TATHAM ENGINEERING

Enhancing our communities

2060 Division Road Subdivision

PRELIMINARY STORMWATER MANAGEMENT REPORT

South Shore Homes

File 319827 | July 6, 2020

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Prepared by:

Tatham Engineering Limited
10 Diana Drive, Building 8, Unit 7
Orillia, Ontario L3V 8K8

T 705-325-1753
tathameng.com

Prepared for:

South Shore Homes
34 Grace Crescent
Oro-Medonte, Ontario L0K 2G1

Authored by:	Reviewed by:
	
Alysse Overholt, B.E.Sc., M.Eng., EIT Intern Engineer	Daniel Twigger, B.Sc.Eng., P.Eng., Senior Engineer, Group Leader

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Issue	Date	Description
1	July 6, 2020	Preliminary SWM Report

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1 Introduction

Tatham Engineering Limited (Tatham) has been retained by South Shore Homes to prepare a preliminary stormwater management (SWM) plan in support of Draft Plan Approval for the proposed residential development known as the 2060 Division Road Subdivision. This report has been prepared to present the recommended stormwater management plan for the subject development.

1.1 SITE DESCRIPTION

The property is described as Part Lot 1, Concession 1 Northern Division in the Township of Severn (Township), Simcoe County or 2060 Division Road West. The site is located east of Highway 12, bound to the south by Division Road West, to the east by Carriage Court, to the west by a commercial property and to the north by residential properties. The property encompasses approximately 12.8 hectares of land and an existing hydro easement cuts across the northeast corner of the property.

1.2 OBJECTIVES

The primary objective of this report is to demonstrate the proposed SWM plan will address any potential adverse impacts the development will have on the local surface water features and on surface water quality and quantity. This will be accomplished by evaluating the impact of the development on local drainage conditions and, where necessary, provide solutions to mitigate any adverse impacts.

1.3 GUIDELINES AND BACKGROUND DOCUMENTS

This report was prepared recognizing the pertinent Municipal and Provincial guidelines on water resources and reports specific to the development and surrounding area including the following publications:

- Hydrogeological Assessment. Ian D. Wilson Associates Limited, November 15, 2019;
- Engineering Design Criteria. Township of Severn, May 2014;
- Design Guidelines for Sewage Works. Ministry of the Environment, Conservation and Parks (2008); and
- Stormwater Management Planning and Design Manual. The Ministry of the Environment, Conservation and Parks, March 2003.

1.4 PROPOSED DEVELOPMENT

The proposed development consists of 23 single family residential lots and the associated municipal roads to service the site. Access to the development will be provided via the proposed extension of Dunforth Drive from Division Road West (Street A) and also via Carriage Court. A rural road cross-section complete with roadside ditches is proposed throughout the development. The residential lots will each have a septic system and a drilled well for sewage treatment and water supply. A servicing easement is proposed between Street B and Street C south of Lots 6 and 22 to convey surface runoff to a proposed stormwater management facility designed to service the development. The proposed stormwater management plan for the development is discussed in Section 3 of this report.

2 Existing Drainage Conditions

A Pre-Development Drainage Plan (Drawing DP-1) has been prepared for the subject property site and should be referenced when reviewing this section of the report. The existing drainage conditions for the subject property were determined from the available background documents, site visits and a topographic survey. Drainage from the site is described as follows:

- Ontario Soil Survey Map No. 29 for Simcoe County North characterizes the soils on-site as Tioga sand loam and hydrologic soil group A;
- The site primarily consists of wooded areas, wetland and cultivated crops, with an average slope of 2.4% from northwest to southeast;
- A mapped watercourse (tributary of the North River) in the southeast corner of the property conveys surface runoff from an external drainage area of approximately 37.4 ha (Ontario Flow Assessment Tool, Ministry of Natural Resources and Forestry) northeast across Division Road West and east across Carriage Court via twin 1300 mm diameter CSP culverts (Outlet 1);
- All runoff from the subject property (represented by Catchment 101) drains overland as sheet flow to the southwest corner of the property and Outlet 1;
- Runoff from an external area (represented by Catchment EXT-1) having an approximate area of 6.12 ha drains overland as sheet flow through the subject property to Outlet 1;
- Runoff from an external area (represented by Catchment EXT-2) having an approximate area of 2.96 ha drains overland as sheet flow via the Division Road West roadside ditch and through the subject property to Outlet 1;
- Three environmentally significant areas have been identified on-site, one in the centre of the property, one along Division Road West and one at the southwest corner of the property (Outlet 1). Environmental buffers have been established for each of the environmentally significant areas;
- The environmentally significant area in the centre of the property (represented by ESA 1) receives surface runoff from Catchment EXT-1 and from the north half of Catchment 101;
- The environmentally significant area along Division Road West (represented by ESA 2) receives surface runoff from ESA 1 via an intermittent channel, as well as from Catchment EXT-2 via the Division Road West roadside ditch, and from the southwest quarter of Catchment 101; and

- The environmentally significant area at the southeast corner of the property including the mapped watercourse tributary of the North River (represented by ESA 3) receives surface runoff from ESA 1 and ESA 2 without a defined channel, as well as sheet flow from the remainder of Catchment 101.

A Visual OTTHYMO hydrologic model was created to quantify existing flows to Outlet 1. The rainfall intensity-duration-frequency (IDF) parameters specified within the Township design standards were applied in this analysis. Scenarios for the 25 mm storm event, the 1:2-year through 1-100-year storm events, as well as the Regional (Timmins) storm event were simulated using the 4-hour Chicago and 24-hour SCS design storm distributions and are summarized in Table 1. It is noted the environmentally significant areas were assumed to provide minimal storage volume for surface runoff. Supporting calculations are provided in Appendix A.

Table 1: Pre-Development Peak Flow Summary

DESIGN STORM	PEAK FLOW (m^3/s)							
	Catchment 101		Catchment EXT-1		Catchment EXT-2		Total	
	Chi	SCS	Chi	SCS	Chi	SCS	Chi	SCS
25 mm	0.017	-	0.007	-	0.012	-	0.034	-
1:2-Year	0.028	0.077	0.011	0.028	0.017	0.039	0.053	0.140
1:5-Year	0.059	0.148	0.022	0.055	0.032	0.070	0.109	0.266
1:10-Year	0.085	0.206	0.032	0.076	0.044	0.094	0.156	0.366
1:25-Year	0.124	0.288	0.046	0.107	0.061	0.127	0.224	0.508
1:50-Year	0.158	0.357	0.059	0.133	0.076	0.154	0.283	0.629
1:100-Year	0.194	0.428	0.072	0.160	0.091	0.182	0.346	0.752
Regional (Timmins)	0.505	-	0.196	-	0.174	-	0.865	-

Note: Chi – 4-hour Chicago design storm; SCS – 24-hour SCS design storm.

3 Stormwater Management Plan

The proposed stormwater management plan has been developed to address any potential adverse impacts the development will have on the local surface water features and on surface water quality and quantity. The proposed stormwater management plan is outlined in the following sections.

3.1 DESIGN CRITERIA

Based on the background information collected and our analysis of this information, a clear understanding of the potential impacts was gained. The following design criteria have been established for the subject development:

- Post development peak flows must be controlled to pre-development levels for the 1:2-year through 1:100-year design storms to prevent flooding and erosion downstream;
- Erosion protection must be provided by controlling the post development 25 mm storm runoff to pre-development levels and by providing a detention time between 24-48 hours;
- The Regional Storm must be safely conveyed through the subject development to the designated outlet;
- Level 1 “Enhanced” water quality treatment in the form of 80% total suspended solids (TSS) removal for the site effluent is required as the outlet is a tributary of the North River, which is a cold water fishery;
- A siltation and erosion control plan is required to prevent sediment release into the environment and mitigate erosion downstream during and after construction; and
- Based on preliminary consultation with the Environmental Consultant, limiting development within the environmentally significant areas is a priority.

3.2 EVALUATION OF SWM SOLUTIONS

SWM solutions including lot level, Low Impact Development (LID), and end-of-pipe measures were evaluated to select the preferred solution or combination of solutions to satisfy the appropriate SWM design criteria and the requirements of the MECP and Township for the subject development.

Lot level and LID measures generally rely on infiltration to provide water quality treatment and reduce runoff volumes. In general, infiltration cells should be installed at least 1.0 m above the seasonally high groundwater level, and the underlying native soil should have a minimum infiltration rate of 15 mm/hr. The Hydrogeological Assessment completed by Ian D. Wilson and

Associates Limited (November 15, 2019) recommends using a conservative soil percolation time of 35 min/cm for the underlying native soil, which equates to an infiltration rate of approximately 17 mm/hr. Applying a safety correction factor of 2.5 to the infiltration rate, as recommended in the Toronto and Region Conservation Authority (TRCA) Stormwater Management Criteria (2012) results in an adjusted infiltration rate of 6.8 mm/hr. The observed groundwater levels range from a depth of 1.83 m to 0.61 m below existing grade, averaging 1.22 m below existing grade across the site. Assuming an average depth below ground for a lot level and LID measure is 1.0 m, the majority of the site is not suitable for application of infiltration measures. Therefore, lot level and LID measures are not recommended.

Appropriate end-of-pipe SWM facilities for drainage areas greater than 5 ha include constructed wetlands, wet ponds and constructed wetland/ wet pond hybrids. Due to anticipated grading constraints within the designated SWM Block, the active storage depth for the end-of-pipe facility will be limited to approximately 1.70 m. The end-of-pipe facility will require a larger footprint area to satisfy the appropriate SWM design criteria including length-to-width flow ratios, which will encroach into the environmentally significant area and wetland along Division Road West (ESA 2). To offset the disturbance to the environmentally significant area and wetland, a constructed wetland end-of-pipe SWM facility with a sediment forebay is recommended. Input and recommendations from the Environmental Consultant will be retained at detailed design to optimize amphibian habitat and minimize ideal habitats for invasive species.

3.3 PROPOSED DRAINAGE CONDITIONS

A Post Development Drainage Plan (Drawing DP-2) has been prepared for the proposed development and should be referenced when reviewing this section of the report. Under proposed conditions, the majority of the development, represented by Catchment 201 (11.65 ha) will drain internally via a combination of swales, roadside ditches and culverts to the proposed constructed wetland end-of-pipe SWMF. The wetland SWMF has been sized to provide water quality treatment and peak flow attenuation for the development prior to discharge to Outlet 1. The water quantity and quality controls provided are discussed further in the following sections. Runoff from the external areas (Catchments EXT-1 and EXT-2) will continue to drain through the subject property, through the development, and will be routed through the wetland SWMF to Outlet 1.

Due to grading constraints along the boundaries of the development, Catchment 202 (1.12 ha) will drain from the site uncontrolled. This area will consist mainly of rooftop and rear yard drainage which is considered clean from a water quality perspective.

3.4 WATER QUANTITY CONTROL

The proposed wetland SWMF will provide the requisite water quantity controls for the development. The primary Hickenbottom perforated riser and orifice plate will provide control for the 25 mm storm runoff. Runoff from the 1:2-year through 1:100-year storm events will be controlled by a secondary outlet consisting of a ditch inlet catchbasin. In the case of an obstruction to the outlet controls, an emergency overflow outlet has been included in the design. The wetland SWMF outlets are described as follows:

- Primary outlet – an HBI-8810 Hickenbottom perforated riser (stock 203 mm dia. inlet with 56 – 25.4 mm dia. holes per 300 mm) and 200 mm diameter reverse grade outlet pipe complete with a 76.2 mm diameter orifice plate;
- Secondary outlet – a 600 mm x 600 mm ditch inlet catchbasin (4:1 grate slope) and a 375 mm diameter outlet pipe; and
- A 5 m wide emergency overflow weir.

As designed, the wetland SWMF provides 765 m^3 of permanent pool storage, 1,034 m^3 of extended detention storage, and 6,456 m^3 of active storage.

The Visual OTTHYMO hydrologic model was revised to compute the post development peak flows and verify the proposed wetland SWMF outlets and storage volumes specified provide the requisite water quantity control for the development. The peak flow rates for the 25 mm storm, 1:2-year through 1:100-year design storms, and the Regional (Timmins) Storm from the wetland SWMF and the total discharge to Outlet 1 are summarized in Table 2. Supporting calculations are provided in Appendix B. Culvert and swale capacity checks are also provided in Appendix B. The operating characteristics of the wetland SWMF are summarized in Table 3. The stage-storage-discharge tables for the wetland SWMF are provided in Appendix C. The preliminary layout of the wetland SWMF is illustrated on the Stormwater Management Pond Layout Drawing (Drawing PND-1) enclosed.

Table 2: Post Development Peak Flow Summary

DESIGN STORM	PEAK FLOW (m^3/s)					
	Wetland SWMF		Catchment 202		Total	
	Chi	SCS	Chi	SCS	Chi	SCS
25 mm	0.004	-	0.005	-	0.008 *(0.034)*	-
1:2 Year	0.008	0.068	0.007	0.017	0.010 *(0.053)*	0.040 *(0.140)*
1:5 Year	0.034	0.191	0.014	0.030	0.036 *(0.109)*	0.171 *(0.266)*
1:10 Year	0.082	0.259	0.019	0.041	0.087 *(0.156)*	0.253 *(0.366)*
1:25 Year	0.141	0.317	0.027	0.055	0.151 *(0.224)*	0.343 *(0.508)*
1:50 Year	0.193	0.349	0.033	0.066	0.207 *(0.283)*	0.381 *(0.629)*
1:100 Year	0.230	0.455	0.040	0.078	0.248 *(0.346)*	0.420 *(0.752)*
Regional (Timmins)	0.790	-	0.071	-	0.845 *(0.865)*	-

Note: *(0.024)* – Existing flow rate; Chi – 4-hour Chicago design storm; SCS – 24-hour SCS design storm.

Table 3: Wetland SWMF Design Operating Characteristics

DESIGN STORM	DISCHARGE (m^3/s)		STORAGE (m^3)		WATER ELEVATION (m)	
	Chi	SCS	Chi	SCS	Chi	SCS
25 mm	0.004	-	485	-	259.39	-
1:2 Year	0.008	0.068	778	1199	259.46	259.61
1:5 Year	0.034	0.191	1188	1554	259.60	259.72
1:10 Year	0.082	0.259	1329	1858	259.65	259.81
1:25 Year	0.141	0.317	1504	2350	259.70	259.95
1:50 Year	0.193	0.349	1656	2857	259.75	260.08
1:100 Year	0.230	0.455	1849	3394	259.81	260.21
Regional (Timmins)	0.790	-	4073	-	260.37	-

3.5 WATER QUALITY TREATMENT

The wetland SWMF has been designed to provide "Enhanced" Level 1 water quality treatment for the subject development. The weighted imperviousness of Catchment 201, EXT-1 and EXT-2 is 15%. The required water quality storage volume for the wetland SWMF is 55 m^3/ha, equating to approximately 1,129 m^3, of which 308 m^3 is to be permanent pool storage. The required extended detention volume is the greater of 40 m^3/ha (821 m^3) or the volume produced by 25 mm of rainfall over the contributing area (534 m^3). Therefore, the required extended detention volume is approximately 821 m^3. The simplified approach for determining the erosion control storage was also considered and is approximately 2,052 m^3.

As previously described, the wetland SWMF has been designed with 765 m^3 of permanent pool storage, 1,034 m^3 of extended detention storage, and 6,456 m^3 of active storage. The wetland SWMF will have a drawdown time of approximately 26 hours for a 25 mm storm event. Supporting calculations are provided in Appendix D.

3.6 ENVIRONMENTALLY SIGNIFICANT AREAS

The environmentally significant area in the centre of the property (ESA 1) will continue to receive surface runoff as sheet flow from Catchment EXT-1 and from rear yard drainage from lots 6 through 10, and 20 through 23. The environmentally significant area along Division Road West (ESA 2) will continue to receive surface runoff from Catchment EXT-2 via the Division Road West roadside ditch, and from rear yard drainage from lots 1 through 5. Surface runoff from the intermittent channel will be redirected to the proposed wetland SWMF. As previously mentioned, the wetland SWMF design encroaches into the environmentally significant area and wetland along Division Road West (ESA 2). However, the disturbance in this area will be offset by the construction of the wetland SWMF and recommendations from the Environmental Consultant will be retained at detailed design to optimize amphibian habitat and minimize ideal habitats for invasive species. The environmentally significant area at the southeast corner of the property (ESA 3) will be largely maintained with the exception of the area required to construct the wetland SWMF outlet. All surface runoff draining to this area will be maintained.

4 Sediment and Erosion Control

4.1 DURING CONSTRUCTION

Erosion and sediment control will be implemented for all construction activities within the development site including vegetation clearing, topsoil stripping, road construction and stockpiling of materials. The basic principles considered to minimize erosion and sedimentation and the resultant negative environmental impacts include:

- Minimize disturbance activities where possible;
- Expose the smallest possible land area to erosion for the shortest amount of time;
- Institute erosion control measures as-required immediately;
- Implement sediment control measures before the outset of construction activities; and
- Carry out regular inspection of erosion/sediment control measures and repair or maintain, as necessary.

Temporary drainage swales with rock flow check dams will be constructed to intercept and direct surface runoff to a proposed temporary sediment basin during construction. The temporary sediment basin will be located and have the same configuration as the proposed wetland SWMF, however the bottom of the main cell will be excavated to 258.10 m to match the sediment forebay. Following the completion of Phase 1 construction, the temporary sediment basin will be cleaned out, regraded and landscaped as per the final design of the wetland SWMF.

As described in the Greater Golden Horseshoe Area Conservation Authorities Erosion and Sediment Control Guideline for Urban Construction (December 2006), sediment basins are appropriate for settling out sediment for drainage areas greater than 2 hectares in size. The temporary sediment basin should provide a minimum 125 m^3/ha of active storage volume (1,456 m^3) with an extended detention zone drawdown time of 48 hours (minimum 75 mm diameter orifice) and achieve a minimum 125 m^3/ha of permanent pool storage volume (1,456 m^3), with a 4:1 length-to-width ratio.

The temporary sediment basin will provide a permanent pool storage volume of 1,512 m^3, and 6,456 m^3 of active storage volume. A temporary turbidity curtain will be installed midway through in the main cell to provide additional sediment protection of the outlet.

The temporary sediment basin is designed to control the post development 25 mm and 1:2-year through 1:100-year design storms to pre-development levels and also safely convey the Regional Storm peak flow to Outlet 1 with 0.30 m of freeboard below the top of pond. Discharge from the temporary sediment basin will be controlled by a series of engineered outlets as follows:

- Primary outlet – an HBI-8810 Hickenbottom perforated riser (stock 203 mm dia. inlet with 56 – 25.4 mm dia. holes per 300 mm) and 200 mm diameter outlet pipe complete with a 76.2 mm diameter orifice plate;
- Secondary outlet – a 600 mm x 600 mm ditch inlet catchbasin (4:1 grate slope) and a 375 mm diameter outlet pipe; and
- A 5 m wide emergency overflow weir.

The sediment basin stage-storage-discharge tables are provided in Appendix E.

4.2 PERMANENT EROSION TREATMENTS

It is also important to consider the necessity of sediment and erosion controls beyond the construction phase and consider permanent treatments for the culvert inlets/outlets, emergency overflow weir, and wetland SWMF. Calculations for the end treatment erosion protection measures will be completed at detailed design.

5 Summary

This report has been prepared to document the proposed stormwater management plan developed in support of the subject development as well as the applicable design criteria and proposed siltation and erosion controls. The SWM Plan ensures the development can be constructed in accordance with all applicable municipal and provincial guidelines while minimizing the impact of the development on local drainage systems.

Peak flows discharged from the site will be controlled to pre-development levels for the 1:2-year through 1:100-year design storms. The wetland SWMF has sufficient storage to attenuate post development peak flows to pre-development levels and has been designed to provide a 26-hour drawdown time for the post development 25 mm storm runoff to meet erosion protection criteria. Culvert and swale capacity calculations demonstrate the Regional design storm can be safely conveyed through the subject development to the designated outlet. The wetland SWMF has been designed to provide the requisite water quality volume and achieves Township and MECP guidelines for forebay and wetland design. The sediment and erosion control plan will reduce the transportation of sediment from the site and mitigate erosion downstream during construction activities and thereafter. Development will be limited within the environmentally significant areas as much as possible, with the exception of the wetland SWMF design which encroaches into the environmentally significant area and wetland along Division Road West (ESA 2). The disturbance to this area will be offset by the construction of the wetland SWMF and recommendations from the Environmental Consultant will be retained at detailed design.

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

EXT–1
6.1 | 39.3

101
12.8 | 46.2

EXT–2
3.0 | 56.6

HYDRO ONE EASEMENT

EASEMENT

ESA 1

ESA 2

ESA 3

2060 DIVISION ROAD

CARRIAGE COURT

DIVISION ROAD WEST

WELL

RP 266.58

EXISTING TWIN 1300mm CSP
EXISTING CREEK

EXISTING CROSSING

LEGEND

- OVERLAND FLOW
- PRE–DEVELOPMENT DRAINAGE BOUNDARY
- PROPERTY LINE
- 267.00 EXISTING CONTOUR

101 — DRAINAGE AREA LABEL
12.8 | 46.2 — CURVE NUMBER
AREA (ha)

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2060 DIVISION ROAD
TOWNSHIP OF SEVERN
PRE–DEVELOPMENT DRAINAGE PLAN

DWG. No. **DP-1**

SCALE: 1:2000	DRAWN: SMM	DATE: JUN. 2020	JOB NO. 319827

Drawing Name: 319827–DPXX.dwg, Plotted: Oct 30, 2020

EXT–1
6.1 | 39.3

EXT–2
2.8 | 57.2

201
11.7 | 23%

202
1.1 | 58.9

HYDRO ONE EASEMENT

STREET A

STREET B

STREET C

CARRIAGE COURT

EASEMENT

ESA 1

ESA 2

ESA 3

SERVICE EASEMENT

STORMWATER MANAGEMENT FACILITY (SEE PND–1)

DIVISION ROAD WEST

EXISTING CROSSING

EXISTING TWIN 1300mm CSP

EXISTING CREEK

LEGEND

- PROPOSED DRAINAGE AREA BOUNDARY
- PROPERTY LINE
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED OVERLAND FLOW DIRECTION

201 — DRAINAGE AREA LABEL
11.7 | 23% — CURVE NUMBER/ IMPERVIOUS %
AREA (ha)

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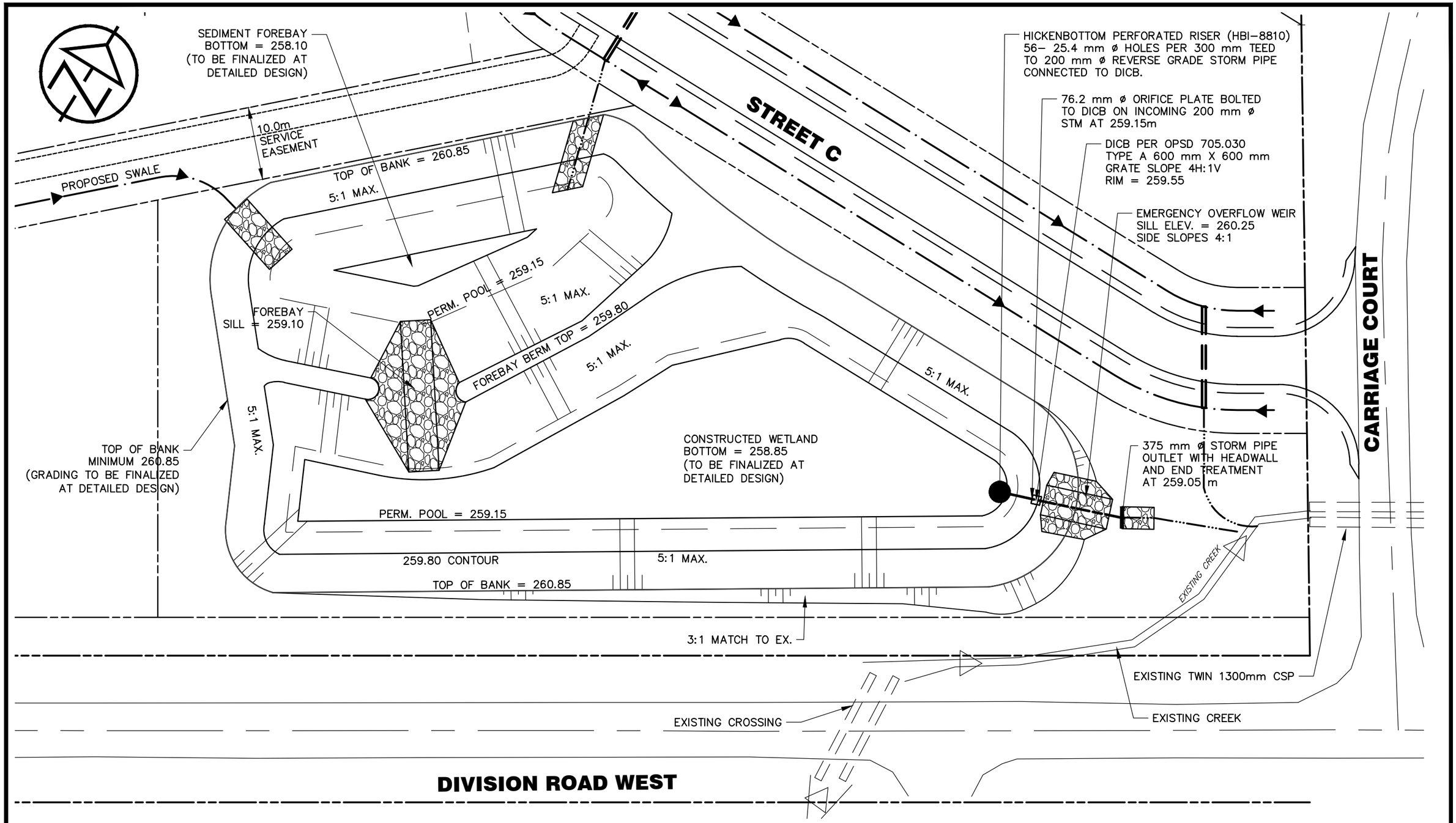
2060 DIVISION ROAD
TOWNSHIP OF SEVERN
POST DEVELOPMENT DRAINAGE PLAN

DWG. No. **DP-2**

SCALE: 1:2000 | DRAWN: SMM | DATE: JUN. 2020 | JOB NO. 319827

Drawing Name: 319827–DPXX.dwg, Plotted: Oct 30, 2020



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2060 DIVISION ROAD
TOWNSHIP OF SEVERN
PRELIMINARY SWM FACILITY LAYOUT

DWG. No. **PND-1**

SCALE: 1:500	DRAWN: SMM	DATE: JUN. 2020	JOB NO. 319827

Drawing Name: 319827-PND1.dwg, Plotted: Jul 03, 2020

Appendix A:
Pre-Development Hydrology

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Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

2060 Division Road	319827

Prepared By

ARO	May 28 2020

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Developmnet Condition

Watershed:	Not within CA
Catchment ID:	101
Catchment Area (ha):	12.77
Impervious %:	0%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Tisl**											
Soil Series		Tioga											
Hydrologic Soils Group		A											
Soil Texture		Sand Loam											
Runoff Coefficient Type		1											
Area (ha)		12.77											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2		100	0.95									
Gravel	3		89	0.09									
Woodland	10	4.54	32	0.08									
Pasture/Lawns	5	2.92	49	0.10									
Meadows	8		38	0.09									
Cultivated	7	3.04	62	0.22									
Waterbody	12	2.27	50	0.05									
Average CN		46.23											
Average C		0.11											
Average IA		8.50											

Time to Peak Calculations

Max. Catchment Elev. (m):	271.50
Min. Catchment Elev. (m):	258.50
Catchment Length (m):	551
Catchment Slope (%):	2.36%
Method: Airport Method	
Time of Concentration (mins):	56.92

Summary

Catchment CN:	46.2
Catchment C:	0.11
Catchment IA (mm):	8.50
Time of Concentration (hrs):	0.95
Catchment Time to Peak (hrs):	0.63
Catchment Time Step (mins):	7.59

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Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

2060 Division Road	319827

Prepared By

ARO	May 28 2020

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Developmnet Condition

Watershed:	Not within CA
Catchment ID:	EXT-1
Catchment Area (ha):	6.12
Impervious %:	0%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Tisl**											
Soil Series		Tioga											
Hydrologic Soils Group		A											
Soil Texture		Sand Loam											
Runoff Coefficient Type		1											
Area (ha)		6.12											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.02	100	0.95									
Gravel	3		89	0.09									
Woodland	10	3.52	32	0.08									
Pasture/Lawns	5	2.57	49	0.10									
Meadows	8		38	0.09									
Cultivated	7		62	0.22									
Waterbody	12		50	0.05									
Average CN		39.31											
Average C		0.09											
Average IA		7.86											

Time to Peak Calculations

Max. Catchment Elev. (m):	272.50
Min. Catchment Elev. (m):	262.50
Catchment Length (m):	510
Catchment Slope (%):	1.96%
Method: Airport Method	
Time of Concentration (mins):	59.48

Summary

Catchment CN:	39.3
Catchment C:	0.09
Catchment IA (mm):	7.86
Time of Concentration (hrs):	0.99
Catchment Time to Peak (hrs):	0.66
Catchment Time Step (mins):	7.93

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Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

2060 Division Road	319827

Prepared By

ARO	May 28 2020

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Pre-Developmnet Condition

Watershed:	Not within CA
Catchment ID:	EXT-2
Catchment Area (ha):	2.96
Impervious %:	15%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Tisl**											
Soil Series		Tioga											
Hydrologic Soils Group		A											
Soil Texture		Sand Loam											
Runoff Coefficient Type		1											
Area (ha)		2.96											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.44	100	0.95									
Gravel	3		89	0.09									
Woodland	10		32	0.08									
Pasture/Lawns	5	2.52	49	0.10									
Meadows	8		38	0.09									
Cultivated	7		62	0.22									
Waterbody	12		50	0.05									
Average CN		56.58											
Average C		0.23											
Average IA		4.55											

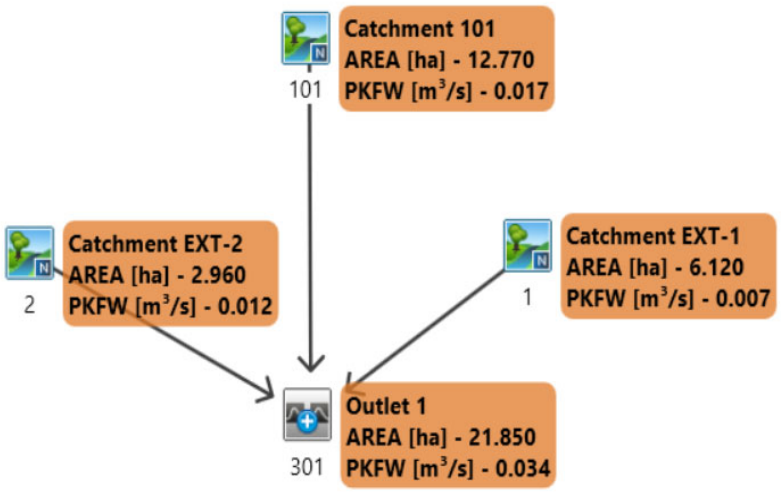
Time to Peak Calculations

Max. Catchment Elev. (m):	272.50
Min. Catchment Elev. (m):	266.00
Catchment Length (m):	325
Catchment Slope (%):	2.00%
Method: Airport Method	
Time of Concentration (mins):	40.85

Summary

Catchment CN:	56.6
Catchment C:	0.23
Catchment IA (mm):	4.55
Time of Concentration (hrs):	0.68
Catchment Time to Peak (hrs):	0.45
Catchment Time Step (mins):	5.45

PROJECT	2060 Division Road	FILE	319827
		DATE	May 28 2020
SUBJECT	Pre Development VO Schematic	NAME	ARO
		PAGE	1 OF 1




NASHYD


ROUTE PIPE


DUHYD


STANDHYD


ROUTE CHANNEL


DIVERT HYD


ADDHYD


ROUTE RESERVOIR

4 HOUR CHICAGO

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

       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:       C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\873b432e-e1ef-47c9-9491-88d31dfd95e1\s
  Summary          filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\873b432e-e1ef-47c9-9491-88d31dfd95e1\s


DATE: 06-19-2020                          TIME: 10:54:00

USER:



COMMENTS: _____________________________________________________________


------------------------------------------------------------------------------
--------------------------
  ***********************************************
  ** SIMULATION : Run 01                       **  25 mm
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\ALOverholt\AppD
|                  |              ata\Local\Temp\
|                  |              680f041e-3335-41ad-9cf3-7a2a1607a7b3\6c444d29
| Ptotal= 24.97 mm |    Comments: CHIC25MM
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
               0.10     1.29 |  1.10     2.81 |  2.10    13.05 |  3.10     2.04
               0.20     1.36 |  1.20     3.22 |  2.20     8.44 |  3.20     1.89
               0.30     1.44 |  1.30     3.77 |  2.30     6.21 |  3.30     1.76
               0.40     1.53 |  1.40     4.55 |  2.40     4.91 |  3.40     1.65
               0.50     1.63 |  1.50     5.77 |  2.50     4.06 |  3.50     1.55
               0.60     1.75 |  1.60     7.86 |  2.60     3.47 |  3.60     1.46
               0.70     1.89 |  1.70    12.27 |  2.70     3.03 |  3.70     1.39
               0.80     2.06 |  1.80    26.17 |  2.80     2.70 |  3.80     1.32
               0.90     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            |
| NASHYD   (  0101)|   Area     (ha)=  12.77   Curve Number    (CN)= 46.2
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.63

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


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
               0.083     1.29 | 1.083     2.81 | 2.083    13.05 |  3.08     2.04
               0.167     1.35 | 1.167     3.14 | 2.167     9.36 |  3.17     1.92
               0.250     1.41 | 1.250     3.55 | 2.250     7.10 |  3.25     1.81
               0.333     1.48 | 1.333     4.08 | 2.333     5.69 |  3.33     1.72
               0.417     1.55 | 1.417     4.79 | 2.417     4.74 |  3.42     1.63
               0.500     1.63 | 1.500     5.77 | 2.500     4.06 |  3.50     1.55
               0.583     1.75 | 1.583     7.86 | 2.583     3.47 |  3.58     1.46
               0.667     1.86 | 1.667    11.39 | 2.667     3.12 |  3.67     1.40
               0.750     1.99 | 1.750    20.61 | 2.750     2.83 |  3.75     1.35
               0.833     2.14 | 1.833    44.73 | 2.833     2.59 |  3.83     1.30
               0.917     2.31 | 1.917    63.46 | 2.917     2.39 |  3.92     1.25
               1.000     2.50 | 2.000    26.96 | 3.000     2.22 |  4.00     1.20

    Unit Hyd Qpeak  (cms)=   0.774

    PEAK FLOW       (cms)=   0.017 (i)
    TIME TO PEAK    (hrs)=   2.750
    RUNOFF VOLUME    (mm)=   0.870
    TOTAL RAINFALL   (mm)=  24.971
    RUNOFF COEFFICIENT   =   0.035

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

------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area     (ha)=   6.12   Curve Number    (CN)= 39.3
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.86   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.66

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


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
               0.083     1.29 | 1.083     2.81 | 2.083    13.05 |  3.08     2.04
               0.167     1.35 | 1.167     3.14 | 2.167     9.36 |  3.17     1.92
               0.250     1.41 | 1.250     3.55 | 2.250     7.10 |  3.25     1.81
               0.333     1.48 | 1.333     4.08 | 2.333     5.69 |  3.33     1.72
               0.417     1.55 | 1.417     4.79 | 2.417     4.74 |  3.42     1.63
               0.500     1.63 | 1.500     5.77 | 2.500     4.06 |  3.50     1.55
               0.583     1.75 | 1.583     7.86 | 2.583     3.47 |  3.58     1.46
               0.667     1.86 | 1.667    11.39 | 2.667     3.12 |  3.67     1.40
               0.750     1.99 | 1.750    20.61 | 2.750     2.83 |  3.75     1.35
               0.833     2.14 | 1.833    44.73 | 2.833     2.59 |  3.83     1.30
               0.917     2.31 | 1.917    63.46 | 2.917     2.39 |  3.92     1.25
               1.000     2.50 | 2.000    26.96 | 3.000     2.22 |  4.00     1.20

    Unit Hyd Qpeak  (cms)=   0.354
```

```
     PEAK FLOW       (cms)=   0.007 (i)
     TIME TO PEAK    (hrs)=   2.750
     RUNOFF VOLUME    (mm)=   0.715
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.029

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   2.96   Curve Number   (CN)= 56.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.55   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.45

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.29 | 1.083    2.81 | 2.083   13.05 |  3.08    2.04
               0.167    1.35 | 1.167    3.14 | 2.167    9.36 |  3.17    1.92
               0.250    1.41 | 1.250    3.55 | 2.250    7.10 |  3.25    1.81
               0.333    1.48 | 1.333    4.08 | 2.333    5.69 |  3.33    1.72
               0.417    1.55 | 1.417    4.79 | 2.417    4.74 |  3.42    1.63
               0.500    1.63 | 1.500    5.77 | 2.500    4.06 |  3.50    1.55
               0.583    1.75 | 1.583    7.86 | 2.583    3.47 |  3.58    1.46
               0.667    1.86 | 1.667   11.39 | 2.667    3.12 |  3.67    1.40
               0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
               0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
               0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
               1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.251

     PEAK FLOW       (cms)=   0.012 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=   1.937
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.078

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

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

--------------------
| ADD HYD  (  0301)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):     6.12   0.007     2.75     0.72
      + ID2= 2 (  0101):    12.77   0.017     2.75     0.87
        ================================================
        ID = 3 (  0301):    18.89   0.024     2.75     0.82

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

--------------------
| ADD HYD  (  0301)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0301):    18.89   0.024     2.75     0.82
      + ID2= 2 (  0002):     2.96   0.012     2.42     1.94

        ================================================
        ID = 1 (  0301):    21.85   0.034     2.67     0.97

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

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

       V    V   I    SSSSS  U   U    A    L             (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\873b432e-e1ef-47c9-9491-88d31dfd95e1\s
  Summary          filename:        C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\873b432e-e1ef-47c9-9491-88d31dfd95e1\s


DATE: 06-19-2020                          TIME: 10:54:00

USER:


COMMENTS: _____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 01                       **  25 mm
  ***********************************************

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

      START @  0.00 hrs
      --------------------
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\680f041e-3335-41ad-9cf3-7a2a1607a7b3\6c444d29-63cc-480a-bfa5-
    remark: CHIC25MM
*
 ** CALIB NASHYD         0101  1  5.0   12.77    0.02  2.75   0.87 0.03   0.000
    [CN=46.2         ]
    [ N = 3.0:Tp 0.63]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\680f041e-3335-41ad-9cf3-7a2a1607a7b3\6c444d29-63cc-480a-bfa5-
    remark: CHIC25MM
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.01  2.75   0.72 0.03   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\680f041e-3335-41ad-9cf3-7a2a1607a7b3\6c444d29-63cc-480a-bfa5-
    remark: CHIC25MM
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.01  2.42   1.94 0.08   0.000
    [CN=56.6         ]
    [ N = 3.0:Tp 0.45]
*
    ADD [  0001+  0101] 0301  3  5.0   18.89    0.02  2.75   0.82  n/a   0.000
*
    ADD [  0301+  0002] 0301  1  5.0   21.85    0.03  2.67   0.97  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\e5566744-9bf8-4df1-ab09-9157c90bd5e5\s
  Summary          filename:        C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\e5566744-9bf8-4df1-ab09-9157c90bd5e5\s


DATE: 06-19-2020                          TIME: 10:54:00

USER:


COMMENTS: _____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 02                       **  1:2 YEAR
  ***********************************************

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

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
```

```
*
 ** CALIB NASHYD         0101  1  5.0   12.77    0.03  2.25   1.85 0.06   0.000
    [CN=46.2         ]
    [ N = 3.0:Tp 0.63]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.01  2.25   1.49 0.05   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.02  1.83   3.58 0.11   0.000
    [CN=56.6         ]
    [ N = 3.0:Tp 0.45]
*
    ADD [  0001+  0101] 0301  3  5.0   18.89    0.04  2.25   1.73  n/a   0.000
*
    ADD [  0301+  0002] 0301  1  5.0   21.85    0.05  2.08   1.98  n/a   0.000
*
 FINISH

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

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


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output            filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\7865c1bf-6449-4cfc-8432-2a443c44d71a\s
  Summary         filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\7865c1bf-6449-4cfc-8432-2a443c44d71a\s


DATE: 06-19-2020                          TIME: 10:54:00

USER:


COMMENTS: _____________________________________________________________
```

```
  ************************************************
  ** SIMULATION : Run 03                        **  1:5 YEAR
  ************************************************

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

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   12.77    0.06  2.17   3.76 0.09   0.000
    [CN=46.2         ]
    [ N = 3.0:Tp 0.63]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.02  2.25   3.01 0.07   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.03  1.83   6.57 0.15   0.000
    [CN=56.6         ]
    [ N = 3.0:Tp 0.45]
*
    ADD [  0001+  0101] 0301  3  5.0   18.89    0.08  2.17   3.52  n/a   0.000
*
    ADD [  0301+  0002] 0301  1  5.0   21.85    0.11  2.08   3.93  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output            filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
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  Summary         filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\0d1167fb-2546-4244-a29f-089283f32746\s
```

```
DATE: 06-19-2020                          TIME: 10:54:00

USER:

COMMENTS: _____________________________________________________________

  ************************************************
  ** SIMULATION : Run 04                        **  1:10 YEAR
  ************************************************

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

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   12.77    0.09  2.17   5.35 0.10   0.000
    [CN=46.2          ]
    [ N = 3.0:Tp 0.63]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.03  2.17   4.28 0.08   0.000
    [CN=39.3          ]
    [ N = 3.0:Tp 0.66]
*
    CHIC STORM                 10.0
    [ Ptot= 51.00 mm ]
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.04  1.83   8.94 0.18   0.000
    [CN=56.6          ]
    [ N = 3.0:Tp 0.45]
*
    ADD [  0001+  0101] 0301  3  5.0   18.89    0.12  2.17   5.00  n/a   0.000
*
    ADD [  0301+  0002] 0301  1  5.0   21.85    0.16  2.08   5.53  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****
```

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output            filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\502546ff-577f-4c74-950a-36e2c4df24d1\s
  Summary         filename:        C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\502546ff-577f-4c74-950a-36e2c4df24d1\s

DATE: 06-19-2020                          TIME: 10:54:00

USER:

COMMENTS: _____________________________________________________________

  ************************************************
  ** SIMULATION : Run 05                        **  1:25 YEAR
  ************************************************

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

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 ** CALIB NASHYD         0101  1  5.0   12.77    0.12  2.17   7.65 0.13   0.000
    [CN=46.2          ]
    [ N = 3.0:Tp 0.63]
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.05  2.17   6.12 0.10   0.000
    [CN=39.3          ]
    [ N = 3.0:Tp 0.66]
*
    CHIC STORM                 10.0
    [ Ptot= 60.03 mm ]
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.06  1.83  12.30 0.20   0.000
    [CN=56.6          ]
    [ N = 3.0:Tp 0.45]
*
    ADD [  0001+  0101] 0301  3  5.0   18.89    0.17  2.17   7.16  n/a   0.000
*
    ADD [  0301+  0002] 0301  1  5.0   21.85    0.22  2.08   7.85  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
Output filename: C:\Users\ALOverholt\AppData\Local\Civica\VH5\929f3348-49da-4a7f-bbe5-f883d8cefa3c\94cc6f1e-ec23-47f5-9eb3-91db96857d86\s
Summary filename: C:\Users\ALOverholt\AppData\Local\Civica\VH5\929f3348-49da-4a7f-bbe5-f883d8cefa3c\94cc6f1e-ec23-47f5-9eb3-91db96857d86\s

DATE: 06-19-2020 TIME: 10:54:00

USER:

COMMENTS: _____

** SIMULATION : Run 06 ** 1:50 YEAR

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ 0.00 hrs								
	CHIC STORM		10.0						
	[Ptot= 66.87 mm]								
*									
**	CALIB NASHYD	0101	1 5.0	12.77	0.16	2.17	9.63	0.14	0.000
	[CN=46.2]								
	[N = 3.0:Tp 0.63]								
*									
	CHIC STORM		10.0						
	[Ptot= 66.87 mm]								
*									
**	CALIB NASHYD	0001	1 5.0	6.12	0.06	2.17	7.72	0.12	0.000
	[CN=39.3]								
	[N = 3.0:Tp 0.66]								
*									
	CHIC STORM		10.0						
	[Ptot= 66.87 mm]								
*									
**	CALIB NASHYD	0002	1 5.0	2.96	0.08	1.83	15.11	0.23	0.000
	[CN=56.6]								
	[N = 3.0:Tp 0.45]								
*									
	ADD [0001+ 0101]	0301	3 5.0	18.89	0.22	2.17	9.01	n/a	0.000
*									
	ADD [0301+ 0002]	0301	1 5.0	21.85	0.28	2.08	9.84	n/a	0.000
*									

V V I SSSSS U U A L (v 6.1.2001)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L

VV I SSSSS UUUUU A A LLLLL

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
Output filename: C:\Users\ALOverholt\AppData\Local\Civica\VH5\929f3348-49da-4a7f-bbe5-f883d8cefa3c\7b618707-ad2e-47aa-9675-e1eda5f23542\s
Summary filename: C:\Users\ALOverholt\AppData\Local\Civica\VH5\929f3348-49da-4a7f-bbe5-f883d8cefa3c\7b618707-ad2e-47aa-9675-e1eda5f23542\s

DATE: 06-19-2020 TIME: 10:54:00

USER:

COMMENTS: _____

** SIMULATION : Run 07 ** 1:100 YEAR

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ 0.00 hrs								
	CHIC STORM		10.0						
	[Ptot= 73.48 mm]								
*									
**	CALIB NASHYD	0101	1 5.0	12.77	0.19	2.08	11.72	0.16	0.000
	[CN=46.2]								
	[N = 3.0:Tp 0.63]								
*									
	CHIC STORM		10.0						
	[Ptot= 73.48 mm]								
*									
**	CALIB NASHYD	0001	1 5.0	6.12	0.07	2.17	9.41	0.13	0.000
	[CN=39.3]								
	[N = 3.0:Tp 0.66]								
*									
	CHIC STORM		10.0						
	[Ptot= 73.48 mm]								
*									
**	CALIB NASHYD	0002	1 5.0	2.96	0.09	1.83	18.02	0.25	0.000
	[CN=56.6]								
	[N = 3.0:Tp 0.45]								
*									
	ADD [0001+ 0101]	0301	3 5.0	18.89	0.27	2.17	10.97	n/a	0.000
*									
	ADD [0301+ 0002]	0301	1 5.0	21.85	0.35	2.00	11.92	n/a	0.000
*									

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


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\355ef8cd-883b-4a7d-8fca-a0a30862bb18\s
  Summary          filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\355ef8cd-883b-4a7d-8fca-a0a30862bb18\s


DATE: 06-19-2020                          TIME: 10:54:00

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 08                        **  REGIONAL (TIMMINS)
  ************************************************

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

      START @  0.00 hrs
      --------------------
    READ STORM                12.0
    [ Ptot=193.00 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\680f041e-3335-41ad-9cf3-7a2a1607a7b3\7d5dbd6d-8eb8-4455-9f0a-
    remark: TIMMINS
*
 ** CALIB NASHYD         0101  1  5.0   12.77    0.50  7.33  70.93 0.37   0.000
    [CN=46.2         ]
    [ N = 3.0:Tp 0.63]
*
    READ STORM                12.0
    [ Ptot=193.00 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\680f041e-3335-41ad-9cf3-7a2a1607a7b3\7d5dbd6d-8eb8-4455-9f0a-
    remark: TIMMINS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.20  7.42  59.37 0.31   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                12.0
    [ Ptot=193.00 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\680f041e-3335-41ad-9cf3-7a2a1607a7b3\7d5dbd6d-8eb8-4455-9f0a-
    remark: TIMMINS
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.17  7.17  92.66 0.48   0.000
    [CN=56.6         ]
    [ N = 3.0:Tp 0.45]
*
    ADD [  0001+  0101] 0301  3  5.0   18.89    0.70  7.33  67.18  n/a   0.000
*
    ADD [  0301+  0002] 0301  1  5.0   21.85    0.86  7.33  70.64  n/a   0.000
*
```

24 HOUR SCS

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

       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:       C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\229ba4a1-0369-4a5f-8b42-f69b259bb21f\s
  Summary          filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\229ba4a1-0369-4a5f-8b42-f69b259bb21f\s


DATE: 06-19-2020                              TIME: 10:51:43

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
--------------------------
  ***********************************************
  ** SIMULATION : Run 01                       **  1:2 YEAR
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\ALOverholt\AppD
|                  |              ata\Local\Temp\
|                  |              dd9feb79-8f39-464f-88da-ede8b3c3e5e6\6273728c
| Ptotal= 53.41 mm |    Comments: 2yr 24hr 15min SCS
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	6.50	0.96	12.75	7.69	19.00	0.96
0.50	0.59	6.75	0.96	13.00	3.95	19.25	0.96
0.75	0.59	7.00	0.96	13.25	3.95	19.50	0.96
1.00	0.59	7.25	0.96	13.50	2.88	19.75	0.96
1.25	0.59	7.50	1.18	13.75	2.88	20.00	0.96
1.50	0.59	7.75	1.18	14.00	2.24	20.25	0.96
1.75	0.59	8.00	1.18	14.25	2.24	20.50	0.64
2.00	0.59	8.25	1.18	14.50	1.60	20.75	0.64
2.25	0.59	8.50	1.39	14.75	1.60	21.00	0.64
2.50	0.69	8.75	1.39	15.00	1.60	21.25	0.64
2.75	0.69	9.00	1.50	15.25	1.60	21.50	0.64
3.00	0.69	9.25	1.50	15.50	1.60	21.75	0.64
3.25	0.69	9.50	1.71	15.75	1.60	22.00	0.64
3.50	0.69	9.75	1.71	16.00	1.60	22.25	0.64
3.75	0.69	10.00	1.92	16.25	1.60	22.50	0.64
4.00	0.69	10.25	1.92	16.50	0.96	22.75	0.64
4.25	0.69	10.50	2.46	16.75	0.96	23.00	0.64
4.50	0.85	10.75	2.46	17.00	0.96	23.25	0.64
4.75	0.85	11.00	3.31	17.25	0.96	23.50	0.64
5.00	0.85	11.25	3.31	17.50	0.96	23.75	0.64
5.25	0.85	11.50	5.13	17.75	0.96	24.00	0.64
5.50	0.85	11.75	5.13	18.00	0.96	24.25	0.64
5.75	0.85	12.00	15.81	18.25	0.96		
6.00	0.85	12.25	65.37	18.50	0.96		
6.25	0.85	12.50	7.69	18.75	0.96		

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

--------------------
| CALIB            |
| NASHYD   (  0101)|   Area     (ha)=  12.77   Curve Number    (CN)= 46.2
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.63

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

                              ---- TRANSFORMED HYETOGRAPH ----
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64

3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64
5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Unit Hyd Qpeak (cms)= 0.774

PEAK FLOW (cms)= 0.077 (i)
TIME TO PEAK (hrs)= 12.833
RUNOFF VOLUME (mm)= 5.926
TOTAL RAINFALL (mm)= 53.410
RUNOFF COEFFICIENT = 0.111

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

CALIB					
NASHYD (0001)	Area (ha)=	6.12	Curve Number (CN)=	39.3	
ID= 1 DT= 5.0 min	Ia (mm)=	7.86	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.66			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64
3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64

5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Unit Hyd Qpeak (cms)= 0.354

PEAK FLOW (cms)= 0.028 (i)
TIME TO PEAK (hrs)= 12.917
RUNOFF VOLUME (mm)= 4.740
TOTAL RAINFALL (mm)= 53.410
RUNOFF COEFFICIENT = 0.089

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

CALIB					
NASHYD (0002)	Area (ha)=	2.96	Curve Number (CN)=	56.6	
ID= 1 DT= 5.0 min	Ia (mm)=	4.55	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.45			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64
3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64
5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Unit Hyd Qpeak (cms)= 0.251

PEAK FLOW (cms)= 0.039 (i)
TIME TO PEAK (hrs)= 12.583
RUNOFF VOLUME (mm)= 9.798
TOTAL RAINFALL (mm)= 53.410
RUNOFF COEFFICIENT = 0.183

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

ADD HYD (0301)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0001):	6.12	0.028	12.92	4.74
	+ ID2= 2 (0101):	12.77	0.077	12.83	5.93
	ID = 3 (0301):	18.89	0.105	12.83	5.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| ADD HYD  (  0301)|
|   3 +  2 =  1    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
       ID1= 3 (  0301):     18.89    0.105     12.83      5.54
     + ID2= 2 (  0002):      2.96    0.039     12.58      9.80
       ================================================
       ID = 1 (  0301):     21.85    0.140     12.75      6.12

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

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

       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output            filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\229ba4a1-0369-4a5f-8b42-f69b259bb21f\s
  Summary          filename:       C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\229ba4a1-0369-4a5f-8b42-f69b259bb21f\s


DATE: 06-19-2020                          TIME: 10:51:43

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 01                         **   1:2 YEAR
  ************************************************

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

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\6273728c-e893-442e-9958-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB NASHYD         0101  1  5.0   12.77    0.08 12.83   5.93 0.11   0.000
    [CN=46.2         ]
    [ N = 3.0:Tp 0.63]
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\6273728c-e893-442e-9958-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.03 12.92   4.74 0.09   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                15.0
    [ Ptot= 53.41 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\6273728c-e893-442e-9958-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.04 12.58   9.80 0.18   0.000
    [CN=56.6         ]
    [ N = 3.0:Tp 0.45]
*
    ADD [  0001+  0101] 0301  3  5.0   18.89    0.11 12.83   5.54  n/a   0.000
*
    ADD [  0301+  0002] 0301  1  5.0   21.85    0.14 12.75   6.12  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output            filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\ccfb09f9-b48e-49c0-8271-acca5245ab55\s
  Summary          filename:       C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\ccfb09f9-b48e-49c0-8271-acca5245ab55\s


DATE: 06-19-2020                          TIME: 10:51:44

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 02                         **   1:5 YEAR
  ************************************************

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

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot= 71.65 mm ]
```

```
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\e43bfcc7-943b-433a-be6e-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB NASHYD         0101  1  5.0   12.77    0.15 12.83  11.12 0.16   0.000
    [CN=46.2         ]
    [ N = 3.0:Tp 0.63]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\e43bfcc7-943b-433a-be6e-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.05 12.83   8.92 0.12   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
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ede8b3c3e5e6\e43bfcc7-943b-433a-be6e-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.07 12.58  17.19 0.24   0.000
    [CN=56.6         ]
    [ N = 3.0:Tp 0.45]
*
    ADD [  0001+  0101]  0301  3  5.0   18.89    0.20 12.83  10.41  n/a   0.000
*
    ADD [  0301+  0002]  0301  1  5.0   21.85    0.27 12.75  11.33  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


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  Output          filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
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  Summary         filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\331f2e7c-1422-4241-8c82-84d77a845d0d\s


DATE: 06-19-2020                          TIME: 10:51:43

USER:
```

COMMENTS: _____

```
  ********************************************
  ** SIMULATION : Run 03                     **  1:10 YEAR
  ********************************************

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


      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
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ede8b3c3e5e6\71c27fd0-a9ea-4afe-a0ac-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB NASHYD         0101  1  5.0   12.77    0.21 12.83  15.24 0.18   0.000
    [CN=46.2         ]
    [ N = 3.0:Tp 0.63]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\71c27fd0-a9ea-4afe-a0ac-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.08 12.83  12.28 0.15   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\71c27fd0-a9ea-4afe-a0ac-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.09 12.58  22.85 0.27   0.000
    [CN=56.6         ]
    [ N = 3.0:Tp 0.45]
*
    ADD [  0001+  0101]  0301  3  5.0   18.89    0.28 12.83  14.28  n/a   0.000
*
    ADD [  0301+  0002]  0301  1  5.0   21.85    0.37 12.75  15.44  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
Output filename: C:\Users\ALOverholt\AppData\Local\Civica\VH5\929f3348-49da-4a7f-bbe5-f883d8cefa3c\d5728c4d-44f2-4425-a24f-ca89872ca018\s
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DATE: 06-19-2020 TIME: 10:51:44

USER:

COMMENTS: _____

** SIMULATION : Run 04 ** 1:25 YEAR

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ 0.00 hrs								
	READ STORM		15.0						
	[Ptot= 98.64 mm]								
	fname : C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-ede8b3c3e5e6\1a3fa4a1-0255-4a47-a503-								
	remark: 25yr 24hr 15min SCS								
*									
**	CALIB NASHYD	0101	1 5.0	12.77	0.29	12.83	21.07	0.21	0.000
	[CN=46.2]								
	[N = 3.0:Tp 0.63]								
*									
	READ STORM		15.0						
	[Ptot= 98.64 mm]								
	fname : C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-ede8b3c3e5e6\1a3fa4a1-0255-4a47-a503-								
	remark: 25yr 24hr 15min SCS								
*									
**	CALIB NASHYD	0001	1 5.0	6.12	0.11	12.83	17.06	0.17	0.000
	[CN=39.3]								
	[N = 3.0:Tp 0.66]								
*									
	READ STORM		15.0						
	[Ptot= 98.64 mm]								
	fname : C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-ede8b3c3e5e6\1a3fa4a1-0255-4a47-a503-								
	remark: 25yr 24hr 15min SCS								
*									
**	CALIB NASHYD	0002	1 5.0	2.96	0.13	12.58	30.65	0.31	0.000
	[CN=56.6]								
	[N = 3.0:Tp 0.45]								
*									
	ADD [0001+ 0101]	0301	3 5.0	18.89	0.39	12.83	19.77	n/a	0.000
*									
	ADD [0301+ 0002]	0301	1 5.0	21.85	0.51	12.75	21.25	n/a	0.000
*									

FINISH

==========

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```
       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


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

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Summary filename: C:\Users\ALOverholt\AppData\Local\Civica\VH5\929f3348-49da-4a7f-bbe5-f883d8cefa3c\98a6f742-62dd-4a79-8d3e-18ed11891dbd\s

DATE: 06-19-2020 TIME: 10:51:43

USER:

COMMENTS: _____

** SIMULATION : Run 05 ** 1:50 YEAR

W/E	COMMAND	HYD ID	DT min	AREA ha	Qpeak cms	Tpeak hrs	R.V. mm	R.C.	Qbase cms
	START @ 0.00 hrs								
	READ STORM		15.0						
	[Ptot=110.08 mm]								
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	remark: 50yr 24hr 15min SCS								
*									
**	CALIB NASHYD	0101	1 5.0	12.77	0.36	12.83	25.99	0.24	0.000
	[CN=46.2]								
	[N = 3.0:Tp 0.63]								
*									
	READ STORM		15.0						
	[Ptot=110.08 mm]								
	fname : C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-								

```
ede8b3c3e5e6\063d3c48-e32d-47e6-934c-
    remark: 50yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.13 12.83  21.14 0.19   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\063d3c48-e32d-47e6-934c-
    remark: 50yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.15 12.58  37.08 0.34   0.000
    [CN=56.6         ]
    [ N = 3.0:Tp 0.45]
*
    ADD [  0001+  0101]  0301  3  5.0   18.89    0.49 12.83  24.42  n/a   0.000
*
    ADD [  0301+  0002]  0301  1  5.0   21.85    0.63 12.75  26.13  n/a   0.000
*
================================================================================
=========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


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  Summary           filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\5786b2ec-57b0-46cc-b22d-b4742482b537\s


DATE: 06-19-2020                          TIME: 10:51:43

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 06                        **  1:100 YEAR
  ************************************************

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


      START @  0.00 hrs
      ---------------------
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\c125530c-e6cb-4e57-ab48-
    remark: 100yr 24hr 15min SCS
*
 ** CALIB NASHYD         0101  1  5.0   12.77    0.43 12.83  31.01 0.26   0.000
    [CN=46.2         ]
    [ N = 3.0:Tp 0.63]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\c125530c-e6cb-4e57-ab48-
    remark: 100yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.16 12.83  25.32 0.21   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname    :    C:\Users\ALOverholt\AppData\Local\Temp\dd9feb79-8f39-464f-88da-
ede8b3c3e5e6\c125530c-e6cb-4e57-ab48-
    remark: 100yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.96    0.18 12.58  43.55 0.36   0.000
    [CN=56.6         ]
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*
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*
    ADD [  0301+  0002]  0301  1  5.0   21.85    0.75 12.75  31.12  n/a   0.000
*
```

Appendix B:
Post Development Hydrology

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 29 2020
SUBJECT	Impervious Area Calculation	NAME	ARO
		PAGE	1 OF 1

Post Development Conditions

Catchment 201	=	11.65	ha
Road Area	=	0.88	ha
Lot Area	=	8.91	ha
R1 Allowable Lot Coverage (20% Lot Are	=	1.78	ha
Wetland/Lake/SWMF	=	2.69	ha
Landscaped	=	6.29	ha

% Impervious	=	23%
Directly Connected % Impervious	=	8%

Catchment 202	=	1.12	ha
Road Area	=	0.06	ha
Lot Area	=	0.84	ha
R1 Allowable Lot Coverage (20% Lot Are	=	0.17	ha
Wetland/Lake/SWMF	=	0.11	ha
Landscaped	=	0.78	ha

% Impervious	=	20%
Directly Connected % Impervious	=	5%

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

2060 Division Road	319827

Prepared By

ARO	May 28 2020

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	Not within CA
Catchment ID:	EXT-2
Catchment Area (ha):	2.75
Impervious %:	16%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Tisl**											
Soil Series		Tioga											
Hydrologic Soils Group		A											
Soil Texture		Sand Loam											
Runoff Coefficient Type		1											
Area (ha)		2.75											
Percentage of Catchment		100%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.44	100	0.95									
Gravel	3		89	0.09									
Woodland	10		32	0.08									
Pasture/Lawns	5	2.31	49	0.10									
Meadows	8		38	0.09									
Cultivated	7		62	0.22									
Waterbody	12		50	0.05									
Average CN		57.16											
Average C		0.24											
Average IA		4.52											

Time to Peak Calculations

Max. Catchment Elev. (m):	272.50
Min. Catchment Elev. (m):	266.00
Catchment Length (m):	325
Catchment Slope (%):	2.00%
Method: Airport Method	
Time of Concentration (mins):	40.40

Summary

Catchment CN:	57.2
Catchment C:	0.24
Catchment IA (mm):	4.52
Time of Concentration (hrs):	0.67
Catchment Time to Peak (hrs):	0.45
Catchment Time Step (mins):	5.39

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (StandHYD)

Project Details

2060 Division Road	319827

Prepared By

ARO	May 28 2020

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	Not within CA
Catchment ID:	201
Catchment Area (ha):	11.69
Impervious %:	23%
Pervious Area (ha):	9.00

Average Curve Number (CN), and Initial Abstraction (IA) for Pervious Area of Catchment

Soil Symbol		**Tisl**							
Soil Series		Tioga							
Hydrologic Soils Group		A							
Soil Texture		Sand Loam							
Runoff Coefficient Type		1							
Area (ha)		9.00							
Percentage of Catchment		100%							
Land Cover Category	**IA**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**	**A (ha)**	**CN**
Impervious	2		100						
Gravel	3		89						
Woodland	10		32						
Pasture/Lawns	5	6.33	49						
Meadows	8		38						
Cultivated	7		62						
Waterbody	12	2.69	50						
Average CN		49.41							
Average IA		7.10							

Notes

CN and IA values have been calculated for the pervious area of the catchment only.

Summary

Catchment CN:	49.4
Catchment IA (mm):	7.10

TATHAM ENGINEERING

Visual OTTHYMO Model Parameter Calculations (NasHYD)

Project Details

2060 Division Road	319827

Prepared By

ARO	May 28 2020

Data Sources

Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997)

Post Development Condition

Watershed:	Not within CA
Catchment ID:	202
Catchment Area (ha):	1.12
Impervious %:	20%

Average Curve Number (CN), Runoff Coefficient (C) and Initial Abstraction (IA)

Soil Symbol		**Tisl**											
Soil Series		Tioga											
Hydrologic Soils Group		A											
Soil Texture		Sand Loam											
Runoff Coefficient Type		1											
Area (ha)		2.75											
Percentage of Catchment		246%											
Land Cover Category	**IA**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**	**A (ha)**	**CN**	**C**
Impervious	2	0.23	100	0.95									
Gravel	3		89	0.09									
Woodland	10		32	0.08									
Pasture/Lawns	5	0.78	49	0.10									
Meadows	8		38	0.09									
Cultivated	7		62	0.22									
Waterbody	12	0.11	50	0.05									
Average CN		24.26											
Average C		0.11											
Average IA		2.07											

Time to Peak Calculations

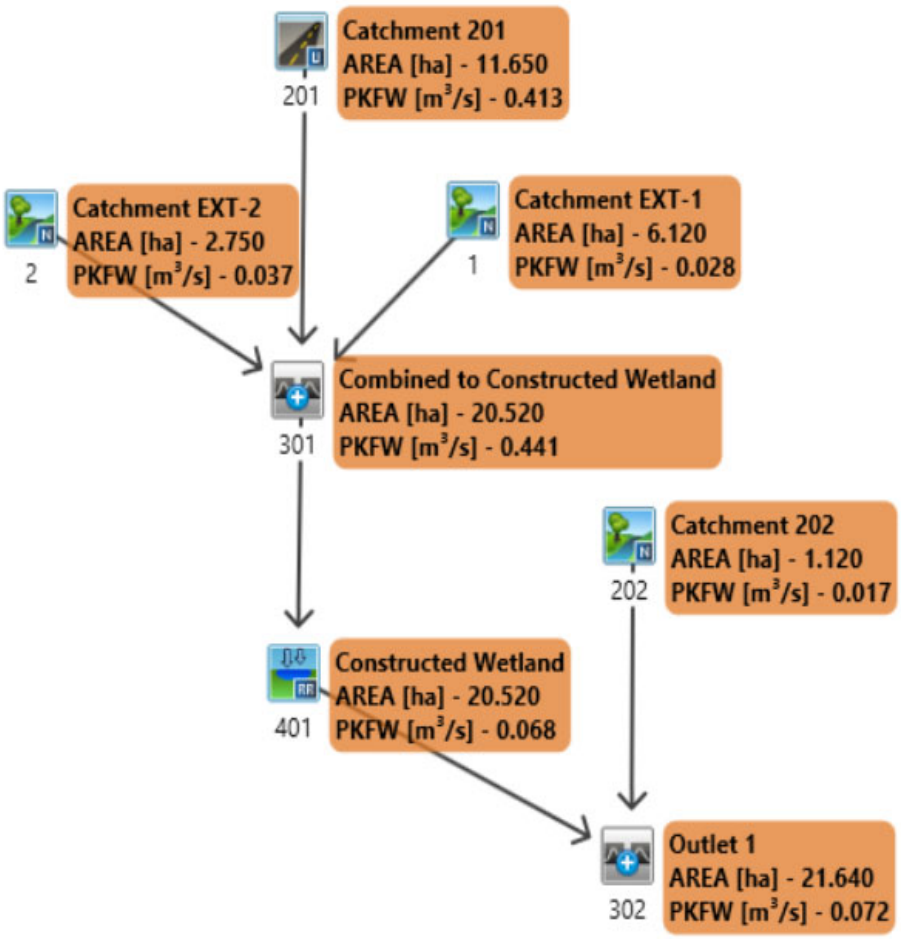
Max. Catchment Elev. (m):	262.50
Min. Catchment Elev. (m):	258.50
Catchment Length (m):	251
Catchment Slope (%):	1.59%
Method: Airport Method	
Time of Concentration (mins):	36.77

Summary

Catchment CN:	59.6
Catchment C:	0.27
Catchment IA (mm):	5.07
Time of Concentration (hrs):	0.61
Catchment Time to Peak (hrs):	0.41
Catchment Time Step (mins):	4.90

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 28 2020
SUBJECT	Post Development VO Schematic	NAME	ARO
		PAGE	1 OF 1



NASHYD

ROUTE PIPE

DUHYD

STANDHYD

ROUTE CHANNEL

DIVERT HYD

ADDHYD

ROUTE RESERVC

4-HOUR CHICAGO

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

       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:       C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\48882bdc-6285-414e-bb52-7f8a837eb0ea\s
  Summary          filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\48882bdc-6285-414e-bb52-7f8a837eb0ea\s


DATE: 06-25-2020                              TIME: 03:35:16

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
--------------------------
  ***********************************************
  ** SIMULATION : Run 01                       ** 25mm
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\ALOverholt\AppD
|                  |              ata\Local\Temp\
|                  |              e3a99fb5-a3a8-4218-a1d1-7806841870fe\6c444d29
| Ptotal= 24.97 mm |    Comments: CHIC25MM
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	1.29	1.10	2.81	2.10	13.05	3.10	2.04
0.20	1.36	1.20	3.22	2.20	8.44	3.20	1.89
0.30	1.44	1.30	3.77	2.30	6.21	3.30	1.76
0.40	1.53	1.40	4.55	2.40	4.91	3.40	1.65
0.50	1.63	1.50	5.77	2.50	4.06	3.50	1.55
0.60	1.75	1.60	7.86	2.60	3.47	3.60	1.46
0.70	1.89	1.70	12.27	2.70	3.03	3.70	1.39
0.80	2.06	1.80	26.17	2.80	2.70	3.80	1.32
0.90	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              |
| NASHYD   (  0001)|   Area    (ha)=   6.12   Curve Number   (CN)= 39.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.86   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.66

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.29	1.083	2.81	2.083	13.05	3.08	2.04
0.167	1.35	1.167	3.14	2.167	9.36	3.17	1.92
0.250	1.41	1.250	3.55	2.250	7.10	3.25	1.81
0.333	1.48	1.333	4.08	2.333	5.69	3.33	1.72
0.417	1.55	1.417	4.79	2.417	4.74	3.42	1.63
0.500	1.63	1.500	5.77	2.500	4.06	3.50	1.55
0.583	1.75	1.583	7.86	2.583	3.47	3.58	1.46
0.667	1.86	1.667	11.39	2.667	3.12	3.67	1.40
0.750	1.99	1.750	20.61	2.750	2.83	3.75	1.35
0.833	2.14	1.833	44.73	2.833	2.59	3.83	1.30
0.917	2.31	1.917	63.46	2.917	2.39	3.92	1.25
1.000	2.50	2.000	26.96	3.000	2.22	4.00	1.20

```
    Unit Hyd Qpeak  (cms)=   0.354

    PEAK FLOW       (cms)=   0.007 (i)
    TIME TO PEAK    (hrs)=   2.750
    RUNOFF VOLUME    (mm)=   0.715
    TOTAL RAINFALL   (mm)=  24.971
    RUNOFF COEFFICIENT   =   0.029

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

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0002)|   Area    (ha)=   2.75   Curve Number   (CN)= 57.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.52   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.45

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.29	1.083	2.81	2.083	13.05	3.08	2.04
0.167	1.35	1.167	3.14	2.167	9.36	3.17	1.92
0.250	1.41	1.250	3.55	2.250	7.10	3.25	1.81
0.333	1.48	1.333	4.08	2.333	5.69	3.33	1.72
0.417	1.55	1.417	4.79	2.417	4.74	3.42	1.63
0.500	1.63	1.500	5.77	2.500	4.06	3.50	1.55
0.583	1.75	1.583	7.86	2.583	3.47	3.58	1.46
0.667	1.86	1.667	11.39	2.667	3.12	3.67	1.40
0.750	1.99	1.750	20.61	2.750	2.83	3.75	1.35
0.833	2.14	1.833	44.73	2.833	2.59	3.83	1.30
0.917	2.31	1.917	63.46	2.917	2.39	3.92	1.25
1.000	2.50	2.000	26.96	3.000	2.22	4.00	1.20

```
    Unit Hyd Qpeak  (cms)=   0.233
```

```
     PEAK FLOW       (cms)=   0.011 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=   1.986
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.080

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=  11.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  23.00   Dir. Conn.(%)=  10.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.68         8.97
     Dep. Storage     (mm)=      1.00         7.13
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    278.69        40.00
     Mannings n           =     0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
              0.083     1.29 | 1.083     2.81 | 2.083    13.05 |  3.08     2.04
              0.167     1.35 | 1.167     3.14 | 2.167     9.36 |  3.17     1.92
              0.250     1.41 | 1.250     3.55 | 2.250     7.10 |  3.25     1.81
              0.333     1.48 | 1.333     4.08 | 2.333     5.69 |  3.33     1.72
              0.417     1.55 | 1.417     4.79 | 2.417     4.74 |  3.42     1.63
              0.500     1.63 | 1.500     5.77 | 2.500     4.06 |  3.50     1.55
              0.583     1.75 | 1.583     7.86 | 2.583     3.47 |  3.58     1.46
              0.667     1.86 | 1.667    11.39 | 2.667     3.12 |  3.67     1.40
              0.750     1.99 | 1.750    20.61 | 2.750     2.83 |  3.75     1.35
              0.833     2.14 | 1.833    44.73 | 2.833     2.59 |  3.83     1.30
              0.917     2.31 | 1.917    63.46 | 2.917     2.39 |  3.92     1.25
              1.000     2.50 | 2.000    26.96 | 3.000     2.22 |  4.00     1.20

     Max.Eff.Inten.(mm/hr)=      63.46         1.95
               over (min)        5.00        40.00
     Storage Coeff.  (min)=      5.67 (ii)   39.74 (ii)
     Unit Hyd. Tpeak (min)=      5.00        40.00
     Unit Hyd. peak  (cms)=      0.20         0.03
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.16         0.03          0.166 (iii)
     TIME TO PEAK    (hrs)=      1.92         2.58           1.92
     RUNOFF VOLUME    (mm)=     23.97         1.49           3.73
     TOTAL RAINFALL   (mm)=     24.97        24.97          24.97
     RUNOFF COEFFICIENT   =      0.96         0.06           0.15

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  49.6    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

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

```
--------------------
| ADD HYD  (  0301)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):      6.12   0.007     2.75     0.72
     + ID2= 2 (  0002):      2.75   0.011     2.42     1.99
       ==================================================
       ID = 3 (  0301):      8.87   0.017     2.50     1.11

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

--------------------
| ADD HYD  (  0301)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0301):      8.87   0.017     2.50     1.11
     + ID2= 2 (  0201):     11.65   0.166     1.92     3.73
       ==================================================
       ID = 1 (  0301):     20.52   0.168     1.92     2.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0401)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                          0.0000     0.0000    |   0.3633     0.3344
                          0.0065     0.0743    |   0.6754     0.3991
                          0.0306     0.1179    |   1.6593     0.4681
                          0.1931     0.1656    |   3.2031     0.5413
                          0.2934     0.2176    |   6.1558     0.6456
                          0.3302     0.2739    |   0.0000     0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (  0301)   20.520     0.168      1.92       2.60
     OUTFLOW: ID= 1 (  0401)   20.520     0.004      5.00       2.46

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.52
                    TIME SHIFT OF PEAK FLOW          (min)=185.00
                    MAXIMUM  STORAGE   USED        (ha.m.)=  0.0485

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   1.12   Curve Number   (CN)= 59.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
              0.083     1.29 | 1.083     2.81 | 2.083    13.05 |  3.08     2.04
              0.167     1.35 | 1.167     3.14 | 2.167     9.36 |  3.17     1.92
              0.250     1.41 | 1.250     3.55 | 2.250     7.10 |  3.25     1.81
              0.333     1.48 | 1.333     4.08 | 2.333     5.69 |  3.33     1.72
              0.417     1.55 | 1.417     4.79 | 2.417     4.74 |  3.42     1.63
              0.500     1.63 | 1.500     5.77 | 2.500     4.06 |  3.50     1.55
              0.583     1.75 | 1.583     7.86 | 2.583     3.47 |  3.58     1.46
              0.667     1.86 | 1.667    11.39 | 2.667     3.12 |  3.67     1.40
```

```
                0.750    1.99 | 1.750   20.61 | 2.750    2.83 |  3.75    1.35
                0.833    2.14 | 1.833   44.73 | 2.833    2.59 |  3.83    1.30
                0.917    2.31 | 1.917   63.46 | 2.917    2.39 |  3.92    1.25
                1.000    2.50 | 2.000   26.96 | 3.000    2.22 |  4.00    1.20

     Unit Hyd Qpeak  (cms)=   0.104

     PEAK FLOW       (cms)=   0.005 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=   2.094
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT   =   0.084

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

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

--------------------
| ADD HYD  (  0302)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0202):     1.12   0.005     2.42     2.09
      + ID2= 2 (  0401):    20.52   0.004     5.00     2.46
        ================================================
        ID = 3 (  0302):    21.64   0.008     2.42     2.44

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

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


       V    V   I    SSSSS  U   U    A    L             (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output           filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\48882bdc-6285-414e-bb52-7f8a837eb0ea\s
  Summary          filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\48882bdc-6285-414e-bb52-7f8a837eb0ea\s


DATE: 06-25-2020                          TIME: 03:35:16

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 01                         **  25 mm
  ************************************************

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

      START @  0.00 hrs
      --------------------
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\e3a99fb5-a3a8-4218-
a1d1-7806841870fe\6c444d29-63cc-480a-bfa5-
    remark: CHIC25MM
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.01  2.75   0.72 0.03   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\e3a99fb5-a3a8-4218-
a1d1-7806841870fe\6c444d29-63cc-480a-bfa5-
    remark: CHIC25MM
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.01  2.42   1.99 0.08   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\e3a99fb5-a3a8-4218-
a1d1-7806841870fe\6c444d29-63cc-480a-bfa5-
    remark: CHIC25MM
*
  * CALIB STANDHYD       0201  1  5.0   11.65    0.17  1.92   3.73 0.15   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.02  2.50   1.11  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    0.17  1.92   2.60  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.00  5.00   2.46  n/a   0.000
*
    READ STORM                  6.0
    [ Ptot= 24.97 mm ]
    fname       :      C:\Users\ALOverholt\AppData\Local\Temp\e3a99fb5-a3a8-4218-
a1d1-7806841870fe\6c444d29-63cc-480a-bfa5-
    remark: CHIC25MM
*
  * CALIB NASHYD         0202  1  5.0    1.12    0.01  2.42   2.09 0.08   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.01  2.42   2.44  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output           filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\4bfa6d47-8a74-4744-869d-32622f1b79bc\s
  Summary          filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\4bfa6d47-8a74-4744-869d-32622f1b79bc\s


DATE: 06-25-2020                          TIME: 03:35:16

USER:
```

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : Run 02                       **  1:2 YEAR
  ***********************************************

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

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.01  2.25   1.49 0.05   0.000
    [CN=39.3          ]
    [ N = 3.0:Tp 0.66]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.02  1.83   3.66 0.11   0.000
    [CN=57.2          ]
    [ N = 3.0:Tp 0.45]
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
  * CALIB STANDHYD       0201  1  5.0   11.65    0.24  1.33   5.77 0.18   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.03  2.00   2.16  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    0.24  1.33   4.21  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.01  4.92   4.07  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 32.79 mm ]
*
  * CALIB NASHYD         0202  1  5.0    1.12    0.01  1.83   3.89 0.12   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.01  1.92   4.06  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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



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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output            filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\4331c51c-c899-4066-805b-59e34931c800\s
  Summary           filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\4331c51c-c899-4066-805b-59e34931c800\s

DATE: 06-25-2020                          TIME: 03:35:16

USER:
```

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : Run 03                       **  1:5 YEAR
  ***********************************************

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

      START @  0.00 hrs
      --------------------
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.02  2.25   3.01 0.07   0.000
    [CN=39.3          ]
    [ N = 3.0:Tp 0.66]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.03  1.83   6.71 0.15   0.000
    [CN=57.2          ]
    [ N = 3.0:Tp 0.45]
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
  * CALIB STANDHYD       0201  1  5.0   11.65    0.34  1.33   9.21 0.21   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.05  2.00   4.16  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    0.35  1.33   7.03  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.03  4.33   6.89  n/a   0.000
*
    CHIC STORM                 10.0
    [ Ptot= 43.76 mm ]
*
  * CALIB NASHYD         0202  1  5.0    1.12    0.01  1.75   7.15 0.16   0.000
    [CN=59.6          ]
    [ N = 3.0:Tp 0.41]
*
```

```
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.04  4.25   6.90  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\6d723732-8231-4421-bbe5-dd6a795d8a97\s
  Summary          filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\6d723732-8231-4421-bbe5-dd6a795d8a97\s


DATE: 06-25-2020                              TIME: 03:35:16

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 04                         ** 1:10 YEAR
  ************************************************

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

      START @  0.00 hrs
      --------------------
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 ** CALIB NASHYD        0001  1  5.0    6.12    0.03  2.17   4.28 0.08   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
 ** CALIB NASHYD        0002  1  5.0    2.75    0.04  1.83   9.13 0.18   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
  * CALIB STANDHYD       0201  1  5.0   11.65    0.41  1.33  11.83 0.23   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.07  2.00   5.78  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    0.42  1.33   9.21  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.08  3.67   9.07  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 51.00 mm ]
*
  * CALIB NASHYD         0202  1  5.0    1.12    0.02  1.75   9.74 0.19   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.09  3.58   9.11  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\225921d9-0856-4e7a-99e6-9050489b5dcb\s
  Summary          filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\225921d9-0856-4e7a-99e6-9050489b5dcb\s


DATE: 06-25-2020                              TIME: 03:35:16

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 05                         ** 1:25 YEAR
  ************************************************

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

```
      START @  0.00 hrs
      --------------------
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.05  2.17   6.12 0.10   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.06  1.83  12.55 0.21   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB STANDHYD        0201  1  5.0   11.65    0.53  1.33  15.43 0.26   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]   0301  3  5.0    8.87    0.10  1.92   8.12  n/a   0.000
*
    ADD [  0301+  0201]   0301  1  5.0   20.52    0.55  1.33  12.27  n/a   0.000
*
 ** Reservoir
    OUTFLOW:              0401  1  5.0   20.52    0.14  3.00  12.13  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 60.03 mm ]
*
 *  CALIB NASHYD          0202  1  5.0    1.12    0.03  1.75  13.37 0.22   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]   0302  3  5.0   21.64    0.15  2.92  12.19  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output            filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\7255ea19-7aca-415d-b81d-8d8cd9c5b094\s
  Summary         filename:        C:\Users\ALOverholt\AppData\Local\Civica\VH5
```


```
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\7255ea19-7aca-415d-b81d-8d8cd9c5b094\s
```


```
DATE: 06-25-2020                          TIME: 03:35:16

USER:

COMMENTS: _____________________________________________________________________


  ************************************************
  ** SIMULATION : Run 06                          ** 1:50 YEAR
  ************************************************

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

      START @  0.00 hrs
      --------------------
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.06  2.17   7.72 0.12   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.07  1.83  15.40 0.23   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB STANDHYD        0201  1  5.0   11.65    0.61  1.33  18.39 0.28   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]   0301  3  5.0    8.87    0.12  1.92  10.10  n/a   0.000
*
    ADD [  0301+  0201]   0301  1  5.0   20.52    0.63  1.33  14.81  n/a   0.000
*
 ** Reservoir
    OUTFLOW:              0401  1  5.0   20.52    0.19  2.83  14.66  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 66.87 mm ]
*
 *  CALIB NASHYD          0202  1  5.0    1.12    0.03  1.75  16.40 0.25   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]   0302  3  5.0   21.64    0.21  2.75  14.75  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
```

```
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output            filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\73c70461-632e-4637-b874-b1582a784be6\s
  Summary         filename:        C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\73c70461-632e-4637-b874-b1582a784be6\s


DATE: 06-25-2020                          TIME: 03:35:16

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 07                         ** 1:100 YEAR
  ************************************************

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

     START @  0.00 hrs
     --------------------
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.07  2.17   9.41 0.13   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.09  1.83  18.36 0.25   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB STANDHYD       0201  1  5.0   11.65    0.69  1.33  21.43 0.29   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002] 0301  3  5.0    8.87    0.15  1.92  12.18  n/a   0.000
*
    ADD [  0301+  0201] 0301  1  5.0   20.52    0.72  1.33  17.43  n/a   0.000
*
 ** Reservoir
    OUTFLOW:            0401  1  5.0   20.52    0.23  2.75  17.29  n/a   0.000
*
    CHIC STORM                10.0
    [ Ptot= 73.48 mm ]
*
 *  CALIB NASHYD         0202  1  5.0    1.12    0.04  1.75  19.53 0.27   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401] 0302  3  5.0   21.64    0.25  2.58  17.41  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output            filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\ecc3d531-1f5a-4581-ba90-97fbb020313a\s
  Summary         filename:        C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\ecc3d531-1f5a-4581-ba90-97fbb020313a\s


DATE: 06-25-2020                          TIME: 03:35:16

USER:


COMMENTS: _____________________________________________________________


  ************************************************
  ** SIMULATION : Run 08                         ** REGIONAL
  ************************************************

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

     START @  0.00 hrs
     --------------------
    READ STORM                12.0
    [ Ptot=193.00 mm ]
    fname       :       C:\Users\ALOverholt\AppData\Local\Temp\e3a99fb5-a3a8-4218-
a1d1-7806841870fe\7d5dbd6d-8eb8-4455-9f0a-
    remark: TIMMINS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.20  7.42  59.37 0.31   0.000
    [CN=39.3         ]
```

```
    [ N = 3.0:Tp 0.66]
*
    READ STORM                 12.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\e3a99fb5-a3a8-4218-
a1d1-7806841870fe\7d5dbd6d-8eb8-4455-9f0a-
    remark: TIMMINS
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.16  7.17  93.84 0.49   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    READ STORM                 12.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\e3a99fb5-a3a8-4218-
a1d1-7806841870fe\7d5dbd6d-8eb8-4455-9f0a-
    remark: TIMMINS
*
 *  CALIB STANDHYD       0201  1  5.0   11.65    0.74  7.00  96.31 0.50   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.35  7.25  70.06  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    1.07  7.00  84.96  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.79  7.58  84.82  n/a   0.000
*
    READ STORM                 12.0
    [ Ptot=193.00 mm ]
    fname      :       C:\Users\ALOverholt\AppData\Local\Temp\e3a99fb5-a3a8-4218-
a1d1-7806841870fe\7d5dbd6d-8eb8-4455-9f0a-
    remark: TIMMINS
*
 *  CALIB NASHYD         0202  1  5.0    1.12    0.07  7.08  98.20 0.51   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.85  7.58  85.51  n/a   0.000
*
 FINISH

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

24-HOUR SCS

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

       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:       C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\6eb0005f-1696-4dea-9572-0bbcdeedf377\s
  Summary          filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\6eb0005f-1696-4dea-9572-0bbcdeedf377\s


DATE: 06-25-2020                              TIME: 03:36:24

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
--------------------------
  ***********************************************
  ** SIMULATION : Run 01                       **   1:2 YEAR
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\ALOverholt\AppD
|                  |              ata\Local\Temp\
|                  |              848abf88-9c5d-4178-8230-28b53c893b0e\6273728c
| Ptotal= 53.41 mm |    Comments: 2yr 24hr 15min SCS
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	6.50	0.96	12.75	7.69	19.00	0.96
0.50	0.59	6.75	0.96	13.00	3.95	19.25	0.96
0.75	0.59	7.00	0.96	13.25	3.95	19.50	0.96
1.00	0.59	7.25	0.96	13.50	2.88	19.75	0.96
1.25	0.59	7.50	1.18	13.75	2.88	20.00	0.96
1.50	0.59	7.75	1.18	14.00	2.24	20.25	0.96
1.75	0.59	8.00	1.18	14.25	2.24	20.50	0.64
2.00	0.59	8.25	1.18	14.50	1.60	20.75	0.64
2.25	0.59	8.50	1.39	14.75	1.60	21.00	0.64
2.50	0.69	8.75	1.39	15.00	1.60	21.25	0.64
2.75	0.69	9.00	1.50	15.25	1.60	21.50	0.64
3.00	0.69	9.25	1.50	15.50	1.60	21.75	0.64
3.25	0.69	9.50	1.71	15.75	1.60	22.00	0.64
3.50	0.69	9.75	1.71	16.00	1.60	22.25	0.64
3.75	0.69	10.00	1.92	16.25	1.60	22.50	0.64
4.00	0.69	10.25	1.92	16.50	0.96	22.75	0.64
4.25	0.69	10.50	2.46	16.75	0.96	23.00	0.64
4.50	0.85	10.75	2.46	17.00	0.96	23.25	0.64
4.75	0.85	11.00	3.31	17.25	0.96	23.50	0.64
5.00	0.85	11.25	3.31	17.50	0.96	23.75	0.64
5.25	0.85	11.50	5.13	17.75	0.96	24.00	0.64
5.50	0.85	11.75	5.13	18.00	0.96	24.25	0.64
5.75	0.85	12.00	15.81	18.25	0.96		
6.00	0.85	12.25	65.37	18.50	0.96		
6.25	0.85	12.50	7.69	18.75	0.96		

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

--------------------
| CALIB            |
| NASHYD   (  0001)|   Area     (ha)=   6.12   Curve Number    (CN)= 39.3
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.86   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.66

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

                              ---- TRANSFORMED HYETOGRAPH ----
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64

3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64
5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Unit Hyd Qpeak (cms)= 0.354

PEAK FLOW (cms)= 0.028 (i)
TIME TO PEAK (hrs)= 12.917
RUNOFF VOLUME (mm)= 4.740
TOTAL RAINFALL (mm)= 53.410
RUNOFF COEFFICIENT = 0.089

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

CALIB					
NASHYD (0002)	Area (ha)=	2.75	Curve Number (CN)=	57.2	
ID= 1 DT= 5.0 min	Ia (mm)=	4.52	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.45			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64
3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64

5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Unit Hyd Qpeak (cms)= 0.233

PEAK FLOW (cms)= 0.037 (i)
TIME TO PEAK (hrs)= 12.583
RUNOFF VOLUME (mm)= 10.002
TOTAL RAINFALL (mm)= 53.410
RUNOFF COEFFICIENT = 0.187

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

CALIB
STANDHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 11.65
Total Imp(%)= 23.00 Dir. Conn.(%)= 10.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.68	8.97
Dep. Storage	(mm)=	1.00	7.13
Average Slope	(%)=	1.00	2.00
Length	(m)=	278.69	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64
3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64
5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Max.Eff.Inten.(mm/hr)=	65.37	10.02		
over (min)	5.00	25.00		
Storage Coeff. (min)=	5.60 (ii)	23.31 (ii)		
Unit Hyd. Tpeak (min)=	5.00	25.00		
Unit Hyd. peak (cms)=	0.20	0.05		
			TOTALS	
PEAK FLOW (cms)=	0.20	0.14	0.269 (iii)	
TIME TO PEAK (hrs)=	12.25	12.58	12.25	
RUNOFF VOLUME (mm)=	52.41	8.35	12.75	
TOTAL RAINFALL (mm)=	53.41	53.41	53.41	
RUNOFF COEFFICIENT =	0.98	0.16	0.24	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 49.6 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

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

ADD HYD (0301)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):		6.12	0.028	12.92	4.74
+ ID2= 2 (0002):		2.75	0.037	12.58	10.00
ID = 3 (0301):		8.87	0.063	12.67	6.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0301)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0301):		8.87	0.063	12.67	6.37
+ ID2= 2 (0201):		11.65	0.269	12.25	12.75
ID = 1 (0301):		20.52	0.296	12.25	9.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0401)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.3633	0.3344
	0.0065	0.0743	0.6754	0.3991
	0.0306	0.1179	1.6593	0.4681
	0.1931	0.1656	3.2031	0.5413
	0.2934	0.2176	6.1558	0.6456
	0.3302	0.2739	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0301)	20.520	0.296	12.25	9.99
OUTFLOW: ID= 1 (0401)	20.520	0.037	14.58	9.85

PEAK FLOW REDUCTION [Qout/Qin](%)= 12.57
TIME SHIFT OF PEAK FLOW (min)=140.00
MAXIMUM STORAGE USED (ha.m.)= 0.1199

CALIB					
NASHYD (0202)	Area	(ha)=	1.12	Curve Number (CN)=	59.6
ID= 1 DT= 5.0 min	Ia	(mm)=	4.90	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		0.41		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64
3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64

```
               5.583    0.85 |11.667    5.13 |17.750    0.96 | 23.83    0.64
               5.667    0.85 |11.750    5.13 |17.833    0.96 | 23.92    0.64
               5.750    0.85 |11.833   15.81 |17.917    0.96 | 24.00    0.64
               5.833    0.85 |11.917   15.81 |18.000    0.96 | 24.08    0.64
               5.917    0.85 |12.000   15.81 |18.083    0.96 | 24.17    0.64
               6.000    0.85 |12.083   65.37 |18.167    0.96 | 24.25    0.64
               6.083    0.85 |12.167   65.37 |18.250    0.96 |

     Unit Hyd Qpeak  (cms)=   0.104

     PEAK FLOW       (cms)=   0.017 (i)
     TIME TO PEAK    (hrs)=  12.583
     RUNOFF VOLUME    (mm)=  10.661
     TOTAL RAINFALL   (mm)=  53.410
     RUNOFF COEFFICIENT   =   0.200

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

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

--------------------
| ADD HYD  (  0302)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0202):     1.12   0.017    12.58    10.66
      + ID2= 2 (  0401):    20.52   0.037    14.58     9.85
        ==========================================================
        ID = 3 (  0302):    21.64   0.040    14.58     9.89

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

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

       V    V   I    SSSSS  U   U    A    L             (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\6eb0005f-1696-4dea-9572-0bbcdeedf377\s
  Summary          filename:        C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\6eb0005f-1696-4dea-9572-0bbcdeedf377\s


DATE: 06-25-2020                          TIME: 03:36:24

USER:


COMMENTS: _____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 01                       **   1:2 YEAR
  ***********************************************

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

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\6273728c-e893-442e-9958-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.03 12.92   4.74 0.09   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\6273728c-e893-442e-9958-
    remark: 2yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.04 12.58  10.00 0.19   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\6273728c-e893-442e-9958-
    remark: 2yr 24hr 15min SCS
*
  *  CALIB STANDHYD       0201  1  5.0   11.65    0.27 12.25  12.75 0.24   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.06 12.67   6.37  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    0.30 12.25   9.99  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.04 14.58   9.85  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 53.41 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\6273728c-e893-442e-9958-
    remark: 2yr 24hr 15min SCS
*
  *  CALIB NASHYD         0202  1  5.0    1.12    0.02 12.58  10.66 0.20   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.04 14.58   9.89  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\29b5a789-6daa-4863-a2e2-d3a56ad42e31\s
  Summary          filename:        C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\29b5a789-6daa-4863-a2e2-d3a56ad42e31\s


DATE: 06-25-2020                          TIME: 03:36:23

USER:
```

```
COMMENTS: ____________________________________________________________

  ***********************************************
  ** SIMULATION : Run 02                       **  1:5 YEAR
  ***********************************************

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

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\e43bfcc7-943b-433a-be6e-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.05 12.83   8.92 0.12   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\e43bfcc7-943b-433a-be6e-
    remark: 5yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.07 12.58  17.52 0.24   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\e43bfcc7-943b-433a-be6e-
    remark: 5yr 24hr 15min SCS
*
  * CALIB STANDHYD        0201  1  5.0   11.65    0.46 12.25  20.57 0.29   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.12 12.67  11.59  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    0.51 12.25  16.69  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.16 13.33  16.55  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot= 71.65 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\e43bfcc7-943b-433a-be6e-
    remark: 5yr 24hr 15min SCS
*
  * CALIB NASHYD         0202  1  5.0    1.12    0.03 12.58  18.65 0.26   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.17 13.25  16.65  n/a   0.000
*
================================================================================
==========================
```

```
       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\ea29e330-2d35-4488-ba07-6f63e1b2847d\s
  Summary          filename:        C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\ea29e330-2d35-4488-ba07-6f63e1b2847d\s


DATE: 06-25-2020                              TIME: 03:36:24

USER:


COMMENTS: ____________________________________________________________

  ***********************************************
  ** SIMULATION : Run 03                       **  1:10 YEAR
  ***********************************************

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

      START @  0.00 hrs
      --------------------
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\71c27fd0-a9ea-4afe-a0ac-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.08 12.83  12.28 0.15   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\71c27fd0-a9ea-4afe-a0ac-
    remark: 10yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.09 12.58  23.26 0.28   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    READ STORM                 15.0
    [ Ptot= 83.66 mm ]
```

```
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\71c27fd0-a9ea-4afe-a0ac-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0   11.65    0.59 12.25  26.41 0.32   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.16 12.67  15.68  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    0.67 12.25  21.77  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.23 13.25  21.63  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 83.66 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\71c27fd0-a9ea-4afe-a0ac-
    remark: 10yr 24hr 15min SCS
*
 *  CALIB NASHYD         0202  1  5.0    1.12    0.04 12.50  24.72 0.30   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.25 13.08  21.79  n/a   0.000
*
 FINISH

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


       V    V   I    SSSSS  U   U    A    L              (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\696a9a18-511f-439b-88c0-52149ee38b80\s
  Summary          filename:        C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\696a9a18-511f-439b-88c0-52149ee38b80\s


DATE: 06-25-2020                          TIME: 03:36:23

USER:
```

COMMENTS: _____

```
  ********************************************
  ** SIMULATION : Run 04                     **  1:25 YEAR
  ********************************************

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

      START @  0.00 hrs
      --------------------
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\1a3fa4a1-0255-4a47-a503-
    remark: 25yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.11 12.83  17.06 0.17   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\1a3fa4a1-0255-4a47-a503-
    remark: 25yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.12 12.58  31.17 0.32   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\1a3fa4a1-0255-4a47-a503-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0   11.65    0.91 12.25  34.36 0.35   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.22 12.67  21.44  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    1.02 12.25  28.77  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.30 13.17  28.63  n/a   0.000
*
    READ STORM                15.0
    [ Ptot= 98.64 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\1a3fa4a1-0255-4a47-a503-
    remark: 25yr 24hr 15min SCS
*
 *  CALIB NASHYD         0202  1  5.0    1.12    0.06 12.50  33.04 0.33   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.34 12.75  28.86  n/a   0.000
*
================================================================================
==========================
```

```
       V    V   I    SSSSS  U   U    A    L             (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\51797fa1-aac6-4e03-aa6d-119afa3c31a1\s
  Summary          filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\51797fa1-aac6-4e03-aa6d-119afa3c31a1\s


DATE: 06-25-2020                          TIME: 03:36:23

USER:


COMMENTS: _____________________________________________________________


  ***********************************************
  ** SIMULATION : Run 05                       **   1:50 YEAR
  ***********************************************

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

     START @  0.00 hrs
     --------------------
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\063d3c48-e32d-47e6-934c-
    remark: 50yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.13 12.83  21.14 0.19   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\063d3c48-e32d-47e6-934c-
    remark: 50yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.15 12.58  37.69 0.34   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\063d3c48-e32d-47e6-934c-
    remark: 50yr 24hr 15min SCS
*
  *  CALIB STANDHYD       0201  1  5.0   11.65    1.11 12.25  40.87 0.37   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.27 12.67  26.27  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    1.23 12.25  34.56  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.34 13.25  34.41  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=110.08 mm ]
    fname                :                C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\063d3c48-e32d-47e6-934c-
    remark: 50yr 24hr 15min SCS
*
  *  CALIB NASHYD         0202  1  5.0    1.12    0.07 12.50  39.88 0.36   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.38 12.83  34.70  n/a   0.000
*
================================================================================
==========================


       V    V   I    SSSSS  U   U    A    L             (v 6.1.2001)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output             filename:      C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\78d00efd-31e9-49b3-899b-a883d2947a88\s
  Summary          filename:         C:\Users\ALOverholt\AppData\Local\Civica\VH5
\929f3348-49da-4a7f-bbe5-f883d8cefa3c\78d00efd-31e9-49b3-899b-a883d2947a88\s


DATE: 06-25-2020                          TIME: 03:36:24

USER:


COMMENTS: _____________________________________________________________
```

```
  ************************************************
  ** SIMULATION : Run 06                         ** 1:100 YEAR
  ************************************************

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

     START @  0.00 hrs
     --------------------
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\c125530c-e6cb-4e57-ab48-
    remark: 100yr 24hr 15min SCS
*
 ** CALIB NASHYD         0001  1  5.0    6.12    0.16 12.83  25.32 0.21   0.000
    [CN=39.3         ]
    [ N = 3.0:Tp 0.66]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\c125530c-e6cb-4e57-ab48-
    remark: 100yr 24hr 15min SCS
*
 ** CALIB NASHYD         0002  1  5.0    2.75    0.17 12.58  44.24 0.37   0.000
    [CN=57.2         ]
    [ N = 3.0:Tp 0.45]
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\c125530c-e6cb-4e57-ab48-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB STANDHYD       0201  1  5.0   11.65    1.30 12.25  47.37 0.39   0.000
    [I%=10.0:S%= 2.00]
*
    ADD [  0001+  0002]  0301  3  5.0    8.87    0.32 12.67  31.19  n/a   0.000
*
    ADD [  0301+  0201]  0301  1  5.0   20.52    1.45 12.25  40.38  n/a   0.000
*
 ** Reservoir
    OUTFLOW:             0401  1  5.0   20.52    0.39 13.33  40.23  n/a   0.000
*
    READ STORM                 15.0
    [ Ptot=120.97 mm ]
    fname                :                 C:\Users\ALOverholt\AppData\Local\Temp
\848abf88-9c5d-4178-8230-28b53c893b0e\c125530c-e6cb-4e57-ab48-
    remark: 100yr 24hr 15min SCS
*
 *  CALIB NASHYD         0202  1  5.0    1.12    0.08 12.50  46.73 0.39   0.000
    [CN=59.6         ]
    [ N = 3.0:Tp 0.41]
*
    ADD [  0202+  0401]  0302  3  5.0   21.64    0.42 13.25  40.57  n/a   0.000
*
```

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	June 25 2020
SUBJECT	Preliminary Culvert & Swale Capacity Check - Rational Method	NAME	ARO
		PAGE	1 OF 3

Culvert Conveyance Check
Culvert 1 (Crossing Street A at Street B)

Runoff Coefficient (Municipal Standard)

2 Year	0.27		
5 Year	0.27		
10 Year	0.27		
25 Year	0.30	=C5*1.10	(MTO Recommended)
50 Year	0.32	=C5*1.20	(MTO Recommended)
100 Year	0.37	=C5*1.25	(MTO Recommended)

Peak Rainfall Intensity — Township of Severn

	2YR	5YR	10YR	25YR	50YR	100YR
A	22.5	29.9	34.8	40.9	45.5	50.0
B	-0.73	-0.73	-0.72	-0.72	-0.72	-0.72

1:2 Year	30.1	mm/hr	T_C =	40.2
1:5 Year	40.0	mm/hr	T_C =	40.2
1:10 Year	46.5	mm/hr	T_C =	40.2
1:25 Year	54.6	mm/hr	T_C =	40.2
1:50 Year	60.8	mm/hr	T_C =	40.2
1:100 Year	66.8	mm/hr	T_C =	40.2

Drainage Area 1.590 ha (Part Catchment EXT-2)

Existing Peak Runoff Rate - Rationa (Q=CiA/360)

	Q		
1:2 Year	0.036	m^3/s	
1:5 Year	0.048	m^3/s	
1:10 Year	0.055	m^3/s	
1:25 Year	0.072	m^3/s	← Conveyance Local Roads
1:50 Year	0.087	m^3/s	
1:100 Year	0.109	m^3/s	

Culvert 1 (Crossing Street A at Street B)
(Manning's Equation - Circular Full Flow Pipe)
$Q = (1.00/n)AR^{2/3}S^{1/2}$

Where n =	Roughness Coefficient	=	0.013	
S =	Slope	=	0.005	m/m
D =	Diameter	=	0.350	m
A =	Cross Sectional Area	=	0.096	m^2
P =	Wetted Perimeter	=	1.100	m
R =	Hydraulic Radius	=	0.088	
Q =	**Provided Capacity**	**=**	**0.103**	**m^3**

Culvert Conveyance Check
Culvert 2 (Crossing Street B to Easement)

Runoff Coefficient (Municipal Standard)

2 Year	0.34	(Weighted average)	
5 Year	0.34	Catchment 202 = 23% Imperv.	
10 Year	0.34	C = (0.7*Imp+0.2) = 0.36	
25 Year	0.37	=C5*1.10	(MTO Recommended)
50 Year	0.40	=C5*1.20	(MTO Recommended)
100 Year	0.46	=C5*1.25	(MTO Recommended)

Peak Rainfall Intensity — Township of Severn

	2YR	5YR	10YR	25YR	50YR	100YR
A	22.5	29.9	34.8	40.9	45.5	50.0
B	-0.73	-0.73	-0.72	-0.72	-0.72	-0.72

1:2 Year	56.0	mm/hr	T_C =	17.2
1:5 Year	74.1	mm/hr	T_C =	17.2
1:10 Year	86.1	mm/hr	T_C =	17.2
1:25 Year	101.1	mm/hr	T_C =	17.2
1:50 Year	112.4	mm/hr	T_C =	17.2
1:100 Year	123.5	mm/hr	T_C =	17.2

Drainage Area 5.910 ha (Part Catchment EXT-2 and 201)

Existing Peak Runoff Rate - Rational Met (Q=CiA/360)

	Q		
1:2 Year	0.083	m^3/s	
1:5 Year	0.110	m^3/s	
1:10 Year	0.128	m^3/s	
1:25 Year	0.165	m^3/s	← Conveyance Local Roads
1:50 Year	0.200	m^3/s	
1:100 Year	0.252	m^3/s	

Culvert 2 (Crossing Street B to Easement)
(Manning's Equation - Circular Full Flow Pipe)
$Q = (1.00/n)AR^{2/3}S^{1/2}$

Where n =	Roughness Coefficient	=	0.013	
S =	Slope	=	0.010	m/m
D =	Diameter	=	0.375	m
A =	Cross Sectional Area	=	0.110	m^2
P =	Wetted Perimeter	=	1.178	m
R =	Hydraulic Radius	=	0.094	
Q =	**Provided Capacity**	**=**	**0.175**	**m^3**

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827		
		DATE	June 25 2020		
SUBJECT	Preliminary Culvert & Swale Capacity Check - Rational Method	NAME	ARO		
		PAGE	2	OF	3

Culvert Conveyance Check
Culvert 3 (Crossing Street C to Easement)

Runoff Coefficient (Municipal Standard)

2 Year	0.36		
5 Year	0.36		
10 Year	0.36		
25 Year	0.40	=C5*1.10	(MTO Recommended)
50 Year	0.43	=C5*1.20	(MTO Recommended)
100 Year	0.50	=C5*1.25	(MTO Recommended)

Peak Rainfall Intensity — Township of Severn

	2YR	5YR	10YR	25YR	50YR	100YR
A	22.5	29.9	34.8	40.9	45.5	50.0
B	-0.73	-0.73	-0.72	-0.72	-0.72	-0.72

1:2 Year	82.9	mm/hr	T_C =	10.0
1:5 Year	109.6	mm/hr	T_C =	10.0
1:10 Year	127.3	mm/hr	T_C =	10.0
1:25 Year	149.4	mm/hr	T_C =	10.0
1:50 Year	165.9	mm/hr	T_C =	10.0
1:100 Year	182.3	mm/hr	T_C =	10.0

Drainage Area 0.566 ha (Part Catchment 201)

Existing Peak Runoff Rate - Rationa (Q=CiA/360)

	Q		
1:2 Year	0.047	m^3/s	
1:5 Year	0.062	m^3/s	
1:10 Year	0.072	m^3/s	
1:25 Year	0.093	m^3/s	← Conveyance Local Roads
1:50 Year	0.113	m^3/s	
1:100 Year	0.142	m^3/s	

Culvert 3 (Crossing Street C to Easement)
(Manning's Equation - Circular Full Flow Pipe)
$Q = (1.00/n)AR^{2/3}S^{1/2}$

Where n =	Roughness Coefficient	=	0.013	
S =	Slope	=	0.005	m/m
D =	Diameter	=	0.350	m
A =	Cross Sectional Area	=	0.096	m^2
P =	Wetted Perimeter	=	1.100	m
R =	Hydraulic Radius	=	0.088	
Q =	**Provided Capacity**	**=**	**0.103**	**m^3**

Culvert Conveyance Check
Culvert 4 (Crossing Street C to Outlet 1)

Runoff Coefficient (Municipal Standard)

2 Year	0.27		
5 Year	0.27		
10 Year	0.27		
25 Year	0.30	=C5*1.10	(MTO Recommended)
50 Year	0.32	=C5*1.20	(MTO Recommended)
100 Year	0.37	=C5*1.25	(MTO Recommended)

Peak Rainfall Intensity — Township of Severn

	2YR	5YR	10YR	25YR	50YR	100YR
A	22.5	29.9	34.8	40.9	45.5	50.0
B	-0.73	-0.73	-0.72	-0.72	-0.72	-0.72

1:2 Year	32.2	mm/hr	T_C =	36.6
1:5 Year	42.8	mm/hr	T_C =	36.6
1:10 Year	49.8	mm/hr	T_C =	36.6
1:25 Year	58.5	mm/hr	T_C =	36.6
1:50 Year	65.0	mm/hr	T_C =	36.6
1:100 Year	71.4	mm/hr	T_C =	36.6

Drainage Area 1.120 ha (Catchment 202)

Existing Peak Runoff Rate - Rational Met (Q=CiA/360)

	Q		
1:2 Year	0.014	m^3/s	
1:5 Year	0.018	m^3/s	
1:10 Year	0.021	m^3/s	
1:25 Year	0.027	m^3/s	← Conveyance Local Roads
1:50 Year	0.033	m^3/s	
1:100 Year	0.042	m^3/s	

Culvert 4 (Crossing Street C to Outlet 1)
(Manning's Equation - Circular Full Flow Pipe)
$Q = (1.00/n)AR^{2/3}S^{1/2}$

Where n =	Roughness Coefficient	=	0.013	
S =	Slope	=	0.010	m/m
D =	Diameter	=	0.300	m
A =	Cross Sectional Area	=	0.071	m^2
P =	Wetted Perimeter	=	0.942	m
R =	Hydraulic Radius	=	0.075	
Q =	**Provided Capacity**	**=**	**0.097**	**m^3**

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827		
		DATE	June 25 2020		
SUBJECT	Preliminary Culvert & Swale Capacity Check - Rational Method	NAME	ARO		
		PAGE	3	OF	3

Swale Conveyance Check
Easement Swale from Street B to Constructed Wetland Forebay

Runoff Coefficient (Municipal Standard)

2 Year	0.34	(Weighted average)
5 Year	0.34	Catchment 202 = 23% Imperv.
10 Year	0.34	C = (0.7*Imp+0.2) = 0.36
25 Year	0.38	=C5*1.10 (MTO Recommended)
50 Year	0.41	=C5*1.20 (MTO Recommended)
100 Year	0.47	=C5*1.25 (MTO Recommended)

Peak Rainfall Intensity Township of Severn

	2YR	5YR	10YR	25YR	50YR	100YR
A	22.5	29.9	34.8	40.9	45.5	50.0
B	-0.73	-0.73	-0.72	-0.72	-0.72	-0.72

1:2 Year	32.2	mm/hr	T_C =	36.6
1:5 Year	42.8	mm/hr	T_C =	36.6
1:10 Year	49.8	mm/hr	T_C =	36.6
1:25 Year	58.5	mm/hr	T_C =	36.6
1:50 Year	65.0	mm/hr	T_C =	36.6
1:100 Year	71.4	mm/hr	T_C =	36.6

Drainage Area 8.210 ha (Part Catchment EXT-2 + 201)

Existing Peak Runoff Rate - Rationa (Q=CiA/360)

	Q	
1:2 Year	0.252	m^3/s
1:5 Year	0.334	m^3/s
1:10 Year	0.389	m^3/s
1:25 Year	0.502	m^3/s
1:50 Year	0.610	m^3/s
1:100 Year	0.767	m^3/s ← Conveyance Capacity Required

Easement Swale from Street B to Constructed Wetland Forebay
(Manning's Equation - Circular Full Flow Pipe)

$Q = (1.00/n)AR^{2/3}S^{1/2}$

Where n =	Roughness Coefficient	=	0.035	
S =	Slope	=	0.012	m/m
W =	Bottom Width	=	0	m
Ss =	Side Slopes	=	3	:1
D =	Depth	=	0.5	m
Sw =	Slope Width	=	1.5	
A =	Area	=	0.75	m^2
P =	Perimeter	=	3.1623	m
R =	Hydraulic Radius	=	0.2372	m
Q =	**Provided Conveyance Capacity**	**=**	**0.8994**	**m^3/s**

Appendix C: Wetland SWMF Stage-Storage-Discharge Tables

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Stage- Storage- Discharge Tables	NAME	ARO
		PAGE	1 OF 4

Stage - Storage Table

Bottom Elev. = 258.10 m
Top of bank = 260.85 m
Stage = 0.15 m

Elevation	Forebay					Main Cell					Total	
	Depth	Area	Avg. Area	Dead Vol.	Live Vol.	Depth	Area	Avg. Area	Dead Vol.	Live Vol.	Dead Accum.	Live Accum.
m	m	m^2	m^3	m^3	m^3	m	m^2	m^3	m^3	m^3	m^3	m^3
258.10	0.00	**70**	70.0	0							0	0.0
258.25	0.15	136	102.9	15							15	0.0
258.40	0.30	201	168.6	25							41	0.0
258.55	0.45	267	234.3	35							76	0.0
258.70	0.60	333	300.0	45							121	0.0
258.85	0.75	399	365.7	55		0.00	**1335**	1335.0	0		176	0.0
259.00	0.90	464	431.4	65		0.15	1500	1417.5	213		453	0.0
259.15	1.05	**530**	497.1	75		0.30	**1665**	1582.5	237		765	0.0
259.30	1.20	630	579.9		87.0	0.45	1848	1756.5		263.5	765	350.5
259.45	1.35	729	679.6		101.9	0.60	2031	1939.6		290.9	765	743.3
259.60	1.50	829	779.3		116.9	0.75	2214	2122.7		318.4	765	1178.6
259.75	1.65	929	879.0		131.8	0.90	2397	2305.8		345.9	765	1656.4
259.90	1.80	1029	978.7		146.8	1.05	2580	2488.9		373.3	765	2176.5
260.05	1.95	1128	1078.4		161.8	1.20	2764	2672.0		400.8	765	2739.0
260.20	2.10	1228	1178.1		176.7	1.35	2947	2855.1		428.3	765	3344.0
260.35	2.25	1328	1277.8		191.7	1.50	3130	3038.2		455.7	765	3991.4
260.50	2.40	1427	1377.5		206.6	1.65	3313	3221.2		483.2	765	4681.2
260.65	2.55	1527	1477.2		221.6	1.80	3496	3404.3		510.7	765	5413.5
260.85	2.75	**1660**	1593.5		318.7	2.00	**3740**	3617.9		723.6	765	6455.8

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Stage- Storage- Discharge Tables	NAME	ARO
		PAGE	2 OF 4

Stage - Discharge Table

Orifice Control	Orifice Plate	Outlet Pipe	Weir Control	DICB	Emergency Weir
Orifice/Pipe Dia. (mm)	76.2	375	Weir Width (m)	0.6x0.6	5
Cross Sectional Area (m^2)	0.0046	0.1104	Sill Elevation (m)	259.55	260.25
Orifice Coefficient	0.63	0.80	Weir Coefficient	0.63	1.65
Inv. Elevation (m)	259.15	259.15	Weir Side Slopes (H:V)	4	4

Water Level	Orifice Plate		Outlet Pipe		DICB		Emergency Weir		Total
	Head	Discharge	Head	Discharge	Head	Discharge	Head	Discharge	Discharge
m	m	m^3/s	m	m^3/s	m	m^3/s	m	m^3/s	m^3/s
259.15	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.000
259.30	0.11	0.004	0.00	0.000	0.00	0.000	0.00	0.000	0.000
259.45	0.26	0.007	0.11	0.131	0.00	0.000	0.00	0.000	0.007
259.60	0.41	0.008	0.26	0.200	0.05	0.022	0.00	0.000	0.031
259.75	0.56	0.010	0.41	0.251	0.20	0.184	0.00	0.000	0.193
259.90	0.71	0.011	0.56	0.293	0.35	0.503	0.00	0.000	0.293
260.05	0.86	0.012	0.71	0.330	0.50	0.981	0.00	0.000	0.330
260.20	1.01	0.013	0.86	0.363	0.65	1.617	0.00	0.000	0.363
260.35	1.16	0.014	1.01	0.394	0.80	2.412	0.10	0.282	0.675
260.50	1.31	0.015	1.16	0.422	0.95	3.365	0.25	1.237	1.659
260.65	1.46	0.015	1.31	0.448	1.10	4.477	0.40	2.755	3.203
260.85	1.66	0.016	1.51	0.481	1.30	6.205	0.60	5.675	6.156

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Stage- Storage- Discharge Tables	NAME	ARO
		PAGE	3 OF 4

Stage-Storage-Discharge Table

Bottom Elev. = 258.10 m
Top of bank = 260.85 m
Stage = 0.15 m

Orifice Control	Orifice Plate	Outlet Pipe
Orifice/Pipe Dia. (mm)	76.2	375
Inv. Elevation (m)	259.15	259.15

Weir Control	DICB	Emergency Weir
Weir Width (m)	0.6x0.6	5
Sill Elevation (m)	259.55	260.25
Weir Side Slopes (H:V)	4	4

Stage	Discharge					Volume
Water Level	Orifice Plate	Outlet Pipe	DICB	Emergency Weir	Total	Live Total
m	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	m^3
259.15	0.000	0.000	0.000	0.000	0.000	0.0
259.30	0.004	0.000	0.000	0.000	0.000	350.5
259.45	0.007	0.131	0.000	0.000	0.007	743.3
259.60	0.008	0.200	0.022	0.000	0.031	1178.6
259.75	0.010	0.251	0.184	0.000	0.193	1656.4
259.90	0.011	0.293	0.503	0.000	0.293	2176.5
260.05	0.012	0.330	0.981	0.000	0.330	2739.0
260.20	0.013	0.363	1.617	0.000	0.363	3344.0
260.35	0.014	0.394	2.412	0.282	0.675	3991.4
260.50	0.015	0.422	3.365	1.237	1.659	4681.2
260.65	0.015	0.448	4.477	2.755	3.203	5413.5
260.85	0.016	0.481	6.205	5.675	6.156	6455.8

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Stage- Storage- Discharge Tables	NAME	ARO
		PAGE	4 OF 4

SWMF Operating Characteristics

Storm Event	Storage (m^3)		Discharge (m^3/s)		Water Level (m)	
	Chicago	SCS	Chicago	SCS	Chicago	SCS
25 mm	485	-	0.004	-	259.39	-
1:2-Year	778	1199	0.008	0.037	259.46	259.61
1:5-Year	1188	1554	0.034	0.158	259.60	259.72
1:10-Year	1329	1858	0.082	0.232	259.65	259.81
1:25-Year	1504	2350	0.141	0.305	259.70	259.95
1:50-Year	1656	2857	0.193	0.337	259.75	260.08
1:100-Year	1849	3394	0.230	0.386	259.81	260.21
Regional	4073	-	0.790	-	260.37	-
Uncontrolled				1.454		260.52

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 22 2020
SUBJECT	Hickenbottom Flow Rating Curves	NAME	ARO
		PAGE	1 OF 1

Hickenbottom Flow Rating Curves

50% Clogged (Per Manufacturer Specifications)

Water Depth	Stock 8" inlet with 56 - 1" holes per 300 mm	Stock 10" inlet with 56 - 1" holes per 300 mm
(ft)	(ft^3/sec)	(ft^3/sec)
1	0.49	0.63
2	1.39	1.78
3	2.55	3.27
4	3.92	5.04
5	5.48	7.04
6	7.2	9.26

50% Clogged (Metric Conversion)

Water Depth	Stock 8" inlet with 56 - 1" holes per 300 mm	Stock 10" inlet with 56 - 1" holes per 300 mm
(m)	(m^3/sec)	(m^3/sec)
0	0.00	0.00
0.30	0.014	0.018
0.61	0.039	0.050
0.91	0.072	0.093
1.22	0.111	0.143
1.52	0.155	0.199
1.83	0.204	0.262

Elevation	Water Level Above Orifice	SSD Table Outlet Control Flow Rate	Stock 8" inlet with 56 - 1" holes per 300 mm	Governing Control
(m)	(m)	(m^3/sec)	(m^3/sec)	
259.15	0.00	0.000	0.000	Orifice
259.30	0.11	0.004	0.007	Orifice
259.45	0.26	0.007	0.012	Orifice
259.60	0.41	0.008	0.023	Orifice
259.75	0.56	0.010	0.035	Orifice
259.90	0.71	0.011	0.050	Orifice
260.05	0.86	0.012	0.066	Orifice
260.20	1.01	0.013	0.084	Orifice
260.35	1.16	0.014	0.103	Orifice
260.50	1.31	0.015	0.124	Orifice
260.65	1.46	0.015	0.146	Orifice
260.85	1.66	0.016	0.169	Orifice

Appendix D:
Water Quality Calculations

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Water Quality Calculations	NAME	ARO
		PAGE	1 OF 1

Water Quality Storage Requirements

Contirbuting Areas

Catchment	201	Area	11.65	ha	%Impervious	23
Catchment	EXT-1	Area	6.12	ha	%Impervious	0
Catchment	EXT-2	Area	2.75	ha	%Impervious	16
		TOTAL AREA	20.52	ha	%Impervious	15

Required Level of Treatment 80 % Enhanced Level
SWM Facility Type 2
(1-Infiltration, 2-Wetlands, 3-Hybrid Wet Pond/Wetland, 4-Wet Pond, 5-Dry Pond)

	Enhanced	Normal	Basic	
Water Quality Storage Requirement	55.0	-	-	m^3/ha
	1128.6			m^3
Permanent Pool Volume Required	15.0	-	-	m^3/ha
	307.8	-	-	m^3
Extended Detention Volume ($40m^3$)	40.0	-	-	m^3/ha
	820.8	-	-	m^3

25mm Storm Runoff Volume	2.60	mm	(VO results at AddHyd 301)
	534	m^3	
Required Extended Detention Volume	821	m^3	
Erosion Control Storage Required	2052	m^3	
% Directly Connected Impervious	10		
Predominant SCS Soils Group	AB		
Source Controls	0		
Storage Volume Requirement	100	m^3/ha	(Figure C.1 MOE SWM Manual)
Permanent Pool Volume Provided	765	m^3	Provided > Required
Extended Det. Storage Provided	1034	m^3	Provided > Required
Active Storage Provided	6456	m^3	Provided > Required

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Pond Drawdown Time	NAME	ARO
		PAGE	1 OF 1

25 mm Storm Event Drawdown Time

$$t = \frac{2\,A_p}{C\,A_o\,(2g)^{0.5}}\;(h_1^{0.5} - h_2^{0.5})$$

Value

where:

t =	drawdown time in seconds						
A_p =	surface area of pond (m^2)	=	2371	m^2			
C =	discharge coefficient (typically 0.63)	=	0.63				
A_o =	cross-sectional area of orifice (m^2)	=	0.005	m^2	for	76.2	mm dia
g =	gravitational acceleration constant (9.81 m/s^2)	=	9.81	m/s^2			
h_1 =	starting water elevation above the orifice (m)	=	0.20	m		259.39	m
h_2 =	ending water elevation above the orifice (m)	=	0.038	m		259.2	m

t = 94,688.90 seconds Q = 0.0057 m^3/s

t = 26 hours

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Forebay Sizing Calculations	NAME	ARO
		PAGE	1 OF 1

SWM Wet Pond Facility Sediment Forebay Sizing

Using MOECC SWMPD Manual (March 2003)

1) Settling Length

$L = \sqrt{(r \times Q_P / V_S)}$

where

r	=	2 :1	Forebay Length to Width Ratio
Q_P	=	0.004	25 mm Storm Outflow for Water Quality (m^3/s)
V_S	=	0.0003	Settling Velocity for 0.15 mm particles (m/s)
L	=	5.55	Forebay Settling Length (m)

2) Dispersion Length

$L = 8 \times Q/(d \times V_F)$

where

Q	=	0.51	1:5-Year Inlet Flow (m^3/s)
d	=	0.45	Depth of the Permanent Pool in Forebay (m)
V_F	=	0.5	Desired Velocity in Forebay (m/s)
L	=	18.24	Forebay Dispersion Length (m)

Actual Forebay Length = 28 m

3) Cleanout Frequency

$F_C = Vol/(L_S \times A_{sew} \times E)$

where

Vol	=	38	Volume in bottom 0.60 m of forebay (m^3)
L_S	=	0.39	Sediment Loading Rate (m^3/ha) - Per Table 6.3 MECP SWMPD Manual
A_{Sew}	=	11.65	Contibuting sewer area (ha)
E	=	80%	SWMF Removal Efficiency (%)
F_C	=	10	Forebay Cleanout Frequency (years)

Appendix E:
Sediment Basin Stage-Storage-Discharge Tables

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Stage- Storage- Discharge Tables	NAME	ARO
		PAGE	1 OF 4

Stage - Storage Table

Bottom Elev. = 258.1 m
Top of bank = 260.85 m
Stage = 0.15 m

Elevation	Forebay					Main Cell					Total	
	Depth	Area	Avg. Area	Dead Vol.	Live Vol.	Depth	Area	Avg. Area	Dead Vol.	Live Vol.	Dead Accum.	Live Accum.
m	m	m^2	m^3	m^3	m^3	m	m^2	m^3	m^3	m^3	m^3	m^3
258.10	0.00	**70**	70.0	0		0.00	**615**	615.0	0		0	0.0
258.25	0.15	136	102.9	15		0.15	765	690.0	103		119	0.0
258.40	0.30	201	168.6	25		0.30	915	840.0	126		270	0.0
258.55	0.45	267	234.3	35		0.45	1065	990.0	148		454	0.0
258.70	0.60	333	300.0	45		0.60	1215	1140.0	171		670	0.0
258.85	0.75	399	365.7	55		0.75	1365	1290.0	193		918	0.0
259.00	0.90	464	431.4	65		0.90	1515	1440.0	216		1199	0.0
259.15	1.05	**530**	497.1	75		1.05	**1665**	1590.0	238		1512	0.0
259.30	1.20	630	579.9		87.0	1.20	1848	1756.5		263.5	1512	350.5
259.45	1.35	729	679.6		101.9	1.35	2031	1939.6		290.9	1512	743.3
259.60	1.50	829	779.3		116.9	1.50	2214	2122.7		318.4	1512	1178.6
259.75	1.65	929	879.0		131.8	1.65	2397	2305.8		345.9	1512	1656.4
259.90	1.80	1029	978.7		146.8	1.80	2580	2488.9		373.3	1512	2176.5
260.05	1.95	1128	1078.4		161.8	1.95	2764	2672.0		400.8	1512	2739.0
260.20	2.10	1228	1178.1		176.7	2.10	2947	2855.1		428.3	1512	3344.0
260.35	2.25	1328	1277.8		191.7	2.25	3130	3038.2		455.7	1512	3991.4
260.50	2.40	1427	1377.5		206.6	2.40	3313	3221.2		483.2	1512	4681.2
260.65	2.55	1527	1477.2		221.6	2.55	3496	3404.3		510.7	1512	5413.5
260.85	2.75	**1660**	1593.5		318.7	2.75	**3740**	3617.9		723.6	1512	6455.8

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Stage- Storage- Discharge Tables	NAME	ARO
		PAGE	2 OF 4

Stage - Discharge Table

Orifice Control	Orifice Plate	Outlet Pipe	Weir Control	DICB	Emergency Weir
Orifice/Pipe Dia. (mm)	76.2	375	Weir Width (m)	0.6x0.6	5
Cross Sectional Area (m^2)	0.0046	0.1104	Sill Elevation (m)	259.55	260.25
Orifice Coefficient	0.63	0.80	Weir Coefficient	0.63	1.65
Inv. Elevation (m)	259.15	259.15	Weir Side Slopes (H:V)	4	4

Water Level	Orifice Plate		Outlet Pipe		DICB		Emergency Weir		Total
	Head	Discharge	Head	Discharge	Head	Discharge	Head	Discharge	Discharge
m	m	m^3/s	m	m^3/s	m	m^3/s	m	m^3/s	m^3/s
259.15	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.000
259.30	0.11	0.004	0.00	0.000	0.00	0.000	0.00	0.000	0.000
259.45	0.26	0.007	0.11	0.131	0.00	0.000	0.00	0.000	0.007
259.60	0.41	0.008	0.26	0.200	0.05	0.022	0.00	0.000	0.031
259.75	0.56	0.010	0.41	0.251	0.20	0.184	0.00	0.000	0.193
259.90	0.71	0.011	0.56	0.293	0.35	0.503	0.00	0.000	0.293
260.05	0.86	0.012	0.71	0.330	0.50	0.981	0.00	0.000	0.330
260.20	1.01	0.013	0.86	0.363	0.65	1.617	0.00	0.000	0.363
260.35	1.16	0.014	1.01	0.394	0.80	2.412	0.10	0.282	0.675
260.50	1.31	0.015	1.16	0.422	0.95	3.365	0.25	1.237	1.659
260.65	1.46	0.015	1.31	0.448	1.10	4.477	0.40	2.755	3.203
260.85	1.66	0.016	1.51	0.481	1.30	6.205	0.60	5.675	6.156

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Stage- Storage- Discharge Tables	NAME	ARO
		PAGE	3 OF 4

Stage-Storage-Discharge Table

Bottom Elev. = 258.10 m
Top of bank = 260.85 m
Stage = 0.15 m

Orifice Control	Orifice Plate	Outlet Pipe
Orifice/Pipe Dia. (mm)	76.2	375
Inv. Elevation (m)	259.15	259.15

Weir Control	DICB	Emergency Weir
Weir Width (m)	0.6x0.6	5
Sill Elevation (m)	259.55	260.25
Weir Side Slopes (H:V)	4	4

Stage	Discharge					Volume
Water Level m	Orifice Plate m^3/s	Outlet Pipe m^3/s	DICB m^3/s	Emergency Weir m^3/s	Total m^3/s	Live Total m^3
259.15	0.000	0.000	0.000	0.000	0.000	0.0
259.30	0.004	0.000	0.000	0.000	0.000	350.5
259.45	0.007	0.131	0.000	0.000	0.007	743.3
259.60	0.008	0.200	0.022	0.000	0.031	1178.6
259.75	0.010	0.251	0.184	0.000	0.193	1656.4
259.90	0.011	0.293	0.503	0.000	0.293	2176.5
260.05	0.012	0.330	0.981	0.000	0.330	2739.0
260.20	0.013	0.363	1.617	0.000	0.363	3344.0
260.35	0.014	0.394	2.412	0.282	0.675	3991.4
260.50	0.015	0.422	3.365	1.237	1.659	4681.2
260.65	0.015	0.448	4.477	2.755	3.203	5413.5
260.85	0.016	0.481	6.205	5.675	6.156	6455.8

TATHAM ENGINEERING

PROJECT	2060 Division Road	FILE	319827
		DATE	May 20 2020
SUBJECT	Stage- Storage- Discharge Tables	NAME	ARO
		PAGE	4 OF 4

SWMF Operating Characteristics

Storm Event	Storage (m^3)		Discharge (m^3/s)		Water Level (m)	
	Chicago	SCS	Chicago	SCS	Chicago	SCS
25 mm	485	-	0.004	-	259.39	-
1:2-Year	778	1199	0.008	0.037	259.46	259.61
1:5-Year	1188	1554	0.034	0.158	259.60	259.72
1:10-Year	1329	1858	0.082	0.232	259.65	259.81
1:25-Year	1504	2350	0.141	0.305	259.70	259.95
1:50-Year	1656	2857	0.193	0.337	259.75	260.08
1:100-Year	1849	3394	0.230	0.386	259.81	260.21
Regional	4073	-	0.790	-	260.37	-
Uncontrolled				1.454		260.52