (ha.m.)= .0424

ADD HYD (0216)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0217):	3.25	.035	13.83	38.33
	+ ID2= 2 (0214):	1.08	.026	12.17	20.14
	ID = 3 (0216):	4.33	.058	12.17	33.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM | Ptotal=105.16 mm

Filename: I:\2016 Projects\116 238 - Burbank Circle Natural Hazards Study\Design\Cumac Phase 2\Stormwater\Otthymo\Cumac

Comments: SCS Type II 24 HR MASS CURVE

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	1.26	6.25	2.10	12.25	15.14	18.25	1.68
.50	.84	6.50	1.68	12.50	7.99	18.50	2.10
.75	1.26	6.75	2.10	12.75	7.57	18.75	1.68
1.00	1.26	7.00	2.10	13.00	5.89	19.00	2.10
1.25	1.26	7.25	2.52	13.25	5.47	19.25	1.68
1.50	.84	7.50	2.10	13.50	4.63	19.50	2.10
1.75	1.26	7.75	2.52	13.75	4.21	19.75	1.68
2.00	1.26	8.00	2.52	14.00	3.37	20.00	1.26
2.25	1.68	8.25	2.94	14.25	2.94	20.25	1.26
2.50	1.26	8.50	2.94	14.50	3.37	20.50	1.26
2.75	1.26	8.75	2.94	14.75	2.94	20.75	1.26
3.00	1.26	9.00	3.37	15.00	3.37	21.00	1.26
3.25	1.68	9.25	3.37	15.25	2.94	21.25	1.26
3.50	1.26	9.50	3.79	15.50	3.37	21.50	1.26
3.75	1.26	9.75	3.79	15.75	2.94	21.75	1.26
4.00	1.68	10.00	4.63	16.00	2.10	22.00	1.26
4.25	1.68	10.25	5.05	16.25	1.68	22.25	1.26
4.50	1.68	10.50	6.31	16.50	2.10	22.50	1.26
4.75	1.68	10.75	6.73	16.75	1.68	22.75	1.26
5.00	1.68	11.00	10.10	17.00	2.10	23.00	1.26
5.25	1.68	11.25	10.10	17.25	1.68	23.25	1.26
5.50	1.68	11.50	31.13	17.50	2.10	23.50	1.26
5.75	1.68	11.75	128.72	17.75	1.68	23.75	1.26
6.00	1.68	12.00	15.14	18.00	2.10		

CALIB | STANDHYD (0200) | ID= 1 DT=10.0 min

Area (ha)= 1.14
Total Imp(%)= 43.00 Dir. Conn.(%)= 15.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.49	.65
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	1.00
Length	(m)=	4.50	90.00

Mannings n = .013 .250

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	1.26	6.167	2.10	12.167	15.14	18.17	1.68
.333	1.05	6.333	1.89	12.333	11.57	18.33	1.89
.500	.84	6.500	1.68	12.500	7.99	18.50	2.10
.667	1.26	6.667	2.10	12.667	7.57	18.67	1.68
.833	1.26	6.833	2.10	12.833	6.73	18.83	1.89
1.000	1.26	7.000	2.10	13.000	5.89	19.00	2.10
1.167	1.26	7.167	2.52	13.167	5.47	19.17	1.68
1.333	1.05	7.333	2.31	13.333	5.05	19.33	1.89
1.500	.84	7.500	2.10	13.500	4.63	19.50	2.10
1.667	1.26	7.667	2.52	13.667	4.21	19.67	1.68
1.833	1.26	7.833	2.52	13.833	3.79	19.83	1.47
2.000	1.26	8.000	2.52	14.000	3.37	20.00	1.26
2.167	1.68	8.167	2.94	14.167	2.94	20.17	1.26
2.333	1.47	8.333	2.94	14.333	3.15	20.33	1.26
2.500	1.26	8.500	2.94	14.500	3.37	20.50	1.26
2.667	1.26	8.667	2.94	14.667	2.94	20.67	1.26
2.833	1.26	8.833	3.15	14.833	3.15	20.83	1.26
3.000	1.26	9.000	3.37	15.000	3.37	21.00	1.26
3.167	1.68	9.167	3.37	15.167	2.94	21.17	1.26
3.333	1.47	9.333	3.58	15.333	3.15	21.33	1.26
3.500	1.26	9.500	3.79	15.500	3.37	21.50	1.26
3.667	1.26	9.667	3.79	15.667	2.94	21.67	1.26
3.833	1.47	9.833	4.21	15.833	2.52	21.83	1.26
4.000	1.68	10.000	4.63	16.000	2.10	22.00	1.26
4.167	1.68	10.167	5.05	16.167	1.68	22.17	1.26
4.333	1.68	10.333	5.68	16.333	1.89	22.33	1.26
4.500	1.68	10.500	6.31	16.500	2.10	22.50	1.26
4.667	1.68	10.667	6.73	16.667	1.68	22.67	1.26
4.833	1.68	10.833	8.41	16.833	1.89	22.83	1.26
5.000	1.68	11.000	10.10	17.000	2.10	23.00	1.26
5.167	1.68	11.167	10.10	17.167	1.68	23.17	1.26
5.333	1.68	11.333	20.61	17.333	1.89	23.33	1.26
5.500	1.68	11.500	31.13	17.500	2.10	23.50	1.26
5.667	1.68	11.667	128.72	17.667	1.68	23.67	1.26
5.833	1.68	11.833	71.93	17.833	1.89	23.83	.63
6.000	1.68	12.000	15.14	18.000	2.10		

				TOTALS
Max.Eff.Inten.(mm/hr)=		128.72	58.57	
over (min)		10.00	20.00	
Storage Coeff. (min)=		.29 (ii)	17.80 (ii)	
Unit Hyd. Tpeak (min)=		10.00	20.00	
Unit Hyd. peak (cms)=		.17	.06	
PEAK FLOW	(cms)=	.06	.07	.101 (iii)
TIME TO PEAK	(hrs)=	11.67	11.83	11.83
RUNOFF VOLUME	(mm)=	103.84	36.95	46.97
TOTAL RAINFALL	(mm)=	104.84	104.84	104.84
RUNOFF COEFFICIENT	=	.99	.35	.45

***** 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)= 1.22				
ID= 1 DT=10.0 min	Total Imp(%)= 52.00	Dir. Conn.(%)= 19.00			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.63	.59	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	1.00	
Length	(m)=	4.50	265.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		128.72	43.50	
over (min)		10.00	40.00	
Storage Coeff.	(min)=	.29 (ii)	37.99 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	40.00	
Unit Hyd. peak	(cms)=	.17	.03	
				TOTALS
PEAK FLOW	(cms)=	.08	.05	.097 (iii)
TIME TO PEAK	(hrs)=	11.67	12.17	11.67
RUNOFF VOLUME	(mm)=	103.84	40.15	52.23
TOTAL RAINFALL	(mm)=	104.84	104.84	104.84
RUNOFF COEFFICIENT	=	.99	.38	.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)= .18				
ID= 1 DT=10.0 min	Total Imp(%)= 46.60	Dir. Conn.(%)= 41.00			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.08	.10	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	.50	
Length	(m)=	4.50	265.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		128.72	15.77	
over (min)		10.00	70.00	
Storage Coeff.	(min)=	.29 (ii)	69.93 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	70.00	
Unit Hyd. peak	(cms)=	.17	.02	
				TOTALS
PEAK FLOW	(cms)=	.03	.00	.027 (iii)
TIME TO PEAK	(hrs)=	11.67	12.83	11.67
RUNOFF VOLUME	(mm)=	103.84	29.64	59.83
TOTAL RAINFALL	(mm)=	104.84	104.84	104.84
RUNOFF COEFFICIENT	=	.99	.28	.57

***** 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)= .71				
ID= 1 DT=10.0 min	Total Imp(%)= 49.00	Dir. Conn.(%)= 24.00			

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.35	.36	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	2.00	.50	
Length	(m)=	4.50	235.00	
Mannings n	=	.013	.250	
Max.Eff.Inten.(mm/hr)=		128.72	30.35	
over (min)		10.00	60.00	
Storage Coeff.	(min)=	.29 (ii)	50.16 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	60.00	
Unit Hyd. peak	(cms)=	.17	.02	
				TOTALS
PEAK FLOW	(cms)=	.06	.02	.065 (iii)
TIME TO PEAK	(hrs)=	11.67	12.50	11.67
RUNOFF VOLUME	(mm)=	103.84	36.93	52.95
TOTAL RAINFALL	(mm)=	104.84	104.84	104.84
RUNOFF COEFFICIENT	=	.99	.35	.50

***** 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					
NASHYD (0206)	Area (ha)= .44	Curve Number (CN)= 49.5			
ID= 1 DT=10.0 min	Ia (mm)= 8.50	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= .54				

Unit Hyd Qpeak (cms)= .031

PEAK FLOW (cms)= .014 (i)
TIME TO PEAK (hrs)= 12.167
RUNOFF VOLUME (mm)= 26.093
TOTAL RAINFALL (mm)= 104.844
RUNOFF COEFFICIENT = .249

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

CALIB		
NASHYD (0201)	Area (ha)= .62	Curve Number (CN)= 57.4

|ID= 1 DT=10.0 min | Ia (mm)= 9.64 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .54

Unit Hyd Qpeak (cms)= .044

PEAK FLOW (cms)= .024 (i)
TIME TO PEAK (hrs)= 12.167
RUNOFF VOLUME (mm)= 31.927
TOTAL RAINFALL (mm)= 104.844
RUNOFF COEFFICIENT = .305

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

| CALIB |
| NASHYD (0205) | Area (ha)= .02 Curve Number (CN)= 49.0
|ID= 1 DT=10.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .54

Unit Hyd Qpeak (cms)= .001

PEAK FLOW (cms)= .001 (i)
TIME TO PEAK (hrs)= 12.167
RUNOFF VOLUME (mm)= 27.249
TOTAL RAINFALL (mm)= 104.844
RUNOFF COEFFICIENT = .260

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

| ROUTE CHN (0207) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	100.00	.0400	Main Channel
3.00	99.00	.0400	Main Channel
3.50	99.00	.0400	Main Channel
6.50	100.00	.0400	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.270E+01	.0	.21	6.13
.11	99.11	.670E+01	.0	.31	4.18
.16	99.16	.120E+02	.1	.39	3.36
.21	99.21	.186E+02	.1	.45	2.86
.26	99.26	.265E+02	.2	.51	2.53
.32	99.32	.356E+02	.3	.57	2.28
.37	99.37	.461E+02	.4	.62	2.09
.42	99.42	.579E+02	.5	.67	1.93
.47	99.47	.710E+02	.7	.72	1.80
.53	99.53	.853E+02	.8	.77	1.69
.58	99.58	.101E+03	1.1	.81	1.60
.63	99.63	.118E+03	1.3	.86	1.52
.68	99.68	.136E+03	1.6	.90	1.45
.74	99.74	.156E+03	1.9	.94	1.38
.79	99.79	.177E+03	2.2	.98	1.33
.84	99.84	.199E+03	2.6	1.02	1.28
.89	99.89	.222E+03	3.0	1.06	1.23
.95	99.95	.247E+03	3.5	1.10	1.19
1.00	100.00	.273E+03	4.0	1.13	1.15

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

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0200)	1.14	.10	11.83	46.97	.20	.44
OUTFLOW: ID= 1 (0207)	1.14	.11	11.83	46.97	.21	.46

| ROUTE CHN (0210) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	100.00	.0400	Main Channel
3.00	99.00	.0400	Main Channel
3.50	99.00	.0400	Main Channel
6.50	100.00	.0400	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.796E+01	.0	.21	18.07
.11	99.11	.197E+02	.0	.31	12.34
.16	99.16	.354E+02	.1	.39	9.89
.21	99.21	.548E+02	.1	.45	8.45
.26	99.26	.780E+02	.2	.51	7.46
.32	99.32	.105E+03	.3	.57	6.73
.37	99.37	.136E+03	.4	.62	6.16
.42	99.42	.171E+03	.5	.67	5.70
.47	99.47	.209E+03	.7	.72	5.32
.53	99.53	.252E+03	.8	.77	5.00
.58	99.58	.298E+03	1.1	.81	4.72
.63	99.63	.348E+03	1.3	.86	4.48
.68	99.68	.402E+03	1.6	.90	4.27
.74	99.74	.459E+03	1.9	.94	4.08
.79	99.79	.521E+03	2.2	.98	3.91
.84	99.84	.586E+03	2.6	1.02	3.76
.89	99.89	.655E+03	3.0	1.06	3.63
.95	99.95	.728E+03	3.5	1.10	3.50
1.00	100.00	.805E+03	4.0	1.13	3.38

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

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0203)	1.22	.10	11.67	52.23	.20	.44
OUTFLOW: ID= 1 (0210)	1.22	.08	11.83	52.22	.18	.41

| ROUTE CHN (0208) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	100.00	.0400	Main Channel
3.00	99.00	.0400	Main Channel
3.50	99.00	.0400	Main Channel
6.50	100.00	.0400	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.242E+01	.0	.21	5.50
.11	99.11	.601E+01	.0	.31	3.76
.16	99.16	.108E+02	.1	.39	3.01
.21	99.21	.167E+02	.1	.45	2.57
.26	99.26	.238E+02	.2	.51	2.27
.32	99.32	.320E+02	.3	.57	2.05
.37	99.37	.414E+02	.4	.62	1.87
.42	99.42	.520E+02	.5	.67	1.73
.47	99.47	.637E+02	.7	.72	1.62
.53	99.53	.766E+02	.8	.77	1.52
.58	99.58	.906E+02	1.1	.81	1.44
.63	99.63	.106E+03	1.3	.86	1.36
.68	99.68	.122E+03	1.6	.90	1.30
.74	99.74	.140E+03	1.9	.94	1.24
.79	99.79	.159E+03	2.2	.98	1.19
.84	99.84	.178E+03	2.6	1.02	1.15
.89	99.89	.199E+03	3.0	1.06	1.10
.95	99.95	.222E+03	3.5	1.10	1.07
1.00	100.00	.245E+03	4.0	1.13	1.03

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

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0202)	.18	.03	11.67	59.83	.11	.31
OUTFLOW: ID= 1 (0208)	.18	.02	11.83	59.81	.09	.28

ROUTE CHN (0209)
IN= 2---> OUT= 1

Routing time step (min)'= 10.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
.00	100.00	.0400	Main Channel
3.00	99.00	.0400	Main Channel
3.50	99.00	.0400	Main Channel
6.50	100.00	.0400	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
.05	99.05	.900E+01	.0	.21	20.43
.11	99.11	.223E+02	.0	.31	13.95
.16	99.16	.400E+02	.1	.39	11.19
.21	99.21	.619E+02	.1	.45	9.55
.26	99.26	.882E+02	.2	.51	8.43
.32	99.32	.119E+03	.3	.57	7.60
.37	99.37	.154E+03	.4	.62	6.96
.42	99.42	.193E+03	.5	.67	6.44
.47	99.47	.237E+03	.7	.72	6.01
.53	99.53	.284E+03	.8	.77	5.65
.58	99.58	.337E+03	1.1	.81	5.34
.63	99.63	.393E+03	1.3	.86	5.07
.68	99.68	.454E+03	1.6	.90	4.83
.74	99.74	.519E+03	1.9	.94	4.62
.79	99.79	.589E+03	2.2	.98	4.43
.84	99.84	.663E+03	2.6	1.02	4.25
.89	99.89	.741E+03	3.0	1.06	4.10
.95	99.95	.823E+03	3.5	1.10	3.96

1.00	100.00	.910E+03	4.0	1.13	3.83

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

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0204)	.71	.07	11.67	52.95	.16	.39
OUTFLOW: ID= 1 (0209)	.71	.05	11.83	52.92	.14	.35

ADD HYD (0213)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0201):	.62	.024	12.17	31.93
	+ ID2= 2 (0205):	.02	.001	12.17	27.25
	ID = 3 (0213):	.64	.025	12.17	31.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0211)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0207):	1.14	.112	11.83	46.97
	+ ID2= 2 (0210):	1.22	.079	11.83	52.22
	ID = 3 (0211):	2.36	.191	11.83	49.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0212)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0208):	.18	.022	11.83	59.81
	+ ID2= 2 (0209):	.71	.047	11.83	52.92
	ID = 3 (0212):	.89	.069	11.83	54.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0214)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0206):	.44	.014	12.17	26.09
	+ ID2= 2 (0213):	.64	.025	12.17	31.78
	ID = 3 (0214):	1.08	.039	12.17	29.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0215) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0211):     2.36    .191    11.83    49.68
        + ID2= 2 (0212):      .89    .069    11.83    54.31
          ================================================
          ID = 3 (0215):     3.25    .260    11.83    50.95

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| RESERVOIR (0217) |
| IN= 2---> OUT= 1 |
| DT= 10.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .0280       .0100
                           .0080      .0020   |    .0670       .1930

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0215)      3.250       .260       11.83       50.95
     OUTFLOW: ID= 1 (0217)      3.250       .040       13.83       50.93

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 15.33
                   TIME SHIFT OF PEAK FLOW         (min)=120.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .0655

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--------------------
| ADD HYD   (0216) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0217):     3.25    .040    13.83    50.93
        + ID2= 2 (0214):     1.08    .039    12.17    29.46
          ================================================
          ID = 3 (0216):     4.33    .073    12.17    45.58

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH
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