



**Shining Hill Estates Phase 3 (Aurora)  
Town of Aurora**

**Functional Servicing and Stormwater  
Management Report**

**March 2021**

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**SUBMISSION HISTORY**

Submission	Date	In Support Of	Distributed To
1 <sup>st</sup>	March 2021	Re-Zoning, Official Plan Amendment, Draft Plan Approval	Town of Aurora, LSRCA, York Region, Shining Hill Estates Collection Inc.

## 1.0 INTRODUCTION

SCS Consulting Group Ltd. has been retained by Shining Hill Estates Collection Inc. to prepare a Functional Servicing and Stormwater Management Report for a proposed development in the Town of Aurora.

### 1.1 Purpose of the Functional Servicing Report

The Functional Servicing and Stormwater Management Report (FSSR) has been prepared in support of an Official Plan Amendment, Zoning Bylaw Amendment, and Plan of Subdivision applications for the proposed development. The Draft Plan of Subdivision is provided in **Appendix A**. The proposed development consists of the following land uses:

- low density residential,
- Mid/High-Rise Residential ,
- a neighbourhood park,
- open space,
- a private school (St. Anne’s School (SAS)), and
- proposed roads.

The purpose of this report is to demonstrate that the development can be graded and serviced in accordance with the Town of Aurora, Lake Simcoe Region Conservation Authority (LSRCA), the Ontario Building Code, and the Ministry of Environment, Conservation and Parks (MECP) design criteria.

### 1.2 Study Area

The study area is a land assembly approximately 31.8 ha in size and is bound by St. John’s Sideroad to the south, the Shining Hill Estates Phase 2 development to the southwest, a tributary of Tannery Creek to the east, existing residential development to the west, and the municipal boundary of Aurora-Newmarket to the north (see **Figure 1.1**).

The existing subject lands are comprised of estate residential uses including two dwellings, ancillary structures and open space areas.

### 1.3 Background Servicing Information

In preparation of the servicing and SWM strategies, the following design guidelines and standards were used:

- South Georgian Bay Lake Simcoe Source Protection Plan (SGBLS SPP) (Approval Date: January 26, 2015, Effective: July 1, 2015, Amended: May 14, 2015);
- Town of Aurora Design Criteria Manual for Engineering Plans (Revised November 2020);
- Technical Guidelines for Stormwater Management Submissions, Lake Simcoe Region Conservation Authority (September, 2016);
- Phosphorus Offsetting Policy, Lake Simcoe Region Conservation Authority (September 2017);

- Water Budget Offsetting Policy, Lake Simcoe Region Conservation Authority (May 2019);
- Lake Simcoe Protection Plan (July 2009); and
- Ministry of Environment, Conservation and Parks (MECP) Stormwater Management Planning and Design Manual (March 2003).

The site servicing and SWM strategies are also based on the following approved Engineering Drawings as well as the following reports for this Draft Plan of Subdivision:

- St. Andrews on The Hill Engineering Drawings, Revision date March 1988, prepared by PMG Consulting Engineers;
- Hydrogeological Investigation, Shining Hill (Phase 3), 162 St. John's Sideroad West, Aurora, Ontario, prepared by Golder Associates, dated March 2021;
- A Geotechnical Investigation and Slope Stability Assessment for Proposed Residential Development, Soil Engineers Ltd., January 2021; and
- A Geotechnical Investigation and for Proposed School Block, Soil Engineers Ltd., January 2021.

Excerpts from the above listed documents are included in **Appendix B**.

A Rainscaping design charette with the Town of Aurora and LSRCA was held on December 15, 2020. The meeting minutes are included in **Appendix B**.

## 2.0 STORMWATER MANAGEMENT

### 2.1 Stormwater Runoff Control Criteria

The following stormwater runoff control criteria have been established based on the greatest requirements of each of the design guidelines and standards listed in **Section 1.3**. The stormwater runoff criteria are summarized below in **Table 2.1**:

**Table 2.1 – Stormwater Runoff Control Criteria**

Criteria	Control Measure
Quantity Control	<p>Peak Flow: Control proposed peak flows to existing peak flows for the 2 through 100 year storm events. (Town, LSRCA)</p> <p>Volume Control: Proposed runoff volume from a 25 mm rainfall event over the total impervious area shall be captured and retained/treated on-site or in accordance with LRCA’s Flexible Treatment guidelines if full compliance with the 25 mm guideline is not possible. (LSRCA)</p>
Quality Control	<p>Total Suspended Solids: MECP Enhanced Level Protection (80% TSS Removal). (MECP, LSRCA, Town)</p> <p>Phosphorus: Per Lake Simcoe Protection Plan, a Phosphorus Loading Study is to be done to determine the existing and proposed phosphorus loading rates. Per the LSPOP, target 100% control and net-zero phosphorus export. (LSRCA)</p>
Erosion Control	Detention of the 25 mm rainfall runoff for a minimum of 24 hours. (LSRCA)
Water Budget	As the site is within a Wellhead Protection Area (WHPA) Q1/Q2, maintain the existing water budget through the use of best management practices such as Low Impact Development measures. (SGBLS SPP)

### 2.2 Existing Drainage

The subject lands are located within the Tannery Creek Watershed in the Town of Aurora. A tributary of the Tannery Creek travels west to east along the southern limits of the property, crosses south under St. John’s Sideroad, and eventually crossing back north under St. John’s Sideroad where it travels south to north east of the subject lands, and ultimately east toward Yonge Street away from the subject property.

As shown on **Figure 2.1**, there are five outlets for the site that all drain to the Tannery Creek:

1. Southwest outlet via sheet flow to the tributary from the SAS site (Catchment 105 – 2.68 ha),
2. Southwest outlet via the tributary (Catchment 101 – 4.12 ha),

3. North outlet via sheet flow from the SAS site toward a drainage draw located to the north in Newmarket (Catchment 104 – 1.06 ha), and
4. North outlet toward a wetland located to the north in Newmarket (Catchment 102 – 3.62 ha), and
5. East outlet via sheet flow down the valley wall (Catchment 103 – 2.39 ha).

Drainage from the Outlets 1 and 3 are wholly from the SAS site, which the development of that block will be subject to Site Plan Control. For the purpose of this FSSR, the hydrology of those catchments will not be assessed as it will be completed through a future the Site Plan Control application.

### 2.2.1 Existing Site Characterization

The soil classifications were identified using the Ontario Soil Survey Complex from OMAFRA and land uses visible in recent aerial photography and verified through a site visit. The mapping identifies that the soils within the study limits are Schomberg Clay Loam. According to the Design Flood Estimation Design Chart H2-6A, the soils are considered as Hydrologic Soil Group C. This is consistent with Golder Associates Hydrogeological Investigation that notes the predominant soil type is Silt Loam, which is a Hydrologic Soil Group C according to the MTO Drainage Management Manual (1997) Design Chart 1.08.

Golder Associates completed in-situ infiltration testing which found a range of estimated infiltration rates of 30 – 75 mm/hr. Applying a safety correction factor yields a design infiltration rates ranging from 12 – 30 mm/hr. Golder Associates is actively monitoring groundwater levels across the site with readings from September 2020 to January 2021. Groundwater monitoring is ongoing and will continue to ensure the spring high groundwater level is observed. Refer to **Appendix B** for excerpts from the Hydrogeological Assessment for the infiltration test results and groundwater monitoring results.

### 2.2.2 Existing Hydrologic Modelling

Hydrologic modelling was undertaken using the Visual Otthymo Version 6.0 software (VO6) based on the 4-hour Chicago, 12-hour SCS Type II, and 24-hour SCS Type II Distribution methods. The IDF rainfall information was obtained from the Town of Aurora Design Criteria Manual to determine the existing peak flows to outlet locations. The existing flows from the study area to the outlet locations are summarized in **Table 2.2**.

**Table 2.2: Summary of Existing Flows**

Return Period Storm	Outlet 2 (Catchment 101) (m <sup>3</sup> /s)			Outlet 5 (Catchment 102) (m <sup>3</sup> /s)			Outlet 4 (Catchment 103) (m <sup>3</sup> /s)		
	4-Hour Chi	12-Hour SCS	24-Hour SCS	4-Hour Chi	12-Hour SCS	24-Hour SCS	4-Hour Chi	12-Hour SCS	24-Hour SCS
2 Year	0.051	0.076	0.093	0.108	0.124	0.195	0.090	0.089	0.152
5 Year	0.099	0.129	0.152	0.207	0.202	0.307	0.171	0.143	0.235
10 Year	0.136	0.175	0.207	0.286	0.269	0.407	0.235	0.188	0.310
25 Year	0.177	0.226	0.269	0.374	0.341	0.517	0.309	0.239	0.392
50 Year	0.231	0.266	0.306	0.482	0.396	0.581	0.394	0.278	0.439
100 Year	0.283	0.307	0.351	0.579	0.453	0.659	0.469	0.317	0.496



A summary of modelling parameters and an existing VO6 schematic are provided in **Appendix C**. A USB drive containing the VO6 hydrology model is also provided in **Appendix C**, or available on request via file transfer.

### 2.3 Proposed Storm Drainage

The proposed storm drainage plan is shown on **Figure 2.2**, while the proposed servicing plan is shown on **Figure 2.3**. Impervious coverage was estimated based on the maximum impervious areas using the anticipated zoning, and is illustrated on **Figure 2.4**.

#### Lot Level Drainage

All split draining lots will use a rear yard infiltration trench to infiltrate runoff from the back half of the roofs. Infiltration measures are required by the Ontario Building Code to be a minimum of 5 m from a foundation. The front yard setbacks are 4.5 m per the zoning bylaw which eliminates the possibility for infiltration measures in the front yard for runoff from the front half of the roofs and driveways. Therefore, infiltration measures for the front half of the roofs and driveways can only be located in the road right-of-way or end-of-pipe.

All roof downspouts are to drain to grassed areas.

#### Outlets 1 and 3 – SAS Site

Runoff to Outlet's 1 and 3 will not be modified as part of the subdivision development. Future development of the site will be subject to Site Plan Control, and the proposed development will have to demonstrate compliance with all of the stormwater runoff control criteria.

#### Outlet 2

Clean runoff from 0.6 ha of rear & front yards (Catchment 207), and major system runoff from 0.24 ha (Catchment 204) will drain via overland flow directly to Outlet 2. Runoff from approximately 2.39 ha (Catchment 206) will be captured by the storm sewer system, controlled to the stormwater runoff control criteria using low impact development (LID) measures within the municipal road right-of-way and an superpipes and conveyed to Outlet 2 via a storm sewer.

The capacity of the St. John's Sideroad ditch will be assessed at detailed design to confirm there is adequate capacity. It is noted that there is a small drainage area to the ditch because there is a high point in the ditch approximately 50 m west of the proposed Street A intersection.

#### Outlet 4

Clean runoff from 0.23 ha of rear & front yards (Catchment 205) will drain via overland flow directly to Outlet 4. Major and minor system runoff from 2.45 ha (Catchment 203), and major system runoff from 0.92 ha (Catchment 202) will be captured by the storm sewer system, controlled to the stormwater runoff control criteria using LIDs within the municipal road right-of-way and an superpipes and conveyed to Outlet 4 via a storm sewer draining east, located within a municipal easement, north of the St. John's Sideroad right-of-way, discharging at the bottom of the valley wall to the Tannery Creek tributary.

The capacity of the St. John’s Sideroad ditch will be assessed at detailed design to confirm there is adequate capacity. It is noted that there is a small drainage area to the ditch because there is a high point in the ditch approximately 50 m west of the proposed Street A intersection.

Outlet 5

Major and minor system runoff from 3.25 ha (Catchments EXT1 and 201), and minor system runoff from 0.92 ha (Catchment 202) will be captured by the storm sewer system, controlled to the stormwater runoff control criteria using LIDs and an end of pipe underground stormwater management facility located under the Neighbourhood Park and conveyed to Outlet 5 via a storm sewer discharging to the Tannery Creek. The runoff from the SAS site that drains to Outlet 5 (Catchment EXT1) will be accommodated for in the end-of-pipe SWM facility for peak flow control, but will be required to provide on-site volume control, quality control (TSS, phosphorus), erosion control, and water balance.

**2.4 Best Management Practices**

In accordance with the Ministry of Environment Stormwater Management Planning and Design Manual (2003) and LSRCA objectives, a review of stormwater management LID measures and best management practices (BMP) was completed. The review included a focus on the treatment train approach, evaluating lot level, conveyance system and end-of-pipe practices.

As part of the review of the LIDs, a “RainScaping” design charrette meeting was held on December 15, 2020. The RainScaping charrette was a meeting with the Town of Aurora, Town of Newmarket, and LSRCA staff, as well as the applicant and the applicant’s consultants to discuss, review and develop LID strategies, opportunities and constraints for the subject development.

The meeting minutes from the RainScaping charrette are included in **Appendix B. Table 2.3** notes the various LIDs and whether they are recommended.

**Table 2.3 – Recommended Stormwater LID & BMP Practices**

<b>STORMWATER MANAGEMENT PRACTICE</b>	<b>RECOMMENDED (Yes/No)</b>
Reduced Lot Grading	Yes
Increased Topsoil Depth	Yes
Passive Landscaping/Bio-Retention	No
Roof Leader to Rear Yard Infiltration Trenches	Yes
Roof Runoff to Retention Cisterns	No
Green Roofs	No
Rooftop and/or Parking Lot Detention Storage	No

<b>STORMWATER MANAGEMENT PRACTICE</b>	<b>RECOMMENDED (Yes/No)</b>
Roof overflow to Grassed Areas	Yes
Pervious Pavement	No
Vegetated Filter Strips	No
Bioswale/Rain Garden	Yes
Exfiltration at Rear Lot Catchbasins	No
Street Catchbasin Infiltration/Filtration System	Yes
Underground Stormwater Detention Facility	Yes
Wet Ponds, Wetlands, Dry Ponds	No

**Reduced Lot Grading** – Reducing lot grades from a maximum of 5% to a minimum of 2% is suggested wherever possible to maximize infiltration and evapotranspiration of stormwater runoff at the lot level.

**Increased Topsoil Depth** – A minimum topsoil restoration depth of 0.3 meters is proposed in all landscaped areas.

**Roof overflow to Grassed Areas** –Roof leaders can be directed to grassed areas where there is grass.

**Bioswale/Rain Garden** – A grassed swale in the boulevard to receive street runoff is proposed running parallel to single loaded roads/laneways and roads without driveway access.

**Roof Runoff to Rear Yard Infiltration Trenches** – Directing roof runoff to subsurface infiltration trenches can be used to promote infiltration. By promoting infiltration water quality and quantity control is provided for the volume of water retained. Infiltration of roof runoff can provide a significant SWM benefits as part of the overall treatment train approach for the proposed development. All split draining lots will use a rear yard infiltration trenches to infiltrate runoff from the back half of the roofs. Infiltration measure are required by the Ontario Building Code to be a minimum of 5 m from a foundation. The front yard setbacks are 4.5 m per the zoning bylaw which eliminates the possibility for infiltration measures in the front yard for runoff from the front half of the roofs and driveways.

**Street Catchbasin Infiltration/Filtration System** – Proposed to treat runoff from the street, there will be a connection from the street catchbasins to an infiltration or filtration trench (groundwater dependent) located in the road boulevard. Where feasible, the infiltration/filtration trenches will be sized for the volume control or water quality control criteria, whichever is a greater volume. Preliminary sizing is discussed further in **Section 2.6**.

**Wet Ponds, Wetlands, Dry Ponds, Underground Storage** – As discussed during the RainsScaping design charette, wet ponds are discouraged by the LSRCA. Underground storage systems are preferred to be located under park areas to utilize dual land uses. Underground

storage will be utilized under the neighbourhood park at achieve the peak flow and erosion control criteria.

**Superpipes** – To meet quantity and erosion control targets, stormwater storage will be provided by the use of superpipes prior to discharging to the drainage outlets.

**Manufactured Treatment Device** - A properly sized manufactured treatment device (MTD) can assist in providing MECP Enhanced (Level 1) treatment and can contribute to the treatment train approach for water quality control. MTD's can be used as standalone devices or as pre-treatment to infiltration or filtration systems and could include catchbasin inserts (such as goss traps), oil-grit separators, or stormwater filters.

The location of the proposed LID measures is shown on **Figure 2.5**.

## 2.5 Proposed Stormwater Management Plan

### 2.5.1 Quantity Control

#### Peak Flow

The proposed superpipe and underground storage system will control proposed flows from the site to existing flow rates for the 2 to 100 year storm events. The preliminary design of these facilities and a comparison of the proposed and existing peak flow rates are discussed further in following sections.

#### Volume

The proposed development targets a volume control criteria to capture and treat or retain the runoff volume from the 25 mm rainfall event from new and/or fully reconstructed impervious areas. Proposed LIDs and BMPs have been sized to provide this storage volume where feasible. The preliminary design of these facilities are discussed further in following sections.

### 2.5.2 Quality Control

Quality control to provide TSS and phosphorus removal will be provided by a treatment train of LID techniques which will include additional topsoil depth on all grassed areas, reduced lot grading where possible, rear yard infiltration trenches, bioswales, a street catchbasin infiltration or filtration system, and an end-of-pipe underground storage system. The preliminary design requirements of the SWM infrastructure to provide the water quality treatment and a detailed phosphorus budget are provided in following sections.

### 2.5.3 Erosion Control

The erosion control criteria is to provide a minimum of 24 hour extended detention of the runoff from a 25 mm rainfall event and will be provided in the superpipe for Outlet 2 and Outlet 4, and in the end-of-pipe underground storage system for Outlet 5. The preliminary design requirements of the facilities are discussed further in a following section.

## 2.5.4 Water Budget

Where feasible, measures to minimize impacts on the water budget will be incorporated into the development design. As noted in the Hydrogeological Investigation, the estimated existing infiltration volume on the proposed development is approximately 17,115 m<sup>3</sup>. Without mitigation the proposed development infiltration volume is approximately 10,005 m<sup>3</sup>.

Low impact development measures will be implemented as previously described to maintain or increase existing infiltration rates. Per the Hydrogeological Investigation, it is anticipated that a proposed infiltration volume of approximately 20,995 m<sup>3</sup> can be achieved through the proposed mitigation measures.

## 2.6 Phosphorus Budget

Under the Lake Simcoe Protection Plan, a stormwater management plan must demonstrate how phosphorus loadings are minimized between existing and proposed. Furthermore, LSRCA's Lake Simcoe Phosphorus Offsetting Policy (September 2017) states that:

*“The phosphorous load from the proposed development on the property will be zero. In situations where the phosphorous load cannot be met or demonstrated in a post-development scenario to achieve the Zero Phosphorous, the developer or proponent shall be required to provide phosphorous off setting to the LSRCA.”*

The MECP database application *Lake Simcoe Phosphorus Loading Development Tool* (v2, 01-April-2012 update) was used to complete the phosphorus budget for the proposed development. Due to the complex treatment train provided by the SWM measures outlined above a spreadsheet based on the MECP database application was developed to determine the proposed conditions phosphorus budget.

### Existing Phosphorus Loadings

The existing phosphorus loading is based on the land uses based on the Ecological Land Classification (ELC) community type for existing conditions shown in the Natural Heritage Evaluation, prepared by Beacon Environmental, submitted under separate cover. The existing land uses are shown on **Figure 2.6**. Based on the Phosphorus Loading Development Tool, the existing annual phosphorus loadings were calculated to be 1.71 kg/year. Refer to **Appendix D** for the phosphorus loading tool output.

### Proposed Phosphorus Loadings

The proposed land uses for the proposed development are shown on **Figure 2.7**. The proposed residential development is considered high intensity development according to the MECP Phosphorus Tool. The Medium Density and SAS Blocks will be subject to Site Plan control, and therefore will be required to complete their own Phosphorus Budget analysis at the Site Plan control stage. The runoff from these blocks that drains to the proposed end-of-pipe subdivision infrastructure will be partially treated for phosphorus removal at those end-of-pipe facilities. The phosphorus from the site plan blocks that is not removed by the end-of-pipe facility will need to be removed to achieve the zero phosphorus target for those blocks, either through additional on-site controls or offsetting, demonstrated at the Site Plan control stage.

The proposed phosphorus loading with no best management practices (BMPs) was calculated to be 13.19 kg/yr (refer to **Appendix G**).

The proposed phosphorus loading with BMPs was calculated to be 3.08 kg/yr (see **Appendix D**). **Table 2.4** provides a summary of the land use, BMP, and phosphorus removal efficiencies for the proposed condition.

**Table 2.4: Phosphorus Budget Summary**

Phosphorus Loading (kg/yr)		
Existing	Proposed without BMPs	Proposed with BMPs
1.71	13.19	3.08

As per LSRCA’s Phosphorus Offsetting Policy, the increase in phosphorus loading will be offset at a rate of \$35,000/kg/year, at a 2.5:1 ratio. The cost of the phosphorous offsetting will total \$309,778.96, which includes a 15% administration cost. As previously noted, this calculation was completed assuming that the Mid/High-Rise and SAS Blocks will remove 100% phosphorus and therefore may be subject to additional phosphorus offsetting to be calculated at the Site Plan Control stage.

## 2.7 Rear Yard Infiltration Trenches

Rear yard infiltration trenches are proposed for all split draining lots to receive runoff from the back half of the roofs. The trenches will be located beneath the rear yard swales and will receive runoff from the back half of the roofs by overland runoff from roof leaders directed to the rear yard swales . They will be composed of washed clear stone with approximate dimensions of 0.6 m deep and 1.0 m wide, which will capture a minimum of 25 mm of runoff from the back half of the roofs. The length of the trench will vary depending on the size of the lots. Based on the design infiltration rate of 12 mm/hr, the runoff storage volume in the trench can be infiltrated with 48 hours. Refer to **Figure 2.8** for details. Calculations are provided in **Appendix E**.

## 2.8 Bioswale/Rain Garden: Roads

The proposed bioswale/rain garden will collect runoff from half of the road right-of-way via proposed curb cuts to facilitate retention and filtration via the proposed engineered soil media and stone base. The curb cuts are proposed along the length of the respective bioswale to maximize conveyed drainage area. Curb cuts are proposed upstream of catchbasins to ensure runoff is conveyed to the bioswale prior to discharging to the proposed storm sewers. In storm events where the capacity of the bioswale is exceeded, runoff will discharge back to the road where it will be captured by catchbasins located immediately downstream of the lowest curb cut.

The bioswales are sized for the greater of the water quality treatment volume per Table 3.2 of the MECP SWM Planning and Design Manual or the 25 mm volume from impervious surfaces.

The bioswale on the 23 m road right-of-way provides storage for 33.3 mm/impervious area, and the bioswale on the 15 m road right-of-way provides storage for 26.7 mm/impervious area. Right-of-way cross sections and the details are discussed further in Section 6.0 and calculations are provided in **Appendix E**.

## 2.9 Bioswale/Rain Garden: Laneway

The proposed bioswales will collect runoff from the front half of the roofs, driveways, and laneways via proposed curb cuts to facilitate infiltration and filtration via the proposed engineered soil media and stone base. The curb cuts are proposed along the length of the respective bioswale to maximize conveyed drainage area. Curb cuts are proposed upstream of catchbasins to ensure runoff is conveyed to the bioswale prior to discharging to the proposed storm sewers. In storm events where the capacity of the bioswale is exceeded, runoff will discharge back to the road where it will be captured by catchbasins located immediately downstream of the lowest curb cut.

The bioswales are sized for the greater of the water quality treatment volume per Table 3.2 of the MECP SWM Planning and Design Manual or the 25 mm volume from impervious surfaces. The bioswale provides storage for 29.2 mm/impervious area. Right-of-way cross sections and the details are discussed further in Section 6.0 and calculations are provided in **Appendix E**.

## 2.10 Catchbasin Infiltration/Filtration Trench

Catchbasin infiltration and filtration trenches are proposed to provide quality control for the municipal road right-of-way and lots draining to the catchbasins. Runoff entering a catchbasin will be directed through a catchbasin pretreatment device (e.g. “goss trap” and sump) before entering a lead directed to the trenches. Runoff in excess of the capacity of the lead, or if an infiltration trench has reached capacity, will be directed through an overflow lead into the minor system. The trenches will be located beneath the right-of-way boulevard. However, they can only fit in one side of the right-of-way due to conflicts with the watermain separation. Therefore, any catchbasin which isn’t directly connected to a trench will have its lead connected to a catchbasin that is directly connected to a trench. The proposed road right-of-way cross section with the catchbasin infiltration/filtration system is discussed further in **Section 6.0**.

Where there is a minimum of 1.0 m of separation to the seasonally high groundwater level to the bottom of the trench, the system will be designed to infiltrate. Where there is not, the system will be designed as a filter trench with an impermeable liner to prevent groundwater inflow and a subdrain returning water back to the storm sewer.

The catchbasin infiltration trenches will be composed of washed clear stone with approximate dimensions of 0.8 m deep and 1.25 m wide. Based on the available groundwater information, the infiltration trenches will be located on Street A, north of Street B.

The catchbasin filtration trenches will be composed of washed clear stone on top of 0.4 m of brick sand. A perforated drain within the brick sand layer connected to the minor system will be provided at the downstream end of the filtration facility. The proposed road right-of-way cross section with the catchbasin infiltration/filtration system is discussed further in **Section 6.0**.

Both infiltration and filtration trenches are sized for a minimum of the water quality treatment volume per Table 3.2 of the MECP SWM Planning and Design Manual. Due to potential conflicts with the service laterals, other utilities in the boulevard, and potential future maintenance, it is not feasible to achieve the 25 mm volume from impervious surfaces. The trenches all provide a minimum of the water quality treatment volume. The trenches provide the following volume from the contributing impervious areas:

- Half of 23 m road right-of-way, adjacent to Neighbourhood park: 27.3 mm/impervious area,
- 23 m road right-of-way, south of Neighbourhood park: 9.2 mm/impervious area,
- south half of 15 m road right-of-way: 22.6 mm/impervious area, and
- 18 m road right-of-way: 10.1 mm/impervious area.

Calculations are provided in **Appendix E**.

## 2.11 End-of-Pipe Underground Storage (Outlet 5)

Catchments 201, 202 and EXT1 will be controlled for erosion and quantity control using an underground storage system, such as “Greenstorm”.

### 2.11.1 Extended Detention

The attenuation of the extended detention volume in the underground storage system will provide erosion protection for the downstream watercourse. The extended detention volume will be sized based on the detention of the 25 mm - 4 hour Chicago rainfall event. The volume calculated for the extended detention will be attenuated for a minimum of 24 hours.

The required extended detention volume for Catchment 202, 202 and EXT1 is 746 m<sup>3</sup> (see **Appendix I**). The peak release rate for the extended detention volume is approximately 0.013 m<sup>3</sup>/s.

### 2.11.2 Quantity Control: Peak Flow

The proposed underground storage will control proposed 2 - 100 year flows from the site to the existing peak flow rates. Proposed hydrology modelling was completed using the VO6 model to determine the required detention storage volume. Refer to the USB drive containing the VO6 hydrology model provided in **Appendix C**. A summary of the resulting storage requirements for the underground storage system is provided in **Table 2.5**.

**Table 2.5: Outlet 5 Underground Storage System Storage Requirements**

Return Period Storm	4 Hour Chicago		12 Hour SCS Type II		24 Hour SCS Type II	
	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )
2 Year	0.054	792	0.114	859	0.148	<b>897</b>



Return Period Storm	4 Hour Chicago		12 Hour SCS Type II		24 Hour SCS Type II	
	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )
5 Year	0.155	923	0.179	1046	0.198	<b>1142</b>
10 Year	0.181	1054	0.222	1222	0.290	<b>1335</b>
25 Year	0.210	1198	0.309	1371	0.372	<b>1507</b>
50 Year	0.296	1344	0.359	1477	0.398	<b>1603</b>
100 Year	0.357	1473	0.394	1589	0.444	<b>1713</b>

Note: Bold values indicate the more conservative (higher) proposed storage volumes

## 2.12 Superpipe: Catchment 203 (Outlet 4)

Catchment 203 will be controlled for erosion and quantity control by superpipe storage.

### 2.12.1 Extended Detention – Catchment 203

The attenuation of the extended detention volume in the underground storage system will provide erosion protection for the downstream watercourse. The extended detention volume will be sized based on the detention of the 25 mm - 4 hour Chicago rainfall event. The volume calculated for the extended detention will be attenuated for a minimum of 24 hours. The required extended detention volume is 325 m<sup>3</sup> (see **Appendix F**). The peak release rate for the extended detention volume is approximately 0.006 m<sup>3</sup>/s.

### 2.12.2 Quantity Control: Peak Flow – Catchment 203

The proposed superpipe will control proposed 2 - 100 year flows from the site to the existing peak flow rates. Proposed hydrology modelling was completed using the VO6 model to determine the required detention storage volume. Refer to the USB drive containing the VO6 hydrology model provided in **Appendix C**. A summary of the resulting storage requirements for the superpipe is provided in **Table 2.6**.

**Table 2.6: Superpipe Storage Requirements – Catchment 203**

Return Period Storm	4 Hour Chicago		12 Hour SCS Type II		24 Hour SCS Type II	
	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )
2 Year	0.035	345	0.073	371	0.099	<b>389</b>
5 Year	0.102	398	0.113	458	0.124	<b>517</b>
10 Year	0.117	477	0.140	556	0.171	<b>631</b>
25 Year	0.146	570	0.177	650	0.199	<b>736</b>
50 Year	0.186	684	0.197	729	0.222	<b>805</b>
100 Year	0.219	796	0.222	806	0.266	<b>886</b>

Note: Bold values indicate the more conservative (higher) proposed storage volumes

## 2.13 Superpipe: Catchment 206 (Outlet 2)

Catchment 206 will be controlled for erosion and quantity control by superpipe storage.

### 2.13.1 Extended Detention – Catchment 206

The attenuation of the extended detention volume in the underground storage system will provide erosion protection for the downstream watercourse. The extended detention volume will be sized based on the detention of the 25 mm - 4 hour Chicago rainfall event. The volume calculated for the extended detention will be attenuated for a minimum of 24 hours. The required extended detention volume is 278 m<sup>3</sup> (see **Appendix F**). The peak release rate for the extended detention volume is approximately 0.005 m<sup>3</sup>/s.

### 2.13.2 Quantity Control: Peak Flow – Catchment 206

The proposed superpipe will control proposed 2 - 100 year flows from the site to the existing peak flow rates. Proposed hydrology modelling was completed using the VO6 model to determine the required detention storage volume. Refer to the USB drive containing the VO6 hydrology model provided in **Appendix C**. A summary of the resulting storage requirements for the superpipe is provided in **Table 2.7**.

**Table 2.7: Superpipe Storage Requirements - Catchment 206**

Return Period Storm	4 Hour Chicago		12 Hour SCS Type II		24 Hour SCS Type II	
	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )	Discharge (m <sup>3</sup> /s)	Storage (m <sup>3</sup> )
2 Year	0.025	305	0.050	337	0.065	<b>356</b>
5 Year	0.071	367	0.086	425	0.098	<b>470</b>
10 Year	0.088	432	0.113	512	0.136	<b>573</b>
25 Year	0.110	505	0.144	598	0.167	<b>682</b>
50 Year	0.143	594	0.163	669	0.182	<b>720</b>
100 Year	0.166	681	0.189	736	0.275	<b>761</b>

Note: Bold values indicate the more conservative (higher) proposed storage volumes

### 2.14 Comparison of Existing Targets and Proposed Flows

To the extent possible, the proposed development was designed to control proposed runoff to the existing levels. **Table 2.8**, **Table 2.9** and **Table 2.10** provides a comparison of existing and proposed flows at outlet locations 2, 4 and 5.

**Table 2.8: Comparison of Existing Targets and Proposed Flows – 4-Hour Chicago**

Return Period Storm	Outlet 2 (m <sup>3</sup> /s)		Outlet 4 (m <sup>3</sup> /s)		Outlet 5 (m <sup>3</sup> /s)	
	Ex.	Prop.	Ex.	Prop.	Ex.	Prop.
2 Year	0.051	0.032	0.090	0.038	0.108	0.054
5 Year	0.099	0.092	0.171	0.111	0.207	0.155
10 Year	0.136	0.129	0.235	0.129	0.286	0.181
25 Year	0.177	0.160	0.309	0.158	0.374	0.210
50 Year	0.231	0.211	0.394	0.204	0.482	0.296

Return Period Storm	Outlet 2 (m <sup>3</sup> /s)		Outlet 4 (m <sup>3</sup> /s)		Outlet 5 (m <sup>3</sup> /s)	
	Ex.	Prop.	Ex.	Prop.	Ex.	Prop.
100 Year	0.283	0.258	0.469	0.236	0.579	0.357

**Table 2.9: Comparison of Existing Targets and Proposed Flows – 12-Hour SCS Type II**

Return Period Storm	Outlet 2 (m <sup>3</sup> /s)		Outlet 4 (m <sup>3</sup> /s)		Outlet 5 (m <sup>3</sup> /s)	
	Ex.	Prop.	Ex.	Prop.	Ex.	Prop.
2 Year	0.076	0.064	0.089	0.079	0.124	0.114
5 Year	0.129	0.117	0.143	0.124	0.202	0.179
10 Year	0.175	0.152	0.188	0.153	0.269	0.222
25 Year	0.226	0.195	0.239	0.195	0.341	0.309
50 Year	0.266	0.224	0.278	0.217	0.396	0.359
100 Year	0.307	0.254	0.317	0.243	0.453	0.394

**Table 2.10: Comparison of Existing Targets and Proposed Flows – 24-Hour SCS Type II**

Return Period Storm	Outlet 2 (m <sup>3</sup> /s)		Outlet 4 (m <sup>3</sup> /s)		Outlet 5 (m <sup>3</sup> /s)	
	Ex.	Prop.	Ex.	Prop.	Ex.	Prop.
2 Year	0.093	0.087	0.152	0.108	0.195	0.148
5 Year	0.152	0.148	0.235	0.141	0.307	0.198
10 Year	0.207	0.203	0.310	0.188	0.407	0.290
25 Year	0.269	0.257	0.392	0.221	0.517	0.372
50 Year	0.306	0.281	0.439	0.242	0.581	0.398
100 Year	0.351	0.342	0.496	0.285	0.659	0.444

As shown in **Tables 2.8, Table 2.9** and **Table 2.10**, the proposed flows are less than or equal to the existing flows for the 2 through 100 year storm events at all target locations. As noted above, discharge rates to Outlets 1 and 3 will be addressed through a subsequent Site Plan Application process for St. Anne’s school.

**2.15 Storm Servicing**

The storm sewer system (minor system) will be designed for the 5 year return storm as per the Town of Aurora standards.

The major system flow drainage (up to the 100 year storm event) will generally be conveyed overland along the road right-of-ways (ROW).

The storm sewer system will typically be designed with grades between 0.5% and 2.0%. Throughout the site, the storm sewer will be constructed at a minimum depth of 1.5 m to provide frost protection and 2.8 m to service basements. It is anticipated that all storm sewers will be able to be provided deep enough to service basements by gravity, however due to the

superpipe storage, it is anticipated that portions of the site will require sump pumps to avoid basement flooding due to the hydraulic grade line in the sewer.

The storm drainage system will be designed in accordance with the Town of Aurora and MECP guidelines, including the following:

- Pipes to be sized to accommodate runoff from a 5 year storm event;
- Minimum Pipe Size: 300 mm diameter;
- Maximum Flow Velocity: 4.5 m/s;
- Minimum Flow Velocity: 0.45 m/s for first run, 0.6 m/s for second to fourth run, 0.75 m/s for subsequent runs; and
- Minimum Pipe Depth: 1.5 m to obvert, 2.8 m to obvert to service basements.

The rainfall intensity will be calculated based on Town of Aurora parameters listed below in **Table 2.11**:

**Table 2.11 – Rainfall Intensity Parameters**

<b>Return Period Storm</b>	<b>A</b>	<b>B</b>	<b>C</b>
2 Year	647.7	4	0.784
5 Year	929.8	4	0.798
10 Year	1021	3	0.787
25 Year	1100	2	0.776
50 Year	1448	3	0.803
100 Year	1770	4	0.820

## 2.16 Overland Flow

Major system flows (greater than the 5 year up to the 100 year storm event) will be conveyed within the road right-of-ways to 100 year capture points. At detailed design, the 100 year capture points will be designed to capture the 100 year flows assuming 50% blockage at a depth not exceeding the maximum ponding depth per Town of Aurora criteria.

## 2.17 Regulatory Floodline

Based on LSRCA’s floodplain mapping, the Regulatory floodplain associated with the tributary of Tannery Creek to the east is well below the proposed development. The Regulatory floodline associated with the tributary of Tannery Creek to the west/southwest was updated during the approval of the Shining Hill Estates Phase 2 development, and is plotting on the **Figure 5.1**, which shows that the proposed development is outside of the Regulatory floodline.

## 3.0 SANITARY SERVICING

### 3.1 Existing Sanitary Sewer System

The existing buildings on the subject lands are serviced with an existing 200 mm diameter sanitary service connection at the property line, opposite of Willow Farm Lane. It is currently unknown what the size of the private sanitary sewer on the property is, however, the existing sanitary manholes were surveyed which indicates the location of the sewer.

The existing sanitary sewer servicing the subject lands discharges to an existing 200 mm diameter sanitary sewer that crosses St. John's Sideroad where it continues south on Willow Farm Lane, east on Heatherfield Lane as a 300 mm diameter, through an easement east and north to St. John's Sideroad, east along St. John's Sideroad, and discharges into a 975 mm diameter trunk sanitary sewer on Yonge Street. The existing sewer system is shown on **Figure 3.1**.

The existing sanitary sewer system was sized to accommodate an area of 12.0 ha and a population of 750 from the subject lands.

A downstream analysis of the existing system up to the Yonge Street trunk is provided in **Appendix G**, which includes the addition of the approved Shining Hill Estates Phase 2 development together with the 12.0 ha and population of 750 from the subject lands. The results show that several runs of the sanitary sewer system are between 90% and 95% capacity.

### 3.2 Proposed Sanitary Sewer System

The preliminary layout for the proposed sanitary sewer within the subject lands is provided on **Figure 3.1** and **Figure 3.2**.

The sanitary sewers within the proposed development will have slopes ranging between 0.5% and 2% (typically) and will be provided at 3 m to 5 m deep.

The sanitary sewer system will be designed in accordance with the Town of Aurora and MECP criteria, including but not limited to:

- ➔ Residential Sanitary Generation Rate: 400 l/c/d,
- ➔ Population Density:
  - 3.8 people/unit (Single Family)
  - 3.5 people/unit (Townhouse)
  - 2.5 people/unit (Apartment)
  - 0.30 persons/student (School)
- ➔ Peaking Factor: Harmon (Min. 2.0, Max. 4.0),
- ➔ Infiltration Rate: 0.26 L/s/ha,
- ➔ Minimum Pipe Size: 200 mm diameter,
- ➔ Minimum Pipe Cover: 2.8 m,
- ➔ Minimum Full Flow Velocity: 0.60 m/s, and
- ➔ Maximum Velocity: 3.0 m/s.

The downstream analysis to the Yonge Street trunk sewer was updated to add the proposed development flows. The proposed development includes 13.85 ha and an equivalent population of 1109 (including residential units, neighbourhood park, and the St. Anne's School). Refer to **Appendix G**, for the sanitary sewer design sheet. The results show that with the addition of the proposed development, that four (4) 300 mm diameter sewer runs on St. John's Sideroad would theoretically be between 100% to 103% capacity, and that two (2) runs on Heatherfield Lane would be at 104% capacity.

To avoid sewer upgrades on Heatherfield Lane, it is proposed to install a new sanitary sewer parallel to St. John's Sideroad to discharge into the existing 300 mm diameter sewer on St. John's Sideroad at existing manhole MH72A, as shown on **Figure 3.1**. The St. John's Sideroad sewer is significantly lower in elevation than the existing and proposed development and has a drop structure at the junction of the easement and St. John's Sideroad. A hydraulic grade line analysis was completed that shows that the 300 mm diameter sewer on St. John's Sideroad can convey the proposed flows without surcharging the sanitary sewer in the easement (upstream of existing MH72A). There are two existing service connections to the St. John's Sideroad sewer that service 77 St. John's Sideroad and 15900 Yonge Street. Based on site reconnaissance, these dwellings are significantly higher than St. John's Sideroad, and based on LSRCA's floodplain mapping the elevation of the dwellings are at least 251.86, which is more than 4.5 m higher than the proposed hydraulic grade line in the sewer. A maximum of 0.07 m hydraulic grade line surcharge on the St. John's Sideroad sanitary sewer at MH72A will not impact these service connections. Design sheets and the hydraulic grade line analysis are provided in **Appendix G**.

## 4.0 WATER SUPPLY AND DISTRIBUTION

### 4.1 Existing Water Distribution

The existing buildings on the subject lands are serviced with an existing private watermain that extends from a 200 mm diameter service connection at the property line, opposite of Willow Farm Lane. The size of the private watermain has been reported to be 150 mm diameter, although drawings are not available. Several existing private hydrants were surveyed and a subsurface utility investigation is being completed to verify the location of the private watermain.

The existing watermain servicing the subject lands crosses St. John's Sideroad with a 200 mm diameter watermain where there is a tee connection to the existing ductile iron watermain on the south boulevard of St. John's Sideroad at the intersection of Willow Farm Lane. At the tee, the watermain is a 300 mm diameter to the east, 200 mm diameter to the west, and 200 mm diameter south on Willow Farm Lane. The existing watermain system is illustrated on **Figure 2.3**.

### 4.2 Proposed Water System

Two connections to the existing system are proposed at St. John's Sideroad. When the future development of the Shining Hill lands in the Town of Newmarket to the north proceed, then the watermain system will be connected through Newmarket. A water meter and pressure reducing valve is expected at the municipal boundary, to be provided in the future when the Newmarket phase proceeds. The preliminary layout for the proposed watermain system is provided on **Figure 2.3**.

Municipal Engineering Solutions (MES) has been retained to complete a Water Distribution Analysis for the proposed development. Due to the time of year at the preparation of this report, a hydrant test was not able to be completed to obtain boundary conditions. The Water Distribution Analysis will be completed when the necessary information is collected. MES has prepared a technical letter outlining the calculated water demands and discussion on the pressure districts (refer to **Appendix H**).

The watermain system will be designed in accordance with the Town of Aurora and MECP criteria including:

- ➔ Residential water usage rate: 400 l/c/d,
- ➔ Schools water usage rate: 110 L/student/d,
- ➔ Population Density:
  - 3.8 people/unit (Single Family)
  - 3.5 people/unit (Townhouse)
  - 2.5 people/unit (Apartment)
- ➔ Minimum Pipe Size: 150 mm diameter,
- ➔ Minimum Pipe Depth: 1.8 m, and
- ➔ Maximum Hydrant Spacing: 150 m.

## 5.0 GRADING

### 5.1 Existing Grading Conditions

Under existing conditions, the site slopes in several directions to several drainage draws to the south, east, and north. East of the proposed development is a deep valley. Site grading alteration has been completed on the property in the past to accommodate the past estate residential use. This includes berms, driveways, parking areas, structures, gardens/landscaping and leveling of fields for recreational use. The existing topography has slopes that range from nearly flat at the south-central portion of the site to approximately 30% at existing embankments. The ground surface elevations through the study area range from approximately 274.25 m in the west to approximately 260 m in the northeast corner.

### 5.2 Proposed Grading Concept

In general, the proposed development will be graded in a manner which will satisfy the following goals:

- Satisfy the Town of Aurora lot and road grading criteria including:
  - Minimum Road Grade: 0.5%
  - Maximum Road Grade: 6.0%
  - Minimum Lot Grade: 2%
  - Maximum Lot Grade: 5%
- Provide continuous road grades for overland flow conveyance;
- Minimize the need for retaining walls;
- Minimize the volume of earth to be moved and minimize cut/fill differential;
- Minimize the need for rear lot catchbasins; and
- Achieve the stormwater management objectives required for the proposed development.

A preliminary grading plan is provided on **Figure 5.1**.

At the detailed design stage, the preliminary grading shown on **Figure 5.1** will be subject to a more in-depth analysis in an attempt to balance the cut and fill volumes and minimize slopes and walls.



## 6.0 RIGHT-OF-WAYS AND SIDEWALKS

The proposed road right-of-way cross-sections are provided on **Figures 6.1, 6.2, 6.3, 6.4, and 6.5**. The sections have been developed to facilitate the LID measures in the boulevard, while still maintaining the general geometric layout of the pavement and street furniture per the Town's standard cross-section as close as possible. The 23 m wide collector road right-of-way has been designed in consultation with the transportation consultant and planning consultant to incorporate a proposed multi-use path and street parking.

The proposed parking and sidewalk location plan is provided on **Figure 6.6**. For the areas where sidewalk will be provided along one side of the street, sidewalks will be typically be located on north or east side of the boulevard or the boulevard side where the larger number of frontages can be serviced.

## **7.0 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION**

During the detailed design stage, erosion and sediment control measures will be designed with a focus on erosion control practices (such as stabilization, track walking, staged earthworks, etc.) as well as sediment controls (such as fencing, mud mats, catchbasin sediment control devices, rock check dams and temporary sediment control ponds). These measures will be designed and constructed as per the Stormwater Management Technical Guidelines document (LSRCA, 2016). A detailed erosion and sediment control plan will be prepared for review and approval by the Town of Aurora and LSRCA prior to any proposed grading being undertaken. This plan will address phasing, inspection and monitoring aspects of erosion and sediment control. All reasonable measures will be taken to ensure sediment loading to the adjacent watercourses and properties are minimized both during and following construction.

## **8.0 UTILITY CONSIDERATIONS**

The utility companies (hydro, natural gas, and telecommunications) have been contacted to circulate the proposed draft plan of subdivision to confirm whether there is sufficient servicing capacity.

## 9.0 SUMMARY

This Functional Servicing and Stormwater Management Report has been prepared in support of the Draft Plan of Subdivision and Zoning By-law Amendment applications for the proposed Shining Hill Estates Phase 3 development in the Town of Aurora. This report outlines the means by which the proposed development can be graded and serviced in accordance with the Town of Aurora, Lake Simcoe Region Conservation Authority, Lake Simcoe Protection Plan, and the Ministry of Environment, Conservation and Parks design criteria and policies.

### General Information

- The existing land use is estate residential;
- The site is located in the East Holland River Watershed draining to the Tannery Creek; and
- The proposed development consists of low density residential, mid/high-rise residential, a neighbourhood park, open space, a private school (St. Anne's School (SAS)), and proposed roads.

### Stormwater Management and Storm Servicing

- Quantity, Peak Flow Control: Peak flow control will be provided by the underground storage and superpipes to control proposed runoff rates in the 2 through 100 year storm events;
- Quantity, Volume Control: The on-site retention/detention of the 25 mm rainfall runoff will be provided to the extent feasible by a treatment train of LIDs and BMPs through the use of rear yard infiltration trenches, rain garden/bioswales, and catchbasin infiltration/filtration trenches in the right-of-way boulevard;
- Quality Control, TSS: MECP Enhanced (Level 1) water quality protection will be provided using a treatment train of LIDs and BMPs including catchbasin sumps and "goss traps", rear yard infiltration trenches, rain garden/bioswales, catchbasin infiltration/filtration trenches in the right-of-way boulevard;
- Quality Control, Phosphorus: A phosphorus budget analysis was completed using the MECP phosphorus budget tool, which shows that the proposed phosphorus export will be approximately 3.08 kg/yr. The phosphorus export is being mitigated through the use of rear yard infiltration trenches, rain garden/bioswales, catchbasin infiltration/filtration trenches in the right-of-way boulevard, and underground storage. An offsetting fee will also be paid to LSRCA in lieu of meeting the zero export criteria;
- Erosion Control: The runoff volume from a 25 mm rainfall event will be detained over 24 hours, to the extent feasible by the underground storage and superpipes;
- Water Budget: Golder Associates has completed a water budget analysis to demonstrate that the proposed annual infiltration rates will not be less than existing rates;
- Storm Servicing:
  - Storm runoff will be conveyed by storm sewers designed in accordance with Town of Aurora and MECP criteria;
  - Storm sewers will generally be designed for the 5 year storm event; and
  - Adequate 100 year overland flow routes will be provided.

### Sanitary Servicing

- ➔ There is an existing 200 mm diameter sanitary sewer service connection that services the property that discharges to the sanitary sewer in the St. Andrew's on The Hill subdivision, ultimately discharging to the 975 mm diameter trunk sanitary sewer at Yonge Street and St. John's Sideroad;
- ➔ A downstream sanitary sewer system analysis has been completed;
- ➔ A new external sanitary sewer running parallel to St. John's Sideroad is proposed to convey sanitary flows, connecting to the 300 mm diameter sanitary sewer on St. John's Sideroad at MH72A; and
- ➔ The existing St. John's Sideroad sanitary sewer will theoretically flow slightly above 100% capacity, however, a hydraulic grade line analysis has been completed that demonstrates that the surcharging will not negatively affect any existing service connections.

### Water Supply and Distribution

- ➔ There is an existing 200 mm transitioning to a 300 mm diameter watermain on St. John's Sideroad;
- ➔ The development is proposed to be serviced with two connections to the St. John's Sideroad watermain;
- ➔ MES has been retained to completed a watermain hydraulic analysis to ensure that there will be sufficient domestic and fire flows to service the development. The analysis will be completed when hydraulic model boundary conditions can be obtained from hydrant tests;
- ➔ A water meter and pressure reducing valve are expected at the municipal boundary between Aurora and Newmarket when development in Newmarket proceeds and the watermain is connected; and
- ➔ Water supply allocation is required from the Town.

### Grading

- ➔ The proposed development grading has been developed to match to the existing surrounding grades, and provide conveyance of stormwater runoff, including external drainage; and
- ➔ The lot grading will be subject to further grading design at the architectural design stage prior to the building permit applications.

### Right-of-Ways and Sidewalks

- ➔ Site specific right-of-way cross sections are proposed to facilitate the low impact development measures in the boulevard, street parking, and multi-use paths.

### Erosion and Sediment Control during Construction

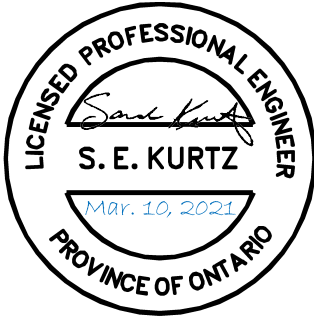
- ➔ An erosion and sediment control plan will be prepared at the detailed engineering stage, in accordance with the Stormwater Management Technical Guidelines document (LSRCA, 2016).

### Utility Considerations

- ➔ The utility companies have been contacted to confirm whether there is sufficient servicing capacity.

Respectfully Submitted:

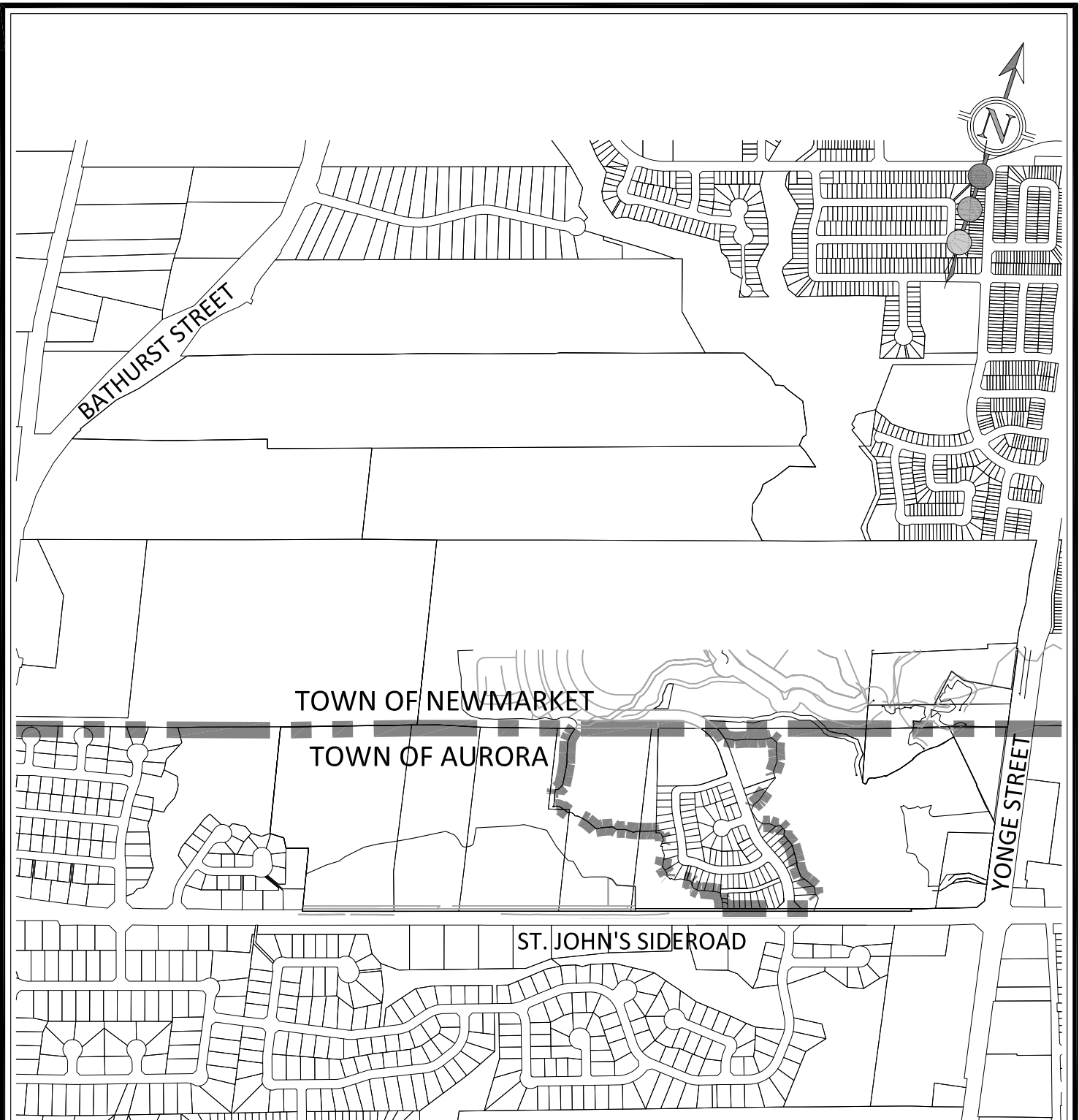
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 FAX: (905) 475-8335

## SHINING HILL ESTATES PHASE 3 - FSSR (AURORA)

### SHINING HILL ESTATE COLLECTION INC.

### SITE LOCATION PLAN

DESIGNED BY: B.B.O.

CHECKED BY: S.E.K.

PROJECT No:

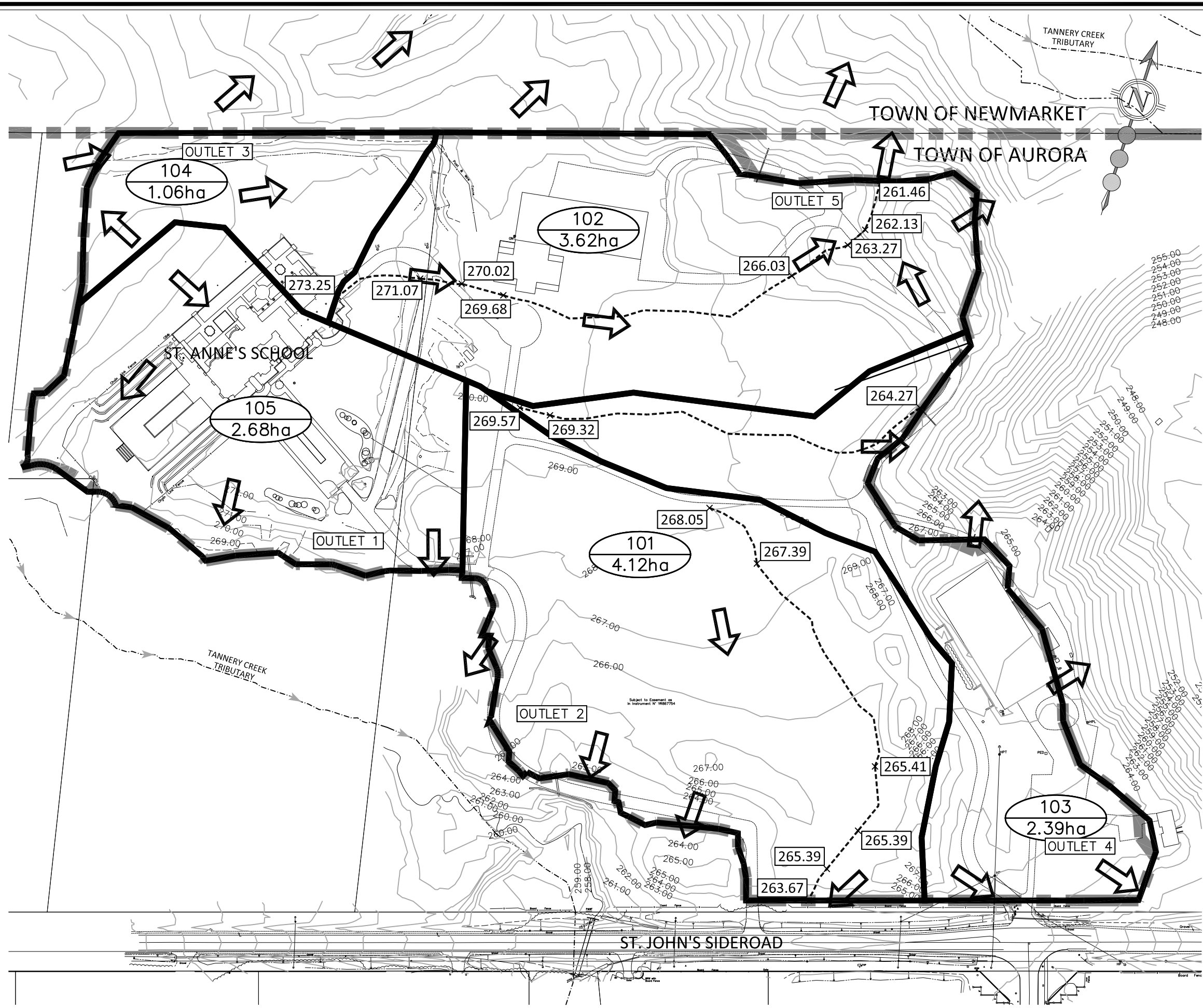
FIGURE No:

SCALE: N.T.S.

DATE: MARCH 2021

**2183**

**1.1**



**LEGEND:**

- MUNICIPAL BOUNDARY
- LIMIT OF DEVELOPMENT
- EXISTING CONTOUR AND ELEVATION
- WETLAND BOUNDARY
- STORM DRAINAGE BOUNDARY
- TIME TO PEAK LENGTH
- TIME TO PEAK ELEVATION
- OVERLAND FLOW DIRECTION
- CATCHMENT ID
- DRAINAGE AREA (HECTARES)

30 CENTURIAN DRIVE, SUITE 100  
 MARKHAM, ONTARIO L3R 8B8  
 TEL: (905) 475-1900  
 FAX: (905) 475-8335

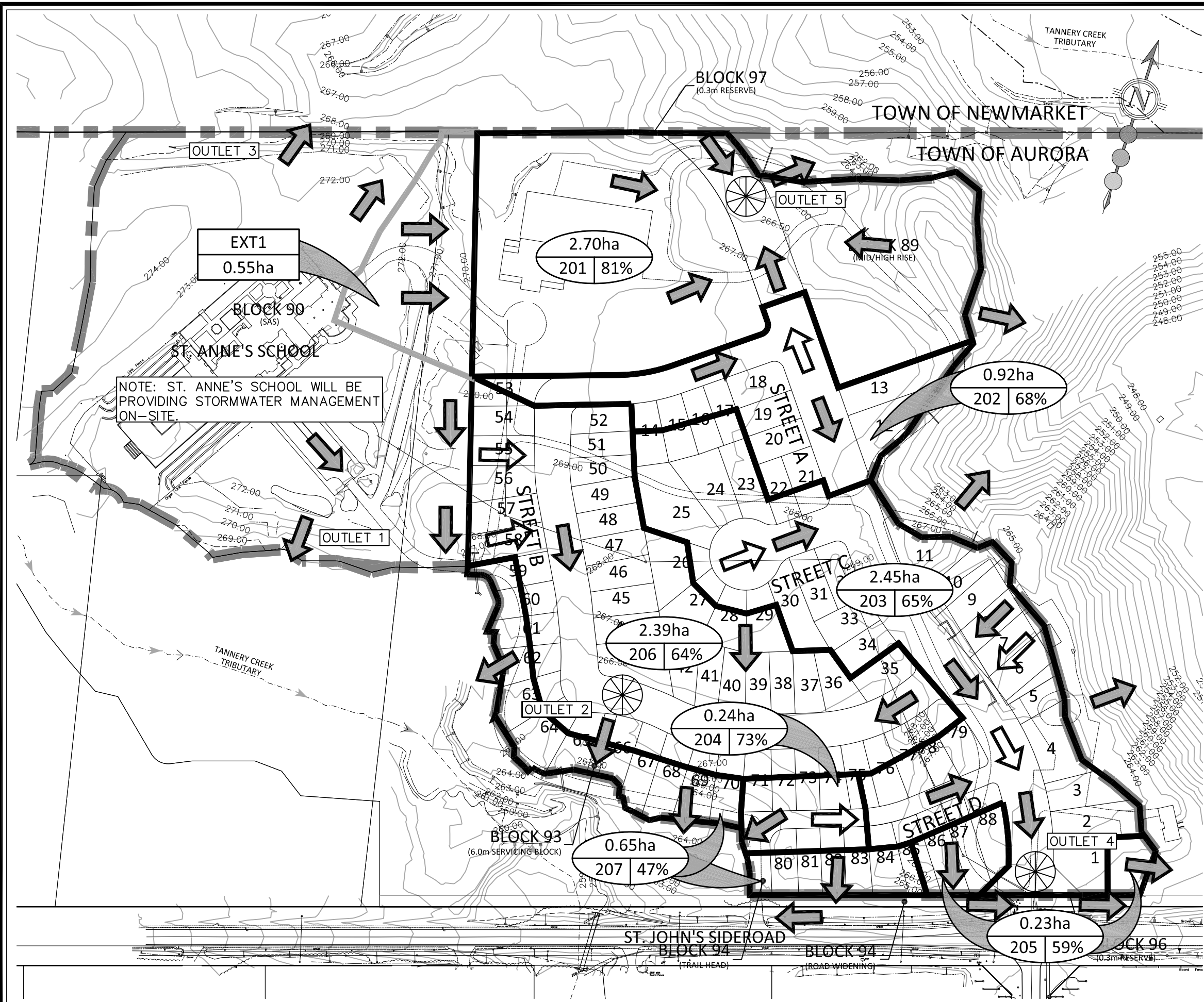
**SHINING HILL ESTATES  
 COLLECTION INC.**

**SHINING HILL ESTATES  
 PHASE 3 - FSSR (AURORA)**

**EXISTING STORM DRAINAGE**

DESIGNED BY: B.B.O.	CHECKED BY: S.E.K.
SCALE: 1:2000	DATE: MARCH 2021
PROJECT No: 2183	FIGURE No: 2.1





NOTE: ST. ANNE'S SCHOOL WILL BE PROVIDING STORMWATER MANAGEMENT ON-SITE.

**LEGEND:**

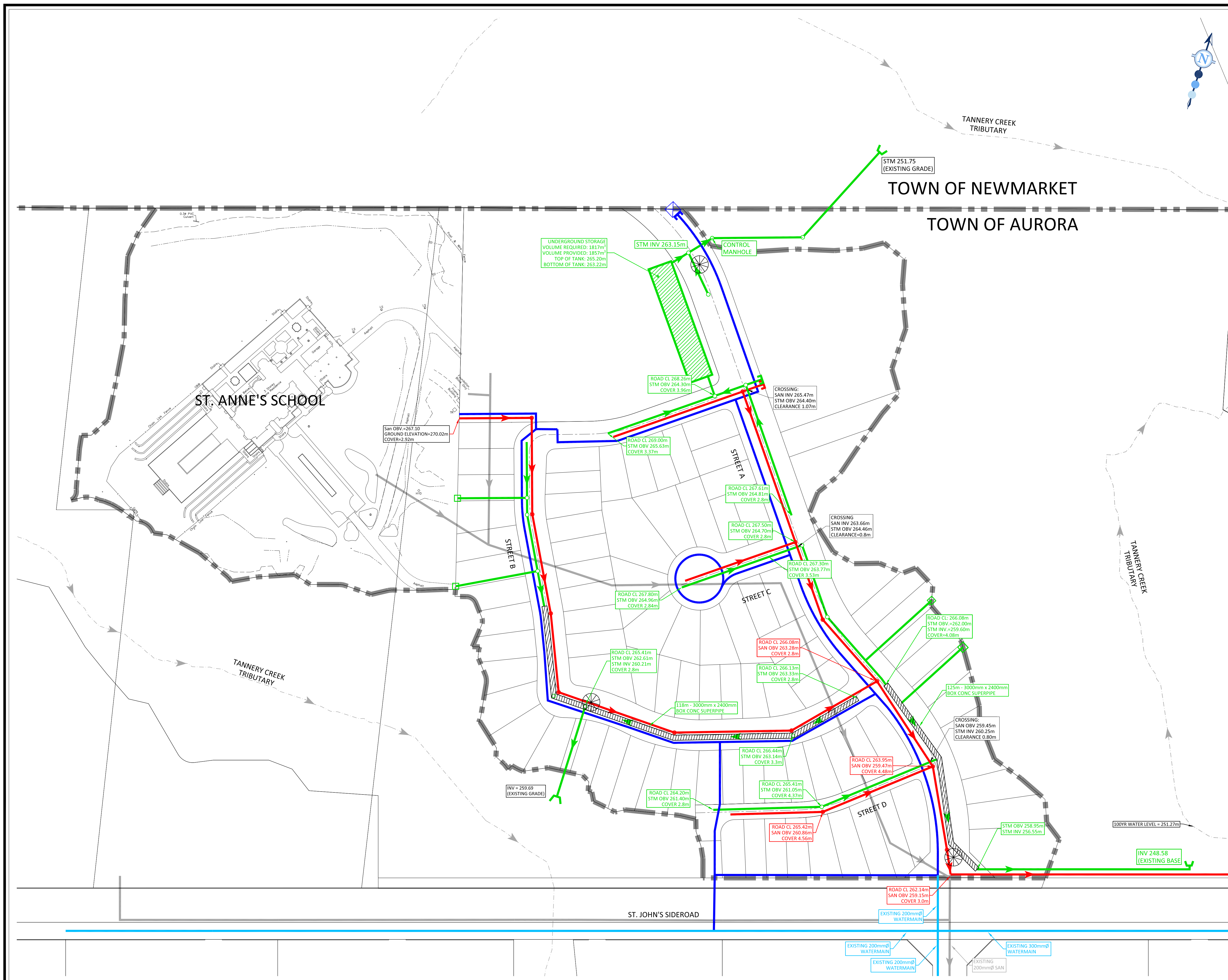
- MUNICIPAL BOUNDARY
- LIMIT OF DEVELOPMENT
- EXISTING CONTOUR AND ELEVATION
- MAJOR SYSTEM - OVERLAND FLOW
- MINOR SYSTEM - STORM SEWER
- WETLAND BOUNDARY
- STORM DRAINAGE BOUNDARY
- EXTERNAL STORM DRAINAGE BOUNDARY
- 100 YEAR CAPTURE LOCATION
- DRAINAGE AREA (HECTARES)  
RUNOFF COEFFICIENT  
CATCHMENT ID
- EXTERNAL CATCHMENT ID  
DRAINAGE AREA

\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

30 CENTURIAN DRIVE, SUITE 100  
MARKHAM, ONTARIO L3R 8B8  
TEL: (905) 475-1900  
FAX: (905) 475-8335

**SHINING HILL ESTATES  
COLLECTION INC.  
SHINING HILL ESTATES  
PHASE 3 - FSSR (AURORA)  
PROPOSED STORM DRAINAGE**

DESIGNED BY: B.B.O.	CHECKED BY: S.E.K.
SCALE: 1:2000	DATE: MARCH 2021
PROJECT No: 2183	FIGURE No: 2.2



**LEGEND:**

	LIMIT OF DEVELOPMENT
	MUNICIPAL BOUNDARY
	STORM SEWER
	SUPERPIPE STORM SEWER
	SANITARY SEWER
	EXISTING SANITARY SEWER
	WATERMAIN
	EXISTING WATERMAIN
	REAR YARD CATCHBASIN
	PROPOSED UNDERGROUND STORAGE
	METER CHAMBER AND PRESSURE REDUCING VALVE
	100 YEAR CAPTURE LOCATION

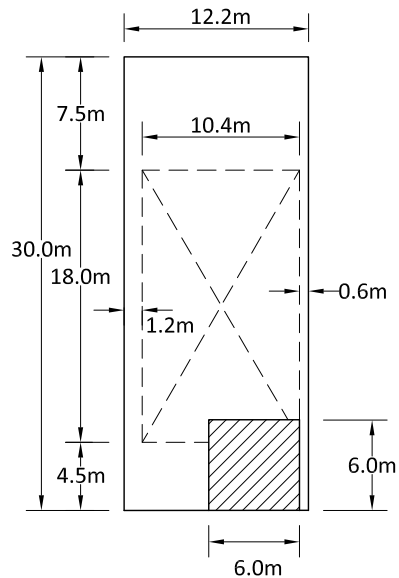
\*NOTE: LAYOUT IS SCHEMATIC ONLY. DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

**SGS consulting group Ltd**  
 30 CENTURIAN DRIVE, SUITE 100  
 MARKHAM, ONTARIO L3R 8B8  
 TEL: (905) 475-1900  
 FAX: (905) 475-8335

**SHINING HILL ESTATES COLLECTION INC.**  
**SHINING HILL ESTATES PHASE 3 - FSSR (AURORA)**  
**PROPOSED SERVICING PLAN**

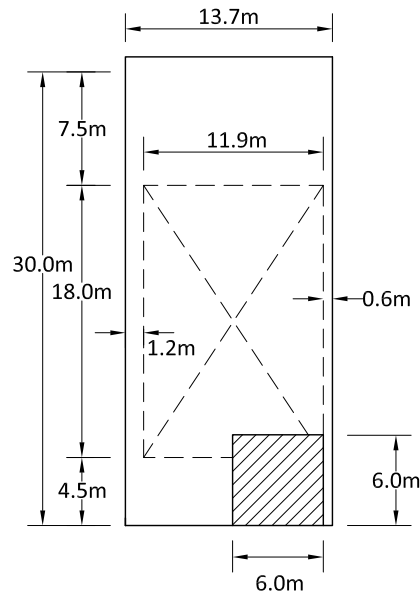
DESIGNED BY: B.B.O.	CHECKED BY: S.E.K.
SCALE: 1:1000	DATE: MARCH 2021
PROJECT No: 2183	FIGURE No: 2.3

TYPICAL 12.2m x 30m SINGLE  
DETACHED DWELLING



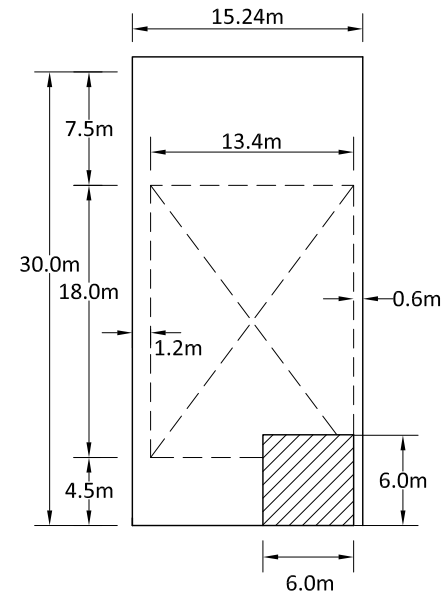
CALCULATED PERCENT IMPERVIOUS = 59%

TYPICAL 13.7m x 30m SINGLE  
DETACHED DWELLING



CALCULATED PERCENT IMPERVIOUS = 59%

TYPICAL 15.24m x 30m SINGLE  
DETACHED DWELLING



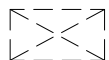
CALCULATED PERCENT IMPERVIOUS = 59%

NOTE: SETBACKS PER ZONING

**LEGEND:**



DRIVEWAY



BUILDING  
ENVELOPE

**SHINING HILL ESTATES  
PHASE 3 - FSSR (AURORA)**

**TYPICAL SINGLE LOT  
COVERAGE**



30 CENTURIAN DRIVE, SUITE 100  
MARKHAM, ONTARIO L3R 8B8  
TEL: (905) 475-1900  
FAX: (905) 475-8335

DESIGNED BY: E.S.

CHECKED BY: E.T.C.K.

SCALE: 1:500

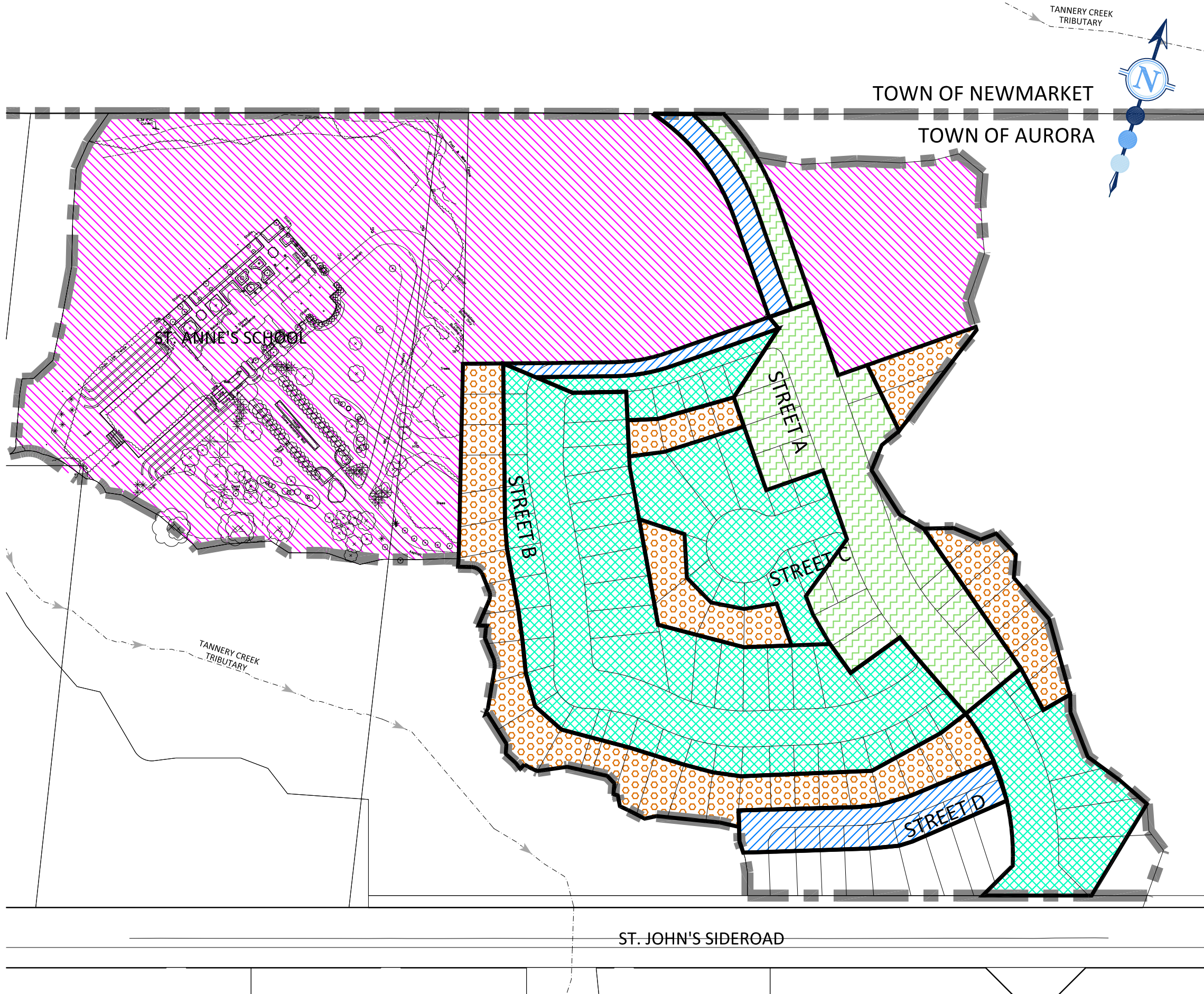
DATE: MARCH 2021

PROJECT No:





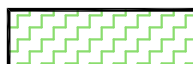

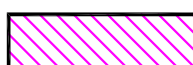
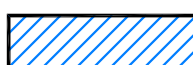
**2183**

FIGURE No:

**2.4**



**LEGEND:**

-  MUNICIPAL BOUNDARY
-  LIMIT OF DEVELOPMENT
-  STORM DRAINAGE BOUNDARY
-  REAR YARD INFILTRATION TRENCH (25 mm/imp-ha)
-  CATCHBASIN INFILTRATION SYSTEM
-  CATCHBASIN FILTRATION SYSTEM
-  ON-SITE INFILTRATION (25 mm/imp-ha)
-  BIOSWALE (25 mm/imp-ha)

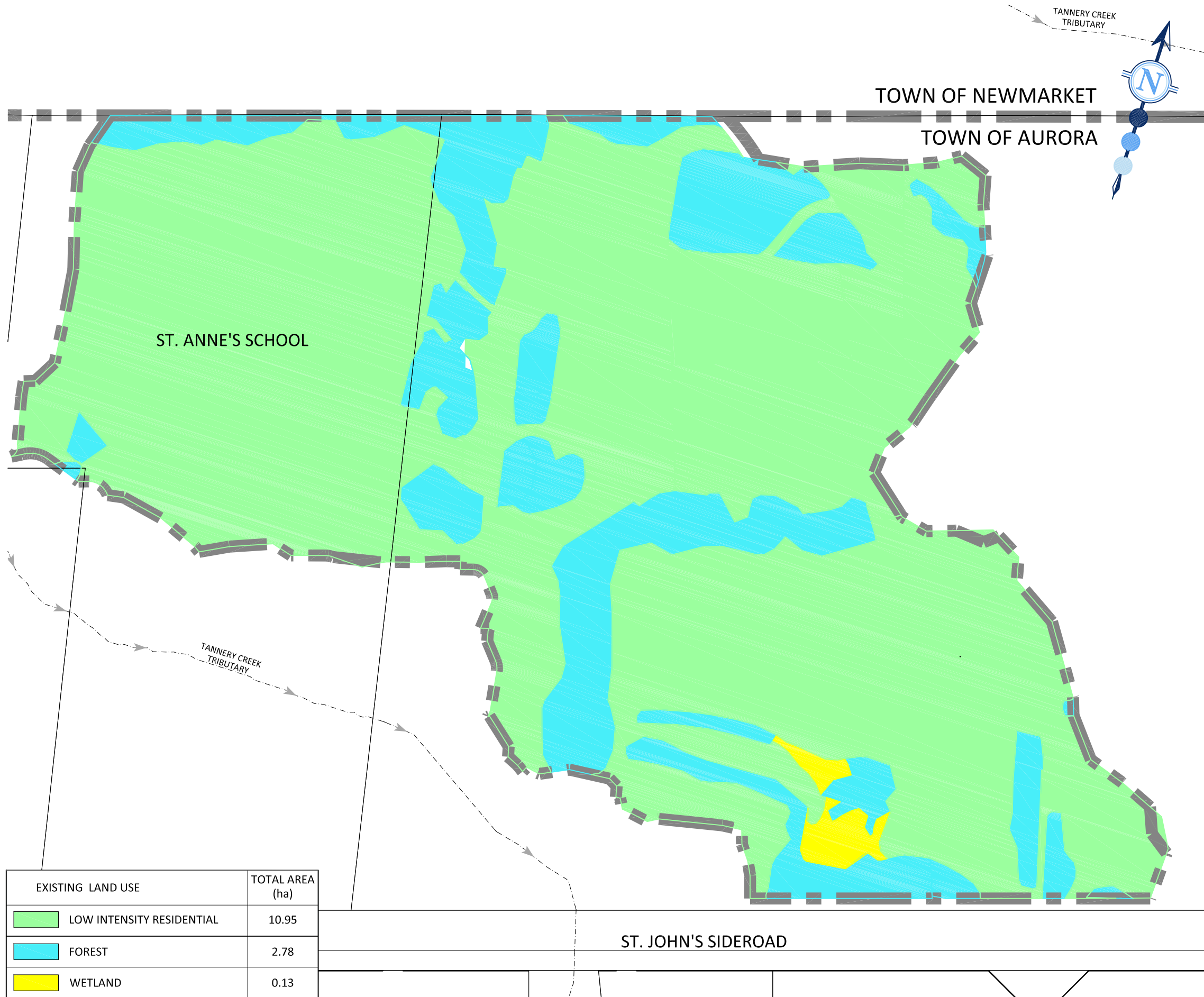
\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

 30 CENTURIAN DRIVE, SUITE 100  
 MARKHAM, ONTARIO L3R 8B8  
 TEL: (905) 475-1900  
 FAX: (905) 475-8335



**SHINING HILL ESTATES  
 COLLECTION INC.  
 SHINING HILL ESTATES  
 PHASE 3 - FSSR (AURORA)**

**LID PLAN**

DESIGNED BY: B.B.O.	CHECKED BY: S.E.K.
SCALE: 1:2000	DATE: MARCH 2021
PROJECT No: <b>2183</b>	FIGURE No: <b>2.5</b>



**LEGEND:**

 MUNICIPAL BOUNDARY  
 LIMIT OF DEVELOPMENT





 30 CENTURIAN DRIVE, SUITE 100  
 MARKHAM, ONTARIO L3R 8B8  
 TEL: (905) 475-1900  
 FAX: (905) 475-8335

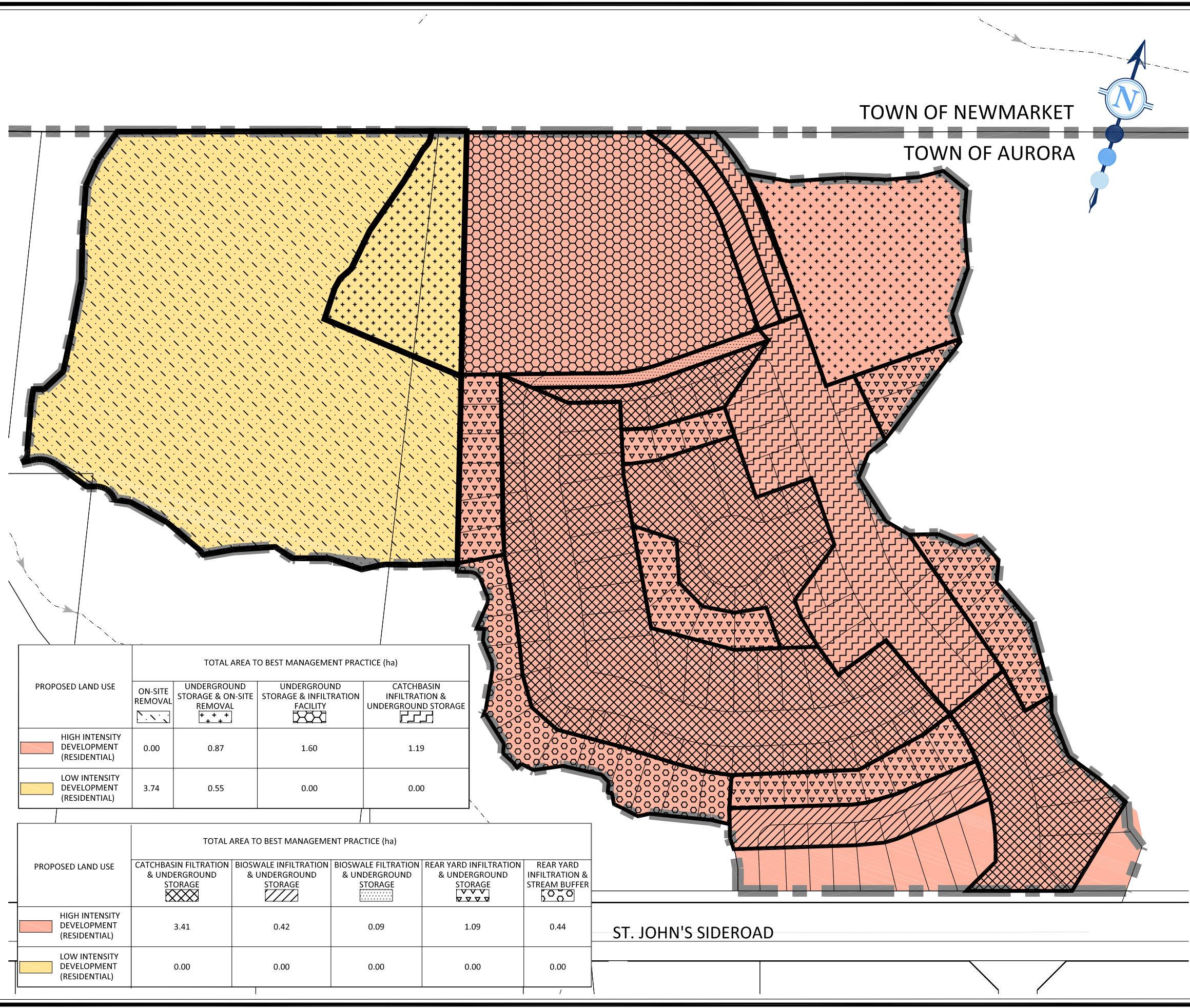
**SHINING HILL ESTATES  
COLLECTION INC.**

**SHINING HILL ESTATES  
PHASE 3 - FSSR (AURORA)**

**EXISTING PHOSPHORUS  
BUDGET**

DESIGNED BY: B.B.O.	CHECKED BY: S.E.K.
SCALE: 1:2000	DATE: MARCH 2021
PROJECT No: <b>2183</b>	FIGURE No: <b>2.6</b>

EXISTING LAND USE	TOTAL AREA (ha)
 LOW INTENSITY RESIDENTIAL	10.95
 FOREST	2.78
 WETLAND	0.13



**LEGEND:**

	MUNICIPAL BOUNDARY
	LIMIT OF DEVELOPMENT
	STORM DRAINAGE BOUNDARY

\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

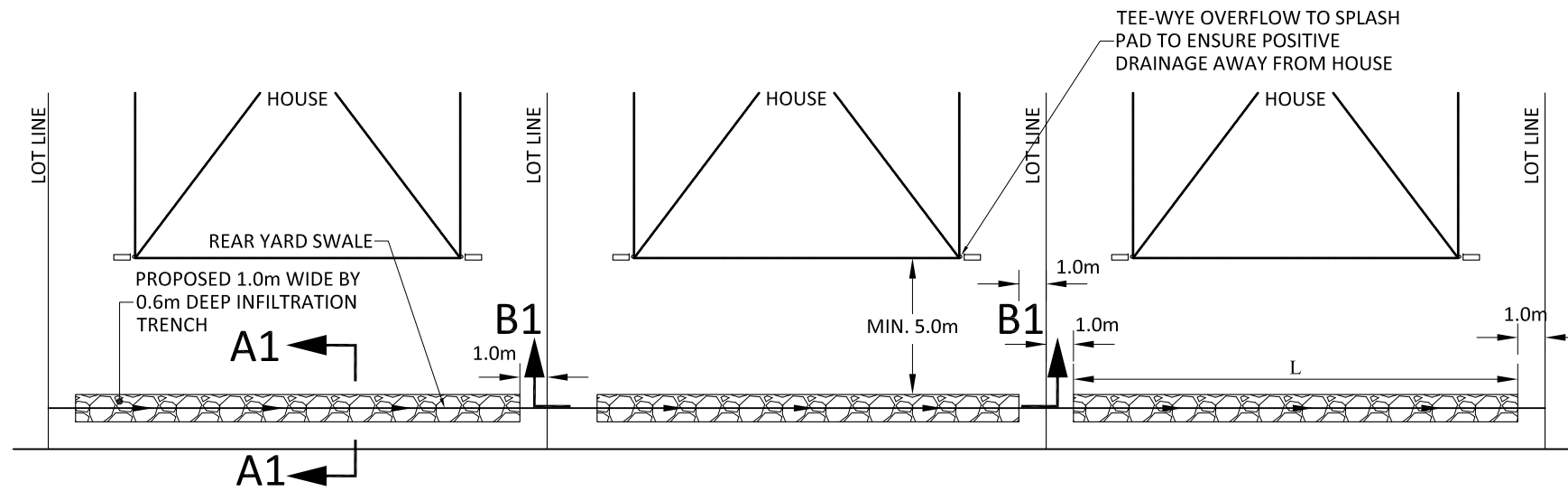
30 CENTURIAN DRIVE, SUITE 100  
 MARKHAM, ONTARIO L3R 8B8  
 TEL: (905) 475-1900  
 FAX: (905) 475-8335

**SHINING HILL ESTATES  
 COLLECTION INC.  
 SHINING HILL ESTATES  
 PHASE 3 - FSSR (AURORA)  
 PROPOSED PHOSPHORUS  
 BUDGET**

PROPOSED LAND USE	TOTAL AREA TO BEST MANAGEMENT PRACTICE (ha)			
	ON-SITE REMOVAL 	UNDERGROUND STORAGE & ON-SITE REMOVAL 	UNDERGROUND STORAGE & INFILTRATION FACILITY 	CATCHBASIN INFILTRATION & UNDERGROUND STORAGE 
HIGH INTENSITY DEVELOPMENT (RESIDENTIAL)	0.00	0.87	1.60	1.19
LOW INTENSITY DEVELOPMENT (RESIDENTIAL)	3.74	0.55	0.00	0.00

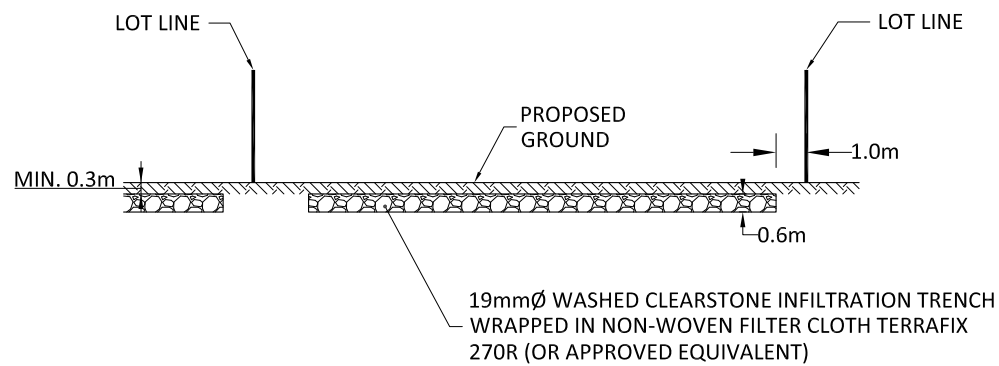
PROPOSED LAND USE	TOTAL AREA TO BEST MANAGEMENT PRACTICE (ha)				
	CATCHBASIN FILTRATION & UNDERGROUND STORAGE 	BIOSWALE INFILTRATION & UNDERGROUND STORAGE 	BIOSWALE FILTRATION & UNDERGROUND STORAGE 	REAR YARD INFILTRATION & UNDERGROUND STORAGE 	REAR YARD INFILTRATION & STREAM BUFFER 
HIGH INTENSITY DEVELOPMENT (RESIDENTIAL)	3.41	0.42	0.09	1.09	0.44
LOW INTENSITY DEVELOPMENT (RESIDENTIAL)	0.00	0.00	0.00	0.00	0.00

DESIGNED BY: B.B.O.	CHECKED BY: S.E.K.
SCALE: 1:2000	DATE: MARCH 2021
PROJECT No: 2183	FIGURE No: 2.7



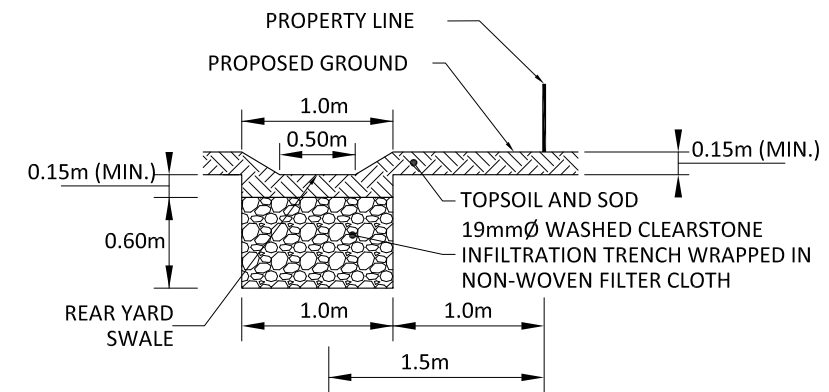
**SPLIT DRAINING LOTS  
PLAN**

SCALE 1:250



**SECTION B1-B1**

SCALE 1:250



**SECTION A1-A1  
INFILTRATION TRENCH ASSEMBLY**

SCALE 1:50

\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

**SHINING HILL ESTATES  
COLLECTION INC.**

**LEGEND:**

**SCS** consulting group ltd  
30 CENTURIAN DRIVE, SUITE 100  
MARKHAM, ONTARIO L3R 8B8  
TEL: (905) 475-1900  
FAX: (905) 475-8335

**SHINING HILL ESTATES  
PHASE 3 - FSSR (AURORA)**

**REAR YARD INFILTRATION  
TRENCH DETAIL**

DESIGNED BY: B.B.O.

CHECKED BY: S.E.K.

PROJECT No:

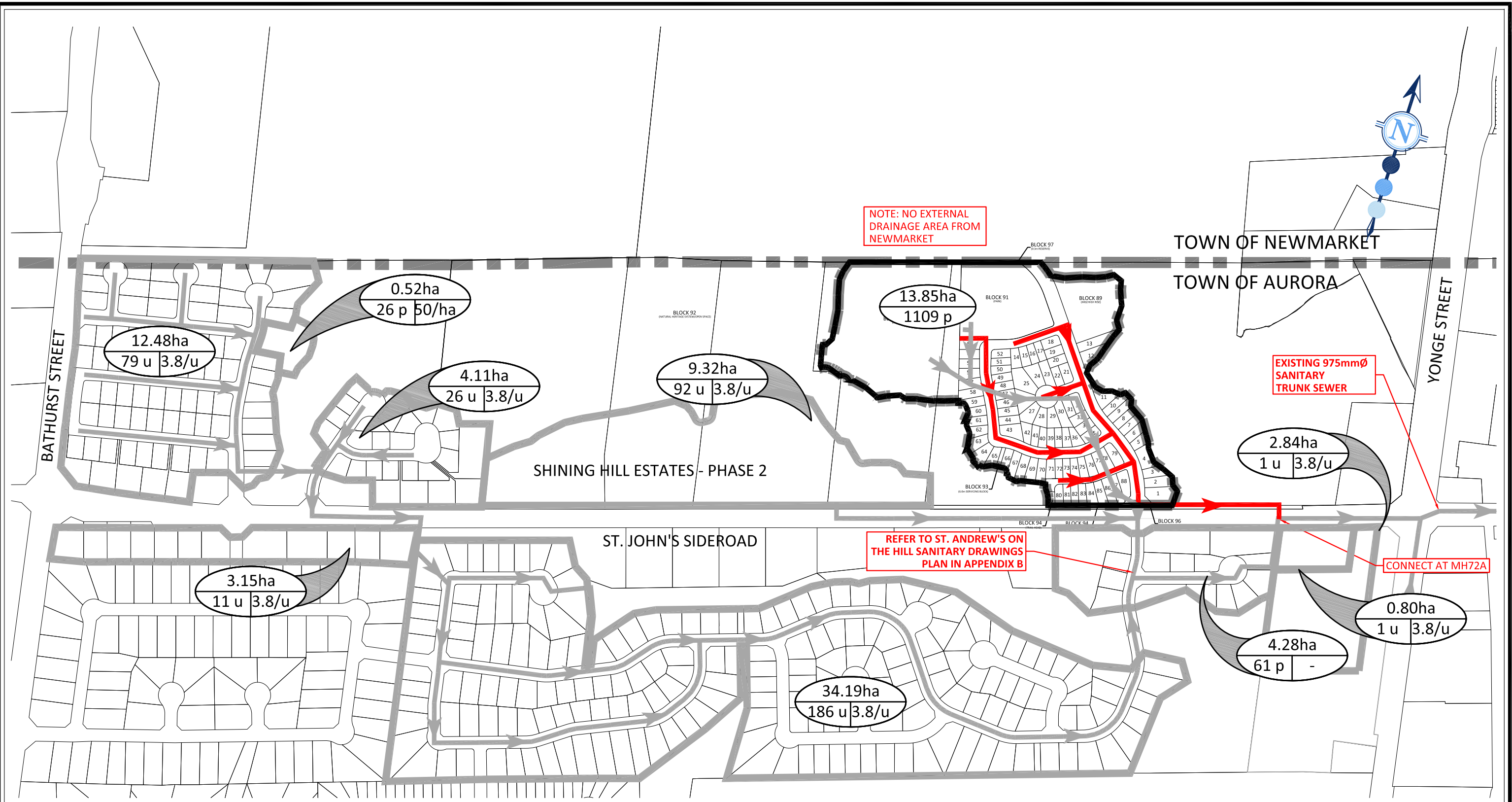
FIGURE No:

SCALE: AS SHOWN

DATE: MARCH 2021

**2183**

**2.8**



\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

### SHINING HILL ESTATES COLLECTION INC.

**SCS consulting group ltd**  
 30 CENTURIAN DRIVE, SUITE 100  
 MARKHAM, ONTARIO L3R 8B8  
 TEL: (905) 475-1900  
 FAX: (905) 475-8335

**LEGEND:**

- MUNICIPAL BOUNDARY
- LIMIT OF DEVELOPMENT
- PROPOSED SANITARY DRAINAGE BOUNDARY
- EXTERNAL SANITARY DRAINAGE BOUNDARY
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER

**Sanitary Drainage Area Data:**

- 1.60ha / 80p / 50/u
- 12.48ha / 79 u / 3.8/u
- 0.52ha / 26 p / 50/ha
- 4.11ha / 26 u / 3.8/u
- 9.32ha / 92 u / 3.8/u
- 13.85ha / 1109 p
- 3.15ha / 11 u / 3.8/u
- 34.19ha / 186 u / 3.8/u
- 2.84ha / 1 u / 3.8/u
- 0.80ha / 1 u / 3.8/u
- 4.28ha / 61 p / -

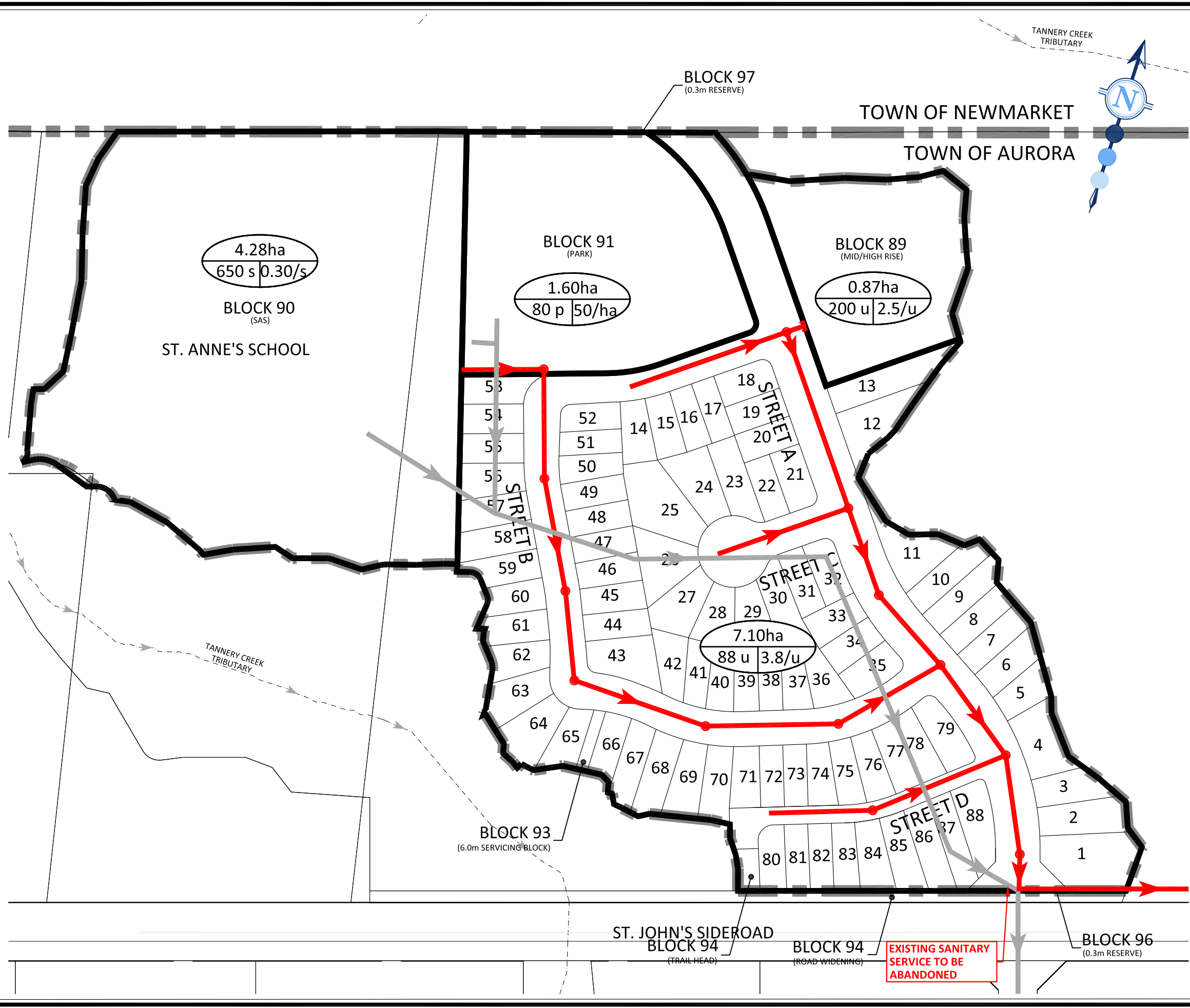
### SHINING HILL ESTATES PHASE 3 - FSSR (AURORA)

DESIGNED BY:	B.B.O.	CHECKED BY:	S.E.K.
SCALE:	1:6000	DATE:	MARCH 2021

### EXTERNAL SANITARY DRAINAGE PLAN

PROJECT No:	FIGURE No:
<b>2183</b>	<b>3.1</b>





**LEGEND:**

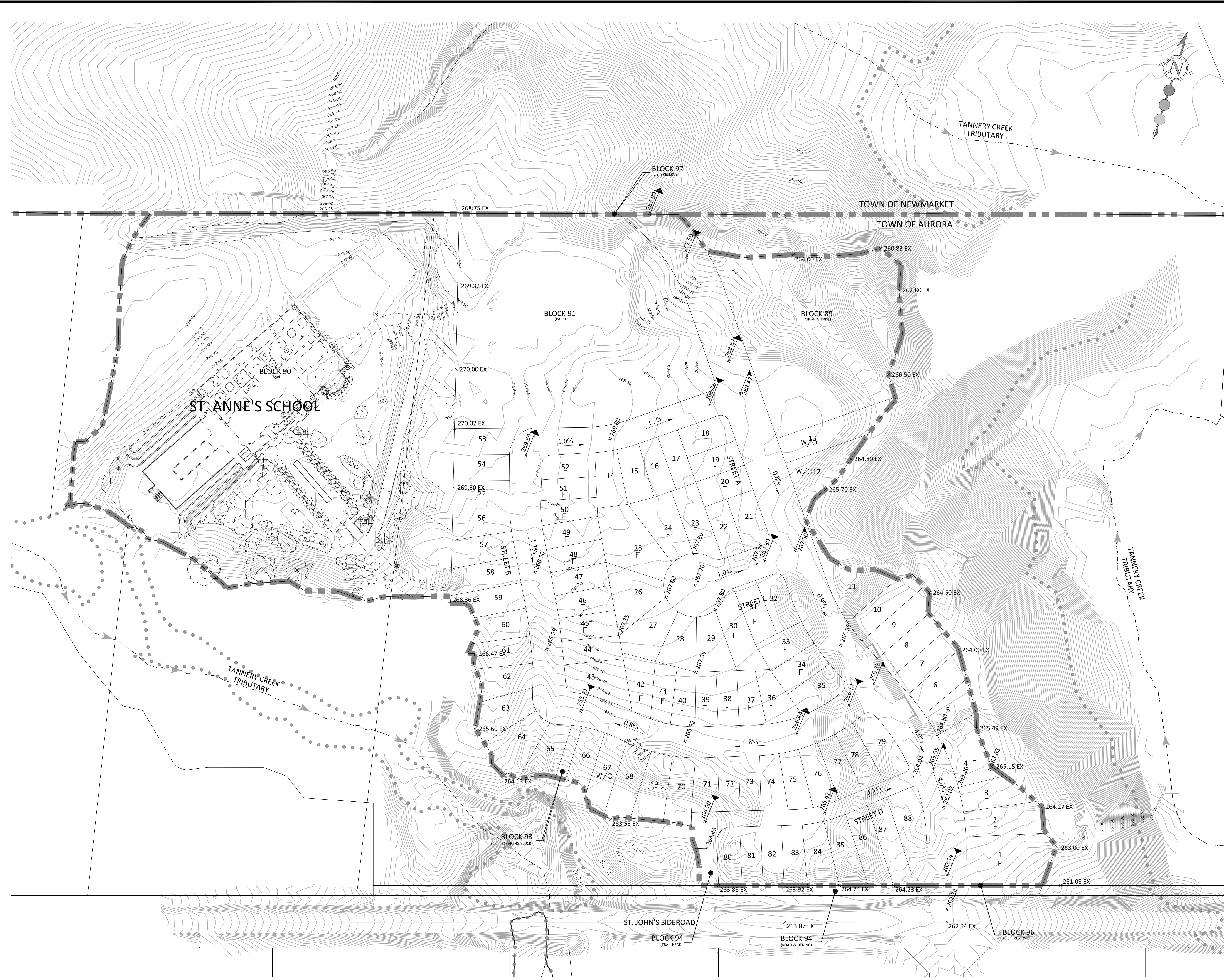
- MUNICIPAL BOUNDARY
- LIMIT OF DEVELOPMENT
- SANITARY DRAINAGE BOUNDARY
- SANITARY SEWER AND FLOW DIRECTION
- EXISTING SANITARY SEWER AND FLOW DIRECTION
- SANITARY DRAINAGE AREA
- PERSONS PER UNIT OR PERSONS PER AREA
- TOTAL POPULATION (p) OR TOTAL UNITS

\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

30 CENTURIAN DRIVE, SUITE 100  
 MARKHAM, ONTARIO L3R 8B8  
 TEL: (905) 475-1900  
 FAX: (905) 475-8335

**SHINING HILL ESTATES  
 COLLECTION INC.  
 SHINING HILL ESTATES  
 PHASE 3 - FSSR (AURORA)  
 PRELIMINARY SANITARY  
 DRAINAGE PLAN**

DESIGNED BY: B.B.O.	CHECKED BY: S.E.K.
SCALE: 1:2000	DATE: MARCH 2021
PROJECT No: 2183	FIGURE No: 3.2



**LEGEND:**

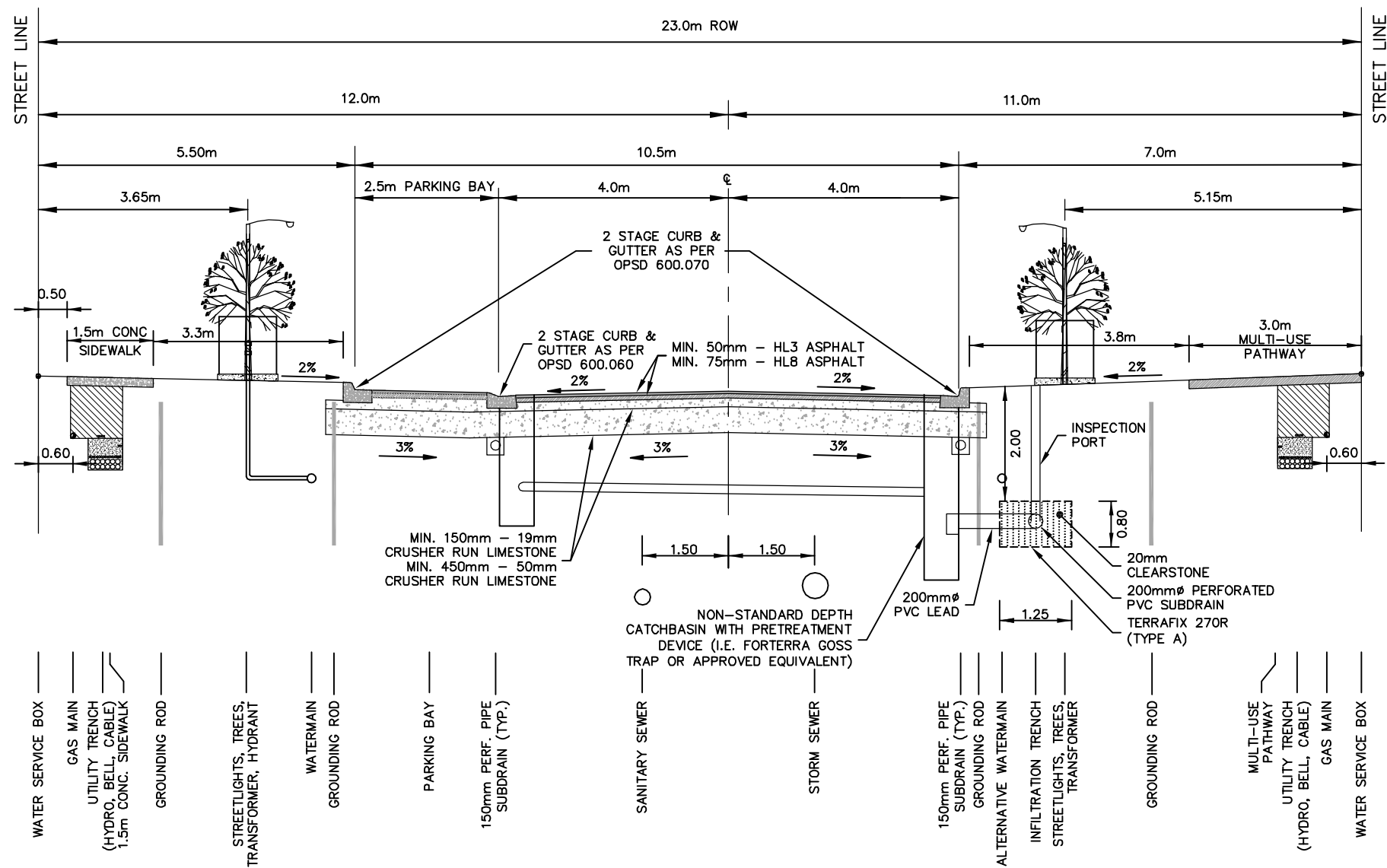
	MUNICIPAL BOUNDARY
	LIMIT OF DEVELOPMENT
	EXISTING CONTOUR AND ELEVATION
	PROPOSED CONTOUR
	EXISTING ELEVATION
	PROPOSED ELEVATION
	PROPOSED 3:1 MAX SLOPE
	PROPOSED ROAD GRADE
	PROPOSED ROAD HIGH / LOW POINT
	EXISTING REGULATORY FLOODLINE
	FRONT DRAINING LOT
	WALKOUT LOT

NOTE: ALL SINGLE RESIDENTIAL LOTS ARE SPLIT DRAINING UNLESS OTHERWISE NOTED.  
 \*NOTE: LAYOUT IS SCHEMATIC ONLY. DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

**SGS consulting group Ltd**  
 30 CENTURIAN DRIVE, SUITE 100  
 MARKHAM, ONTARIO L3R 8B8  
 TEL: (905) 475-1900  
 FAX: (905) 475-8335

**SHINING HILL ESTATES  
 COLLECTION INC.  
 SHINING HILL ESTATES  
 PHASE 3 - FSSR (AURORA)  
 PRELIMINARY GRADING PLAN**

DESIGNED BY: B.B.O.	CHECKED BY: S.E.K.
SCALE: 1:1000	DATE: MARCH 2021
PROJECT No: 2183	FIGURE No: 5.1



\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

**SHINING HILL ESTATES  
COLLECTION INC.**

30 CENTURIAN DRIVE, SUITE 100  
MARKHAM, ONTARIO L3R 8B8  
TEL: (905) 475-1900  
FAX: (905) 475-8335

**LEGEND:**

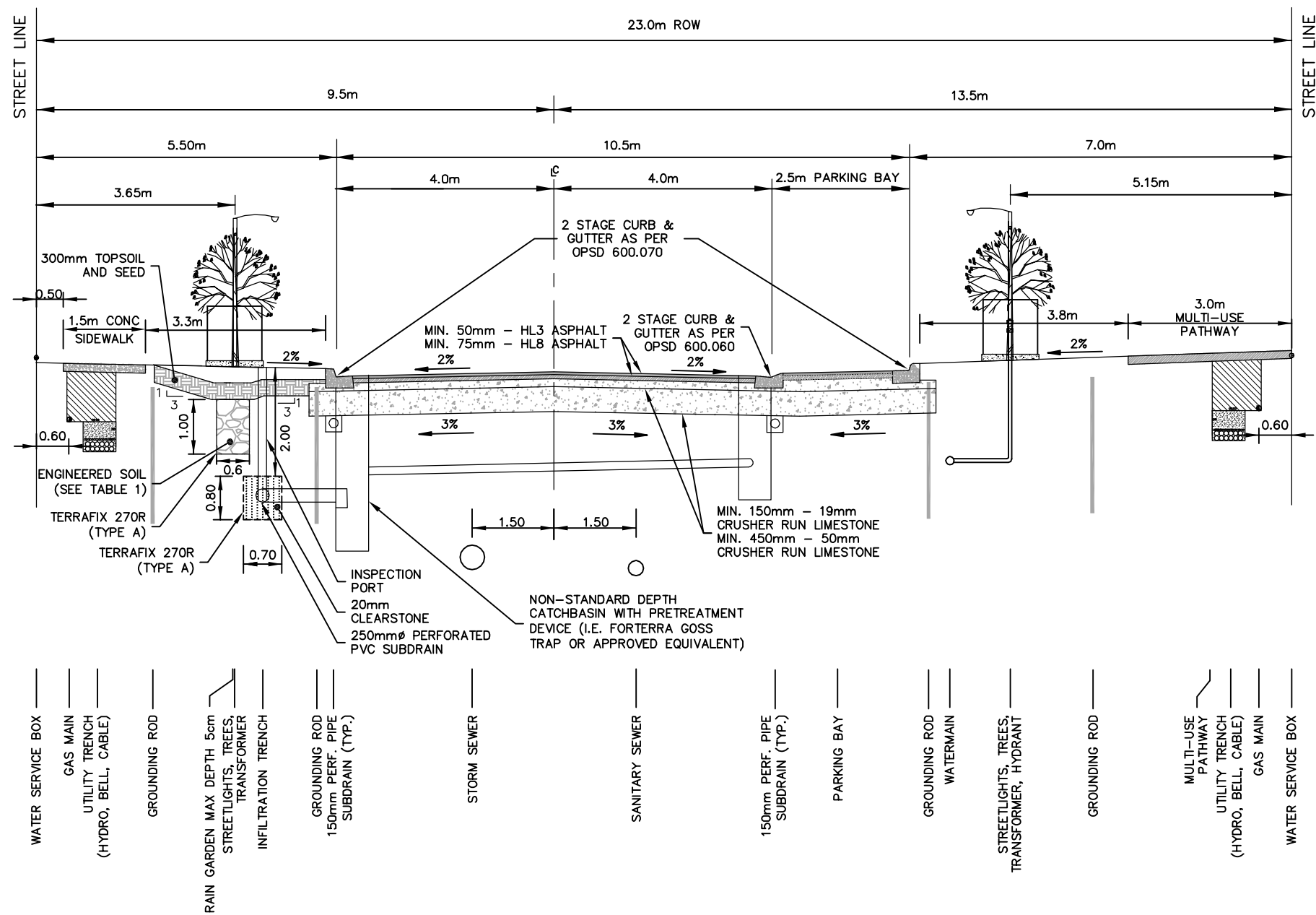
WATER SERVICE BOX	WATERMAIN	PARKING BAY	SANITARY SEWER	150mm PERF. PIPE SUBDRAIN (TYP.)	ALTERNATIVE WATERMAIN	MULTI-USE PATHWAY	WATER SERVICE BOX
GAS MAIN	GROUNDING ROD	150mm PERF. PIPE SUBDRAIN (TYP.)	STORM SEWER	GROUNDING ROD	INFILTRATION TRENCH	UTILITY TRENCH (HYDRO, BELL, CABLE)	GAS MAIN
UTILITY TRENCH (HYDRO, BELL, CABLE) 1.5m CONC. SIDEWALK	STREETLIGHTS, TREES, TRANSFORMER, HYDRANT	GROUNDING ROD	NON-STANDARD DEPTH CATCHBASIN WITH PRETREATMENT DEVICE (I.E. FORTERRA GOSS TRAP OR APPROVED EQUIVALENT)	INSPECTION PORT	STREETLIGHTS, TREES, TRANSFORMER	GROUNDING ROD	UTILITY TRENCH (HYDRO, BELL, CABLE)

**SHINING HILL ESTATES  
PHASE 3 - FSSR (AURORA)**

DESIGNED BY:	B.B.O.	CHECKED BY:	S.E.K.
SCALE:	1:100	DATE:	MARCH 2021

**23.0m COLLECTOR  
ROAD SECTION**

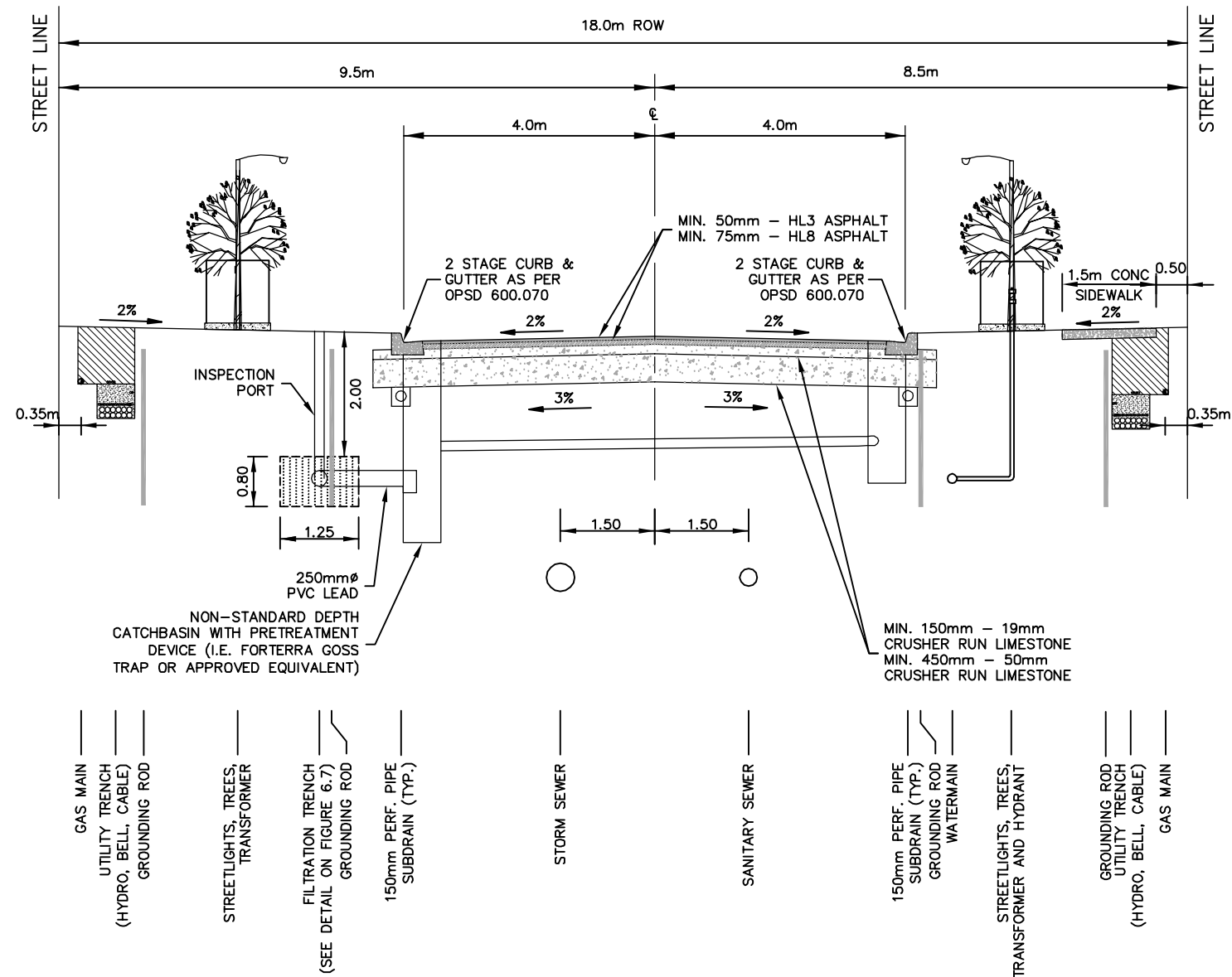
PROJECT No:	FIGURE No:
<b>2183</b>	<b>6.1</b>



ENGINEERED SOIL - TABLE 1	
COMPONENT	PERCENT BY WEIGHT
SAND (2.0 TO 0.05mm DIA.)	85 TO 88%
FINES (<0.05mm DIA.)	8 TO 12%
ORGANIC MATTER	3 TO 5%

\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

<b>SHINING HILL ESTATES COLLECTION INC.</b>  30 CENTURIAN DRIVE, SUITE 100 MARKHAM, ONTARIO L3R 8B8 TEL: (905) 475-1900 FAX: (905) 475-8335	<b>LEGEND:</b>  	<b>SHINING HILL ESTATES PHASE 3 - FSSR (AURORA)</b>		<b>23.0m COLLECTOR ROAD ALTERNATIVE SECTION</b>	
		DESIGNED BY: B.B.O. SCALE: 1:100	CHECKED BY: S.E.K. DATE: MARCH 2021	PROJECT No: <b>2183</b>	FIGURE No: <b>6.2</b>



\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

SHINING HILL ESTATES  
COLLECTION INC.

LEGEND:

SHINING HILL ESTATES  
PHASE 3 - FSSR (AURORA)

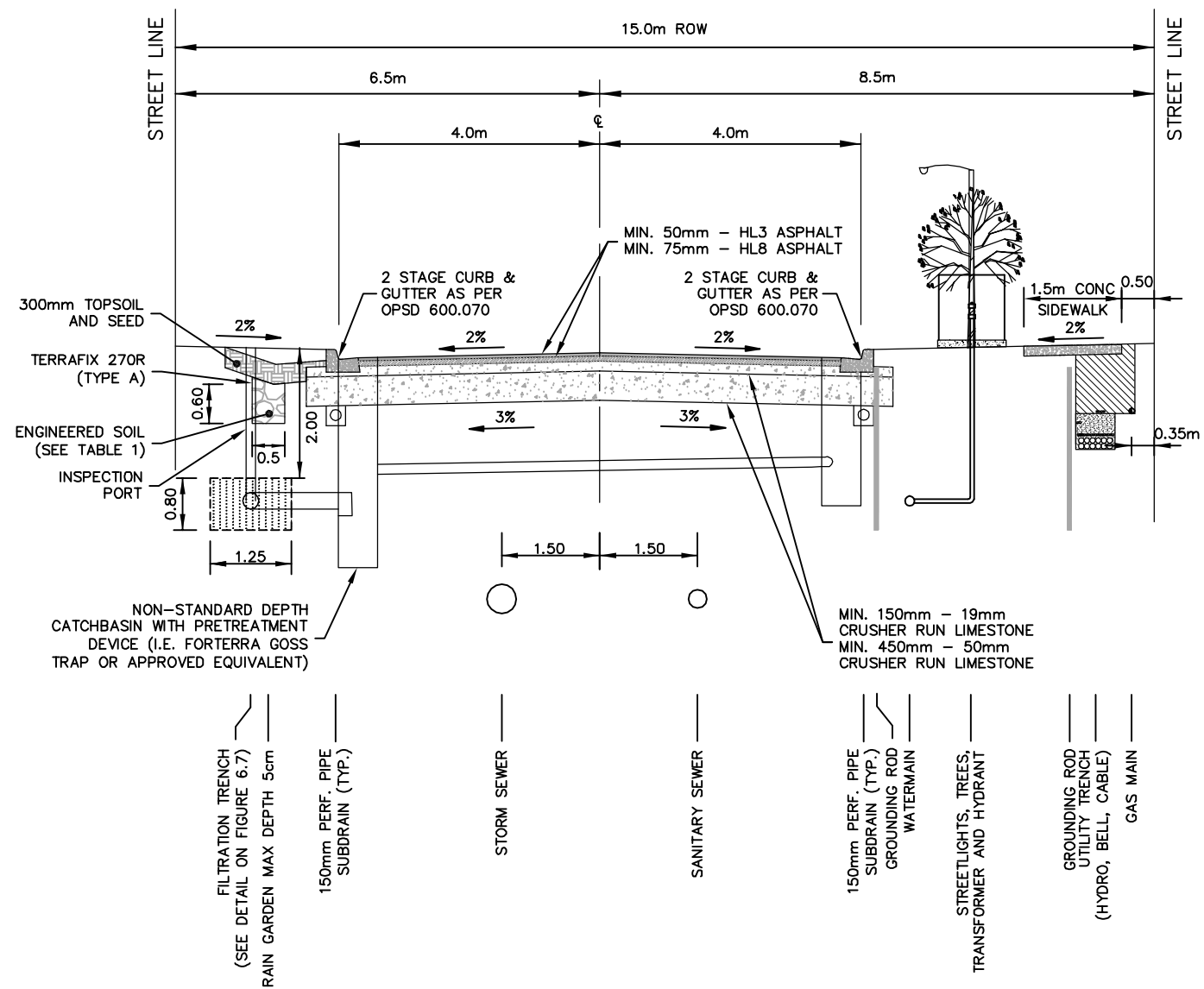
18.0m LOCAL ROAD  
SECTION



30 CENTURIAN DRIVE, SUITE 100  
MARKHAM, ONTARIO L3R 8B8  
TEL: (905) 475-1900  
FAX: (905) 475-8335

DESIGNED BY:	B.B.O.	CHECKED BY:	S.E.K.
SCALE:	1:100	DATE:	MARCH 2021

PROJECT No:	FIGURE No:
2183	6.3



ENGINEERED SOIL - TABLE 1	
COMPONENT	PERCENT BY WEIGHT
SAND (2.0 TO 0.05mm DIA.)	85 TO 88%
FINES (<0.05mm DIA.)	8 TO 12%
ORGANIC MATTER	3 TO 5%

\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

**SHINING HILL ESTATES  
COLLECTION INC.**

**LEGEND:**

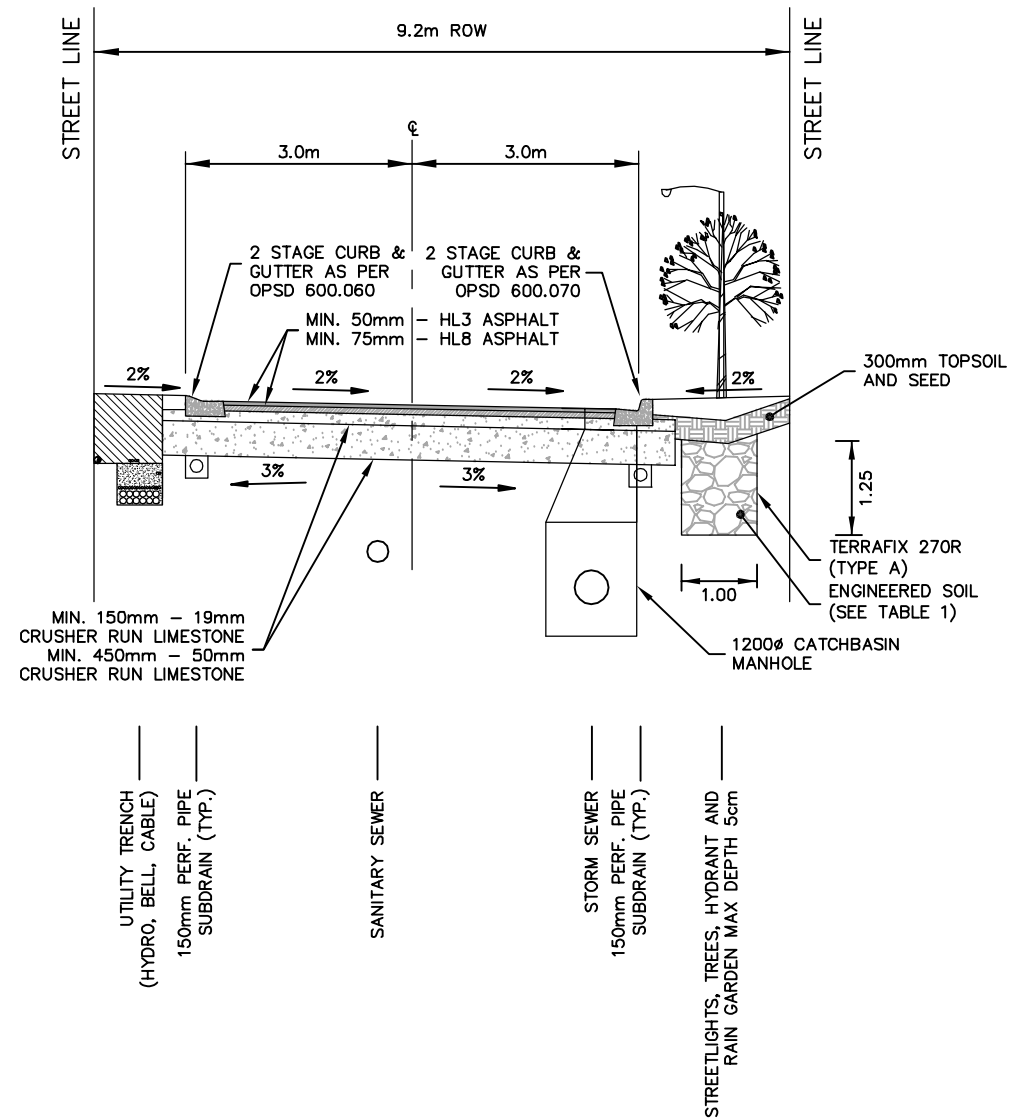
**SHINING HILL ESTATES  
PHASE 3 - FSSR (AURORA)**

**15.0m LOCAL ROAD SECTION**

**SCS consulting group ltd**  
30 CENTURIAN DRIVE, SUITE 100  
MARKHAM, ONTARIO L3R 8B8  
TEL: (905) 475-1900  
FAX: (905) 475-8335

DESIGNED BY: B.B.O.	CHECKED BY: S.E.K.
SCALE: 1:100	DATE: MARCH 2021

PROJECT No:	FIGURE No:
<b>2183</b>	<b>6.4</b>



ENGINEERED SOIL - TABLE 1	
COMPONENT	PERCENT BY WEIGHT
SAND (2.0 TO 0.05mm DIA.)	85 TO 88%
FINES (<0.05mm DIA.)	8 TO 12%
ORGANIC MATTER	3 TO 5%

\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

**SHINING HILL ESTATES  
COLLECTION INC.**

**LEGEND:**

**SHINING HILL ESTATES  
PHASE 3 - FSSR (AURORA)**

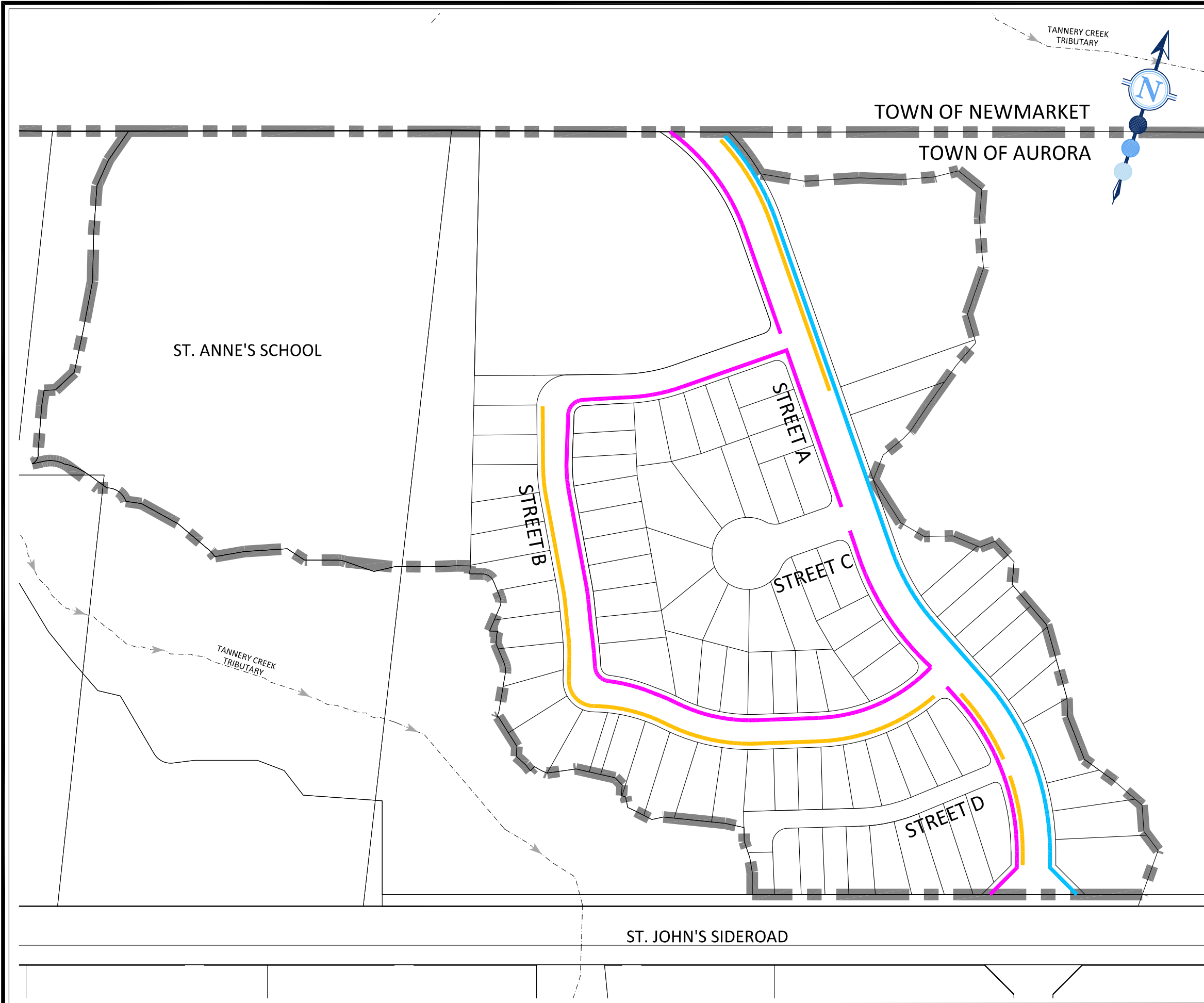
**9.2m LANEWAY SECTION**

**SCS consulting group ltd**  
30 CENTURIAN DRIVE, SUITE 100  
MARKHAM, ONTARIO L3R 8B8  
TEL: (905) 475-1900  
FAX: (905) 475-8335

DESIGNED BY:	B.B.O.	CHECKED BY:	S.E.K.
SCALE:	1:100	DATE:	MARCH 2021

PROJECT No:  
**2183**

FIGURE No:  
**6.5**



**LEGEND:**

-  MUNICIPAL BOUNDARY
-  LIMIT OF DEVELOPMENT
-  PARKING LANE
-  SIDEWALK
-  MULTI-USE PATH

\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

 30 CENTURIAN DRIVE, SUITE 100  
 MARKHAM, ONTARIO L3R 8B8  
 TEL: (905) 475-1900  
 FAX: (905) 475-8335

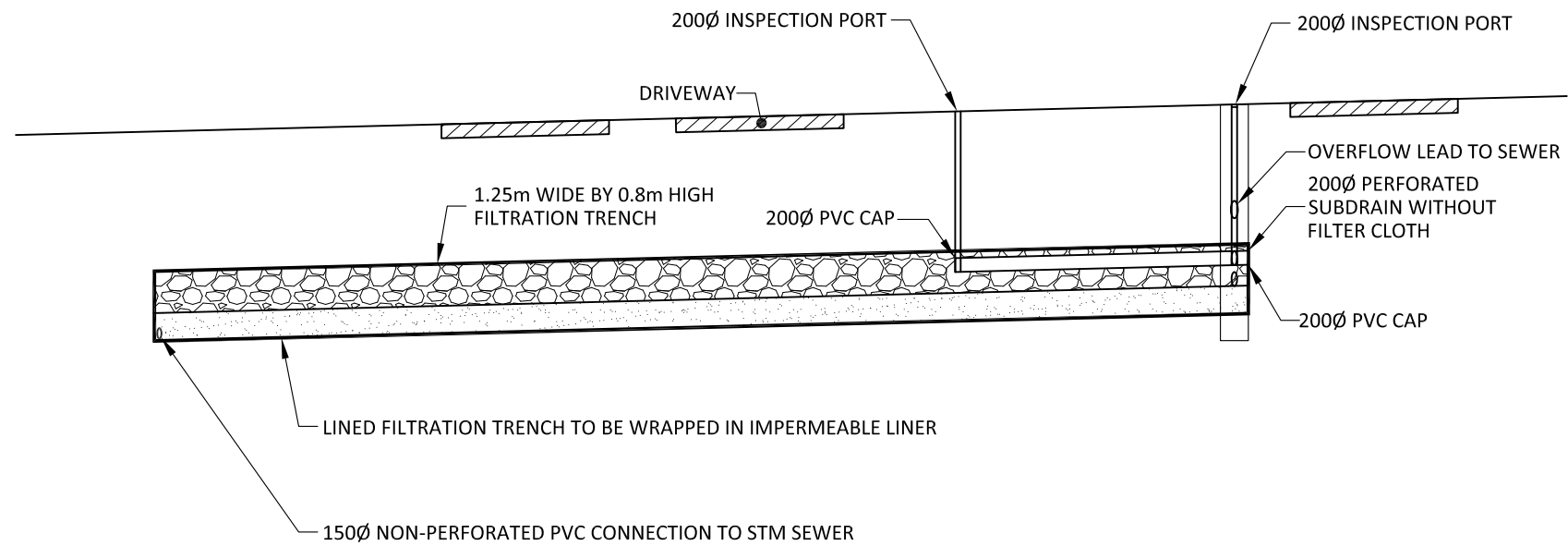
**SHINING HILL ESTATES  
 COLLECTION INC.**

**SHINING HILL ESTATES  
 PHASE 3 - FSSR (AURORA)**

**SIDEWALK AND PARKING PLAN**

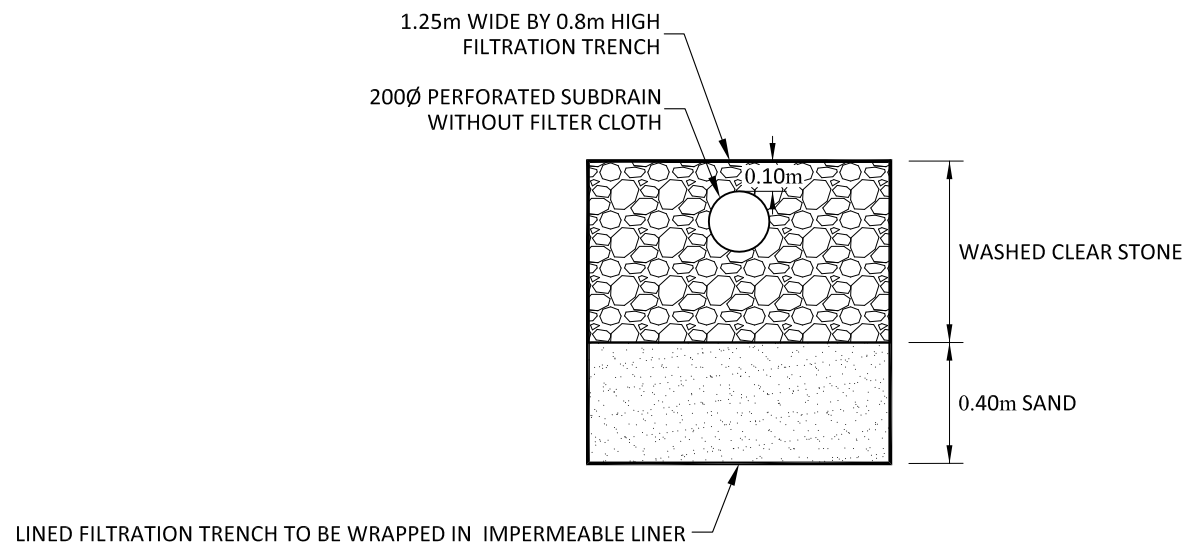
DESIGNED BY: B.B.O.	CHECKED BY: S.E.K.
SCALE: 1:2000	DATE: MARCH 2021
PROJECT No: 2183	FIGURE No: 6.6





**PRELIMINARY FILTRATION TRENCH - PROFILE VIEW**

SCALE: N.T.S.



**PRELIMINARY FILTRATION TRENCH  
CROSS-SECTION**

SCALE: N.T.S.

\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

**SHINING HILL ESTATES  
COLLECTION INC.**

**LEGEND:**

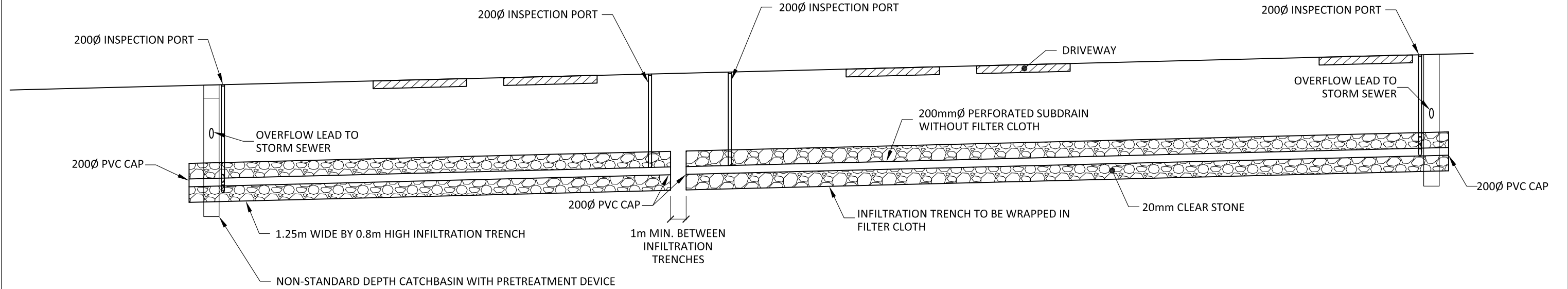
**SCS** consulting group ltd  
30 CENTURIAN DRIVE, SUITE 100  
MARKHAM, ONTARIO L3R 8B8  
TEL: (905) 475-1900  
FAX: (905) 475-8335

**SHINING HILL ESTATES  
PHASE 3 - FSSR (AURORA)**

**CATCHBASIN FILTRATION  
TRENCH DETAIL**

DESIGNED BY:	B.B.O.	CHECKED BY:	S.E.K.
SCALE:	AS SHOWN	DATE:	MARCH 2021

PROJECT No:	FIGURE No:
<b>2183</b>	<b>6.7</b>



### PRELIMINARY INFILTRATION TRENCH - PROFILE VIEW

SCALE: N.T.S.

\*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

**SHINING HILL ESTATES  
COLLECTION INC.**

**LEGEND:**

**SCS** consulting group ltd  
 30 CENTURIAN DRIVE, SUITE 100  
 MARKHAM, ONTARIO L3R 8B8  
 TEL: (905) 475-1900  
 FAX: (905) 475-8335

**SHINING HILL ESTATES  
PHASE 3 - FSSR (AURORA)**

**CATCHBASIN INFILTRATION  
TRENCH DETAIL**

DESIGNED BY:	B.B.O.	CHECKED BY:	S.E.K.
SCALE:	AS SHOWN	DATE:	MARCH 2021

PROJECT No:  
**2183**

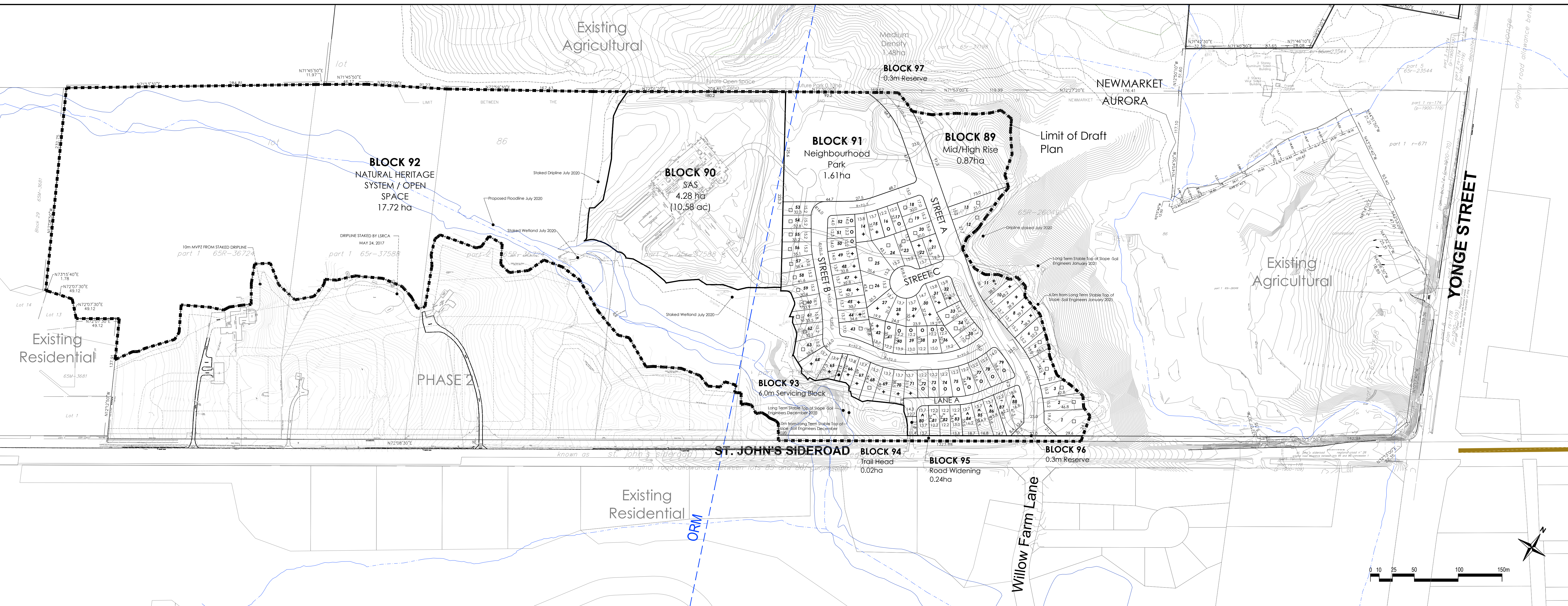
FIGURE No:  
**6.8**

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**APPENDIX A**

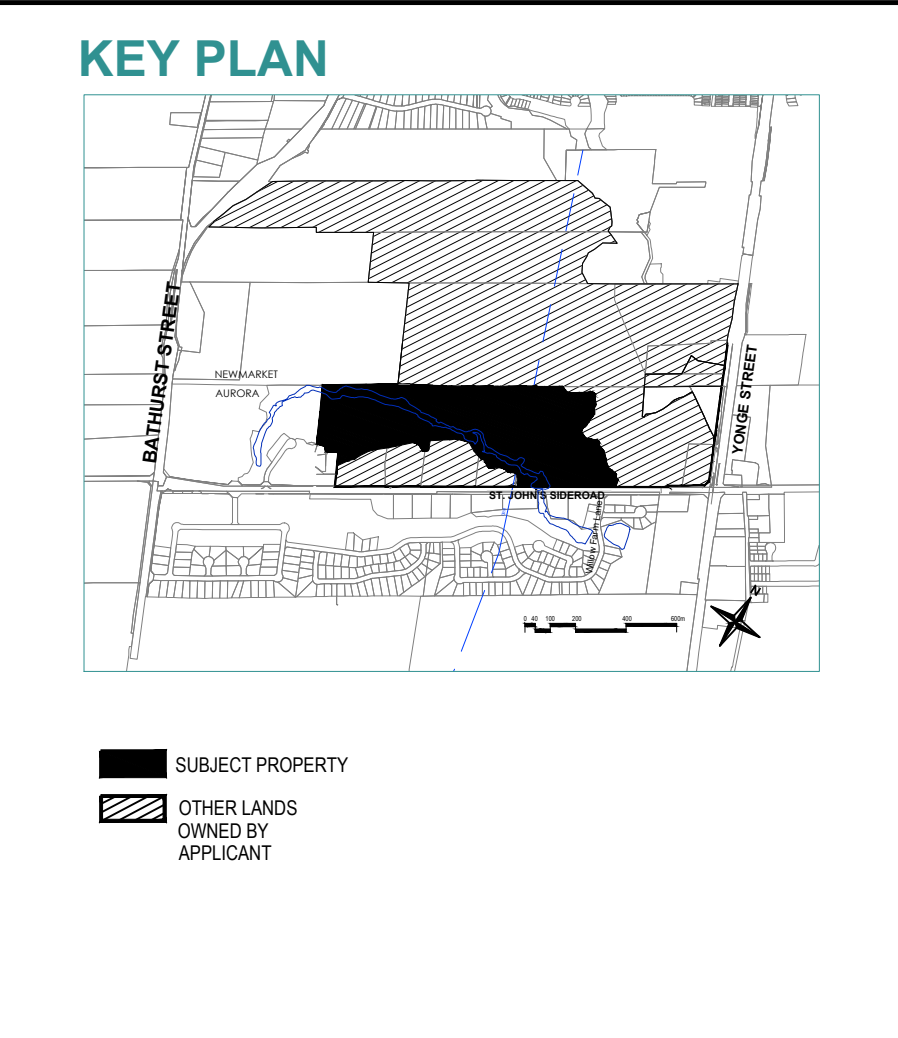
**DRAFT PLAN OF SUBDIVISION**

---



# DRAFT PLAN OF SUBDIVISION

Part of Lot 86, Concession 1  
Town of Aurora  
Regional Municipality of York



### SCHEDULE OF LAND USE

LOT / BLOCK	LAND USE	UNITS	AREA
1-79	Single Detached Min. 15.24m	□ 31	2.01
	Single Detached Min. 13.70m	+ 29	1.59
	Single Detached Min. 12.20m	○ 19	0.83
80-88	Lane Access Single Detached Min. 13.70m	△ 5	0.30
	Lane Access Single Detached Min. 12.20m	~ 4	0.19
89	Mid / High Rise Residential		0.87
90	Saint Anne's School		4.28
91	Neighbourhood Park		1.61
92	Natural Heritage / Open Space		17.72
93	Servicing Block		0.02
94	Trail Head		0.02
95	Road Widening		0.24
96-97	0.3m Reserves		0.01
Street A	23.0m Right of Way 436m		1.02
Street B-C	18.0m Right of Way 420m		0.81
Street B	15.0m Right of Way 108m		0.16
Lane A	9.2m Right of Way 141m		0.14
<b>TOTAL</b>		<b>88</b>	<b>31.79</b>

### OWNER'S AUTHORIZATION

I hereby authorize Malone Given Parsons Ltd. to prepare and submit this Draft Plan of Subdivision to the Town of Aurora.

Angelo DeGasperis \_\_\_\_\_ Date \_\_\_\_\_

### SURVEYOR'S CERTIFICATE

I hereby certify that the boundaries of the lands to be subdivided and their relationship to the adjacent lands are correctly shown.

Neil A. LeGrow \_\_\_\_\_ Date \_\_\_\_\_

### ADDITIONAL INFORMATION

AS REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT, CHAPTER P.13(R.S.O. 1990).

(a),(e),(f),(g),(j),(l) - As shown of the Draft Plan.  
 (b),(c) - As shown on the Draft and Key Plan.  
 (d) - Land to be used in accordance with the Schedule of Land Use.  
 (i) - Soil is clay loam and sandy loam.  
 (h),(k) - Full municipal services to be provided.

Prepared by:

140 Renfrew Drive, Suite 201  
Markham, Ontario, L3R 6B3  
Tel: (905) 513-0170  
www.mgp.ca

Prepared for:

**SHINING HILL ESTATE COLLECTION INC.**

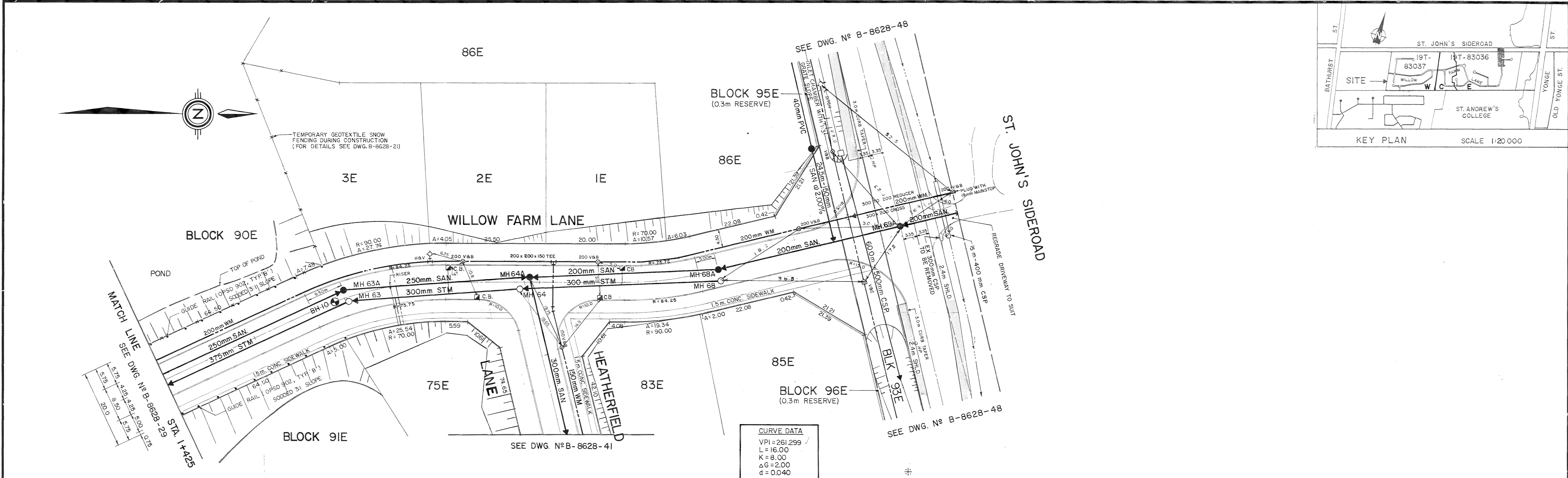
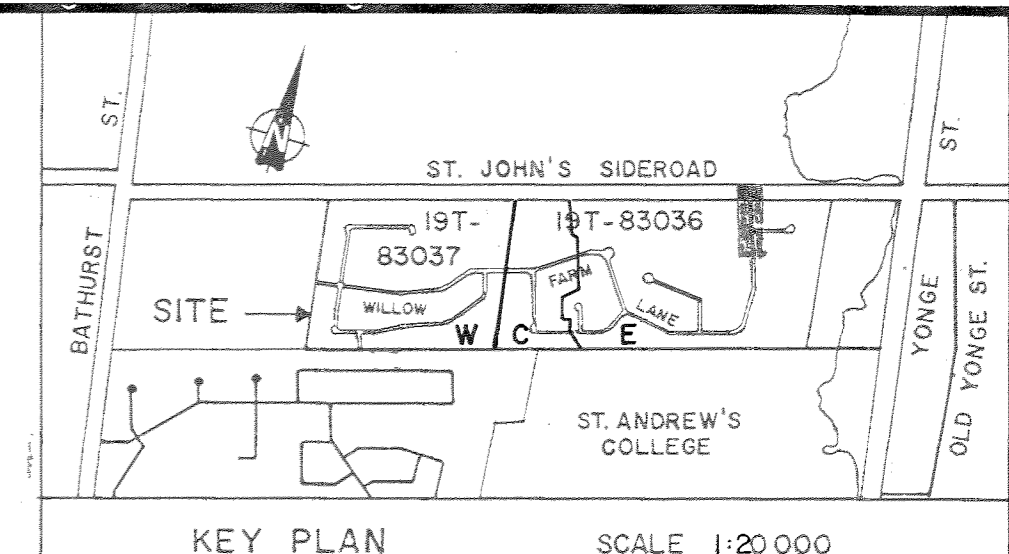
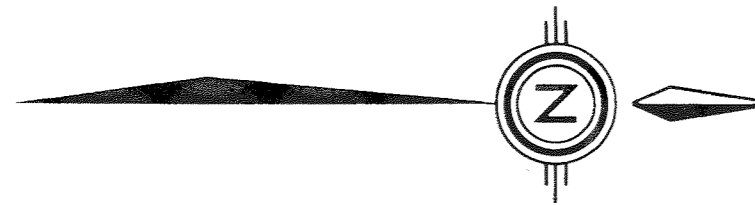
Date: March 2, 2021      Project No.: 15-2374

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**APPENDIX B1**

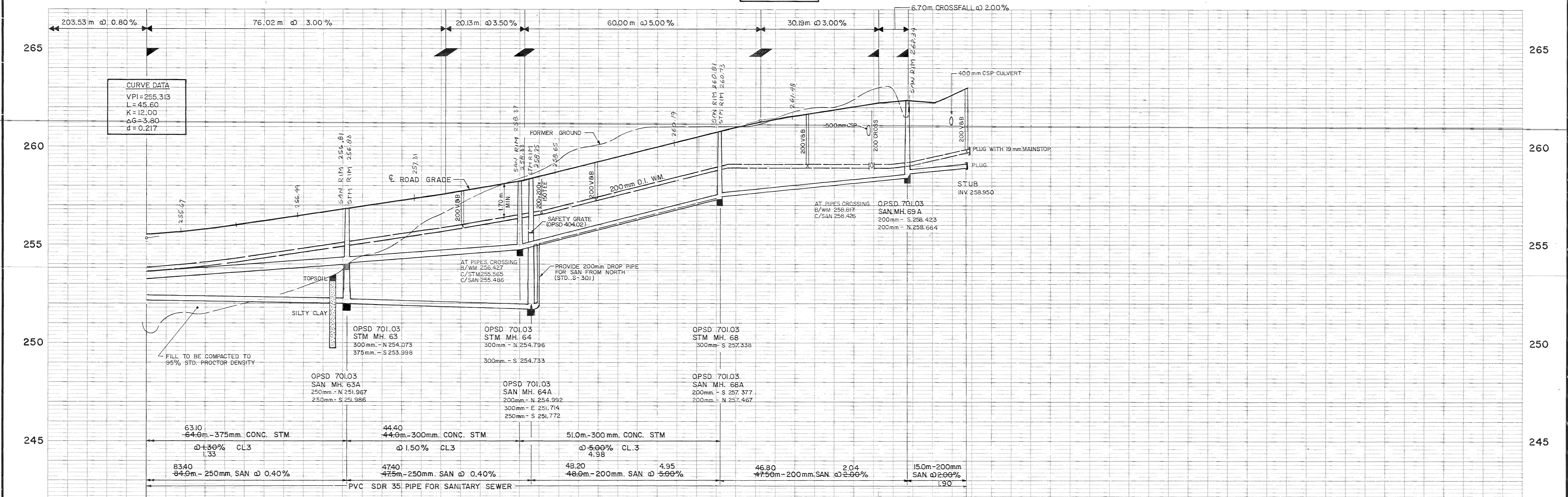
**BACKGROUND DRAWINGS**

---



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 ΔG = 2.00  
 d = 0.040



**CURVE DATA**

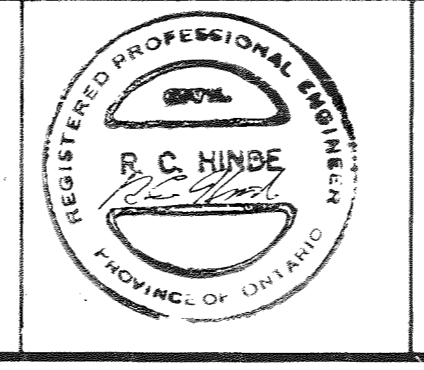
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CHAINAGE	VPI 1+425	E.V.C. 1+447.60	1+450	B.C. 1+466.13	1+475	E.C. 1+501.02	INT. 1+521.15	1+525	B.C. 1+546.52	E.C. 1+566.48	1+573.15	B.V.C. 1+581.15	E.V.C. 1+588.05	1+613.34	1+618.04

**GENERAL NOTES**

1. REVISED AS PER TOWN'S COMMENTS NOV. 87
2. REVISED AS PER TOWN'S COMMENTS FEB. 88
3. SAN, WM AND ROAD GRADE REVISED MAR. 88
4. REVISED AS CONSTRUCTED SEWERS INVERTS JAN. 89
5. AS CONSTRUCTED SEWERS LENGTH AND GRADE JAN. 91
6. AS CONSTRUCTED C ROADS AND WM TIES NOV. 94

Nº	REVISIONS	DATE	APPROVED
1.	REVISED AS PER TOWN'S COMMENTS	NOV. 87	
2.	REVISED AS PER TOWN'S COMMENTS	FEB. 88	
3.	SAN, WM AND ROAD GRADE REVISED	MAR. 88	
4.	REVISED AS CONSTRUCTED SEWERS INVERTS	JAN. 89	
5.	AS CONSTRUCTED SEWERS LENGTH AND GRADE	JAN. 91	
6.	AS CONSTRUCTED C ROADS AND WM TIES	NOV. 94	



**TOWN OF AURORA APPROVED**

DATE: Aug. 10th 1988

*William P. Maitland*  
 DIRECTOR OF PUBLIC WORKS

**ST. ANDREWS ON THE HILL**

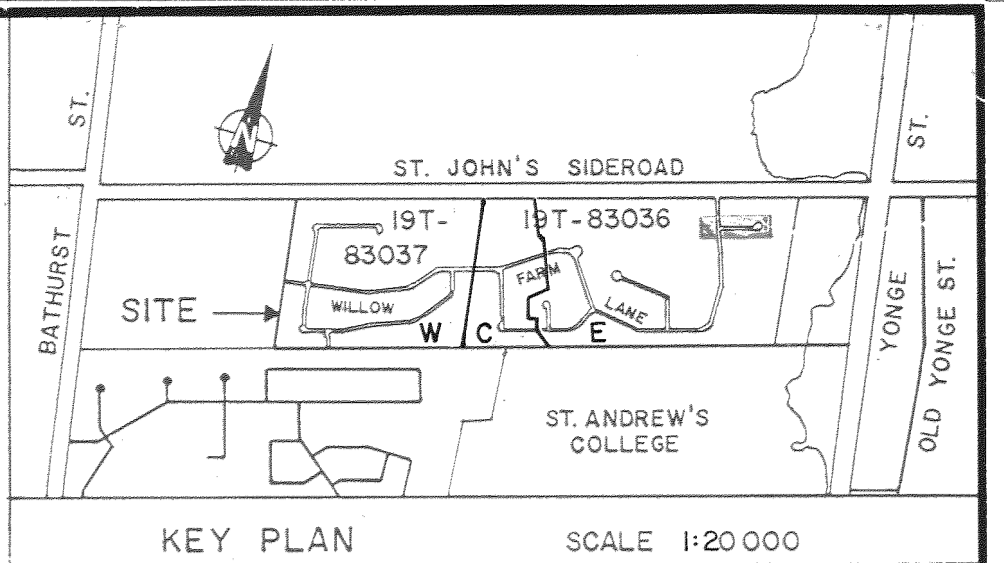
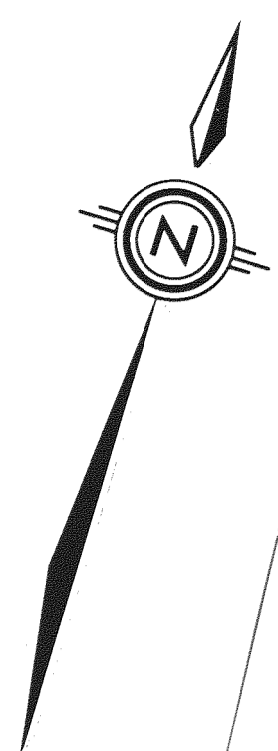
PLAN AND PROFILE

**WILLOW FARM LANE**

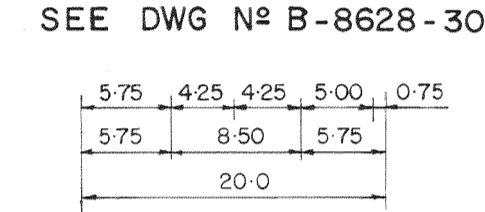
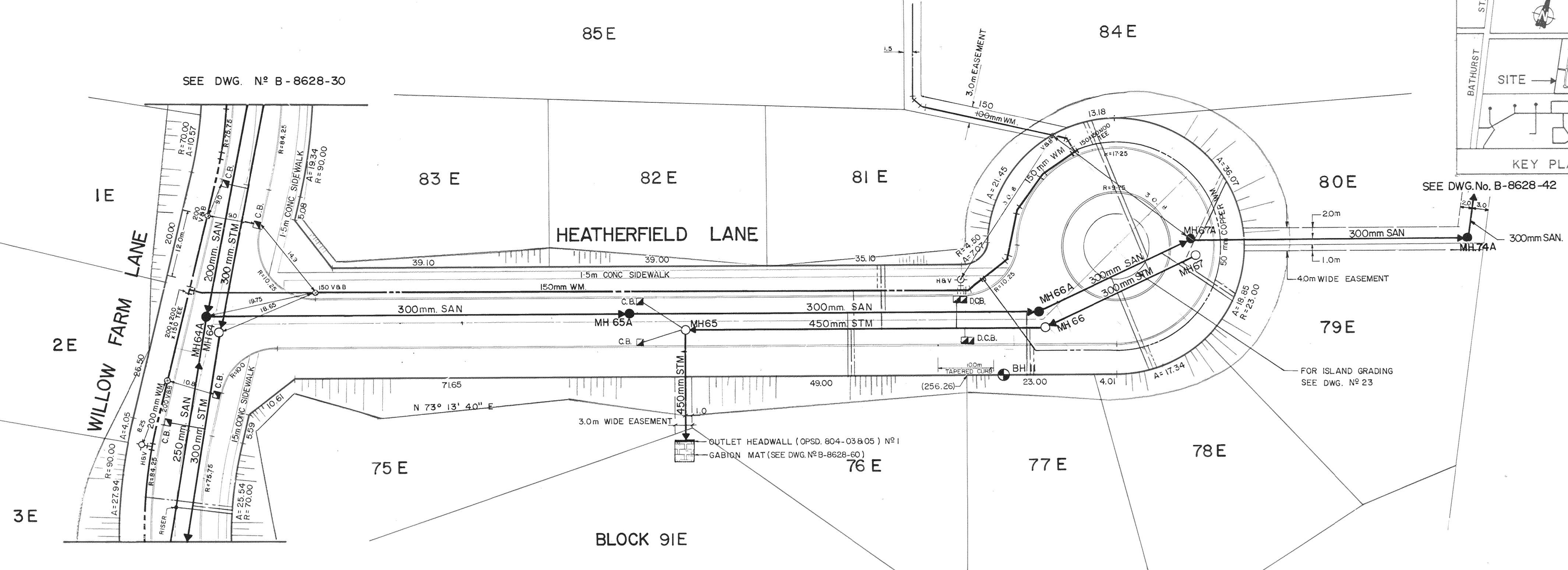
STA. 1+425 to 1+612.98

**TOWN OF AURORA ENGINEERING DEPARTMENT**

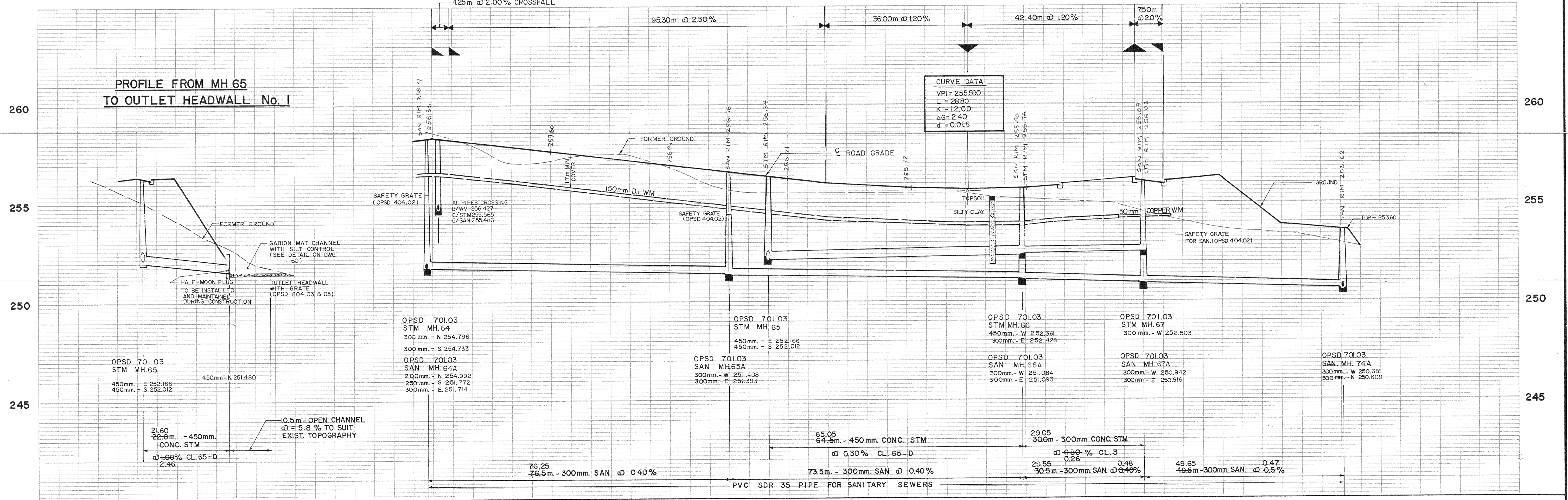
DESIGN Y.R.	SCALE HOR. 1:500	VERT. 1:100
DRAWN D.K., L.J.K.	REVIEWED T.E.	DRAWING Nº 8-8628-30
DATE JUNE '87	SHEET Nº 7 OF 7	



4385-1-1  
1385-1-1



PROFILE FROM MH 65 TO OUTLET HEADWALL No. 1



PROPOSED ELEV.	CHAINAGE
258.239	0+000
258.214	0+004.25
257.736	0+025
257.162	0+050
256.587	0+075
255.022	0+095.5
255.733	B.V.C. 0+121.5
255.676	V.P.I. 0+130.5
255.733	0+149.5
256.080	0+177.5
255.849	0+185.45

GENERAL NOTES

1. REVISED AS PER TOWN'S COMMENTS
2. REVISED AS PER TOWN'S COMMENTS
3. SAN., STM. SEWERS AND ROAD GRADES REVISED
4. REVISED AS CONSTRUCTED SEWERS INVERTS
5. AS CONSTRUCTED SEWERS LENGTH AND GRADE
6. AS CONSTRUCTED E ROADS & WM TIES

Nº	REVISIONS	DATE	APPROVED
1.	REVISED AS PER TOWN'S COMMENTS	NOV. 87	
2.	REVISED AS PER TOWN'S COMMENTS	FEB. 88	
3.	SAN., STM. SEWERS AND ROAD GRADES REVISED	MAR. 88	
4.	REVISED AS CONSTRUCTED SEWERS INVERTS	JAN. 89	
5.	AS CONSTRUCTED SEWERS LENGTH AND GRADE	JAN. 91	
6.	AS CONSTRUCTED E ROADS & WM TIES	NOV. 94	

**PMG CONSULTING ENGINEERS & PLANNERS**  
95 Bridgeland Avenue, Toronto, Canada M6A 2V3  
Telephone: (416) 787-4935 / 0348

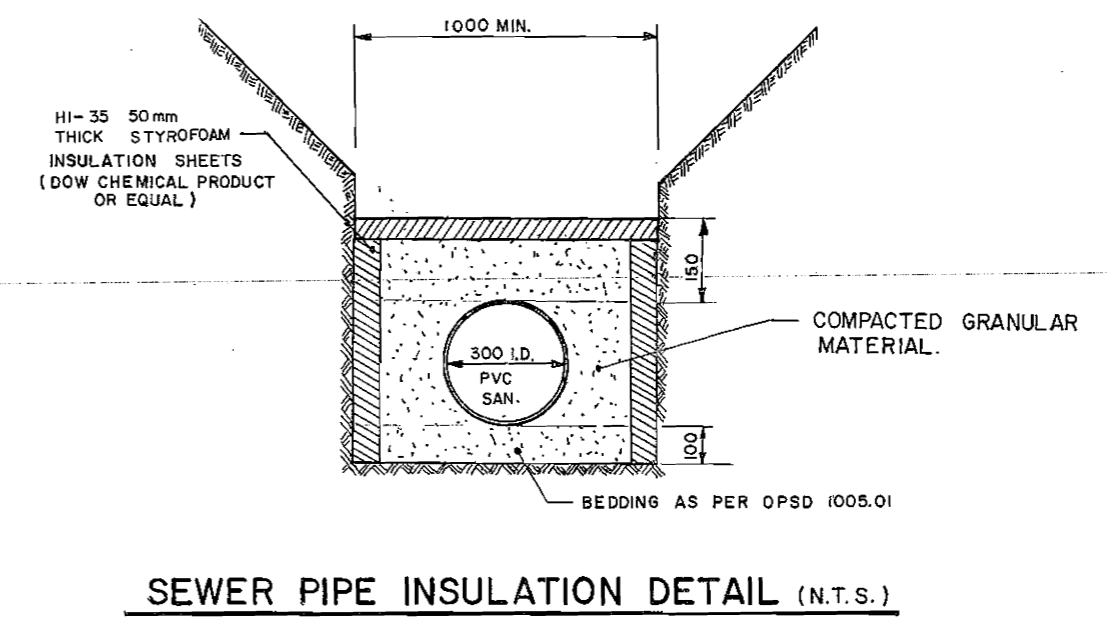
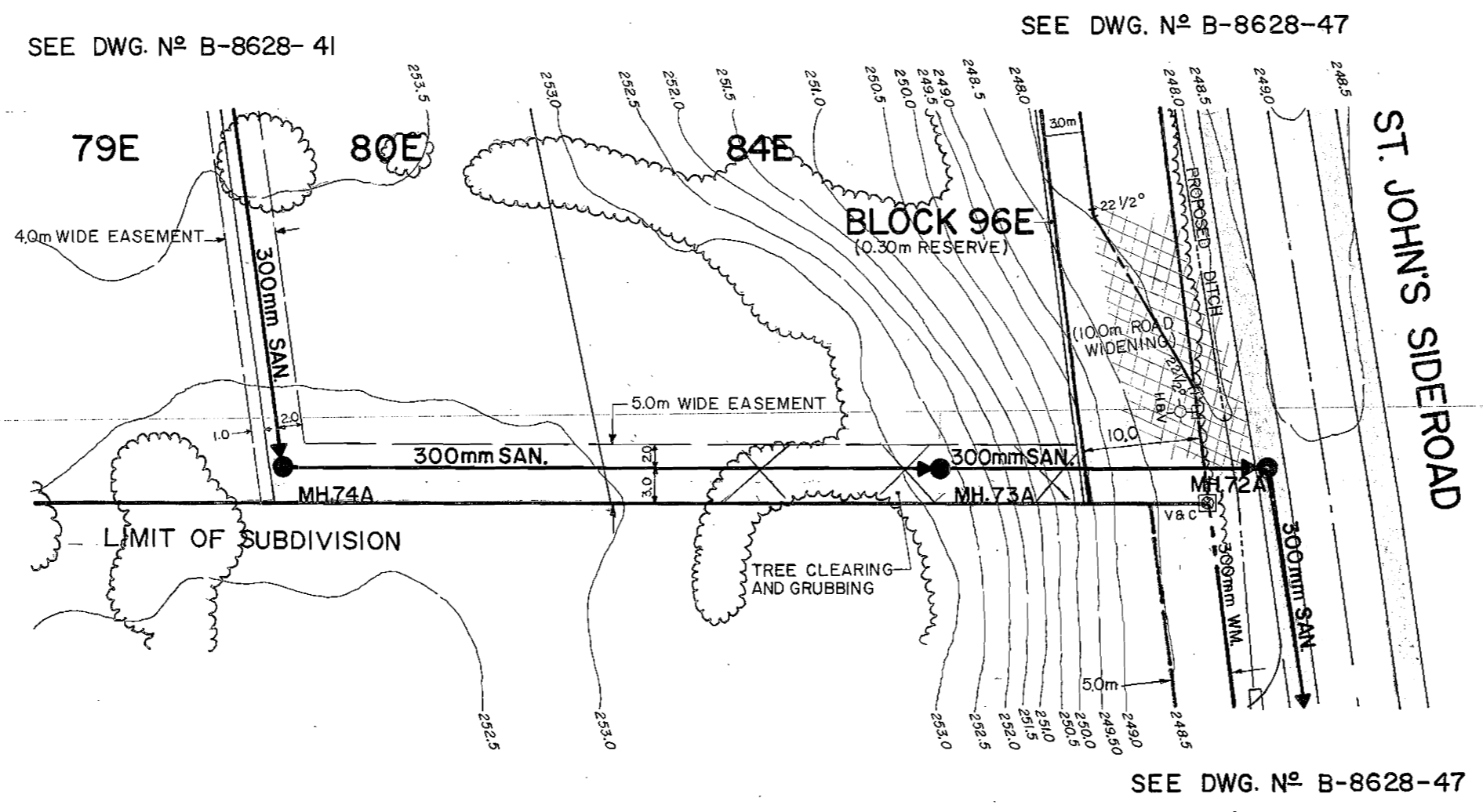
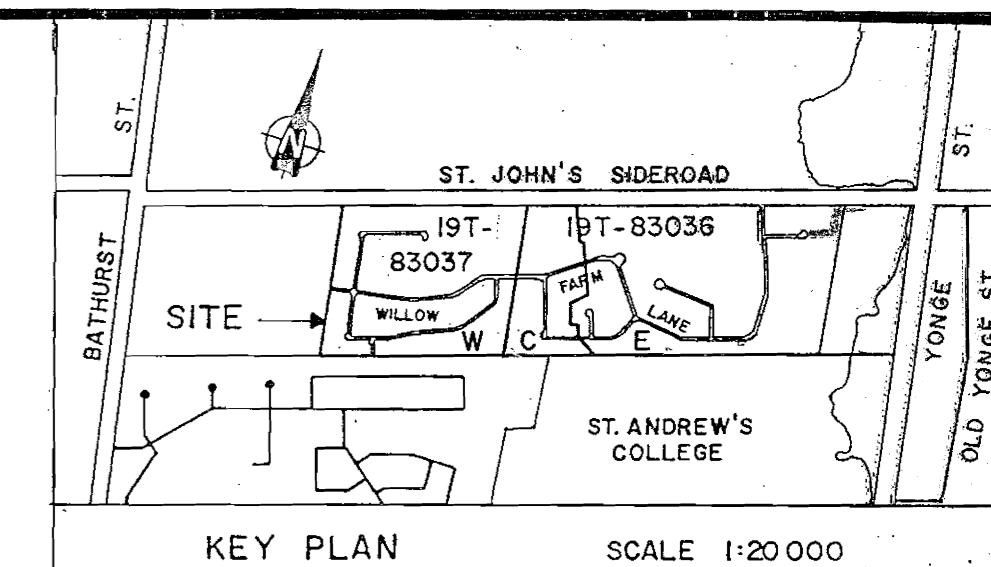
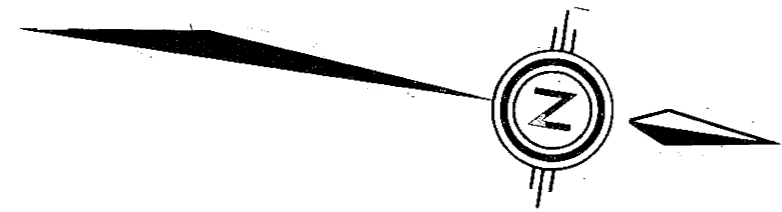


**TOWN OF AURORA APPROVED**  
DATE: Aug 10th 1988  
William J. Moran  
DIRECTOR OF PUBLIC WORKS

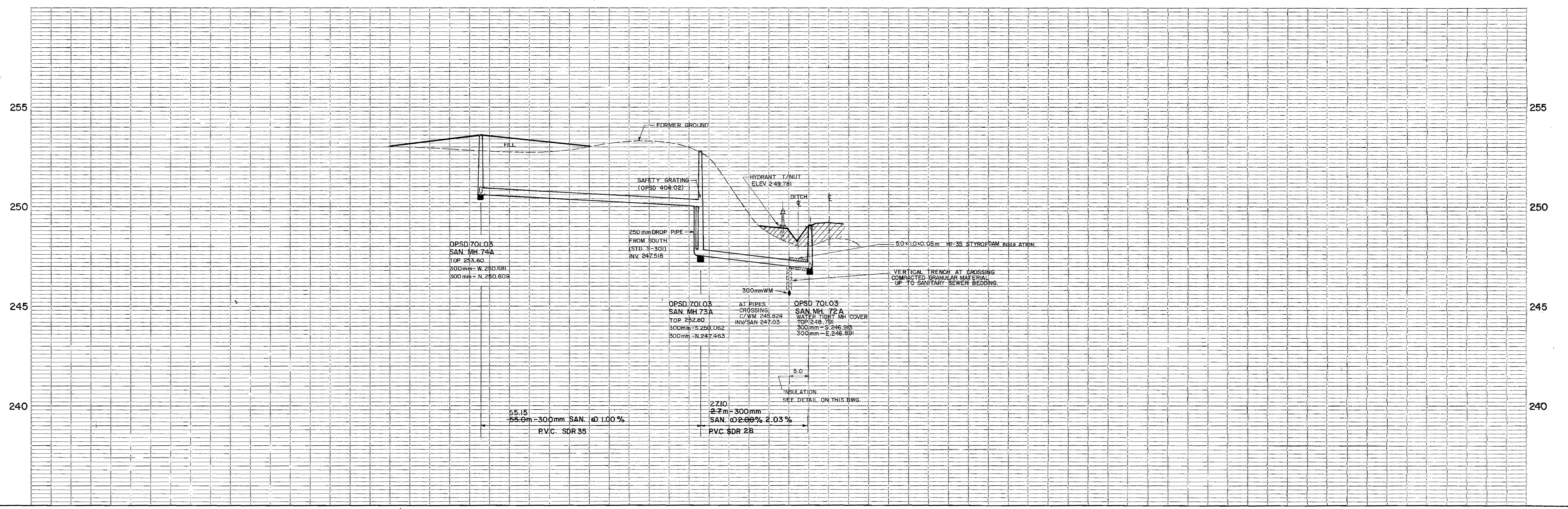
**ST. ANDREWS ON THE HILL**  
PLAN AND PROFILE  
**HEATHERFIELD LANE**  
STA. 0+000 to 0+184.45

**TOWN OF AURORA ENGINEERING DEPARTMENT**

DESIGN Y.R.	SCALE HOR. 1:500	VERT. 1:100
DRAWN L.J.K., K.A.	REVIEWED Y.R.	DRAWING Nº B-8628-41
DATE JUNE '87	SHEET Nº	OF



NOTE:  
ALL DISTURBED AREA SHALL BE  
HYDRO SEEDED AND MULCHED.

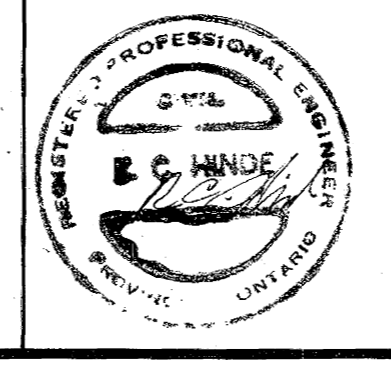


EXISTING ELEV.	255
CHAINAGE	0+087.5

NO	REVISIONS	DATE	APPROVED
1.	SANITARY SEWER RELOCATED	MAR. 88	
2.	REVISED AS CONSTRUCTED SAN SEWER INVERTS	JAN. 89	
3.	AS CONSTRUCTED SAN. SEWER LENGTH AND GRADE	JAN. 91	

NO	REVISIONS	DATE	APPROVED
1.	SANITARY SEWER RELOCATED	MAR. 88	
2.	REVISED AS CONSTRUCTED SAN SEWER INVERTS	JAN. 89	
3.	AS CONSTRUCTED SAN. SEWER LENGTH AND GRADE	JAN. 91	

**PMG**  
CONSULTING ENGINEERS & PLANNERS  
95 Bridgeland Avenue, Toronto, Canada M6A 2V3  
Telephone: (416) 787-4935 / 0348



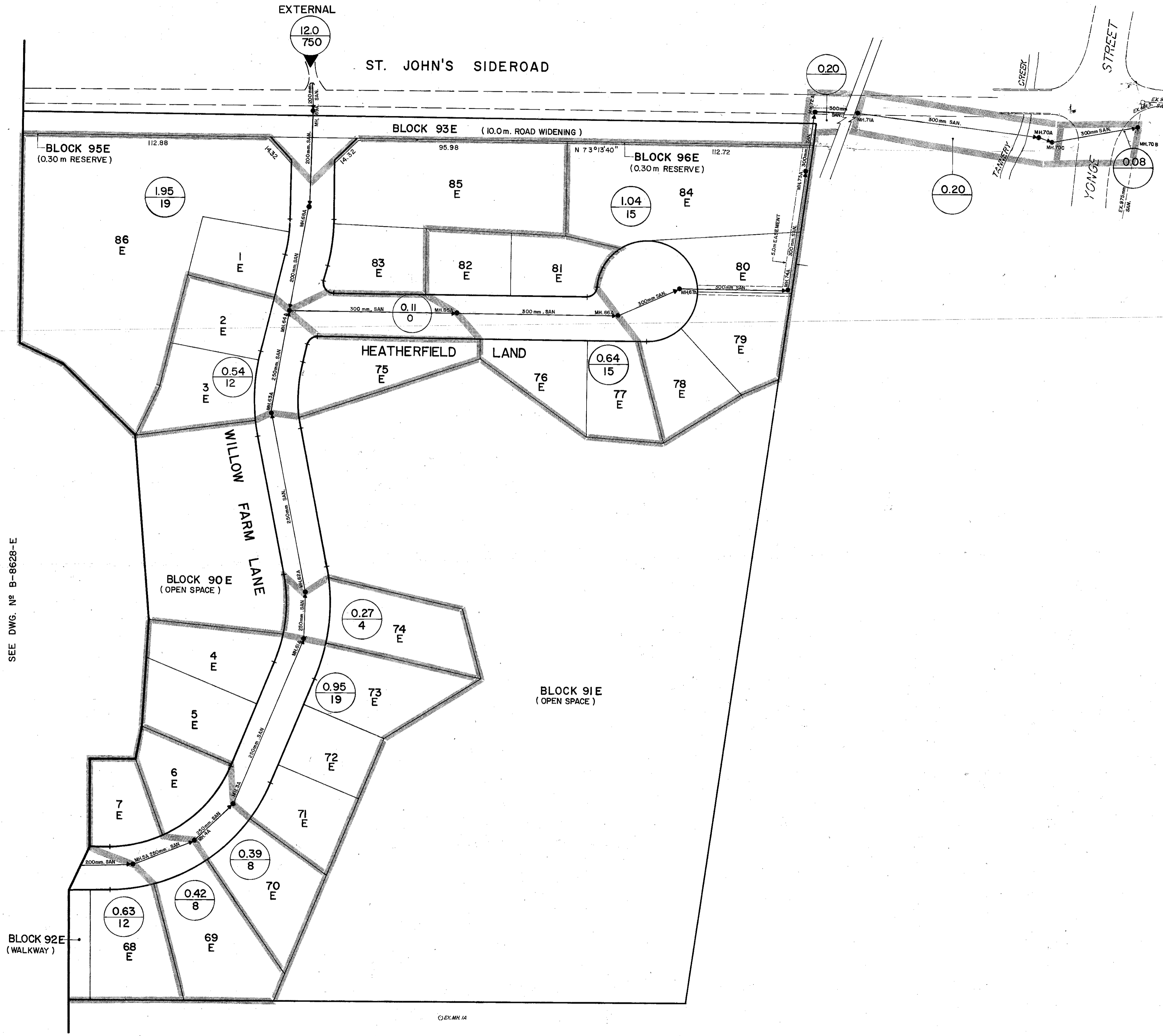
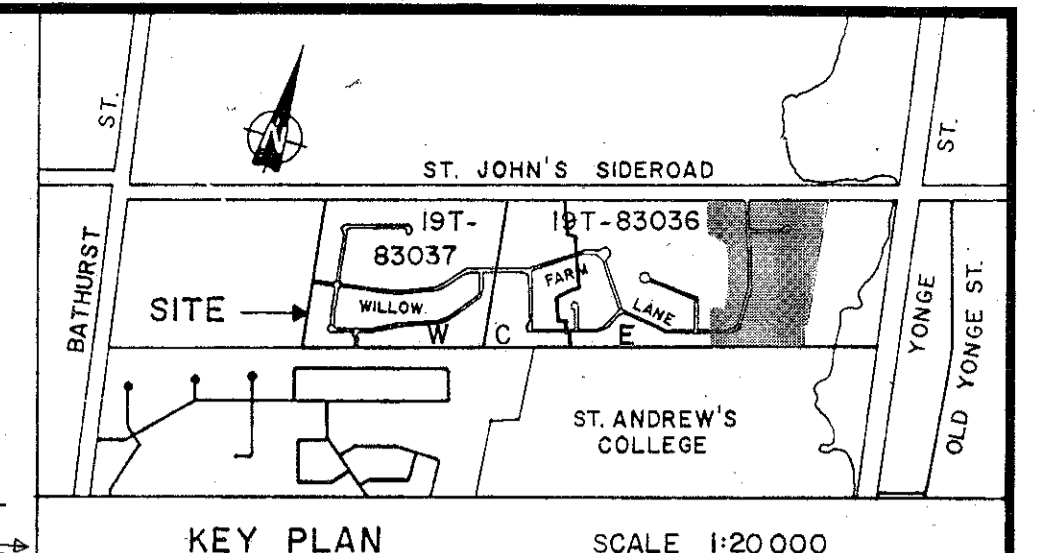
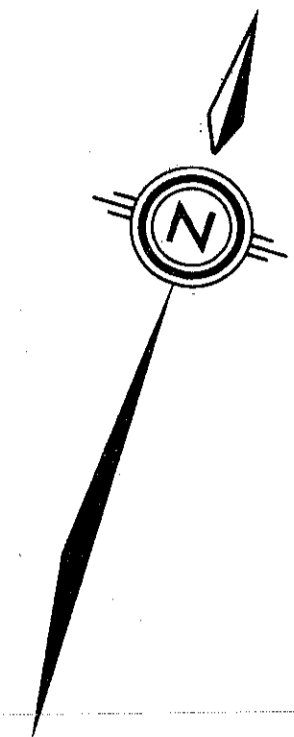
**TOWN OF AURORA**  
**APPROVED**  
DATE: Aug 1991  
Director of Public Works

**ST. ANDREWS ON THE HILL**  
PLAN AND PROFILE  
**SANITARY SEWER EASEMENT No 1.**  
STA. 0+000 to 0+087.500

**TOWN OF AURORA**  
ENGINEERING DEPARTMENT

DESIGN	Y.R.	SCALE	HOR. 1:500	VERT. 1:100
DRAWN	K.A.	REVIEWED	T.E.	DRAWING No B-8628-42
DATE	JUNE '87	SHEET No	1 OF 1	





POPULATION BASED ON 3.8 PERSONS PER UNIT.

LEGEND

AREA IN HECTARES  
POPULATION

SEE DWG. N° B-8628-E

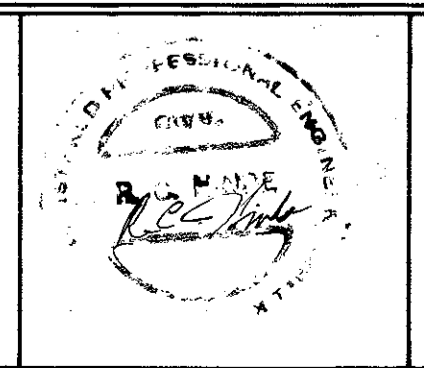
BLOCK 92E (WALKWAY)

GEX/MH/IA

GENERAL NOTES

N°	REVISIONS	DATE	APPROVED
1.	REVISED AS PER TOWN'S COMMENTS	NOV. 87	
2.	SAN SEWERS REVISED	MAR. 88	

**PMG** CONSULTING ENGINEERS & PLANNERS  
95 Bridgeland Avenue, Toronto, Canada M6A 2V3  
Telephone: (416) 787-4935 / 0348



TOWN OF AURORA  
**APPROVED**  
DATE Aug 10th 1988...  
*William A. Markes*  
DIRECTOR OF PUBLIC WORKS

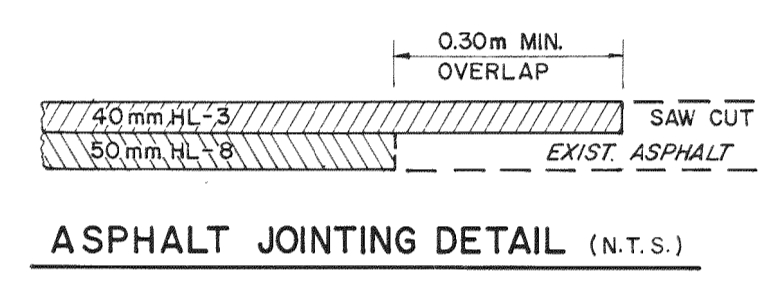
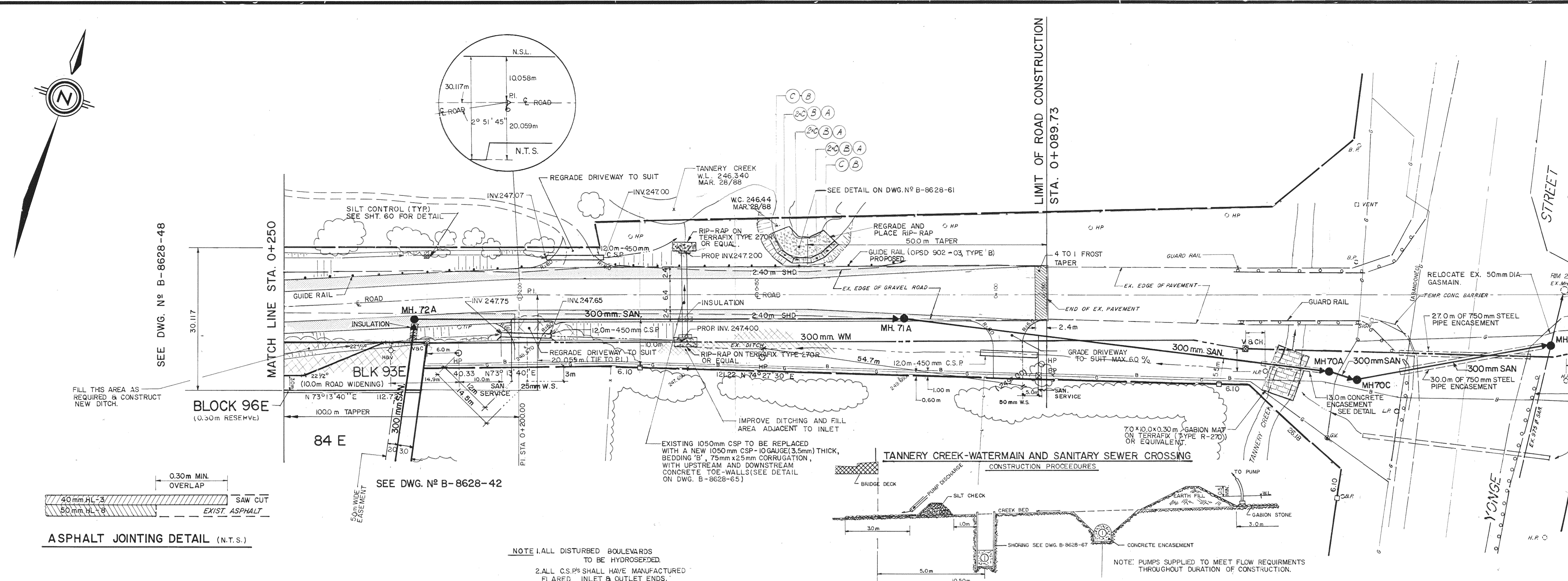
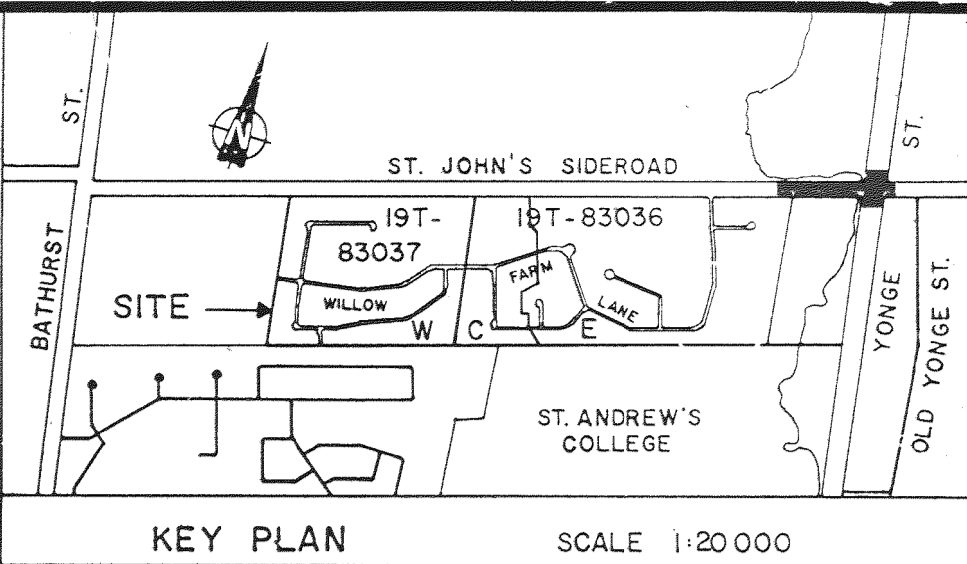
ST. ANDREWS ON THE HILL  
SANITARY DRAINAGE PLAN

TOWN OF AURORA  
ENGINEERING DEPARTMENT

DESIGN Y.R.	SCALE 1:1000
DRAWN R. Z. L. K.	REVIEWED Y.R.
DATE AUG. 87	SHEET N° 3 OF 3

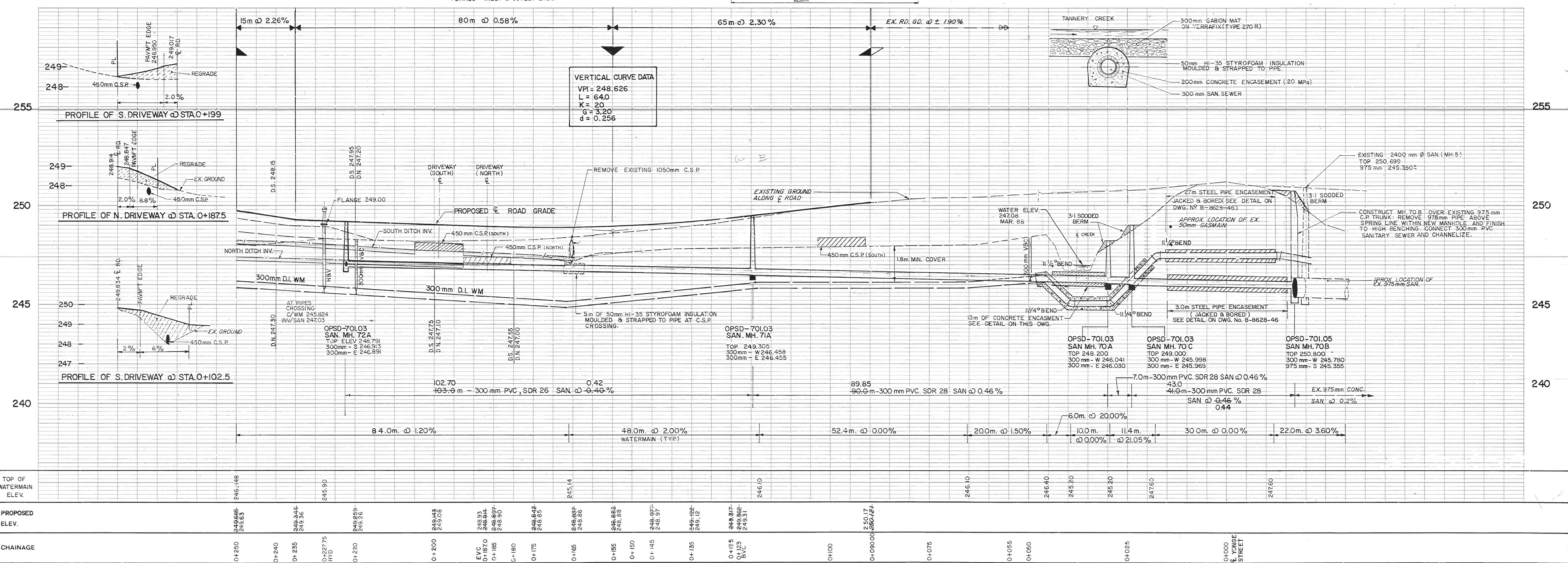
DRAWING N° B-8628-F

4935-1-1  
5070-1-1-1



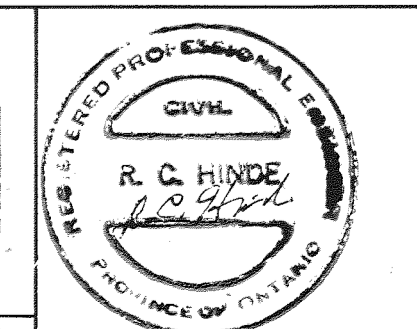
NOTE 1. ALL DISTURBED BOULEVARDS TO BE HYDROSEEDED.  
2. ALL C.S.P.'S SHALL HAVE MANUFACTURED FLARED INLET & OUTLET ENDS.

GENERAL NOTES:  
1. THE LOCATION OF UTILITIES IS APPROXIMATE, THE CONTRACTOR IS RESPONSIBLE FOR LOCATING THE EXISTING UTILITIES AND SHALL PROVIDE ADEQUATE PROTECTION DURING CONSTRUCTION.  
2. EXISTING HYDRO POLES ON THE SOUTH SIDE OF ST. JOHN'S SIDEROAD TO BE RELOCATED BY OTHERS.



NO	REVISIONS	DATE	APPROVED	NO	REVISIONS	DATE	APPROVED
7.	REVISED ROADWAY CULVERT TO CONCRETE	APR. 89		1.	REVISED AS PER TOWN'S COMMENTS	NOV. 87	
8.	REVISED ROADWAY CULVERT TO CSP	MAY. 89		2.	REVISED AS PER TOWN'S COMMENTS	JAN. 88	
9.	REVISED LOCATION OF MH.70A AND MH.70B	MAY. 89		3.	REVISED AS PER TOWN'S COMMENTS	MAR. 88	
10.	REVISED LOCATION OF MH.70A AND NEW MH.70C	SEP. 90		4.	ALIGNMENT OF ROAD, DITCH LINES AND DITCH GRADINGS	MAY 88	
11.	AS CONSTRUCTED SAN SEWER LENGTH AND GRADE	JAN. 91		5.	REVISED WM. OFFSET	MAY 88	
12.	AS BUILT ROAD AND WM TIES	MAR. 91		6.	REVISED AS CONSTRUCTED SAN SEWER INVERTS	JAN. 89	
				13.	AS BUILT WATER & SANITARY SERVICE TIES	MAY 92	

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95 Bridgeland Avenue, Toronto, Canada M6A 2V3  
Telephone: (416) 787-4935 / 0348



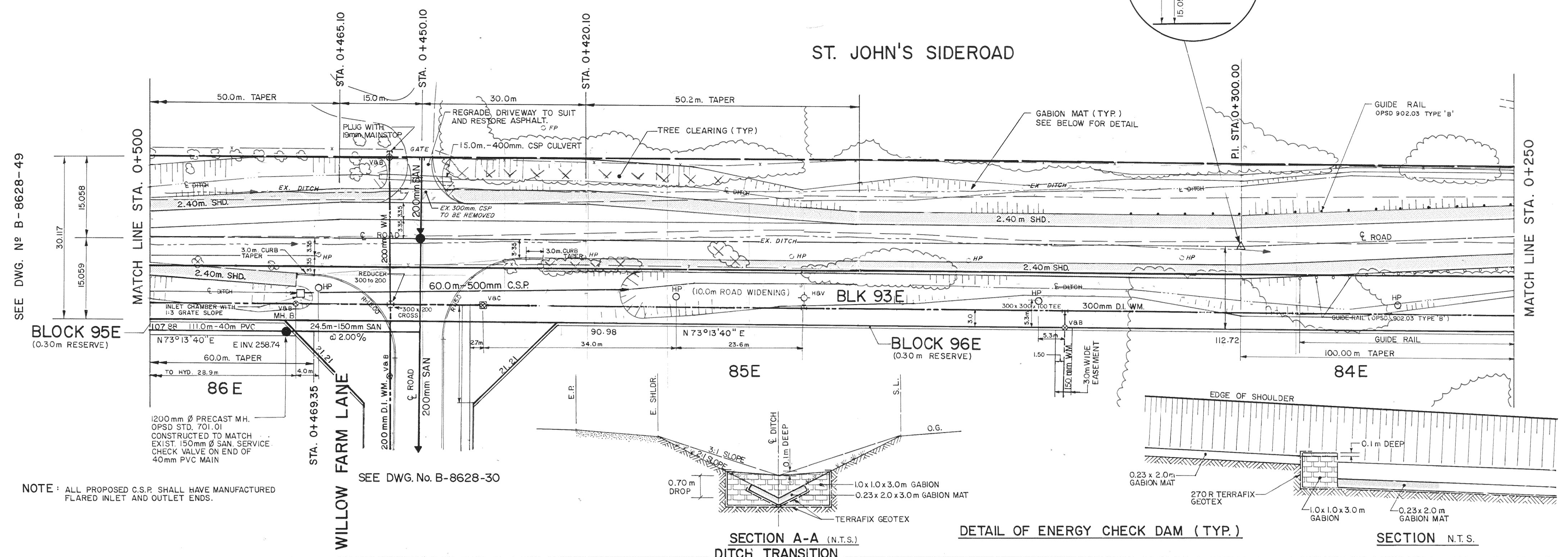
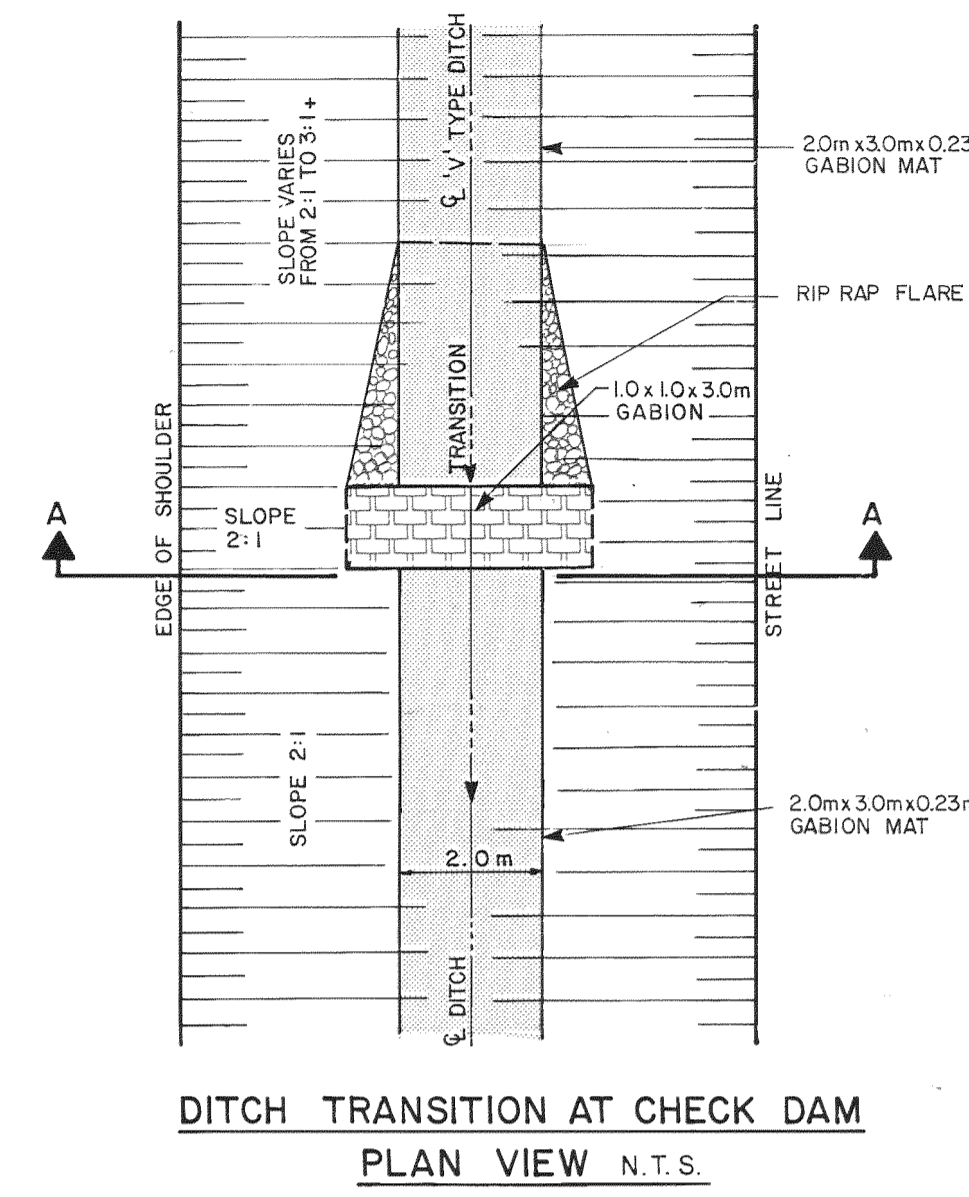
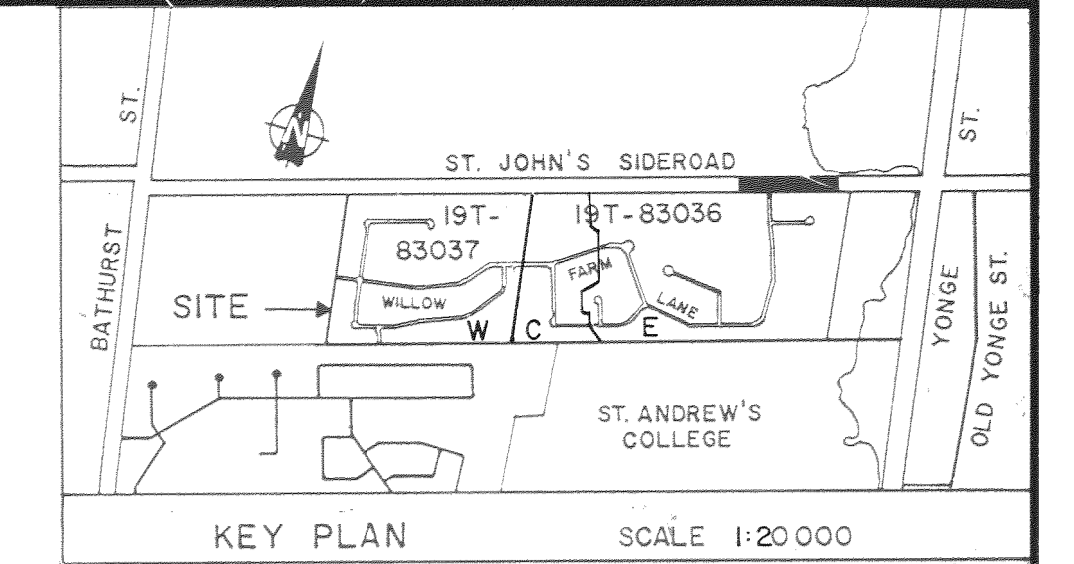
TOWN OF AURORA  
APPROVED  
DATE Aug 19 1987  
Director of Public Works

ST. ANDREWS ON THE HILL  
PLAN AND PROFILE  
ST. JOHN'S SIDEROAD  
STA. 0+000 TO 0+250

TOWN OF AURORA  
ENGINEERING DEPARTMENT

DESIGN	Y.R.	SCALE	HOR. 1:500	VERT. 1:100
DRAWN	M.J.B.	REVIEWED	Y.R.	DRAWING NO. B-8628-47
DATE	JUNE '87	SHEET NO.	OF	

4935-1-2  
5070-1-2  
4235-1-2



SEE DWG. NO. B-8628-49

SEE DWG. NO. B-8628-47

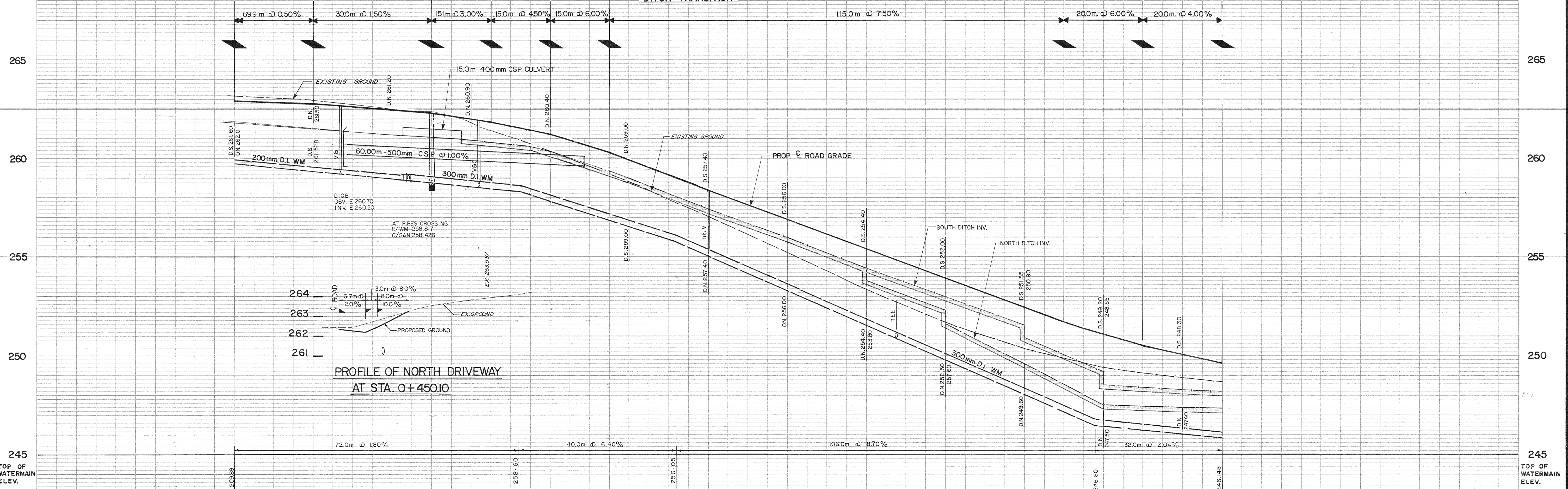
NOTE: ALL PROPOSED C.S.P. SHALL HAVE MANUFACTURED FLARED INLET AND OUTLET ENDS.

SEE DWG. NO. B-8628-30

SECTION A-A (N.T.S.)  
DITCH TRANSITION

DETAIL OF ENERGY CHECK DAM (TYP.)

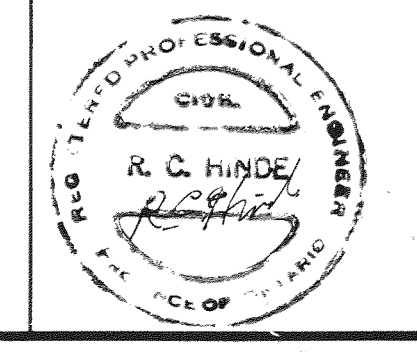
SECTION N.T.S.



PROPOSED ELEV.	265.99	266.99	267.99	268.99	269.99	270.99	271.99	272.99	273.99	274.99	275.99	276.99	277.99	278.99	279.99	280.99	281.99	282.99	283.99	284.99	285.99	286.99	287.99	288.99	289.99	290.99	291.99	292.99	293.99	294.99	295.99	296.99	297.99	298.99	299.99	300.99
CHAINAGE	0+500	0+490	0+480	0+470	0+460	0+450	0+440	0+430	0+420	0+410	0+400	0+390	0+380	0+370	0+360	0+350	0+340	0+330	0+320	0+310	0+300	0+290	0+280	0+270	0+260	0+250	0+240	0+230	0+220	0+210	0+200	0+190	0+180	0+170	0+160	0+150

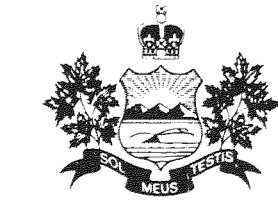
Nº	REVISIONS	DATE	APPROVED	Nº	REVISIONS	DATE	APPROVED
7	LENGTHENED GUIDE RAIL, REVISED DITCH LINES	APR. 89		1	AS PER TOWN'S COMMENTS	NOV. 87	
8	AS BUILT E. ROAD AND WM. TIES.			2	AS PER TOWN'S COMMENTS	JAN. 88	
				3	AS PER TOWN'S COMMENTS	MAR. 88	
				4	ALIGNMENT OF ROAD, DITCH, CHECK DAMS, DITCH LINING AND DITCH GRADING	MAY. 88	
				5	REVISE WM. OFFSET, LENGTHEN S.M. CSP TO 60m RELOCATE DITCH TO 10m S. of ROAD	NOV. 88	
				6	SAN. SERVICE	NOV. 88	

PMG CONSULTING ENGINEERS & PLANNERS  
95 Bridgeland Avenue, Toronto, Canada M6A 2V3  
Telephone: (416) 787-4935 / 0348



TOWN OF AURORA  
**APPROVED**  
DATE August 19 1989  
M. M. M. M.  
DIRECTOR OF PUBLIC WORKS

ST. ANDREWS ON-THE-HILL  
PLAN AND PROFILE  
ST. JOHN'S SIDEROAD  
STA. 0+250 to 0+500



TOWN OF AURORA  
ENGINEERING DEPARTMENT

DESIGN Y. R.	SCALE HOR. 1:500	VERT. 1:100
DRAWN M. J. L. K.	REVIEWED T. E.	DRAWING N° B-8628-48
DATE JUNE '87	SHEET N°	OF

---

**APPENDIX B2**

**RAINSCAPING MEETING MINUTES**

---

**File #:** 2183  
**Date:** January 5, 2021

Project:	<b>Shining Hill Estates</b>
Purpose:	<b>Rainscaping Design Charrette</b>
Date/Time of Meeting:	<b>December 15, 2020 – 1:00 pm to 3:30 pm</b>
Location:	<b>SCS hosted Zoom</b>
Next Meeting:	<b>TBD</b>

Attendees:	Recipient(s):	Email:
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The following is considered to be a true and accurate record of the items discussed. Any errors or omissions in these minutes should be provided in writing to the author immediately.

The purpose of this meeting was to establish a suite of LID and SWM solutions in consultation with Aurora, Newmarket, and the LSRCA, for application in the Shining Hill Estates Phase 3 functional servicing design.

<b>Item:</b>	<b>Action:</b>
<b>1.0 Rainscaping Charrette Presentation</b>	
1.1 Planning Status	
<ul style="list-style-type: none"> <li>➔ St. Anne’s School (Aurora) occupancy targeted for September 2022</li> <li>➔ Phase 3 Newmarket requires Official Plan amendment and urban zoning designation. Secondary plan level reports required prior to draft plan approval.</li> </ul>	Info
1.2 Geotechnical Investigation	
<ul style="list-style-type: none"> <li>➔ Long term stable top of slope (LTSTOS) generally follows physical top of slope except in localized area in south east of Phase 3 (Aurora).</li> <li>➔ LTSTOS still to be evaluated near SAS driveway and all of Phase 3 within Newmarket.</li> <li>➔ Soils generally suitable for surface retention, clay liner required in sandy areas.</li> <li>➔ Varved clays encountered in many areas having a low estimated percolation rate.</li> </ul>	Info

<b><u>Item:</u></b>	<b><u>Action:</u></b>
<p>1.3 Hydrogeology (Golder)</p> <ul style="list-style-type: none"> <li>➔ Municipal wells in Aurora near the site (southeast corner of Yonge Street and St. John’s Sideroad) tap into the deep Thorncliffe aquifer. Impacts to water quality from the proposed development are expected to be minimal because of the depth of the wells, the low permeability clay, and the groundwater gradient which generally discharges to the Tannery Creek tributaries within the site.</li> <li>➔ Groundwater depth ranges from 2 m to 6.5 m, most shallow towards the east. Measured in December 2020, spring monitoring required to establish seasonal high elevations.</li> <li>➔ WHPA-Q1 requires matching pre-development recharge.</li> </ul>	Info
<p>1.4 Ecology and Constraints</p> <ul style="list-style-type: none"> <li>➔ Recommending minimum vegetation protection zone (MVPZ) of: 10 m to dripline/woodland, 30 m to watercourse, and 15 m to wetlands.</li> <li>➔ A reduced MVPZ is recommended adjacent to the existing St. Anne’s School driveway access. It is 3 m to the woodland/dripline and 6 m to the wetland. This is consistent with the existing condition.</li> <li>➔ Regulatory floodline generally not the limiting constraint due to deep valley corridors.</li> <li>➔ Existing drainage boundaries map is attached.</li> </ul>	Info
<p>1.5 Development Concept and Preliminary Engineering</p> <ul style="list-style-type: none"> <li>➔ Steep road connections expected to St. John’s and Bathurst.</li> <li>➔ Expecting road grades between 0.7% and 5%, and lot grades between 2% and 5%.</li> <li>➔ Sloping or walls could be required at some locations around the site perimeter to make up grade.</li> </ul>	Info
<p>1.6 Stormwater Management</p> <ul style="list-style-type: none"> <li>➔ LSRCA’s guidelines are the principal SWM criteria.</li> <li>➔ Constraints are low permeability soils, steep topography for grading, and shallow to moderate groundwater depth.</li> <li>➔ Opportunities are: underground storage in park blocks, infiltration/filtration in boulevard LIDs, steep topography for storm outfall flexibility.</li> </ul>	Info

<u>Item:</u>	<u>Action:</u>
<b>2.0 Municipal Feedback on LIDs and SWM - Aurora</b>	
2.1 Bioswales and Grassed Swales (in boulevard or elsewhere)	
<ul style="list-style-type: none"> <li>•→ Aurora has some experience maintaining grassed bioswales and grassed swales that have worked well. Has experienced some issues with sediment build up at curb cut inlets and short circuiting.</li> <li>•→ Aurora open to implementing bioswales/grassed swales in boulevards in the future. Notes that more focus should be given to operations and maintenance manuals, and protection during construction.</li> <li>•→ Driveways will limit these LIDs, but many single loaded roads in the plan present opportunities.</li> </ul>	Info
2.2 Permeable Pavement	
<ul style="list-style-type: none"> <li>•→ Aurora has had issues with clogging and short circuiting.</li> </ul>	Info
2.3 Catchbasin Infiltration/Exfiltration	
<ul style="list-style-type: none"> <li>•→ Aurora currently operating and monitoring some of these systems. But only in a small number. No issues thus far.</li> <li>•→ Unlikely to accept them under the road or hard surfaces.</li> <li>•→ Not preferred relative to surface LIDs because easy visual inspection from the surface is not possible.</li> <li>•→ LSRCA/SCS note there are design alternatives to improve ease of inspection and maintenance, such as inspection ports and cleanouts for flushing.</li> <li>•→ Access in the event of reconstruction is good when this LID is located under a pervious surface behind the curb line, and they are also at a shallower depth in this configuration.</li> </ul>	Info



<b><u>Item:</u></b>	<b><u>Action:</u></b>
<p>2.4 General/Other</p> <ul style="list-style-type: none"> <li>•→ Town has concerns over yearly sediment load in catchbasins.</li> <li>•→ It will be easier for the Town to accept LIDs if they are well protected during construction and ready to be certified immediately. Focus should be on managing impacts of sedimentation on Town operations.</li> <li>•→ Aurora does not accept rain gardens on lots for municipal maintenance (i.e. easement and municipal maintenance agreement). SCS notes that privately owned ones can still contribute to water balance and phosphorous removal.</li> <li>•→ LSRCA/SCS note possibility of super elevating roads draining to rain gardens on one side of the ROW. It was noted that Highland Gate utilized superelevated roads. Town noted that Operations may not be favourable to superelevated roads and that further discussions would be required.</li> <li>•→ Aurora Development Engineering supports underground storage usage in parks, but noted that discussions with Parks is necessary (Brian Jakovina to confirm with Parks). Easy truck and maintenance access are key. Also supports this approach to optimize land use. It was noted that LSRCA is working with City of Barrie to utilize underground storage/infiltration below programmed parks extensively, which provide good truck access utilizing hard surfaces from the programmed parks.</li> </ul>	<p>Info</p>
<p><b>3.0 Municipal Feedback on SWM and LIDs - Newmarket</b></p>	
<p>3.1 General</p>	
<ul style="list-style-type: none"> <li>•→ Newmarket not excluding any LIDs or SWM methods at this stage.</li> <li>•→ Town has ceased using sand for winter road maintenance which should make LID maintenance easier in the future.</li> </ul>	<p>Info</p>
<p><b>4.0 Design Charrette (Aurora)</b></p>	
<p>4.1 The owner anticipates the Aurora medium density block will be a mid-rise apartment-style building. There are opportunities for a variety of LIDs given that this will be a private site plan.</p>	<p>Info</p>
<p>4.2 MGP noted that minor building additions are expected on the SAS site in the long term. MGP and Aurora to discuss greenspace access for the school. Accommodation for increased impervious should be included in the SWM design.</p>	<p>Aurora/MGP</p>
<p>4.3 Aurora prefers LIDs under grassed areas rather than under hard surfaces.</p>	<p>Info</p>

<b><u>Item:</u></b>	<b><u>Action:</u></b>
4.4 Aurora noted that all LIDs on a lot must be privately owned. Aurora will not provide any maintenance for such LIDs. SCS noted that such LIDs can be used toward water balance and phosphorus removal credit. Developer obtains an ECA for the private lot LIDs, which are removed from the ECA upon transfer to the municipality.	Info
4.5 Three outlets are expected for the Aurora lands. Likely superpipe to the southwest with outfall to the westerly Tannery Creek tributary; underground SWM in park with outfall to the northeast; and a superpipe connecting to St. John's Sideroad and discharging northeast to Tannery Creek.	Info
4.6 Aurora noted limited experience with curb cuts relative to the amount sketched on the plan. Bioswales are viable, but curb cut inlets have been a source of maintenance issues. Suggested the developer/engineer explore mitigation measures such as wider inlets.	Info
<b>5.0 Design Charrette (Newmarket)</b>	
5.1 The engineering preference for the northern most watercourse crossing is to align it south of the existing farm crossing. This alignment locates the SWM block in a lower area, and eliminates unnecessary bends in the road.	Info
5.2 Newmarket noted the use of underground SWM infrastructure with park land above would have to be discussed at a later date. Newmarket is open to this idea if it uses land more wisely. Newmarket has experience with this approach in the Mosaik subdivision, and is learning from the ongoing maintenance of this SWM infrastructure.	Info
5.3 LSRCA suggested mandating the school block provide on-site LID control.	Info
5.4 LSRCA noted the restoration/trail block is a good location for compensation plantings for proposed crossing disturbances. Newmarket expressed interest in increasing woodland continuity using this block. MGP, Newmarket, LSRCA, Beacon to discuss further.	MGP Newmarket LSRCA Beacon
5.5 Newmarket noted to consider boulevard swale depth at detailed design and that it does not inhibit grass cutting, or else it could lead to homeowner tampering.	Info
<b>6.0 Design Charrette (General)</b>	
6.1 LSRCA noted opportunities for localized SWM treatment at end of the cul-de-sacs in the concept plan.	Info
6.2 Many single loaded roads exist in the plan, and present opportunities for boulevard LIDs at the surface (e.g.. bioswales).	Info

<b><u>Item:</u></b>	<b><u>Action:</u></b>
6.3 LSRCA noted a precedent for successful implementation of underground storage in parkland in Barrie. The City provided some level of parkland dedication. MGP wished to discuss further with Newmarket/Aurora on potential levels of parkland dedication with combined SWM. Current concept plan sets aside SWM blocks conservatively, size not assessed in detail.	MGP/ Newmarket/ Aurora
6.4 Site topography generally falls west to east. Therefore, west side of north/south laneways would be optimal for LIDs.	Info
6.5 Beacon noted that each of the three headwater drainage features will have to be assessed further and each will have their own management recommendations. LSRCA noted an assessment of allowable water quality to the features is required. It was noted that LIDs in the buffer areas present good opportunities for feature recharge.	Info
6.6 SWM blocks are conceptual in size at this stage.	Info
6.7 Newmarket noted an interest in increased use of soft landscaping in medium density blocks. MGP noted that mid-rise development is anticipated in these blocks per their preliminary plans. SCS noted that private plans allow for better use of open space for LIDs on private site plans, such as permeable paving products that would be avoided elsewhere in the subdivision.	Info
6.8 LSRCA noted that a ‘post to pre’ water balance approach is generally required for all features. A site wide water balance is also required. Each feature catchment will also require a water balance. LSRCA/Beacon/SCS/Golder to meet again once hydrogeology work is advanced to discuss specific requirements. Natural Heritage to be included as well.	Beacon LSRCA Golder SCS
6.9 LSRCA noted the approved Phase 1 (Newmarket) site implemented underground storage and a bioretention facility. LSRCA recognized that while treatment at source is the primary objective, constraints may necessitate conventional end of pipe approaches such as manufactured treatment devices. Does not expect that school board would accept a requirement for on-site LID.	Info

**SCS Consulting Group Ltd.**



Ben O’Neill, EIT  
 boneill@scsconsultinggroup.com

Attachments: Figure 1.1 – Draft Existing Storm Drainage Plan  
 Concept Plan Markup Sketch  
 Design Charrette PowerPoint Presentation

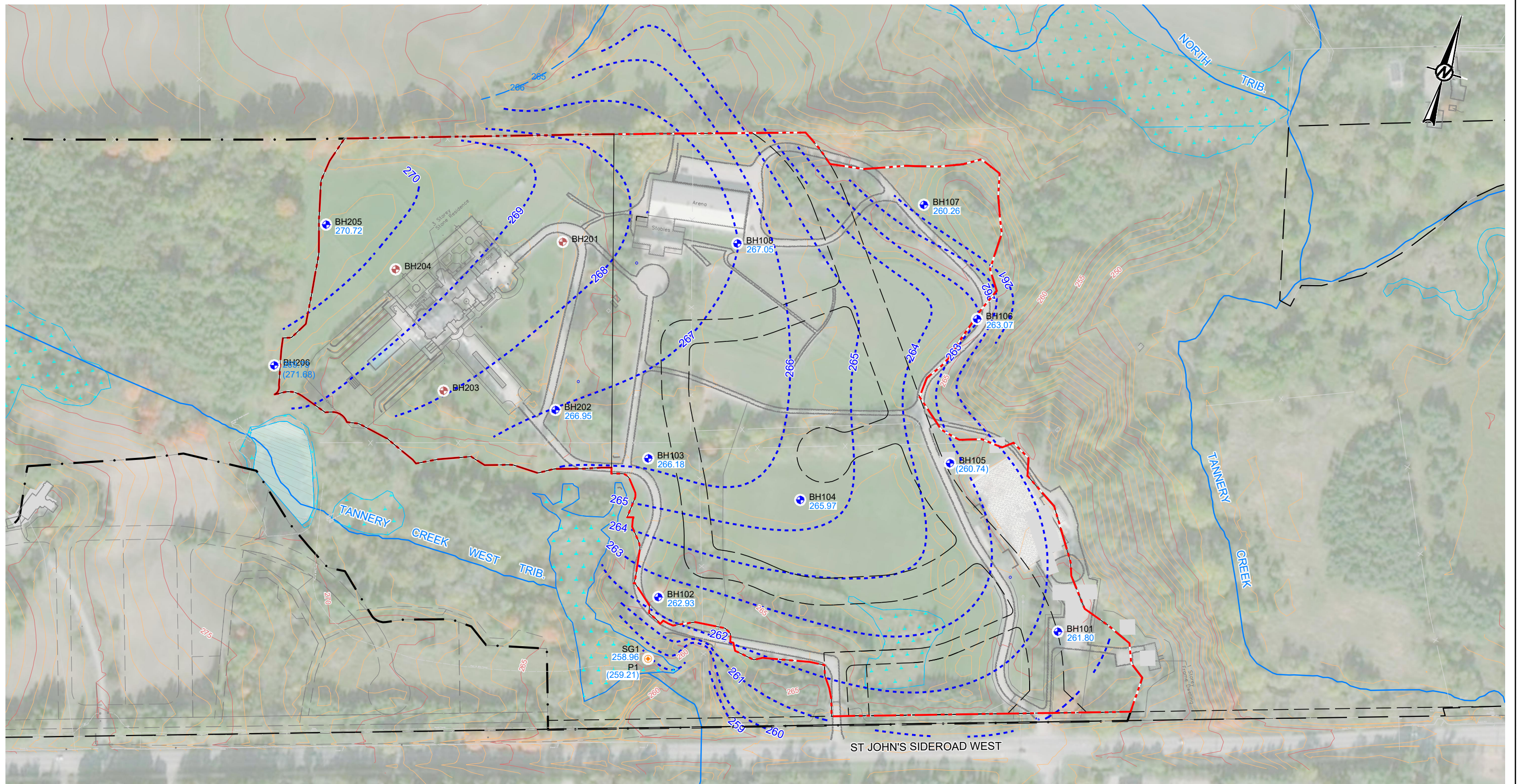
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**APPENDIX B3**

**HYDROGEOLOGICAL ASSESSMENT EXCERPTS**

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Path: \\golder.com\publicdata\diffusion\shininghill\clients\shining\_hill\_estates\_aurora\162\_sl\_johns\_sideroad\20210309\_12\_SCS\40\_PROD\0001-Hydro\CS | File Name: 20360612\_001-CH-002.dwg | Last Edited By: jregier Date: 2021-03-09 Time: 3:38:20 PM | Printed By: jregier Date: 2021-03-09 Time: 3:56:16 PM



**LEGEND**

- PHASE 3 (AURORA) BOUNDARY
- SOIL ENG MONITORING WELL
- SOIL ENG BOREHOLE
- GOLDER PIEZOMETER / STAFF GAUGE
- 262.42 STATIC WATER LEVEL (JANUARY 2021)
- (258.99) LOWER SCREENED POTENTIAL (masl)
- WATER TABLE CONTOUR (masl)
- ▲ WETLAND (BEACON)
- SITE CONTOURS (1 masl INTERVAL)

**REFERENCES AND NOTES**

1. MAPPING BASED ON ESRI GEOGRAPHY NETWORK OBM FEATURES AND CLIENT CAD COMPILATIONS
2. WETLAND AND ECOLOGICAL FEATURES, BEACON, FEBRUARY 2021
3. MAPPED FEATURES AND LOCATIONS ARE APPROXIMATE AND NOT TO SCALE
4. BETWEEN THE WELLS AND TEST WELLS, CONTOURED SURFACES ARE NOT PROVEN.
5. LOWER SCREENED POTENTIALS (LEVELS IN BRACKETS) NOT USED FOR INTERPOLATION.

CLIENT  
**SHINING HILL ESTATES COLLECTION INC.**  
 C/O SCS CONSULTING GROUP LTD.

CONSULTANT



YYYY-MM-DD 2021-03-09

DESIGNED

PREPARED JPR

REVIEWED JG

APPROVED CMK

PROJECT  
**HYDROGEOLOGICAL INVESTIGATION**  
 SHINING HILL (PHASE 3)  
 162, 306, 370, 434 & 488 ST. JOHN'S SIDEROAD WEST, AURORA

TITLE  
**WATER TABLE JANUARY 2021**

PROJECT NO.  
20360612

CONTROL  
0001

REV.  
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FIGURE  
8



25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A4/B

seasonal and annual fluctuations should be anticipated. Further, stabilized groundwater conditions may not have been present at BH106 on September 29, November 16, November 24, and December 1, 2020.

The depth to groundwater at the monitoring wells ranged from 1.33 mbgs (BH104 on January 19, 2021) to 4.70 mbgs (BH202 on November 24, 2020) and from elevations of 258.30 masl (BH107 on September 29, 2020) to 271.68 masl (BH206-D [deep] on January 19, 2021) on the dates monitored. The groundwater elevation data on September 29, 2020 are shown on the Record of Borehole Sheets (Appendix D), and the groundwater elevation data on December 1, 2020 and January 19, 2021 are shown on Figures 7A to 7C, Site Sections A - A', B - B' and C - C', respectively. The groundwater elevation data from January 19, 2021 is presented on Figure 8, Water Table (January 2021). In general, shallow groundwater flow is inferred to follow topography, with flow in an eastern direction towards Tannery Creek, in a northeast direction towards the Tannery Creek North Tributary, and in a south to southwest direction towards the Tannery Creek West Tributary and the pond, depending on location (refer to Figure 8).

The groundwater elevations at BH206-D (deep) ranged from about 1.9 m to 2.2 m higher than at BH206-S (shallow) during the monitoring events, indicating an upward vertical gradient at that location. It is noted that the monitoring well in BH105 was installed by Soil Eng. for geotechnical purposes and was screened in the silty clay unit at a lower elevation (i.e., 250.0 masl to 253.1 masl) relative to the other monitoring wells. Therefore, the groundwater levels measured in BH206-D and BH105 are not considered representative of water table conditions.

At staff gauge SG1, located in the Tannery Creek West Tributary, a water depth ranging from 0.26 m to 0.29 m was recorded on the monitoring events on November 16, November 24 and December 1, 2020, and January 19, 2021; flowing water was observed in the Tannery Creek West Tributary on those dates. A downward hydraulic gradient was observed at P1/SG1 on November 16, November 24 and December 1, 2020. An upward hydraulic gradient was observed at P1/SG1 on January 19, 2021. Below grade water levels were recorded at P1 on the monitoring events on November 16, November 24 and December 1, 2020, and January 19, 2021.

Automatic data loggers (i.e., pressure transducers) were installed at BH102, BH107, BH206-D (deep) and BH206-S (shallow) on December 1, 2020, set to record every four hours and downloaded on January 19, 2021. Daily precipitation data was obtained from Environment and Climate Change Canada (ECCC) for the Toronto North York Meteorological Station (ID 615S001), which was the nearest station to the site with daily precipitation data for this period. Hydrographs of the logger data with daily precipitation data are provided as Figures E-2 to E-5, Appendix E. As shown, the data indicate that the groundwater elevation in BH102 and BH107 and increases in delayed response to some rain events during this period. A similar but muted groundwater elevation trend is observed at BH206-D (deep), while a steady groundwater elevation increase was observed at BH206-S (shallow). It is noted that the data loggers will remain in these four monitoring wells until the summer of 2021 (or until construction begins) to monitor seasonal groundwater levels at the site, the results of which will be reported under separate cover.

### 3.4 Hydraulic Testing

Single well response testing (i.e., rising head tests) was carried out at BH103, BH108 and BH202 on November 16, 2020, and at BH101 and BH206-S (shallow) on December 1, 2020. The rising head tests were carried out by rapidly lowering the water levels by purging with a dedicated Waterra footvalve and tubing. The resulting water level recoveries were monitored with an electronic water level tape and automatic data logger. The recovery data were analyzed using the AQTESOLV for Windows (1996 – 2007) Version 4.5 software. The Bouwer and Rice (1976) method for unconfined conditions was applied to the rising head test data. Estimates of hydraulic

conductivity (K) obtained from the rising head tests are summarized below in Table 1. Summary printouts of the rising head test data and results from AQTESOLV are included in Appendix F.

**Table 1: Summary of Estimated Hydraulic Conductivity**

Borehole	Unit Screened	Depth of Monitoring Well (mbgs)	Method	K (cm/s)
BH101	SILTY CLAY	7.6	Bouwer and Rice (1976), unconfined	$2 \times 10^{-6}$
BH103	SANDY SILT	4.6	Bouwer and Rice (1976), unconfined	$1 \times 10^{-3}$
BH108	SANDY SILT	4.6	Bouwer and Rice (1976), unconfined	$5 \times 10^{-4}$
BH202	SILTY FINE SAND	6.1	Bouwer and Rice (1976), unconfined	$4 \times 10^{-4}$
BH206-S (shallow)	SILTY CLAY	7.6	Bouwer and Rice (1976), unconfined	$3 \times 10^{-6}$

**Notes:**

mbgs – metres below ground surface. cm/s – centimetres per second

The hydraulic conductivity estimates for the non-cohesive sandy silt and silty fine sand soils ranged from  $4 \times 10^{-4}$  cm/s to  $1 \times 10^{-3}$  cm/s, with a geometric mean of  $6 \times 10^{-4}$  cm/s (n=3). The hydraulic conductivity estimates for the silty clay unit ranged from  $2 \times 10^{-6}$  cm/s to  $3 \times 10^{-6}$  cm/s, with a geometric mean of  $3 \times 10^{-6}$  cm/s (n=2). The estimated hydraulic conductivity values are considered reasonable for the units tested.

### 3.5 Guelph Permeameter Testing

Soil infiltration rate testing was carried out on November 24, 2020 in the unsaturated zone using a Guelph Permeameter (Soilmoisture Equipment Corp., Model 2800K1). The Guelph Permeameter was operated in general accordance with the procedures outlined by the manufacturer (Soilmoisture Equipment Corp., 2012) using a single head method. The apparatus was installed at the base of hand-augered test holes.

Once the outflow of water at the depth of installation reached a steady-state flow rate, the field-saturated hydraulic conductivity,  $K_{fs}$ , of the soil was estimated using the following equation (Elrick et. al., 1989):

$$K_{fs} = \frac{C_1 Q_1}{2 \pi H_1^2 + \pi a^2 C_1 + 2 \pi \frac{H_1}{\alpha^*}}$$

Where:  $C_1$  = shape factor  
 $Q_1$  = flow rate (cm<sup>3</sup>/s)  
 $H_1$  = water column height (cm)  
 $a$  = well radius (cm)  
 $\alpha^*$  = alpha factor (0.12 cm<sup>-1</sup> for Type 3 soils)

The field data and analysis of the infiltration rate tests are presented as Figures F-1 to F-5, Appendix F. Based on the resulting  $K_{fs}$  (cm/s), the corresponding infiltration rates (mm/hr) were estimated using the approximate

relationship presented in the *Low Impact Development Stormwater Management Planning and Design Guide* (or “*Design Guide*”) (TRCA and CVCA, 2010). A summary of the infiltration rate test results is presented in Table 2, below.

**Table 2: Summary of Estimated Infiltration Rates**

Test	Soil Description	Depth Relative to Grade (mbgs)	Est. Field-Saturated Hydraulic Conductivity $K_{fs}$ (cm/s)	Estimated Infiltration Rate <sup>1</sup> (mm/hr)	Correction Factor	Corrected Estimated Infiltration Rate <sup>2</sup> (mm/hr)
GP-101 (near BH101)	Inferred SILTY SAND (FILL) <sup>3</sup>	1.0	$9 \times 10^{-5}$	49	3.5	14
GP-102 (near BH102)	SILT	0.7	$1 \times 10^{-5}$	30	2.5 <sup>5</sup>	12
GP-105 (near BH105)	SAND	0.8	$1 \times 10^{-4}$	50	3.5	14
GP-106 (near BH106)	Inferred SILTY FINE SAND <sup>4</sup>	1.1	$3 \times 10^{-4}$	62	3.5	18
GP-206 (near BH206)	SAND	0.7	$1 \times 10^{-3}$	75	2.5 <sup>5</sup>	30

**Notes:**

mbgs – metres below ground surface. cm/s - centimetres per second. mm/hr – millimetres per hour

<sup>1</sup> – based on Table C1 from TRCA and CVCA (2010).

<sup>2</sup> – correction factor in accordance with Table C2 from TRCA and CVCA (2010).

<sup>3</sup> – the base of the test hole was near the contact point between silty sand fill and the underlying silty clay unit. In Golder’s opinion, this result is more representative of silty sand fill.

<sup>4</sup> – the base of the test hole was near the contact point between silty fine sand and the underlying silty clay unit. In Golder’s opinion, this result is more representative of silty fine sand.

<sup>5</sup> – should the clearance between the invert of the LID feature(s) and the underlying silty clay unit be less than 1.5 m, the correction factor should be increased to 3.5.

The field-saturated hydraulic conductivity values of the silty sand fill, silt, silty fine sand, and sand ranged from approximately  $1 \times 10^{-5}$  cm/s to  $1 \times 10^{-3}$  cm/s, with corresponding infiltration rates ranging from 30 mm/hr to 75 mm/hr.

The infiltration rate estimates from this investigation are based on the test methods discussed above and are for the corresponding fill/soil types encountered. They represent the fill/soil conditions at the tested locations and depths only; conditions may vary between and beyond the tested locations. Care should be taken during construction of any proposed infiltration measures to preserve the existing soil structure and avoid compaction and re-working which could reduce its infiltrative properties.

For preliminary design purposes, a correction factor was applied to estimate the design infiltration rate in accordance with guidance provided in TRCA and CVCA (2010), to account for potential reductions in soil permeability due to compaction, smearing during the construction of a given infiltration feature and the gradual accumulation of fine sediments over the lifespan of the infiltration feature. Based on the guidance, a correction factor of 2.5 to 3.5 was applied to the estimated infiltration rates. The corrected infiltration rate estimate ranges from approximately 12 mm/hr to 30 mm/hr, with a geometric mean of 17 mm/hr (n=5). As noted above in Table 2,



meteorological data from the Toronto Buttonville A ECCC Meteorological Station based on the WHC assigned to each land use area.

- Runoff was calculated as the difference between surplus and infiltration.

### 5.3 Water Balance Results

Average annual water balance assessments were carried out on a site-wide basis as described in Sections 5.1 and 5.2. The results for the pre-development, post-development, and mitigated post-development scenarios are presented in this section.

#### 5.3.1 Pre-Development Condition

Based on the results of the assessment, the average annual pre-development water balance was estimated as summarized in Table 3, and as detailed in Table G-3, Appendix G.

**Table 3: Pre-Development Average Annual Water Balance Results**

Component	Average Annual Volume m <sup>3</sup> /yr
	Site-Wide
Precipitation (P)	121,825
Evapotranspiration (ET)	73,230
Surplus (S)	48,255
Infiltration (I)	17,110
Runoff (R)	31,145

For the pre-development condition, the estimated average annual runoff from the site is approximately 31,145 m<sup>3</sup> and the average annual infiltration on the site is approximately 17,110 m<sup>3</sup>.

#### 5.3.2 Post-Development Condition

Based on the results of the assessment, the average annual post-development water balance was estimated as summarized in Table 4, and as detailed in Table G-3, Appendix G.

**Table 4: Post-Development Average Annual Water Balance Results**

Component	Average Annual Volume m <sup>3</sup> /yr
	Site-Wide
Precipitation (P)	121,825
Evapotranspiration (ET)	44,245
Surplus (S)	77,470
Infiltration (I)	10,005
Runoff (R)	67,465

For the post-development condition, the estimated average annual runoff from the site is approximately 67,465 m<sup>3</sup> and the estimated average annual infiltration on the site is approximately 10,005 m<sup>3</sup>. As a result of land use changes from site development, runoff is expected to increase by 117% (i.e., 31,145 m<sup>3</sup> to 67,465 m<sup>3</sup>) and infiltration is expected to decrease by 42% (i.e., 17,110 m<sup>3</sup> to 10,005 m<sup>3</sup>) on an average annual basis.

### 5.3.3 Post-Development Condition Including Mitigation

Average annual infiltration volumes at the site are expected to decrease relative to pre-development conditions and runoff volumes are expected to increase as a result of development. Groundwater recharge from the site is inferred to mainly discharge towards Tannery Creek, the Tannery Creek West Tributary and the Tannery Creek North Tributary valley lands, which are considered to be intermittent and permanent coldwater streams. In addition, the western portion of the site is within the Oak Ridges Moraine Conservation Plan area, and the site is within the WHPA-Q1 (i.e., within the WHPA-B/C/D areas of York Region municipal wells to the east) and WHPA-Q2 areas. Therefore, it is considered prudent to incorporate low impact development (LID) measures into the development design to mitigate against reductions to post-development infiltration rates to the extent practical. Further, the use of LID measures for stormwater runoff from development sites assists to support the natural hydrologic cycle by helping to maintain groundwater recharge, provide additional water quality treatment and reduce the volume of runoff from a site.

The conceptual LID measures proposed for the site as part of the Functional Servicing design by SCS are presented on the LID Plan (SCS, 2021; see Appendix B), and are comprised of catchbasin infiltration trenches, rear-yard infiltration trenches, catchbasin filtration trenches, bioswales, and on-site infiltration as described below. The neighborhood park (Block 91) will also have an underground storm water storage tank that will not impact infiltration or evapotranspiration and will release runoff to the Tannery Creek North Tributary. The designed retention volumes for each of the measures were provided by SCS. The LID measures are located throughout the site so that the enhancements to post-development infiltration rates and the attenuation of storm water volumes will benefit Tannery Creek and the North and West Tributaries of Tannery Creek.

#### Catchbasin Infiltration Trenches

The Draft Plan of Subdivision (see Appendix B) includes 12 single-detached homes on Street A (Blocks 5-13, 18-20, and 33-34) and 4 on Street C (Blocks 21, 22, 31, and 32). Catchbasin infiltration trenches along the front portion of the proposed single detached units and the adjacent Street A (between Street B and Lane A), including half of the road north of Street B, are proposed to capture flow from roof runoff and other impervious surfaces for these proposed dwellings and road via overland flow.

The catchbasin infiltration trench should be designed in accordance with guidance from the *Low Impact Development Stormwater Management Planning and Design Guide* (TRCA & CVC, 2010). It is understood that the infiltration trench along Street A, adjacent to the Neighbourhood Park above Street B, will be designed to retain up to a 27.3 mm storm event. The infiltration trench south of the Neighbourhood Park along Street A will be designed to retain up to a 9.2 mm storm event. The preliminary infiltration trench designs are shown in the Catchbasin Infiltration Trench Detail in Appendix B (SCS, 2021).

A frequency analysis of precipitation observed at the Toronto Buttonville A station (1986 to 2017) was conducted based on the available storage of the proposed infiltration galleries. Resultant runoff reduction factors of 81% and 57% were applied to the impervious area draining to the infiltration trench north and south of Street B, adjacent to the Neighbourhood Park.

### Rear-Yard Infiltration Trenches

The Draft Plan of Subdivision (see Appendix B) includes 9 single detached houses along Street A (Blocks 5-13), 31 along Street B (Blocks 14-17 and 53-79), and 4 along Street C (Blocks 26-29) of the site. Rear-yard infiltration trenches along the proposed single detached units of Street A; adjacent to Tannery Creek, Street B; adjacent to the Tannery Creek West Tributary, and Street C are proposed to capture flow from rear roof runoff for these proposed dwellings via overland flow.

The infiltration trenches should be designed with guidance from the *Low Impact Development Stormwater Management Planning and Design Guide* (TRCA & CVC, 2010). It is understood that the infiltration trenches will be designed to retain up to a 25 mm storm event. The preliminary rear yard infiltration trench design is shown in the Rear Yard Infiltration Trench Detail in Appendix B (SCS, 2021).

A frequency analysis of precipitation observed at the Toronto Buttonville A station (1986 to 2017) was conducted based on the available storage of the proposed infiltration trenches. A resultant runoff reduction factor of 80% was applied to the area draining to the infiltration trenches.

### Catchbasin Filtration Trenches

The Draft Plan of Subdivision (see Appendix B) includes 18 single-detached homes along the east side of Street B (Blocks 36-52), 31 along the west and north sides of Street B (Blocks 14-17 and 53-79), 12 on Street C, and 6 on Street A. Catchbasin filtration trenches along the front portion of the proposed single detached units of Streets A, B, and C, the adjacent Street B (18 m ROW), half of the north section of Street B (15 m ROW), and a section of Street A (south of Street B) are proposed to capture flow from both front and full roof runoff and other impervious surfaces for these proposed dwellings and road via overland flow.

The catchbasin filtration trench should be designed in accordance with guidance from the *Low Impact Development Stormwater Management Planning and Design Guide* (TRCA & CVC, 2010). It is understood that the filtration trench will be designed with an impermeable liner, which will promote attenuation and settlement of sediments but will not increase infiltration. The preliminary filtration trench design is shown in the Catchbasin Filtration Trench Detail in Appendix B (SCS, 2021).

### Bioswales

The following locations have been identified for the use of bioswales to collect and retain runoff (refer to the Draft Plan of Subdivision; Appendix B):

- Half of the Street A north of Street B is proposed to incorporate a bioswale which will be designed to capture runoff from the street with a design retention of up to a 33.3 mm storm event.
- A portion of Street B adjacent to the Neighbourhood Park is proposed to incorporate a bioswale which will be designed to capture runoff from the street with a design retention of up to a 26.7 mm storm event.
- The front impervious portions of nine lane-access single detached houses along Lane A, including Lane A, will be collected by a bioswale with a design retention of up to a 29.2 mm storm event.

The bioswales should be designed with guidance from the *Low Impact Development Stormwater Management Planning and Design Guide* (TRCA & CVC, 2010). A frequency analysis of precipitation observed at the Toronto Buttonville A station (1986 to 2017) was conducted based on the available storage of the proposed bioswales.

Resultant runoff reduction factors of 82%, 81% and 81% were applied to the areas draining towards Street A, Street B and Lane A, respectively.

### **On-site Infiltration**

The Draft Plan of Subdivision (see Appendix B) includes a neighborhood park (Block 91) to the north, a mid/high rise residential area (Block 89) to the northeast adjacent to Tannery Creek, and a school block for Saint Anne's School (Block 90) to the west adjacent to the Tannery Creek West Tributary. It is anticipated that the school and mid/high rise residential blocks will direct impervious runoff flow to on-site LID features, such as infiltration trenches or bioswales, to achieve 25 mm volume control. The park block will utilize proposed underground storage along the east boundary of the block adjacent to Street A, as shown on the Proposed Servicing Plan (SCS, 2021; see Appendix B). The underground storage measure will provide attenuation to stormwater flows but will not impact infiltration or evapotranspiration. Designs for these LID features are not available at this time but will be demonstrated at the site plan control stage. For the purpose of this assessment, no runoff reduction was considered for these blocks.

### **Groundwater Elevations**

At this time, a conceptual design of the LID measures described above has been completed and details such as final grades and the inverts of LID measures will be available as designs progress. Also, groundwater level monitoring during a time of seasonally high groundwater conditions has not yet been carried out. Groundwater monitoring is on-going and will continue until the summer 2021 (or until construction begins).

The mitigated post-development scenario presented below assumes that a 1 m separation between the subsurface LID inverts and seasonally high groundwater elevations will be maintained. Based on the available data, the depth to groundwater could present challenges to the implementation of subsurface infiltration features used as LID measures. During the September 29, 2020 monitoring event, the average depth to groundwater in the subdivision area (i.e., monitoring wells BH101 to BH104 and BH107 to BH108) was 3.3 m below existing grade. During the January 19, 2021 monitoring event, the average depth to groundwater in the subdivision area (i.e., as above, but including BH106) was 2.2 m below existing grade.

In the event that a 1 m separation distance cannot be maintained, a subsurface LID would still enhance post-development infiltration rates, especially at times of seasonally low groundwater conditions, provided that the outlet or overflow of the LID remains above the seasonally high groundwater level. If the separation distance is less than 1 m, less average annual infiltration and more average annual runoff would be achieved than presented below. In any event, the infiltration features also function to capture and attenuate precipitation events at the site and provide a benefit to the storm water management scheme. The findings presented below should be re-assessed at the time of detailed design and on the basis of seasonal high groundwater elevation data.

### **Results**

Based on the above, the average annual mitigated post-development water balance was estimated as summarized in Table 5, and as detailed in Table G-3, Appendix G.

**Table 5: Mitigated Post-Development Average Annual Water Balance Results**

Component	Annual Volume m <sup>3</sup> /yr
	Site-Wide
Precipitation (P)	121,825
Evapotranspiration (ET)	44,245
Surplus (S)	77,470
Infiltration (I)	20,640
Runoff (R)	56,830

The proposed LID mitigation scheme is estimated to increase average annual infiltration by approximately 10,635 m<sup>3</sup> and reduce average annual runoff similarly, compared to the un-mitigated post-development condition. As a result, on a site-wide basis, average annual infiltration is estimated to increase by 21% (i.e., 17,110 m<sup>3</sup> to 20,640 m<sup>3</sup>) and average annual runoff is expected to increase by 82% (i.e., 31,145 m<sup>3</sup> to 56,830 m<sup>3</sup>) as a result of development compared to pre-development conditions. As discussed above, if the separation distance between the LID inverts and the seasonally high groundwater elevations is less than 1 m, less average annual infiltration and more average annual runoff would be achieved than presented in Table 5.

## 6.0 DISCUSSION

The site is generally located on tableland areas between Tannery Creek and the North and West Tributaries of Tannery Creek. Portions of the site are mapped within LSRCA regulated areas, and the western portion of the site is mapped within the Oak Ridges Moraine Conservation Plan Area and Greenbelt.

The findings of the subsurface investigation indicate that shallow native soils at the site are predominantly comprised of a non-cohesive deposit (ranging in gradation from silt to sand) with an average thickness of about 3.2 m and with moderate hydraulic conductivity. The thick underlying deposit of silty clay has moderate to low hydraulic conductivity. Based on MECP water well records, the thickness of the clay/till aquitard at the site is on the order of 50 m or more. Shallow groundwater flow is inferred to follow topography, with flow in an eastern direction towards Tannery Creek, in a northeast direction towards the Tannery Creek North Tributary, and in a south to southwest direction towards the Tannery Creek West Tributary and the man-made on-line pond, depending on location. The on-line pond discharges to the Tannery Creek West Tributary.

A bi-level groundwater monitoring well was installed at BH206 near the on-line pond and the Tannery Creek West Tributary. During the five monitoring events carried out to date, the vertical hydraulic gradient was upwards. This result is consistent with discharging groundwater conditions and information provided by Beacon that the Tannery Creek West Tributary is a permanently flowing coldwater stream, as is Tannery Creek off-site to the east.

Piezometer/staff gauge pair P1/SG1 was installed in the Tannery Creek West Tributary and within the willow mineral thicket swamp. A downward hydraulic gradient was observed at P1/SG1 on November 16, November 24 and December 1, 2020, indicating recharging conditions on those dates. An upward hydraulic gradient was observed at P1/SG1 on January 19, 2021, indicating discharging conditions. Below grade water levels were

**Table E-1 - Water Level Depths and Elevations**  
**Hydrogeological Investigation**  
**Shining Hill (Phase 3), 162 St. John's Sideroad West, Aurora, Ontario**

Monitoring Well ID	Ground Surface Elevation (masl)	Screen Interval (masl)	29-Sep-20		16-Nov-20		24-Nov-20		01-Dec-20		19-Jan-21	
			Depth (mbgs)	Elevation (masl)	Depth (mbgs)	Elevation (masl)	Depth (mbgs)	Elevation (masl)	Depth (mbgs)	Elevation (masl)	Depth (mbgs)	Elevation (masl)
BH101	265.00	257.4 to 258.9	4.50	260.50	4.13	260.87	4.19	260.81	3.89	261.11	3.20	261.80
BH102	264.90	258.8 to 260.3	2.80	262.10	2.66	262.24	2.67	262.24	2.48	262.42	1.97	262.93
BH103	268.00	263.4 to 265.0	2.50	265.50	2.40	265.61	2.40	265.61	2.26	265.75	1.82	266.18
BH104	267.30	261.2 to 262.7	2.70	264.60	2.24	265.06	2.24	265.06	2.18	265.12	1.33	265.97
BH105	266.80	250.0 to 253.1	7.20	259.60	6.78	260.02	6.72	260.08	6.60	260.20	6.06	260.74
BH106	265.30	257.7 to 259.2	DRY	DRY	6.92	258.38	5.92	259.38	3.69	261.61	2.24	263.07
BH107	262.50	256.4 to 257.9	4.20	258.30	3.56	258.94	3.61	258.89	2.82	259.68	2.24	260.26
BH108	269.30	264.7 to 266.3	3.20	266.10	3.08	266.22	3.10	266.20	2.97	266.34	2.25	267.05
BH202	271.30	265.2 to 266.7	4.60	266.70	4.69	266.61	4.70	266.61	4.64	266.67	4.35	266.95
BH205	274.10	268.0 to 269.5	3.80	270.30	3.97	270.13	4.00	270.10	3.78	270.33	3.38	270.72
BH206-D	273.30	261.1 to 262.6	2.00	271.30	1.83	271.48	1.84	271.47	1.73	271.57	1.62	271.68
BH206-S	273.30	265.7 to 267.2	3.90	269.40	3.92	269.38	3.92	269.38	3.89	269.42	3.57	269.73
P1	259.43	-			DRY	DRY	1.11	258.32	0.68	258.75	0.22	259.21
SG1	258.70	-			-0.27	258.97	-0.27	258.97	-0.29	258.99	-0.26	258.96

**Notes:**

1. mbgs = metres below ground surface
2. masl = metres above sea level
3. Monitoring wells 101 to 108, 202, 205 and 206D/S were installed by Soil Engineers Ltd. in September 2020. The elevations provided are understood to be referenced to a geodetic datum.
4. D = deep, S = shallow
5. P = piezometer, SG = staff gauge; installed by Golder Associates Ltd. on November 16, 2020.
6. Elevation data for ground surface at the location of the P1 and SG1 were surveyed by Golder Associates Ltd. and are referenced to a geodetic datum.
7. Groundwater level data from September 29, 2020, were measured by Soil Engineers Ltd.
8. Stabilized groundwater conditions may not have been present at BH106 on Sept. 29, Nov. 16, Nov. 24, and Dec. 1, 2020.

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**APPENDIX C1**

**EXISTING HYDROLOGY**

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# Existing Hydrology 4hr Chicago Storm

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V V I SSSSS U U A L (v 6.0.2001)
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 \*\*\*\*\*

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Input filename: C:\Program Files (x86)\Visual OTTHYMO
6.0\VO2\voin.dat
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0af8143f9a42\1053490c-ee07-4d56-85bb-53e58490bbce\s

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DATE: 02/19/2021 TIME: 05:02:08

USER:

COMMENTS: \_\_\_\_\_

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*****
** SIMULATION : Run 01: 4hr Chicago 2yr **
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| CHICAGO STORM | IDF curve parameters: A= 647.700
| Ptotal= 34.80 mm | B= 4.000
| | C= 0.784
-----
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min

```

Time to peak ratio = 0.33

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
2.69	0.17	2.27	1.17	17.17	2.17	5.25	3.17
2.50	0.33	2.59	1.33	81.81	2.33	4.49	3.33
2.34	0.50	3.04	1.50	22.50	2.50	3.93	3.50
2.20	0.67	3.72	1.67	11.86	2.67	3.51	3.67
2.08	0.83	4.86	1.83	8.23	2.83	3.18	3.83
1.98	1.00	7.29	2.00	6.38	3.00	2.91	4.00

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| CALIB |
| NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0
| ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.43

```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
2.69	0.033	2.27	1.033	17.17	2.033	5.25	3.03
2.69	0.067	2.27	1.067	17.17	2.067	5.25	3.07
2.69	0.100	2.27	1.100	17.17	2.100	5.25	3.10
2.69	0.133	2.27	1.133	17.17	2.133	5.25	3.13
2.69	0.167	2.27	1.167	17.17	2.167	5.25	3.17
2.50	0.200	2.59	1.200	81.81	2.200	4.49	3.20
2.50	0.233	2.59	1.233	81.81	2.233	4.49	3.23
2.50	0.267	2.59	1.267	81.81	2.267	4.49	3.27
2.50	0.300	2.59	1.300	81.81	2.300	4.49	3.30



2.50	0.333	2.59	1.333	81.81	2.333	4.49	3.33
	0.367	3.04	1.367	22.50	2.367	3.93	3.37
2.34	0.400	3.04	1.400	22.50	2.400	3.93	3.40
2.34	0.433	3.04	1.433	22.50	2.433	3.93	3.43
2.34	0.467	3.04	1.467	22.50	2.467	3.93	3.47
2.34	0.500	3.04	1.500	22.50	2.500	3.93	3.50
2.34	0.533	3.72	1.533	11.86	2.533	3.51	3.53
2.20	0.567	3.72	1.567	11.86	2.567	3.51	3.57
2.20	0.600	3.72	1.600	11.86	2.600	3.51	3.60
2.20	0.633	3.72	1.633	11.86	2.633	3.51	3.63
2.20	0.667	3.72	1.667	11.86	2.667	3.51	3.67
2.20	0.700	4.86	1.700	8.23	2.700	3.18	3.70
2.08	0.733	4.86	1.733	8.23	2.733	3.18	3.73
2.08	0.767	4.86	1.767	8.23	2.767	3.18	3.77
2.08	0.800	4.86	1.800	8.23	2.800	3.18	3.80
2.08	0.833	4.86	1.833	8.23	2.833	3.18	3.83
2.08	0.867	7.29	1.867	6.38	2.867	2.91	3.87
1.98	0.900	7.29	1.900	6.38	2.900	2.91	3.90
1.98	0.933	7.29	1.933	6.38	2.933	2.91	3.93
1.98	0.967	7.29	1.967	6.38	2.967	2.91	3.97
1.98	1.000	7.29	2.000	6.38	3.000	2.91	4.00

Unit Hyd Qpeak (cms)= 0.366  
PEAK FLOW (cms)= 0.051 (i)  
TIME TO PEAK (hrs)= 1.900  
RUNOFF VOLUME (mm)= 7.133  
TOTAL RAINFALL (mm)= 34.800  
RUNOFF COEFFICIENT = 0.205

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

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| CALIB |
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0
|ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.16

```

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.108 (i)  
TIME TO PEAK (hrs)= 1.500  
RUNOFF VOLUME (mm)= 9.144  
TOTAL RAINFALL (mm)= 34.800  
RUNOFF COEFFICIENT = 0.263

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

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-----
-----
| CALIB |
| NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0
|ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.12

```

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.090 (i)  
TIME TO PEAK (hrs)= 1.400  
RUNOFF VOLUME (mm)= 9.622  
TOTAL RAINFALL (mm)= 34.800  
RUNOFF COEFFICIENT = 0.276

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

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V V I SSSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

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OOO TTTT TTTT 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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2.47 1.00 9.42 | 2.00 8.20 | 3.00 3.67 | 4.00

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

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 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
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-----  
 | CALIB |  
 | NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0  
 |ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00  
 ----- U.H. Tp(hrs)= 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

DATE: 02/19/2021 TIME: 05:02:08  
 USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
 \*\* SIMULATION : Run 02: 4hr Chicago 5yr \*\*  
 \*\*\*\*\*

-----  
 | CHICAGO STORM | IDF curve parameters: A= 929.800  
 | Ptotal= 46.26 mm | B= 4.000  
 C= 0.798  
 -----  
 used in: INTENSITY = A / (t + B)^C  
 Duration of storm = 4.00 hrs  
 Storm time step = 10.00 min  
 Time to peak ratio = 0.33

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.38	0.17	2.85	1.17	22.78	2.17	6.71	3.17
3.14	0.33	3.26	1.33	113.18	2.33	5.71	3.33
2.94	0.50	3.84	1.50	30.05	2.50	4.99	3.50
2.76	0.67	4.71	1.67	15.53	2.67	4.45	3.67
2.60	0.83	6.21	1.83	10.66	2.83	4.02	3.83

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

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.38	0.033	2.85	1.033	22.78	2.033	6.71	3.03
3.38	0.067	2.85	1.067	22.78	2.067	6.71	3.07
3.38	0.100	2.85	1.100	22.78	2.100	6.71	3.10
3.38	0.133	2.85	1.133	22.78	2.133	6.71	3.13
3.38	0.167	2.85	1.167	22.78	2.167	6.71	3.17
3.14	0.200	3.26	1.200	113.18	2.200	5.71	3.20
3.14	0.233	3.26	1.233	113.18	2.233	5.71	3.23
3.14	0.267	3.26	1.267	113.18	2.267	5.71	3.27
3.14	0.300	3.26	1.300	113.18	2.300	5.71	3.30
3.14	0.333	3.26	1.333	113.18	2.333	5.71	3.33
2.94	0.367	3.84	1.367	30.05	2.367	4.99	3.37
2.94	0.400	3.84	1.400	30.05	2.400	4.99	3.40
2.94	0.433	3.84	1.433	30.05	2.433	4.99	3.43
2.94	0.467	3.84	1.467	30.05	2.467	4.99	3.47
2.94	0.500	3.84	1.500	30.05	2.500	4.99	3.50
2.76	0.533	4.71	1.533	15.53	2.533	4.45	3.53
2.76	0.567	4.71	1.567	15.53	2.567	4.45	3.57

2.76	0.600	4.71	1.600	15.53	2.600	4.45	3.60
2.76	0.633	4.71	1.633	15.53	2.633	4.45	3.63
2.76	0.667	4.71	1.667	15.53	2.667	4.45	3.67
2.76	0.700	6.21	1.700	10.66	2.700	4.02	3.70
2.61	0.733	6.21	1.733	10.66	2.733	4.02	3.73
2.60	0.767	6.21	1.767	10.66	2.767	4.02	3.77
2.60	0.800	6.21	1.800	10.66	2.800	4.02	3.80
2.60	0.833	6.21	1.833	10.66	2.833	4.02	3.83
2.60	0.867	9.42	1.867	8.20	2.867	3.67	3.87
2.47	0.900	9.42	1.900	8.20	2.900	3.67	3.90
2.47	0.933	9.42	1.933	8.20	2.933	3.67	3.93
2.47	0.967	9.42	1.967	8.20	2.967	3.67	3.97
2.47	1.000	9.42	2.000	8.20	3.000	3.67	4.00

Unit Hyd Qpeak (cms) = 0.366

PEAK FLOW (cms) = 0.099 (i)  
 TIME TO PEAK (hrs) = 1.867  
 RUNOFF VOLUME (mm) = 12.757  
 TOTAL RAINFALL (mm) = 46.257  
 RUNOFF COEFFICIENT = 0.276

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

```

-----
| CALIB |
| NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0
| ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00
-----
U.H. Tp (hrs)= 0.12

```

Unit Hyd Qpeak (cms) = 0.761

PEAK FLOW (cms) = 0.171 (i)  
 TIME TO PEAK (hrs) = 1.400  
 RUNOFF VOLUME (mm) = 16.368  
 TOTAL RAINFALL (mm) = 46.257  
 RUNOFF COEFFICIENT = 0.354

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

```

=====
V V I SSSSS U U A L (v 6.0.2001)
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 LLLL
OOO TTTT TTTT 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  
 6.0\VO2\voin.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\d52ca22b-04f2-4d5b-a5fc-3b557e7dfe9a\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\d52ca22b-04f2-4d5b-a5fc-3b557e7dfe9a\s

DATE: 02/19/2021

TIME: 05:02:09

```

-----
| CALIB |
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00
-----
U.H. Tp (hrs)= 0.16

```

Unit Hyd Qpeak (cms) = 0.864

PEAK FLOW (cms) = 0.207 (i)  
 TIME TO PEAK (hrs) = 1.467  
 RUNOFF VOLUME (mm) = 15.805  
 TOTAL RAINFALL (mm) = 46.257  
 RUNOFF COEFFICIENT = 0.342

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

USER:

COMMENTS: \_\_\_\_\_

```

-----
*****
** SIMULATION : Run 03: 4hr Chicago 10yr **
*****

```

```

-----
| CHICAGO STORM | IDF curve parameters: A=1021.000
| Ptotal= 54.13 mm | B= 3.000
| | C= 0.787
-----
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
4.06	0.17	3.43	1.17	25.32	2.17	7.85	3.17
3.78	0.33	3.92	1.33	135.63	2.33	6.73	3.33
3.54	0.50	4.59	1.50	33.17	2.50	5.91	3.50
3.33	0.67	5.59	1.67	17.50	2.67	5.29	3.67
3.15	0.83	7.28	1.83	12.21	2.83	4.79	3.83
2.99	1.00	10.84	2.00	9.50	3.00	4.39	4.00

```

-----
| CALIB |
| NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0
| ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00
| | U.H. Tp(hrs)= 0.43
-----

```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
4.06	0.033	3.43	1.033	25.32	2.033	7.85	3.03
4.06	0.067	3.43	1.067	25.32	2.067	7.85	3.07
4.06	0.100	3.43	1.100	25.32	2.100	7.85	3.10
4.06	0.133	3.43	1.133	25.32	2.133	7.85	3.13
4.06	0.167	3.43	1.167	25.32	2.167	7.85	3.17
3.78	0.200	3.92	1.200	135.63	2.200	6.73	3.20
3.78	0.233	3.92	1.233	135.63	2.233	6.73	3.23
3.78	0.267	3.92	1.267	135.63	2.267	6.73	3.27
3.78	0.300	3.92	1.300	135.63	2.300	6.73	3.30
3.78	0.333	3.92	1.333	135.63	2.333	6.73	3.33
3.54	0.367	4.59	1.367	33.17	2.367	5.91	3.37
3.54	0.400	4.59	1.400	33.17	2.400	5.91	3.40
3.54	0.433	4.59	1.433	33.17	2.433	5.91	3.43
3.54	0.467	4.59	1.467	33.17	2.467	5.91	3.47
3.54	0.500	4.59	1.500	33.17	2.500	5.91	3.50
3.33	0.533	5.59	1.533	17.50	2.533	5.29	3.53
3.33	0.567	5.59	1.567	17.50	2.567	5.29	3.57
3.33	0.600	5.59	1.600	17.50	2.600	5.29	3.60
3.33	0.633	5.59	1.633	17.50	2.633	5.29	3.63
3.33	0.667	5.59	1.667	17.50	2.667	5.29	3.67
3.15	0.700	7.28	1.700	12.21	2.700	4.79	3.70
3.15	0.733	7.28	1.733	12.21	2.733	4.79	3.73
3.15	0.767	7.28	1.767	12.21	2.767	4.79	3.77
3.15	0.800	7.28	1.800	12.21	2.800	4.79	3.80
3.15	0.833	7.28	1.833	12.21	2.833	4.79	3.83

2.99	0.867	10.84	1.867	9.50	2.867	4.39	3.87
2.99	0.900	10.84	1.900	9.50	2.900	4.39	3.90
2.99	0.933	10.84	1.933	9.50	2.933	4.39	3.93
2.99	0.967	10.84	1.967	9.50	2.967	4.39	3.97
2.99	1.000	10.84	2.000	9.50	3.000	4.39	4.00

Unit Hyd Qpeak (cms) = 0.366

PEAK FLOW (cms) = 0.136 (i)  
 TIME TO PEAK (hrs) = 1.833  
 RUNOFF VOLUME (mm) = 17.209  
 TOTAL RAINFALL (mm) = 54.135  
 RUNOFF COEFFICIENT = 0.318

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

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

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 =====

V V I SSSSS U U A L (v 6.0.2001)  
 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 TTTT TTTT 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  
 6.0\VO2\voin.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\bd1d93a0-35b0-4307-835d-ea09e3609464\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\bd1d93a0-35b0-4307-835d-ea09e3609464\s

DATE: 02/19/2021 TIME: 05:02:09

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
 \*\* SIMULATION : Run 04: 4hr Chicago 25yr \*\*  
 \*\*\*\*\*

-----  
 | CHICAGO STORM | IDF curve parameters: A=1100.000  
 | Ptotal= 62.15 mm | B= 2.000

-----  
 -----  
 | CALIB |  
 | NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0  
 | ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00  
 -----  
 U.H. Tp(hrs)= 0.16

Unit Hyd Qpeak (cms) = 0.864

PEAK FLOW (cms) = 0.286 (i)  
 TIME TO PEAK (hrs) = 1.467  
 RUNOFF VOLUME (mm) = 20.955  
 TOTAL RAINFALL (mm) = 54.135  
 RUNOFF COEFFICIENT = 0.387

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

-----  
 -----  
 | CALIB |  
 | NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0  
 | ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00  
 -----  
 U.H. Tp(hrs)= 0.12

Unit Hyd Qpeak (cms) = 0.761

PEAK FLOW (cms) = 0.235 (i)  
 TIME TO PEAK (hrs) = 1.400  
 RUNOFF VOLUME (mm) = 21.562  
 TOTAL RAINFALL (mm) = 54.135  
 RUNOFF COEFFICIENT = 0.398

```

-----
                                C= 0.776
used in:  INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step   = 10.00 min
Time to peak ratio = 0.33

RAIN      TIME      RAIN | TIME      RAIN |' TIME      RAIN | TIME
mm/hr     hrs      mm/hr | hrs      mm/hr |' hrs      mm/hr | hrs
4.78      0.17      4.06 | 1.17      27.34 | 2.17      9.00 | 3.17
4.46      0.33      4.62 | 1.33      159.94 | 2.33      7.77 | 3.33
4.19      0.50      5.38 | 1.50      35.45 | 2.50      6.86 | 3.50
3.95      0.67      6.51 | 1.67      19.27 | 2.67      6.16 | 3.67
3.74      0.83      8.38 | 1.83      13.70 | 2.83      5.61 | 3.83
3.55      1.00     12.24 | 2.00      10.80 | 3.00      5.16 | 4.00

```

```

0.233  4.62 | 1.233  159.94 | 2.233  7.77 | 3.23
0.267  4.62 | 1.267  159.94 | 2.267  7.77 | 3.27
0.300  4.62 | 1.300  159.94 | 2.300  7.77 | 3.30
0.333  4.62 | 1.333  159.94 | 2.333  7.77 | 3.33
0.367  5.38 | 1.367  35.45 | 2.367  6.86 | 3.37
0.400  5.38 | 1.400  35.45 | 2.400  6.86 | 3.40
0.433  5.38 | 1.433  35.45 | 2.433  6.86 | 3.43
0.467  5.38 | 1.467  35.45 | 2.467  6.86 | 3.47
0.500  5.38 | 1.500  35.45 | 2.500  6.86 | 3.50
0.533  6.51 | 1.533  19.27 | 2.533  6.16 | 3.53
0.567  6.51 | 1.567  19.27 | 2.567  6.16 | 3.57
0.600  6.51 | 1.600  19.27 | 2.600  6.16 | 3.60
0.633  6.51 | 1.633  19.27 | 2.633  6.16 | 3.63
0.667  6.51 | 1.667  19.27 | 2.667  6.16 | 3.67
0.700  8.38 | 1.700  13.70 | 2.700  5.61 | 3.70
0.733  8.38 | 1.733  13.70 | 2.733  5.61 | 3.73
0.767  8.38 | 1.767  13.70 | 2.767  5.61 | 3.77
0.800  8.38 | 1.800  13.70 | 2.800  5.61 | 3.80
0.833  8.38 | 1.833  13.70 | 2.833  5.61 | 3.83
0.867  12.24 | 1.867  10.80 | 2.867  5.16 | 3.87
0.900  12.24 | 1.900  10.80 | 2.900  5.16 | 3.90
0.933  12.24 | 1.933  10.80 | 2.933  5.16 | 3.93
0.967  12.24 | 1.967  10.80 | 2.967  5.16 | 3.97
1.000  12.24 | 2.000  10.80 | 3.000  5.16 | 4.00

```

```

-----
| CALIB      |
| NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0
|ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.43

```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```

----- TRANSFORMED HYETOGRAPH -----
RAIN      TIME      RAIN | TIME      RAIN |' TIME      RAIN | TIME
mm/hr     hrs      mm/hr | hrs      mm/hr |' hrs      mm/hr | hrs
4.78      0.033     4.06 | 1.033     27.34 | 2.033     9.00 | 3.03
4.78      0.067     4.06 | 1.067     27.34 | 2.067     9.00 | 3.07
4.78      0.100     4.06 | 1.100     27.34 | 2.100     9.00 | 3.10
4.78      0.133     4.06 | 1.133     27.34 | 2.133     9.00 | 3.13
4.78      0.167     4.06 | 1.167     27.34 | 2.167     9.00 | 3.17
4.78      0.200     4.62 | 1.200     159.94 | 2.200     7.77 | 3.20
4.46

```

```

Unit Hyd Qpeak (cms)= 0.366
PEAK FLOW (cms)= 0.177 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 22.137

```

TOTAL RAINFALL (mm) = 62.155  
 RUNOFF COEFFICIENT = 0.356

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

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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  
 6.0\VO2\voin.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
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 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\538c9d6b-1120-44e8-9eb7-8485156dfela\s

DATE: 02/19/2021 TIME: 05:02:09

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
 \*\* SIMULATION : Run 05: 4hr Chicago 50yr \*\*  
 \*\*\*\*\*

-----  
 | CHICAGO STORM | IDF curve parameters: A=1448.000  
 | Ptotal= 70.32 mm | B= 3.000  
 C= 0.803  
 -----  
 used in: INTENSITY = A / (t + B)^C  
 Duration of storm = 4.00 hrs  
 Storm time step = 10.00 min  
 Time to peak ratio = 0.33

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
4.94	0.17	4.16	1.17	32.64	2.17	9.72	3.17
4.59	0.33	4.76	1.33	184.62	2.33	8.29	3.33

-----  
 | CALIB |  
 | NASHYD ( 0102) | Area (ha) = 3.62 Curve Number (CN) = 80.0  
 | ID= 1 DT= 2.0 min | Ia (mm) = 5.70 # of Linear Res.(N) = 3.00  
 -----  
 U.H. Tp (hrs) = 0.16

Unit Hyd Qpeak (cms) = 0.864

PEAK FLOW (cms) = 0.374 (i)  
 TIME TO PEAK (hrs) = 1.467  
 RUNOFF VOLUME (mm) = 26.566  
 TOTAL RAINFALL (mm) = 62.155  
 RUNOFF COEFFICIENT = 0.427

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

-----  
 | CALIB |  
 | NASHYD ( 0103) | Area (ha) = 2.39 Curve Number (CN) = 80.0  
 | ID= 1 DT= 2.0 min | Ia (mm) = 4.80 # of Linear Res.(N) = 3.00  
 -----  
 U.H. Tp (hrs) = 0.12

Unit Hyd Qpeak (cms) = 0.761

PEAK FLOW (cms) = 0.309 (i)  
 TIME TO PEAK (hrs) = 1.400  
 RUNOFF VOLUME (mm) = 27.208  
 TOTAL RAINFALL (mm) = 62.155  
 RUNOFF COEFFICIENT = 0.438

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

-----  
 =====  
 V V I SSSSS U U A L (v 6.0.2001)  
 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

4.29	0.50	5.60	1.50	43.10	2.50	7.26	3.50
4.03	0.67	6.86	1.67	22.23	2.67	6.47	3.67
3.81	0.83	9.00	1.83	15.32	2.83	5.85	3.83
3.61	1.00	13.56	2.00	11.84	3.00	5.35	4.00

4.29	0.500	5.60	1.500	43.10	2.500	7.26	3.50
4.03	0.533	6.86	1.533	22.23	2.533	6.47	3.53
4.03	0.567	6.86	1.567	22.23	2.567	6.47	3.57
4.03	0.600	6.86	1.600	22.23	2.600	6.47	3.60
4.03	0.633	6.86	1.633	22.23	2.633	6.47	3.63
4.03	0.667	6.86	1.667	22.23	2.667	6.47	3.67
4.03	0.700	9.00	1.700	15.32	2.700	5.85	3.70
3.81	0.733	9.00	1.733	15.32	2.733	5.85	3.73
3.81	0.767	9.00	1.767	15.32	2.767	5.85	3.77
3.81	0.800	9.00	1.800	15.32	2.800	5.85	3.80
3.81	0.833	9.00	1.833	15.32	2.833	5.85	3.83
3.81	0.867	13.56	1.867	11.84	2.867	5.35	3.87
3.61	0.900	13.56	1.900	11.84	2.900	5.35	3.90
3.61	0.933	13.56	1.933	11.84	2.933	5.35	3.93
3.61	0.967	13.56	1.967	11.84	2.967	5.35	3.97
3.61	1.000	13.56	2.000	11.84	3.000	5.35	4.00

```

-----
-----
| CALIB |
| NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0
| ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.43

```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```

-----
-----
| CALIB |
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.16

```

```

Unit Hyd Qpeak (cms)= 0.366
PEAK FLOW (cms)= 0.231 (i)
TIME TO PEAK (hrs)= 1.800
RUNOFF VOLUME (mm)= 27.495
TOTAL RAINFALL (mm)= 70.316
RUNOFF COEFFICIENT = 0.391

```

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

```

-----
-----
| CALIB |
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.16

```

```

Unit Hyd Qpeak (cms)= 0.864
PEAK FLOW (cms)= 0.482 (i)

```



TIME TO PEAK (hrs)= 1.467  
 RUNOFF VOLUME (mm)= 32.585  
 TOTAL RAINFALL (mm)= 70.316  
 RUNOFF COEFFICIENT = 0.463

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

```

-----
-----
| CALIB |
| NASHYD ( 0103)| Area (ha)= 2.39 Curve Number (CN)= 80.0
|ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.12
  
```

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.394 (i)  
 TIME TO PEAK (hrs)= 1.400  
 RUNOFF VOLUME (mm)= 33.257  
 TOTAL RAINFALL (mm)= 70.316  
 RUNOFF COEFFICIENT = 0.473

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

```

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```

```

V V I SSSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUU A A LLLL
OOO TTTT TTTT 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  
 6.0\VO2\voin.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\20672c59-c98c-4845-bc7e-8d1c2c6132c3\s

Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\20672c59-c98c-4845-bc7e-8d1c2c6132c3\s

DATE: 02/19/2021

TIME: 05:02:09

USER:

COMMENTS: \_\_\_\_\_

```

-----
*****
** SIMULATION : Run 06: 4hr Chicago 100yr **
*****
  
```

```

-----
| CHICAGO STORM | IDF curve parameters: A=1770.000
| Ptotal= 78.03 mm | B= 4.000
-----
C= 0.820
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33
  
```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
5.19	0.17	4.34	1.17	38.21	2.17	10.60	3.17
4.81	0.33	5.00	1.33	203.31	2.33	8.96	3.33
4.48	0.50	5.92	1.50	50.96	2.50	7.78	3.50
4.20	0.67	7.33	1.67	25.51	2.67	6.90	3.67
3.96	0.83	9.77	1.83	17.18	2.83	6.21	3.83
3.74	1.00	15.10	2.00	13.06	3.00	5.65	4.00

```

-----
-----
| CALIB |
| NASHYD ( 0101)| Area (ha)= 4.12 Curve Number (CN)= 75.0
|ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00
  
```

----- U.H. Tp(hrs)= 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

RAIN mm/hr	---- TRANSFORMED HYETOGRAPH ----							
	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
5.19	0.033	4.34	1.033	38.21	2.033	10.60	3.03	
5.19	0.067	4.34	1.067	38.21	2.067	10.60	3.07	
5.19	0.100	4.34	1.100	38.21	2.100	10.60	3.10	
5.19	0.133	4.34	1.133	38.21	2.133	10.60	3.13	
5.19	0.167	4.34	1.167	38.21	2.167	10.60	3.17	
4.81	0.200	5.00	1.200	203.31	2.200	8.96	3.20	
4.81	0.233	5.00	1.233	203.31	2.233	8.96	3.23	
4.81	0.267	5.00	1.267	203.31	2.267	8.96	3.27	
4.81	0.300	5.00	1.300	203.31	2.300	8.96	3.30	
4.81	0.333	5.00	1.333	203.31	2.333	8.96	3.33	
4.48	0.367	5.92	1.367	50.96	2.367	7.78	3.37	
4.48	0.400	5.92	1.400	50.96	2.400	7.78	3.40	
4.48	0.433	5.92	1.433	50.96	2.433	7.78	3.43	
4.48	0.467	5.92	1.467	50.96	2.467	7.78	3.47	
4.48	0.500	5.92	1.500	50.96	2.500	7.78	3.50	
4.20	0.533	7.33	1.533	25.51	2.533	6.90	3.53	
4.20	0.567	7.33	1.567	25.51	2.567	6.90	3.57	
4.20	0.600	7.33	1.600	25.51	2.600	6.90	3.60	
4.20	0.633	7.33	1.633	25.51	2.633	6.90	3.63	
4.20	0.667	7.33	1.667	25.51	2.667	6.90	3.67	
3.96	0.700	9.77	1.700	17.18	2.700	6.21	3.70	
3.96	0.733	9.77	1.733	17.18	2.733	6.21	3.73	

3.96	0.767	9.77	1.767	17.18	2.767	6.21	3.77
3.96	0.800	9.77	1.800	17.18	2.800	6.21	3.80
3.96	0.833	9.77	1.833	17.18	2.833	6.21	3.83
3.96	0.867	15.10	1.867	13.06	2.867	5.65	3.87
3.74	0.900	15.10	1.900	13.06	2.900	5.65	3.90
3.74	0.933	15.10	1.933	13.06	2.933	5.65	3.93
3.74	0.967	15.10	1.967	13.06	2.967	5.65	3.97
3.74	1.000	15.10	2.000	13.06	3.000	5.65	4.00

Unit Hyd Qpeak (cms)= 0.366

PEAK FLOW (cms)= 0.283 (i)  
 TIME TO PEAK (hrs)= 1.800  
 RUNOFF VOLUME (mm)= 32.825  
 TOTAL RAINFALL (mm)= 78.027  
 RUNOFF COEFFICIENT = 0.421

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

-----  
 -----  
 | CALIB |  
 | NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0  
 | ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00  
 -----  
 U.H. Tp(hrs)= 0.16

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.579 (i)  
 TIME TO PEAK (hrs)= 1.467  
 RUNOFF VOLUME (mm)= 38.509  
 TOTAL RAINFALL (mm)= 78.027  
 RUNOFF COEFFICIENT = 0.494

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

-----  
 -----  
 | CALIB |  
 | NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0  
 | ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00  
 -----  
 U.H. Tp(hrs)= 0.12

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms) = 0.469 (i)  
 TIME TO PEAK (hrs) = 1.400  
 RUNOFF VOLUME (mm) = 39.203  
 TOTAL RAINFALL (mm) = 78.027  
 RUNOFF COEFFICIENT = 0.502

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

\*\* SIMULATION : Run 07: 25mm 4hr \*\*  
 \*\*\*\*\*

-----  
 | READ STORM | Filename: C:\Users\mmacdonald\AppData  
 | | ata\Local\Temp\  
 | | 2e4bf4c9-070b-4d50-a252-  
 43332f6ff6fb\d4c2113e  
 | Ptotal= 25.00 mm | Comments: 25MM4HR  
 -----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
2.80	0.17	2.07	1.17	5.70	2.17	5.19	3.17
2.62	0.33	2.27	1.33	10.78	2.33	4.47	3.33
2.48	0.50	2.52	1.50	50.21	2.50	3.95	3.50
2.35	0.67	2.88	1.67	13.37	2.67	3.56	3.67
2.23	0.83	3.38	1.83	8.29	2.83	3.25	3.83
2.14	1.00	4.18	2.00	6.30	3.00	3.01	4.00

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 =====  
 V V I SSSSS U U A L (v 6.0.2001)  
 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  
 6.0\VO2\voain.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\c301758c-ded8-4c47-8f12-bd26e5e5e022\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\c301758c-ded8-4c47-8f12-bd26e5e5e022\s

DATE: 02/19/2021 TIME: 05:02:09  
 USER:

COMMENTS: \_\_\_\_\_

-----  
 | CALIB |  
 | NASHYD ( 0101) | Area (ha) = 4.12 Curve Number (CN) = 75.0  
 | ID= 1 DT= 2.0 min | Ia (mm) = 6.40 # of Linear Res. (N) = 3.00  
 ----- U.H. Tp (hrs) = 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

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

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
2.80	0.033	2.07	1.033	5.70	2.033	5.19	3.03
2.80	0.067	2.07	1.067	5.70	2.067	5.19	3.07
2.80	0.100	2.07	1.100	5.70	2.100	5.19	3.10
2.80	0.133	2.07	1.133	5.70	2.133	5.19	3.13

\*\*\*\*\*

2.80	0.167	2.07	1.167	5.70	2.167	5.19	3.17
	0.200	2.27	1.200	10.78	2.200	4.47	3.20
2.62							
	0.233	2.27	1.233	10.78	2.233	4.47	3.23
2.62							
	0.267	2.27	1.267	10.78	2.267	4.47	3.27
2.62							
	0.300	2.27	1.300	10.78	2.300	4.47	3.30
2.62							
	0.333	2.27	1.333	10.78	2.333	4.47	3.33
2.62							
	0.367	2.52	1.367	50.21	2.367	3.95	3.37
2.48							
	0.400	2.52	1.400	50.21	2.400	3.95	3.40
2.48							
	0.433	2.52	1.433	50.21	2.433	3.95	3.43
2.48							
	0.467	2.52	1.467	50.21	2.467	3.95	3.47
2.48							
	0.500	2.52	1.500	50.21	2.500	3.95	3.50
2.48							
	0.533	2.88	1.533	13.37	2.533	3.56	3.53
2.35							
	0.567	2.88	1.567	13.37	2.567	3.56	3.57
2.35							
	0.600	2.88	1.600	13.37	2.600	3.56	3.60
2.35							
	0.633	2.88	1.633	13.37	2.633	3.56	3.63
2.35							
	0.667	2.88	1.667	13.37	2.667	3.56	3.67
2.35							
	0.700	3.38	1.700	8.29	2.700	3.25	3.70
2.23							
	0.733	3.38	1.733	8.29	2.733	3.25	3.73
2.23							
	0.767	3.38	1.767	8.29	2.767	3.25	3.77
2.23							
	0.800	3.38	1.800	8.29	2.800	3.25	3.80
2.23							
	0.833	3.38	1.833	8.29	2.833	3.25	3.83
2.23							
	0.867	4.18	1.867	6.30	2.867	3.01	3.87
2.14							
	0.900	4.18	1.900	6.30	2.900	3.01	3.90
2.14							
	0.933	4.18	1.933	6.30	2.933	3.01	3.93
2.14							
	0.967	4.18	1.967	6.30	2.967	3.01	3.97
2.14							
	1.000	4.18	2.000	6.30	3.000	3.01	4.00
2.14							

PEAK FLOW (cms)= 0.019 (i)  
 TIME TO PEAK (hrs)= 2.167  
 RUNOFF VOLUME (mm)= 3.349  
 TOTAL RAINFALL (mm)= 24.997  
 RUNOFF COEFFICIENT = 0.134

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

-----  
 -----  
 | CALIB |  
 | NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0  
 | ID= 1 DT= 2.0 min | Ta (mm)= 5.70 # of Linear Res.(N)= 3.00  
 -----  
 U.H. Tp(hrs)= 0.16

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.039 (i)  
 TIME TO PEAK (hrs)= 1.667  
 RUNOFF VOLUME (mm)= 4.497  
 TOTAL RAINFALL (mm)= 24.997  
 RUNOFF COEFFICIENT = 0.180

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

-----  
 -----  
 | CALIB |  
 | NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0  
 | ID= 1 DT= 2.0 min | Ta (mm)= 4.80 # of Linear Res.(N)= 3.00  
 -----  
 U.H. Tp(hrs)= 0.12

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.035 (i)  
 TIME TO PEAK (hrs)= 1.600  
 RUNOFF VOLUME (mm)= 4.872  
 TOTAL RAINFALL (mm)= 24.997  
 RUNOFF COEFFICIENT = 0.195

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

-----  
 -----  
 FINISH  
 =====  
 =====

Unit Hyd Qpeak (cms)= 0.366

Existing Hydrology  
12hr SCS Type II

=====

Mass curve time step = 30.00 min  
New Storm time step = 10.00 min

V V I SSSSS U U A L (v 6.0.2001)  
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  
6.0\VO2\voim.dat  
Output filename:  
C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-  
0af8143f9a42\53e6d70e-4dda-45d3-8414-e9c4f7aeb174\s  
Summary filename:  
C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-  
0af8143f9a42\53e6d70e-4dda-45d3-8414-e9c4f7aeb174\s

DATE: 02/19/2021 TIME: 05:01:36

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
\*\* SIMULATION : Run 01: 12 hr SCS 2yr \*\*  
\*\*\*\*\*

-----  
| MASS STORM | Filename: C:\Users\mmacdonald\AppData\Local\Temp\  
| | ata\Local\Temp\  
| | 1f223602-111d-4e37-b618-  
8f2a32bf9eff\10a53c20  
| Ptotal= 44.52 mm | Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION  
-----  
Duration of storm = 12.00 hrs

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.78	0.17	0.30	3.17	1.78	6.17	29.38	9.17
1.78	0.33	0.59	3.33	1.78	6.33	18.70	9.33
1.78	0.50	0.89	3.50	1.78	6.50	8.01	9.50
1.48	0.67	0.89	3.67	1.78	6.67	6.53	9.67
1.19	0.83	0.89	3.83	1.78	6.83	5.05	9.83
0.89	1.00	0.89	4.00	1.78	7.00	3.56	10.00
0.89	1.17	0.89	4.17	2.08	7.17	3.26	10.17
0.89	1.33	0.89	4.33	2.37	7.33	2.97	10.33
0.89	1.50	0.89	4.50	2.67	7.50	2.67	10.50
0.89	1.67	0.89	4.67	2.97	7.67	2.67	10.67
0.89	1.83	0.89	4.83	3.26	7.83	2.67	10.83
0.89	2.00	0.89	5.00	3.56	8.00	2.67	11.00
0.89	2.17	1.19	5.17	4.16	8.17	2.37	11.17
0.89	2.33	1.48	5.33	4.75	8.33	2.08	11.33
0.89	2.50	1.78	5.50	5.34	8.50	1.78	11.50
0.89	2.67	1.78	5.67	16.92	8.67	1.78	11.67
0.89	2.83	1.78	5.83	28.49	8.83	1.78	11.83
0.89	3.00	1.78	6.00	40.07	9.00	1.78	12.00

-----  
| CALIB |  
| NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0  
| ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00  
-----  
U.H. Tp(hrs)= 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

		---- TRANSFORMED HYETOGRAPH ----								1.19	0.800	0.89   3.800	1.78   6.800	5.05   9.80
RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	1.19	0.833	0.89   3.833	1.78   6.833	5.05   9.83
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	0.89	0.867	0.89   3.867	1.78   6.867	3.56   9.87
1.78	0.033	0.30	3.033	1.78	6.033	29.38	9.03	0.89	0.900	0.89	0.900	0.89   3.900	1.78   6.900	3.56   9.90
1.78	0.067	0.30	3.067	1.78	6.067	29.38	9.07	0.89	0.933	0.89	0.933	0.89   3.933	1.78   6.933	3.56   9.93
1.78	0.100	0.30	3.100	1.78	6.100	29.38	9.10	0.89	0.967	0.89	0.967	0.89   3.967	1.78   6.967	3.56   9.97
1.78	0.133	0.30	3.133	1.78	6.133	29.38	9.13	0.89	1.000	0.89	1.000	0.89   4.000	1.78   7.000	3.56   10.00
1.78	0.167	0.30	3.167	1.78	6.167	29.38	9.17	0.89	1.033	0.89	1.033	0.89   4.033	2.08   7.033	3.26   10.03
1.78	0.200	0.59	3.200	1.78	6.200	18.70	9.20	0.89	1.067	0.89	1.067	0.89   4.067	2.08   7.067	3.26   10.07
1.78	0.233	0.59	3.233	1.78	6.233	18.70	9.23	0.89	1.100	0.89	1.100	0.89   4.100	2.08   7.100	3.26   10.10
1.78	0.267	0.59	3.267	1.78	6.267	18.70	9.27	0.89	1.133	0.89	1.133	0.89   4.133	2.08   7.133	3.26   10.13
1.78	0.300	0.59	3.300	1.78	6.300	18.70	9.30	0.89	1.167	0.89	1.167	0.89   4.167	2.08   7.167	3.26   10.17
1.78	0.333	0.59	3.333	1.78	6.333	18.70	9.33	0.89	1.200	0.89	1.200	0.89   4.200	2.37   7.200	2.97   10.20
1.78	0.367	0.89	3.367	1.78	6.367	8.02	9.37	0.89	1.233	0.89	1.233	0.89   4.233	2.37   7.233	2.97   10.23
1.78	0.400	0.89	3.400	1.78	6.400	8.01	9.40	0.89	1.267	0.89	1.267	0.89   4.267	2.37   7.267	2.97   10.27
1.78	0.433	0.89	3.433	1.78	6.433	8.01	9.43	0.89	1.300	0.89	1.300	0.89   4.300	2.37   7.300	2.97   10.30
1.78	0.467	0.89	3.467	1.78	6.467	8.01	9.47	0.89	1.333	0.89	1.333	0.89   4.333	2.37   7.333	2.97   10.33
1.78	0.500	0.89	3.500	1.78	6.500	8.01	9.50	0.89	1.367	0.89	1.367	0.89   4.367	2.67   7.367	2.67   10.37
1.48	0.533	0.89	3.533	1.78	6.533	6.53	9.53	0.89	1.400	0.89	1.400	0.89   4.400	2.67   7.400	2.67   10.40
1.48	0.567	0.89	3.567	1.78	6.567	6.53	9.57	0.89	1.433	0.89	1.433	0.89   4.433	2.67   7.433	2.67   10.43
1.48	0.600	0.89	3.600	1.78	6.600	6.53	9.60	0.89	1.467	0.89	1.467	0.89   4.467	2.67   7.467	2.67   10.47
1.48	0.633	0.89	3.633	1.78	6.633	6.53	9.63	0.89	1.500	0.89	1.500	0.89   4.500	2.67   7.500	2.67   10.50
1.48	0.667	0.89	3.667	1.78	6.667	6.53	9.67	0.89	1.533	0.89	1.533	0.89   4.533	2.97   7.533	2.67   10.53
1.19	0.700	0.89	3.700	1.78	6.700	5.05	9.70	0.89	1.567	0.89	1.567	0.89   4.567	2.97   7.567	2.67   10.57
1.19	0.733	0.89	3.733	1.78	6.733	5.05	9.73	0.89	1.600	0.89	1.600	0.89   4.600	2.97   7.600	2.67   10.60
1.19	0.767	0.89	3.767	1.78	6.767	5.05	9.77	0.89	1.633	0.89	1.633	0.89   4.633	2.97   7.633	2.67   10.63
1.19								0.89	1.667	0.89	1.667	0.89   4.667	2.97   7.667	2.67   10.67

0.89 1.700 0.89 | 4.700 3.26 | 7.700 2.67 | 10.70  
0.89 1.733 0.89 | 4.733 3.26 | 7.733 2.67 | 10.73  
0.89 1.767 0.89 | 4.767 3.26 | 7.767 2.67 | 10.77  
0.89 1.800 0.89 | 4.800 3.26 | 7.800 2.67 | 10.80  
0.89 1.833 0.89 | 4.833 3.26 | 7.833 2.67 | 10.83  
0.89 1.867 0.89 | 4.867 3.56 | 7.867 2.67 | 10.87  
0.89 1.900 0.89 | 4.900 3.56 | 7.900 2.67 | 10.90  
0.89 1.933 0.89 | 4.933 3.56 | 7.933 2.67 | 10.93  
0.89 1.967 0.89 | 4.967 3.56 | 7.967 2.67 | 10.97  
0.89 2.000 0.89 | 5.000 3.56 | 8.000 2.67 | 11.00  
0.89 2.033 1.19 | 5.033 4.16 | 8.033 2.37 | 11.03  
0.89 2.067 1.19 | 5.067 4.16 | 8.067 2.37 | 11.07  
0.89 2.100 1.19 | 5.100 4.16 | 8.100 2.37 | 11.10  
0.89 2.133 1.19 | 5.133 4.16 | 8.133 2.37 | 11.13  
0.89 2.167 1.19 | 5.167 4.16 | 8.167 2.37 | 11.17  
0.89 2.200 1.48 | 5.200 4.75 | 8.200 2.08 | 11.20  
0.89 2.233 1.48 | 5.233 4.75 | 8.233 2.08 | 11.23  
0.89 2.267 1.48 | 5.267 4.75 | 8.267 2.08 | 11.27  
0.89 2.300 1.48 | 5.300 4.75 | 8.300 2.08 | 11.30  
0.89 2.333 1.48 | 5.333 4.75 | 8.333 2.08 | 11.33  
0.89 2.367 1.78 | 5.367 5.34 | 8.367 1.78 | 11.37  
0.89 2.400 1.78 | 5.400 5.34 | 8.400 1.78 | 11.40  
0.89 2.433 1.78 | 5.433 5.34 | 8.433 1.78 | 11.43  
0.89 2.467 1.78 | 5.467 5.34 | 8.467 1.78 | 11.47  
0.89 2.500 1.78 | 5.500 5.34 | 8.500 1.78 | 11.50  
0.89 2.533 1.78 | 5.533 16.92 | 8.533 1.78 | 11.53  
0.89 2.567 1.78 | 5.567 16.92 | 8.567 1.78 | 11.57

0.89 2.600 1.78 | 5.600 16.92 | 8.600 1.78 | 11.60  
0.89 2.633 1.78 | 5.633 16.92 | 8.633 1.78 | 11.63  
0.89 2.667 1.78 | 5.667 16.92 | 8.667 1.78 | 11.67  
0.89 2.700 1.78 | 5.700 28.49 | 8.700 1.78 | 11.70  
0.89 2.733 1.78 | 5.733 28.49 | 8.733 1.78 | 11.73  
0.89 2.767 1.78 | 5.767 28.49 | 8.767 1.78 | 11.77  
0.89 2.800 1.78 | 5.800 28.49 | 8.800 1.78 | 11.80  
0.89 2.833 1.78 | 5.833 28.49 | 8.833 1.78 | 11.83  
0.89 2.867 1.78 | 5.867 40.07 | 8.867 1.78 | 11.87  
0.89 2.900 1.78 | 5.900 40.07 | 8.900 1.78 | 11.90  
0.89 2.933 1.78 | 5.933 40.07 | 8.933 1.78 | 11.93  
0.89 2.967 1.78 | 5.967 40.07 | 8.967 1.78 | 11.97  
0.89 3.000 1.78 | 6.000 40.07 | 9.000 1.78 | 12.00

Unit Hyd Qpeak (cms)= 0.366

PEAK FLOW (cms)= 0.076 (i)  
TIME TO PEAK (hrs)= 6.533  
RUNOFF VOLUME (mm)= 11.757  
TOTAL RAINFALL (mm)= 44.372  
RUNOFF COEFFICIENT = 0.265

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

-----  
-----  
| CALIB |  
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0  
| ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res. (N)= 3.00  
-----  
U.H. Tp (hrs)= 0.16

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.124 (i)  
TIME TO PEAK (hrs)= 6.200  
RUNOFF VOLUME (mm)= 14.635  
TOTAL RAINFALL (mm)= 44.372  
RUNOFF COEFFICIENT = 0.330

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

```

-----
| CALIB |
| NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0
| ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00
-----
U.H. Tp (hrs)= 0.12

```

Unit Hyd Qpeak (cms)= 0.761

```

PEAK FLOW (cms)= 0.089 (i)
TIME TO PEAK (hrs)= 6.167
RUNOFF VOLUME (mm)= 15.186
TOTAL RAINFALL (mm)= 44.372
RUNOFF COEFFICIENT = 0.342

```

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

```

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=====
V V I SSSSS U U A L (v 6.0.2001)
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 TTTT TTTT 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
6.0\VO2\voin.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-
0af8143f9a42\61a146ab-7c79-444a-b697-e537d7c33535\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-
0af8143f9a42\61a146ab-7c79-444a-b697-e537d7c33535\s

```

DATE: 02/19/2021

TIME: 05:01:36

USER:

COMMENTS: \_\_\_\_\_

```

-----
*****
** SIMULATION : Run 02: 12 hr SCS 5yr **
*****

```

```

-----
| MASS STORM |
| |
| |
| 8f2a32bf9eff\50d26708
| Ptotal= 58.28 mm |
-----

```

Filename: C:\Users\mmacdonald\AppData\Local\Temp\1f223602-111d-4e37-b618-

Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 12.00 hrs  
 Mass curve time step = 30.00 min  
 New Storm time step = 10.00 min

RAIN mm/hr	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
0.17	0.39	3.17	2.33	6.17	38.46	9.17	
2.33	0.33	0.78	3.33	2.33	6.33	24.48	9.33
2.33	0.50	1.17	3.50	2.33	6.50	10.49	9.50
2.33	0.67	1.17	3.67	2.33	6.67	8.55	9.67
1.94	0.83	1.17	3.83	2.33	6.83	6.61	9.83
1.55	1.00	1.17	4.00	2.33	7.00	4.66	10.00
1.17	1.17	1.17	4.17	2.72	7.17	4.27	10.17
1.17	1.33	1.17	4.33	3.11	7.33	3.89	10.33
1.17	1.50	1.17	4.50	3.50	7.50	3.50	10.50
1.17	1.67	1.17	4.67	3.89	7.67	3.50	10.67
1.17	1.83	1.17	4.83	4.27	7.83	3.50	10.83
1.17	2.00	1.17	5.00	4.66	8.00	3.50	11.00
1.17							



1.17	2.17	1.55	5.17	5.44	8.17	3.11	11.17
1.17	2.33	1.94	5.33	6.22	8.33	2.72	11.33
1.17	2.50	2.33	5.50	6.99	8.50	2.33	11.50
1.17	2.67	2.33	5.67	22.15	8.67	2.33	11.67
1.17	2.83	2.33	5.83	37.30	8.83	2.33	11.83
1.17	3.00	2.33	6.00	52.45	9.00	2.33	12.00

2.33	0.433	1.17	3.433	2.33	6.433	10.49	9.43
2.33	0.467	1.17	3.467	2.33	6.467	10.49	9.47
2.33	0.500	1.17	3.500	2.33	6.500	10.49	9.50
2.33	0.533	1.17	3.533	2.33	6.533	8.55	9.53
1.94	0.567	1.17	3.567	2.33	6.567	8.55	9.57
1.94	0.600	1.17	3.600	2.33	6.600	8.55	9.60
1.94	0.633	1.17	3.633	2.33	6.633	8.55	9.63
1.94	0.667	1.17	3.667	2.33	6.667	8.55	9.67
1.94	0.700	1.17	3.700	2.33	6.700	6.61	9.70
1.55	0.733	1.17	3.733	2.33	6.733	6.61	9.73
1.55	0.767	1.17	3.767	2.33	6.767	6.61	9.77
1.55	0.800	1.17	3.800	2.33	6.800	6.61	9.80
1.55	0.833	1.17	3.833	2.33	6.833	6.61	9.83
1.55	0.867	1.17	3.867	2.33	6.867	4.66	9.87
1.17	0.900	1.17	3.900	2.33	6.900	4.66	9.90
1.17	0.933	1.17	3.933	2.33	6.933	4.66	9.93
1.17	0.967	1.17	3.967	2.33	6.967	4.66	9.97
1.17	1.000	1.17	4.000	2.33	7.000	4.66	10.00
1.17	1.033	1.17	4.033	2.72	7.033	4.27	10.03
1.17	1.067	1.17	4.067	2.72	7.067	4.27	10.07
1.17	1.100	1.17	4.100	2.72	7.100	4.27	10.10
1.17	1.133	1.17	4.133	2.72	7.133	4.27	10.13
1.17	1.167	1.17	4.167	2.72	7.167	4.27	10.17
1.17	1.200	1.17	4.200	3.11	7.200	3.89	10.20
1.17	1.233	1.17	4.233	3.11	7.233	3.89	10.23
1.17	1.267	1.17	4.267	3.11	7.267	3.89	10.27
1.17	1.300	1.17	4.300	3.11	7.300	3.89	10.30

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-----
-----
| CALIB          |
| NASHYD ( 0101)| Area (ha)= 4.12 Curve Number (CN)= 75.0
| ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.43

```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```

----- TRANSFORMED HYETOGRAPH -----
RAIN
TIME      RAIN | TIME      RAIN | TIME      RAIN | TIME
hrs      mm/hr | hrs      mm/hr | hrs      mm/hr | hrs
mm/hr
0.033    0.39 | 3.033    2.33 | 6.033    38.47 | 9.03
2.33     0.067 | 3.067    2.33 | 6.067    38.46 | 9.07
2.33     0.100 | 3.100    2.33 | 6.100    38.46 | 9.10
2.33     0.133 | 3.133    2.33 | 6.133    38.46 | 9.13
2.33     0.167 | 3.167    2.33 | 6.167    38.46 | 9.17
2.33     0.200 | 3.200    2.33 | 6.200    24.48 | 9.20
2.33     0.233 | 3.233    2.33 | 6.233    24.48 | 9.23
2.33     0.267 | 3.267    2.33 | 6.267    24.48 | 9.27
2.33     0.300 | 3.300    2.33 | 6.300    24.48 | 9.30
2.33     0.333 | 3.333    2.33 | 6.333    24.48 | 9.33
2.33     0.367 | 3.367    2.33 | 6.367    10.49 | 9.37
2.33     0.400 | 3.400    2.33 | 6.400    10.49 | 9.40
2.33

```

1.17	1.333	1.17	4.333	3.11	7.333	3.89	10.33
1.17	1.367	1.17	4.367	3.50	7.367	3.50	10.37
1.17	1.400	1.17	4.400	3.50	7.400	3.50	10.40
1.17	1.433	1.17	4.433	3.50	7.433	3.50	10.43
1.17	1.467	1.17	4.467	3.50	7.467	3.50	10.47
1.17	1.500	1.17	4.500	3.50	7.500	3.50	10.50
1.17	1.533	1.17	4.533	3.89	7.533	3.50	10.53
1.17	1.567	1.17	4.567	3.89	7.567	3.50	10.57
1.17	1.600	1.17	4.600	3.89	7.600	3.50	10.60
1.17	1.633	1.17	4.633	3.89	7.633	3.50	10.63
1.17	1.667	1.17	4.667	3.89	7.667	3.50	10.67
1.17	1.700	1.17	4.700	4.27	7.700	3.50	10.70
1.17	1.733	1.17	4.733	4.27	7.733	3.50	10.73
1.17	1.767	1.17	4.767	4.27	7.767	3.50	10.77
1.17	1.800	1.17	4.800	4.27	7.800	3.50	10.80
1.17	1.833	1.17	4.833	4.27	7.833	3.50	10.83
1.17	1.867	1.17	4.867	4.66	7.867	3.50	10.87
1.17	1.900	1.17	4.900	4.66	7.900	3.50	10.90
1.17	1.933	1.17	4.933	4.66	7.933	3.50	10.93
1.17	1.967	1.17	4.967	4.66	7.967	3.50	10.97
1.17	2.000	1.17	5.000	4.66	8.000	3.50	11.00
1.17	2.033	1.55	5.033	5.44	8.033	3.11	11.03
1.17	2.067	1.55	5.067	5.44	8.067	3.11	11.07
1.17	2.100	1.55	5.100	5.44	8.100	3.11	11.10
1.17	2.133	1.55	5.133	5.44	8.133	3.11	11.13
1.17	2.167	1.55	5.167	5.44	8.167	3.11	11.17
1.17	2.200	1.94	5.200	6.22	8.200	2.72	11.20

1.17	2.233	1.94	5.233	6.22	8.233	2.72	11.23
1.17	2.267	1.94	5.267	6.22	8.267	2.72	11.27
1.17	2.300	1.94	5.300	6.22	8.300	2.72	11.30
1.17	2.333	1.94	5.333	6.22	8.333	2.72	11.33
1.17	2.367	2.33	5.367	6.99	8.367	2.33	11.37
1.17	2.400	2.33	5.400	6.99	8.400	2.33	11.40
1.17	2.433	2.33	5.433	6.99	8.433	2.33	11.43
1.17	2.467	2.33	5.467	6.99	8.467	2.33	11.47
1.17	2.500	2.33	5.500	6.99	8.500	2.33	11.50
1.17	2.533	2.33	5.533	22.14	8.533	2.33	11.53
1.17	2.567	2.33	5.567	22.15	8.567	2.33	11.57
1.17	2.600	2.33	5.600	22.15	8.600	2.33	11.60
1.17	2.633	2.33	5.633	22.15	8.633	2.33	11.63
1.17	2.667	2.33	5.667	22.15	8.667	2.33	11.67
1.17	2.700	2.33	5.700	37.30	8.700	2.33	11.70
1.17	2.733	2.33	5.733	37.30	8.733	2.33	11.73
1.17	2.767	2.33	5.767	37.30	8.767	2.33	11.77
1.17	2.800	2.33	5.800	37.30	8.800	2.33	11.80
1.17	2.833	2.33	5.833	37.30	8.833	2.33	11.83
1.17	2.867	2.33	5.867	52.45	8.867	2.33	11.87
1.17	2.900	2.33	5.900	52.45	8.900	2.33	11.90
1.17	2.933	2.33	5.933	52.45	8.933	2.33	11.93
1.17	2.967	2.33	5.967	52.45	8.967	2.33	11.97
1.16	3.000	2.33	6.000	52.45	9.000	2.33	12.00

Unit Hyd Qpeak (cms)= 0.366  
PEAK FLOW (cms)= 0.129 (i)  
TIME TO PEAK (hrs)= 6.533  
RUNOFF VOLUME (mm)= 19.592

TOTAL RAINFALL (mm) = 58.086  
RUNOFF COEFFICIENT = 0.337

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

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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  
6.0\VO2\voin.dat  
Output filename:  
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
0af8143f9a42\befae2a-69e0-4901-97a3-b007aa9f7208\s  
Summary filename:  
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
0af8143f9a42\befae2a-69e0-4901-97a3-b007aa9f7208\s

DATE: 02/19/2021 TIME: 05:01:36  
USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
\*\* SIMULATION : Run 03: 12 hr SCS 10yr \*\*  
\*\*\*\*\*

-----  
| MASS STORM | Filename: C:\Users\mmacdonald\AppData  
| | ata\Local\Temp\  
| | 1f223602-111d-4e37-b618-  
| 8f2a32bf9eff\09e2f1c6  
Ptotal= 68.88 mm
Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION  
  
Duration of storm = 12.00 hrs  
Mass curve time step = 30.00 min  
New Storm time step = 10.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
2.76	0.17	0.46	3.17	2.76	6.17	45.46	9.17

-----  
| CALIB |  
| NASHYD ( 0102) | Area (ha) = 3.62 Curve Number (CN) = 80.0  
| ID= 1 DT= 2.0 min | Ia (mm) = 5.70 # of Linear Res.(N) = 3.00  
-----  
U.H. Tp (hrs) = 0.16

Unit Hyd Qpeak (cms) = 0.864

PEAK FLOW (cms) = 0.202 (i)  
TIME TO PEAK (hrs) = 6.200  
RUNOFF VOLUME (mm) = 23.678  
TOTAL RAINFALL (mm) = 58.086  
RUNOFF COEFFICIENT = 0.408

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

-----  
| CALIB |  
| NASHYD ( 0103) | Area (ha) = 2.39 Curve Number (CN) = 80.0  
| ID= 1 DT= 2.0 min | Ia (mm) = 4.80 # of Linear Res.(N) = 3.00  
-----  
U.H. Tp (hrs) = 0.12

Unit Hyd Qpeak (cms) = 0.761

PEAK FLOW (cms) = 0.143 (i)  
TIME TO PEAK (hrs) = 6.167  
RUNOFF VOLUME (mm) = 24.303  
TOTAL RAINFALL (mm) = 58.086  
RUNOFF COEFFICIENT = 0.418

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

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=====

V	V	I	SSSS	U	U	A	L	(v 6.0.2001)			
V	V	I	SS	U	U	A	A	L			
V	V	I	SS	U	U	AAAA	L				
V	V	I	SS	U	U	A	A	L			
VV	I	SSSS	UUUU	A	A	LLLL					
OOO	TTTT	TTTT	H	H	Y	Y	M	M	OOO	TM	
O	O	T	T	H	H	Y	Y	MM	MM	O	O

2.76	0.33	0.92	3.33	2.76	6.33	28.93	9.33
	0.50	1.38	3.50	2.76	6.50	12.40	9.50
2.76	0.67	1.38	3.67	2.76	6.67	10.10	9.67
2.30	0.83	1.38	3.83	2.76	6.83	7.81	9.83
1.84	1.00	1.38	4.00	2.76	7.00	5.51	10.00
1.38	1.17	1.38	4.17	3.21	7.17	5.05	10.17
1.38	1.33	1.38	4.33	3.67	7.33	4.59	10.33
1.38	1.50	1.38	4.50	4.13	7.50	4.13	10.50
1.38	1.67	1.38	4.67	4.59	7.67	4.13	10.67
1.38	1.83	1.38	4.83	5.05	7.83	4.13	10.83
1.38	2.00	1.38	5.00	5.51	8.00	4.13	11.00
1.38	2.17	1.84	5.17	6.43	8.17	3.67	11.17
1.38	2.33	2.30	5.33	7.35	8.33	3.21	11.33
1.38	2.50	2.76	5.50	8.27	8.50	2.76	11.50
1.38	2.67	2.76	5.67	26.17	8.67	2.76	11.67
1.38	2.83	2.76	5.83	44.08	8.83	2.76	11.83
1.38	3.00	2.76	6.00	61.99	9.00	2.76	12.00

2.76	0.067	0.46	3.067	2.76	6.067	45.46	9.07
	0.100	0.46	3.100	2.76	6.100	45.46	9.10
2.76	0.133	0.46	3.133	2.76	6.133	45.46	9.13
2.76	0.167	0.46	3.167	2.76	6.167	45.46	9.17
2.76	0.200	0.92	3.200	2.76	6.200	28.93	9.20
2.76	0.233	0.92	3.233	2.76	6.233	28.93	9.23
2.76	0.267	0.92	3.267	2.76	6.267	28.93	9.27
2.76	0.300	0.92	3.300	2.76	6.300	28.93	9.30
2.76	0.333	0.92	3.333	2.76	6.333	28.93	9.33
2.76	0.367	1.38	3.367	2.76	6.367	12.40	9.37
2.76	0.400	1.38	3.400	2.76	6.400	12.40	9.40
2.76	0.433	1.38	3.433	2.76	6.433	12.40	9.43
2.76	0.467	1.38	3.467	2.76	6.467	12.40	9.47
2.76	0.500	1.38	3.500	2.76	6.500	12.40	9.50
2.30	0.533	1.38	3.533	2.76	6.533	10.10	9.53
2.30	0.567	1.38	3.567	2.76	6.567	10.10	9.57
2.30	0.600	1.38	3.600	2.76	6.600	10.10	9.60
2.30	0.633	1.38	3.633	2.76	6.633	10.10	9.63
2.30	0.667	1.38	3.667	2.76	6.667	10.10	9.67
2.30	0.700	1.38	3.700	2.76	6.700	7.81	9.70
1.84	0.733	1.38	3.733	2.76	6.733	7.81	9.73
1.84	0.767	1.38	3.767	2.76	6.767	7.81	9.77
1.84	0.800	1.38	3.800	2.76	6.800	7.81	9.80
1.84	0.833	1.38	3.833	2.76	6.833	7.81	9.83
1.84	0.867	1.38	3.867	2.76	6.867	5.51	9.87
1.38	0.900	1.38	3.900	2.76	6.900	5.51	9.90
1.38	0.933	1.38	3.933	2.76	6.933	5.51	9.93

```

-----
-----
| CALIB          |
| NASHYD ( 0101)| Area (ha)= 4.12 Curve Number (CN)= 75.0
|ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.43

```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```

----- TRANSFORMED HYETOGRAPH -----
RAIN      TIME      RAIN | TIME      RAIN | TIME      RAIN | TIME
mm/hr     hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs
2.76      0.033   0.46 | 3.033    2.76 | 6.033    45.46 | 9.03

```



1.38 2.767 2.76 | 5.767 44.08 | 8.767 2.76 | 11.77  
 1.38 2.800 2.76 | 5.800 44.08 | 8.800 2.76 | 11.80  
 1.38 2.833 2.76 | 5.833 44.08 | 8.833 2.76 | 11.83  
 1.38 2.867 2.76 | 5.867 61.99 | 8.867 2.76 | 11.87  
 1.38 2.900 2.76 | 5.900 61.99 | 8.900 2.76 | 11.90  
 1.38 2.933 2.76 | 5.933 61.99 | 8.933 2.76 | 11.93  
 1.38 2.967 2.76 | 5.967 61.99 | 8.967 2.76 | 11.97  
 1.38 3.000 2.76 | 6.000 61.99 | 9.000 2.76 | 12.00

Unit Hyd Qpeak (cms)= 0.366

PEAK FLOW (cms)= 0.175 (i)  
 TIME TO PEAK (hrs)= 6.500  
 RUNOFF VOLUME (mm)= 26.376  
 TOTAL RAINFALL (mm)= 68.650  
 RUNOFF COEFFICIENT = 0.384

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

-----  
 | CALIB |  
 | NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0  
 | ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00  
 -----  
 U.H. Tp(hrs)= 0.16

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.269 (i)  
 TIME TO PEAK (hrs)= 6.200  
 RUNOFF VOLUME (mm)= 31.335  
 TOTAL RAINFALL (mm)= 68.650  
 RUNOFF COEFFICIENT = 0.456

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

-----  
 | CALIB |  
 | NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0  
 | ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00  
 -----  
 U.H. Tp(hrs)= 0.12

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.188 (i)  
 TIME TO PEAK (hrs)= 6.133  
 RUNOFF VOLUME (mm)= 32.001  
 TOTAL RAINFALL (mm)= 68.650  
 RUNOFF COEFFICIENT = 0.466

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

FINISH

V V I SSSSS U U A L (v 6.0.2001)  
 V V I SS U U A A L  
 V V I SS U U A A A A L  
 V V I SS U U A A L  
 VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT 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  
 6.0\VO2\voindat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\2e05f9ce-ec26-4964-820f-24d689d01128\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\2e05f9ce-ec26-4964-820f-24d689d01128\s

DATE: 02/19/2021 TIME: 05:01:36

USER:

COMMENTS: \_\_\_\_\_

```

1.60      2.67   3.19 | 5.67   30.35 | 8.67   3.19 | 11.67
1.60      2.83   3.19 | 5.83   51.11 | 8.83   3.19 | 11.83
1.60      3.00   3.19 | 6.00   71.87 | 9.00   3.19 | 12.00
1.60

```

```

*****
** SIMULATION : Run 04: 12 hr SCS 25yr      **
*****

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-----
| MASS STORM |      Filename: C:\Users\mmacdonald\AppData
|            |      ata\Local\Temp\
|            |      1f223602-111d-4e37-b618-
8f2a32bf9eff\672af8e8
| Ptotal= 79.86 mm |      Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION
-----

```

```

-----
| CALIB      |
| NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0
| ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.43

```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```

Duration of storm = 12.00 hrs
Mass curve time step = 30.00 min
New Storm time step = 10.00 min

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.19	0.17	0.53	3.17	3.19	6.17	52.71	9.17
3.19	0.33	1.06	3.33	3.19	6.33	33.54	9.33
3.19	0.50	1.60	3.50	3.19	6.50	14.38	9.50
2.66	0.67	1.60	3.67	3.19	6.67	11.71	9.67
2.13	0.83	1.60	3.83	3.19	6.83	9.05	9.83
1.60	1.00	1.60	4.00	3.19	7.00	6.39	10.00
1.60	1.17	1.60	4.17	3.73	7.17	5.86	10.17
1.60	1.33	1.60	4.33	4.26	7.33	5.32	10.33
1.60	1.50	1.60	4.50	4.79	7.50	4.79	10.50
1.60	1.67	1.60	4.67	5.32	7.67	4.79	10.67
1.60	1.83	1.60	4.83	5.86	7.83	4.79	10.83
1.60	2.00	1.60	5.00	6.39	8.00	4.79	11.00
1.60	2.17	2.13	5.17	7.45	8.17	4.26	11.17
1.60	2.33	2.66	5.33	8.52	8.33	3.73	11.33
1.60	2.50	3.19	5.50	9.58	8.50	3.19	11.50

```

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

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.19	0.033	0.53	3.033	3.19	6.033	52.71	9.03
3.19	0.067	0.53	3.067	3.19	6.067	52.71	9.07
3.19	0.100	0.53	3.100	3.19	6.100	52.71	9.10
3.19	0.133	0.53	3.133	3.19	6.133	52.71	9.13
3.19	0.167	0.53	3.167	3.19	6.167	52.71	9.17
3.19	0.200	1.06	3.200	3.19	6.200	33.54	9.20
3.19	0.233	1.06	3.233	3.19	6.233	33.54	9.23
3.19	0.267	1.06	3.267	3.19	6.267	33.54	9.27
3.19	0.300	1.06	3.300	3.19	6.300	33.54	9.30
3.19	0.333	1.06	3.333	3.19	6.333	33.54	9.33
3.19	0.367	1.60	3.367	3.19	6.367	14.38	9.37
3.19	0.400	1.60	3.400	3.19	6.400	14.38	9.40
3.19	0.433	1.60	3.433	3.19	6.433	14.38	9.43
3.19	0.467	1.60	3.467	3.19	6.467	14.38	9.47
3.19	0.500	1.60	3.500	3.19	6.500	14.38	9.50

2.66	0.533	1.60	3.533	3.19	6.533	11.71	9.53	1.60	1.433	1.60	4.433	4.79	7.433	4.79	10.43
2.66	0.567	1.60	3.567	3.19	6.567	11.71	9.57	1.60	1.467	1.60	4.467	4.79	7.467	4.79	10.47
2.66	0.600	1.60	3.600	3.19	6.600	11.71	9.60	1.60	1.500	1.60	4.500	4.79	7.500	4.79	10.50
2.66	0.633	1.60	3.633	3.19	6.633	11.71	9.63	1.60	1.533	1.60	4.533	5.32	7.533	4.79	10.53
2.66	0.667	1.60	3.667	3.19	6.667	11.71	9.67	1.60	1.567	1.60	4.567	5.32	7.567	4.79	10.57
2.13	0.700	1.60	3.700	3.19	6.700	9.05	9.70	1.60	1.600	1.60	4.600	5.32	7.600	4.79	10.60
2.13	0.733	1.60	3.733	3.19	6.733	9.05	9.73	1.60	1.633	1.60	4.633	5.32	7.633	4.79	10.63
2.13	0.767	1.60	3.767	3.19	6.767	9.05	9.77	1.60	1.667	1.60	4.667	5.32	7.667	4.79	10.67
2.13	0.800	1.60	3.800	3.19	6.800	9.05	9.80	1.60	1.700	1.60	4.700	5.86	7.700	4.79	10.70
2.13	0.833	1.60	3.833	3.19	6.833	9.05	9.83	1.60	1.733	1.60	4.733	5.86	7.733	4.79	10.73
1.60	0.867	1.60	3.867	3.19	6.867	6.39	9.87	1.60	1.767	1.60	4.767	5.86	7.767	4.79	10.77
1.60	0.900	1.60	3.900	3.19	6.900	6.39	9.90	1.60	1.800	1.60	4.800	5.86	7.800	4.79	10.80
1.60	0.933	1.60	3.933	3.19	6.933	6.39	9.93	1.60	1.833	1.60	4.833	5.86	7.833	4.79	10.83
1.60	0.967	1.60	3.967	3.19	6.967	6.39	9.97	1.60	1.867	1.60	4.867	6.39	7.867	4.79	10.87
1.60	1.000	1.60	4.000	3.19	7.000	6.39	10.00	1.60	1.900	1.60	4.900	6.39	7.900	4.79	10.90
1.60	1.033	1.60	4.033	3.73	7.033	5.86	10.03	1.60	1.933	1.60	4.933	6.39	7.933	4.79	10.93
1.60	1.067	1.60	4.067	3.73	7.067	5.86	10.07	1.60	1.967	1.60	4.967	6.39	7.967	4.79	10.97
1.60	1.100	1.60	4.100	3.73	7.100	5.86	10.10	1.60	2.000	1.60	5.000	6.39	8.000	4.79	11.00
1.60	1.133	1.60	4.133	3.73	7.133	5.86	10.13	1.60	2.033	2.13	5.033	7.45	8.033	4.26	11.03
1.60	1.167	1.60	4.167	3.73	7.167	5.86	10.17	1.60	2.067	2.13	5.067	7.45	8.067	4.26	11.07
1.60	1.200	1.60	4.200	4.26	7.200	5.32	10.20	1.60	2.100	2.13	5.100	7.45	8.100	4.26	11.10
1.60	1.233	1.60	4.233	4.26	7.233	5.32	10.23	1.60	2.133	2.13	5.133	7.45	8.133	4.26	11.13
1.60	1.267	1.60	4.267	4.26	7.267	5.32	10.27	1.60	2.167	2.13	5.167	7.45	8.167	4.26	11.17
1.60	1.300	1.60	4.300	4.26	7.300	5.32	10.30	1.60	2.200	2.66	5.200	8.52	8.200	3.73	11.20
1.60	1.333	1.60	4.333	4.26	7.333	5.32	10.33	1.60	2.233	2.66	5.233	8.52	8.233	3.73	11.23
1.60	1.367	1.60	4.367	4.79	7.367	4.79	10.37	1.60	2.267	2.66	5.267	8.52	8.267	3.73	11.27
1.60	1.400	1.60	4.400	4.79	7.400	4.79	10.40	1.60	2.300	2.66	5.300	8.52	8.300	3.73	11.30
1.60								1.60							



1.60 2.333 2.66 | 5.333 8.52 | 8.333 3.73 | 11.33  
 1.60 2.367 3.19 | 5.367 9.58 | 8.367 3.19 | 11.37  
 1.60 2.400 3.19 | 5.400 9.58 | 8.400 3.19 | 11.40  
 1.60 2.433 3.19 | 5.433 9.58 | 8.433 3.19 | 11.43  
 1.60 2.467 3.19 | 5.467 9.58 | 8.467 3.19 | 11.47  
 1.60 2.500 3.19 | 5.500 9.58 | 8.500 3.19 | 11.50  
 1.60 2.533 3.19 | 5.533 30.34 | 8.533 3.19 | 11.53  
 1.60 2.567 3.19 | 5.567 30.35 | 8.567 3.19 | 11.57  
 1.60 2.600 3.19 | 5.600 30.35 | 8.600 3.19 | 11.60  
 1.60 2.633 3.19 | 5.633 30.35 | 8.633 3.19 | 11.63  
 1.60 2.667 3.19 | 5.667 30.35 | 8.667 3.19 | 11.67  
 1.60 2.700 3.19 | 5.700 51.11 | 8.700 3.19 | 11.70  
 1.60 2.733 3.19 | 5.733 51.11 | 8.733 3.19 | 11.73  
 1.60 2.767 3.19 | 5.767 51.11 | 8.767 3.19 | 11.77  
 1.60 2.800 3.19 | 5.800 51.11 | 8.800 3.19 | 11.80  
 1.60 2.833 3.19 | 5.833 51.11 | 8.833 3.19 | 11.83  
 1.60 2.867 3.19 | 5.867 71.87 | 8.867 3.19 | 11.87  
 1.60 2.900 3.19 | 5.900 71.87 | 8.900 3.19 | 11.90  
 1.60 2.933 3.19 | 5.933 71.87 | 8.933 3.19 | 11.93  
 1.60 2.967 3.19 | 5.967 71.87 | 8.967 3.19 | 11.97  
 1.60 3.000 3.19 | 6.000 71.87 | 9.000 3.19 | 12.00  
 1.59

Unit Hyd Qpeak (cms)= 0.366  
 PEAK FLOW (cms)= 0.226 (i)  
 TIME TO PEAK (hrs)= 6.500  
 RUNOFF VOLUME (mm)= 33.937  
 TOTAL RAINFALL (mm)= 79.594  
 RUNOFF COEFFICIENT = 0.426

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

```

-----
-----
| CALIB |
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0
|ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.16
  
```

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.341 (i)  
 TIME TO PEAK (hrs)= 6.200  
 RUNOFF VOLUME (mm)= 39.737  
 TOTAL RAINFALL (mm)= 79.594  
 RUNOFF COEFFICIENT = 0.499

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

```

-----
-----
| CALIB |
| NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0
|ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.12
  
```

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.239 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 40.435  
 TOTAL RAINFALL (mm)= 79.594  
 RUNOFF COEFFICIENT = 0.508

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

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V V I SSSSS U U A L (v 6.0.2001)
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 TTTT TTTT 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  
 6.0\VO2\voin.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\964cb521-67a4-41af-965d-0e3039282c3e\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\964cb521-67a4-41af-965d-0e3039282c3e\s

DATE: 02/19/2021 TIME: 05:01:36

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
 \*\* SIMULATION : Run 05: 12 hr SCS 50yr \*\*  
 \*\*\*\*\*

-----  
 | MASS STORM | Filename: C:\Users\mmacdonald\AppData  
 | | ata\Local\Temp\  
 | | 1f223602-111d-4e37-b618-  
 8f2a32bf9eff\ac8c9659  
Ptotal= 87.91 mm
 Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 12.00 hrs  
 Mass curve time step = 30.00 min  
 New Storm time step = 10.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.52	0.17	0.59	3.17	3.52	6.17	58.02	9.17
3.52	0.33	1.17	3.33	3.52	6.33	36.92	9.33
3.52	0.50	1.76	3.50	3.52	6.50	15.82	9.50
2.93	0.67	1.76	3.67	3.52	6.67	12.89	9.67

2.34	0.83	1.76	3.83	3.52	6.83	9.96	9.83
1.76	1.00	1.76	4.00	3.52	7.00	7.03	10.00
1.76	1.17	1.76	4.17	4.10	7.17	6.45	10.17
1.76	1.33	1.76	4.33	4.69	7.33	5.86	10.33
1.76	1.50	1.76	4.50	5.27	7.50	5.27	10.50
1.76	1.67	1.76	4.67	5.86	7.67	5.27	10.67
1.76	1.83	1.76	4.83	6.45	7.83	5.27	10.83
1.76	2.00	1.76	5.00	7.03	8.00	5.27	11.00
1.76	2.17	2.34	5.17	8.20	8.17	4.69	11.17
1.76	2.33	2.93	5.33	9.38	8.33	4.10	11.33
1.76	2.50	3.52	5.50	10.55	8.50	3.52	11.50
1.76	2.67	3.52	5.67	33.41	8.67	3.52	11.67
1.76	2.83	3.52	5.83	56.26	8.83	3.52	11.83
1.76	3.00	3.52	6.00	79.12	9.00	3.52	12.00

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 | CALIB |  
 | NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0  
 | ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00  
 -----  
 U.H. Tp(hrs)= 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.52	0.033	0.59	3.033	3.52	6.033	58.02	9.03
3.52	0.067	0.59	3.067	3.52	6.067	58.02	9.07
3.52	0.100	0.59	3.100	3.52	6.100	58.02	9.10
3.52	0.133	0.59	3.133	3.52	6.133	58.02	9.13

3.52	0.167	0.59   3.167	3.52   6.167	58.02   9.17	1.76	1.067	1.76   4.067	4.10   7.067	6.45   10.07
3.52	0.200	1.17   3.200	3.52   6.200	36.93   9.20	1.76	1.100	1.76   4.100	4.10   7.100	6.45   10.10
3.52	0.233	1.17   3.233	3.52   6.233	36.92   9.23	1.76	1.133	1.76   4.133	4.10   7.133	6.45   10.13
3.52	0.267	1.17   3.267	3.52   6.267	36.92   9.27	1.76	1.167	1.76   4.167	4.10   7.167	6.45   10.17
3.52	0.300	1.17   3.300	3.52   6.300	36.92   9.30	1.76	1.200	1.76   4.200	4.69   7.200	5.86   10.20
3.52	0.333	1.17   3.333	3.52   6.333	36.92   9.33	1.76	1.233	1.76   4.233	4.69   7.233	5.86   10.23
3.52	0.367	1.76   3.367	3.52   6.367	15.83   9.37	1.76	1.267	1.76   4.267	4.69   7.267	5.86   10.27
3.52	0.400	1.76   3.400	3.52   6.400	15.82   9.40	1.76	1.300	1.76   4.300	4.69   7.300	5.86   10.30
3.52	0.433	1.76   3.433	3.52   6.433	15.82   9.43	1.76	1.333	1.76   4.333	4.69   7.333	5.86   10.33
3.52	0.467	1.76   3.467	3.52   6.467	15.82   9.47	1.76	1.367	1.76   4.367	5.27   7.367	5.27   10.37
3.52	0.500	1.76   3.500	3.52   6.500	15.82   9.50	1.76	1.400	1.76   4.400	5.27   7.400	5.27   10.40
3.52	0.533	1.76   3.533	3.52   6.533	12.89   9.53	1.76	1.433	1.76   4.433	5.27   7.433	5.27   10.43
2.93	0.567	1.76   3.567	3.52   6.567	12.89   9.57	1.76	1.467	1.76   4.467	5.27   7.467	5.27   10.47
2.93	0.600	1.76   3.600	3.52   6.600	12.89   9.60	1.76	1.500	1.76   4.500	5.27   7.500	5.27   10.50
2.93	0.633	1.76   3.633	3.52   6.633	12.89   9.63	1.76	1.533	1.76   4.533	5.86   7.533	5.27   10.53
2.93	0.667	1.76   3.667	3.52   6.667	12.89   9.67	1.76	1.567	1.76   4.567	5.86   7.567	5.27   10.57
2.93	0.700	1.76   3.700	3.52   6.700	9.96   9.70	1.76	1.600	1.76   4.600	5.86   7.600	5.27   10.60
2.34	0.733	1.76   3.733	3.52   6.733	9.96   9.73	1.76	1.633	1.76   4.633	5.86   7.633	5.27   10.63
2.34	0.767	1.76   3.767	3.52   6.767	9.96   9.77	1.76	1.667	1.76   4.667	5.86   7.667	5.27   10.67
2.34	0.800	1.76   3.800	3.52   6.800	9.96   9.80	1.76	1.700	1.76   4.700	6.45   7.700	5.27   10.70
2.34	0.833	1.76   3.833	3.52   6.833	9.96   9.83	1.76	1.733	1.76   4.733	6.45   7.733	5.27   10.73
2.34	0.867	1.76   3.867	3.52   6.867	7.03   9.87	1.76	1.767	1.76   4.767	6.45   7.767	5.27   10.77
1.76	0.900	1.76   3.900	3.52   6.900	7.03   9.90	1.76	1.800	1.76   4.800	6.45   7.800	5.27   10.80
1.76	0.933	1.76   3.933	3.52   6.933	7.03   9.93	1.76	1.833	1.76   4.833	6.45   7.833	5.27   10.83
1.76	0.967	1.76   3.967	3.52   6.967	7.03   9.97	1.76	1.867	1.76   4.867	7.03   7.867	5.27   10.87
1.76	1.000	1.76   4.000	3.52   7.000	7.03   10.00	1.76	1.900	1.76   4.900	7.03   7.900	5.27   10.90
1.76	1.033	1.76   4.033	4.10   7.033	6.45   10.03	1.76	1.933	1.76   4.933	7.03   7.933	5.27   10.93
1.76					1.76				

1.76 1.967 1.76 | 4.967 7.03 | 7.967 5.27 | 10.97  
1.76 2.000 1.76 | 5.000 7.03 | 8.000 5.27 | 11.00  
1.76 2.033 2.34 | 5.033 8.20 | 8.033 4.69 | 11.03  
1.76 2.067 2.34 | 5.067 8.20 | 8.067 4.69 | 11.07  
1.76 2.100 2.34 | 5.100 8.20 | 8.100 4.69 | 11.10  
1.76 2.133 2.34 | 5.133 8.20 | 8.133 4.69 | 11.13  
1.76 2.167 2.34 | 5.167 8.20 | 8.167 4.69 | 11.17  
1.76 2.200 2.93 | 5.200 9.38 | 8.200 4.10 | 11.20  
1.76 2.233 2.93 | 5.233 9.38 | 8.233 4.10 | 11.23  
1.76 2.267 2.93 | 5.267 9.38 | 8.267 4.10 | 11.27  
1.76 2.300 2.93 | 5.300 9.38 | 8.300 4.10 | 11.30  
1.76 2.333 2.93 | 5.333 9.38 | 8.333 4.10 | 11.33  
1.76 2.367 3.52 | 5.367 10.55 | 8.367 3.52 | 11.37  
1.76 2.400 3.52 | 5.400 10.55 | 8.400 3.52 | 11.40  
1.76 2.433 3.52 | 5.433 10.55 | 8.433 3.52 | 11.43  
1.76 2.467 3.52 | 5.467 10.55 | 8.467 3.52 | 11.47  
1.76 2.500 3.52 | 5.500 10.55 | 8.500 3.52 | 11.50  
1.76 2.533 3.52 | 5.533 33.40 | 8.533 3.52 | 11.53  
1.76 2.567 3.52 | 5.567 33.41 | 8.567 3.52 | 11.57  
1.76 2.600 3.52 | 5.600 33.41 | 8.600 3.52 | 11.60  
1.76 2.633 3.52 | 5.633 33.41 | 8.633 3.52 | 11.63  
1.76 2.667 3.52 | 5.667 33.41 | 8.667 3.52 | 11.67  
1.76 2.700 3.52 | 5.700 56.26 | 8.700 3.52 | 11.70  
1.76 2.733 3.52 | 5.733 56.26 | 8.733 3.52 | 11.73  
1.76 2.767 3.52 | 5.767 56.26 | 8.767 3.52 | 11.77  
1.76 2.800 3.52 | 5.800 56.26 | 8.800 3.52 | 11.80  
1.76 2.833 3.52 | 5.833 56.26 | 8.833 3.52 | 11.83

1.76 2.867 3.52 | 5.867 79.12 | 8.867 3.52 | 11.87  
1.76 2.900 3.52 | 5.900 79.12 | 8.900 3.52 | 11.90  
1.76 2.933 3.52 | 5.933 79.12 | 8.933 3.52 | 11.93  
1.76 2.967 3.52 | 5.967 79.12 | 8.967 3.52 | 11.97  
1.76 3.000 3.52 | 6.000 79.12 | 9.000 3.52 | 12.00

Unit Hyd Qpeak (cms)= 0.366

PEAK FLOW (cms)= 0.266 (i)  
TIME TO PEAK (hrs)= 6.500  
RUNOFF VOLUME (mm)= 39.764  
TOTAL RAINFALL (mm)= 87.617  
RUNOFF COEFFICIENT = 0.454

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

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| CALIB |  
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0  
| ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00  
----- U.H. Tp(hrs)= 0.16

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.396 (i)  
TIME TO PEAK (hrs)= 6.167  
RUNOFF VOLUME (mm)= 46.140  
TOTAL RAINFALL (mm)= 87.617  
RUNOFF COEFFICIENT = 0.527

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

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| CALIB |  
| NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0  
| ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00  
----- U.H. Tp(hrs)= 0.12

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.278 (i)  
TIME TO PEAK (hrs)= 6.100  
RUNOFF VOLUME (mm)= 46.857  
TOTAL RAINFALL (mm)= 87.617  
RUNOFF COEFFICIENT = 0.535

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

1f223602-111d-4e37-b618-  
8f2a32bf9eff\3fa7c120  
| Ptotal= 95.98 mm | Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 12.00 hrs  
Mass curve time step = 30.00 min  
New Storm time step = 10.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
0.17	0.64	3.17	3.84	6.17	63.35	9.17	
3.84							
0.33	1.28	3.33	3.84	6.33	40.31	9.33	
3.84							
0.50	1.92	3.50	3.84	6.50	17.28	9.50	
3.84							
0.67	1.92	3.67	3.84	6.67	14.08	9.67	
3.20							
0.83	1.92	3.83	3.84	6.83	10.88	9.83	
2.56							
1.00	1.92	4.00	3.84	7.00	7.68	10.00	
1.92							
1.17	1.92	4.17	4.48	7.17	7.04	10.17	
1.92							
1.33	1.92	4.33	5.12	7.33	6.40	10.33	
1.92							
1.50	1.92	4.50	5.76	7.50	5.76	10.50	
1.92							
1.67	1.92	4.67	6.40	7.67	5.76	10.67	
1.92							
1.83	1.92	4.83	7.04	7.83	5.76	10.83	
1.92							
2.00	1.92	5.00	7.68	8.00	5.76	11.00	
1.92							
2.17	2.56	5.17	8.96	8.17	5.12	11.17	
1.92							
2.33	3.20	5.33	10.24	8.33	4.48	11.33	
1.92							
2.50	3.84	5.50	11.52	8.50	3.84	11.50	
1.92							
2.67	3.84	5.67	36.47	8.67	3.84	11.67	
1.92							
2.83	3.84	5.83	61.43	8.83	3.84	11.83	
1.92							
3.00	3.84	6.00	86.38	9.00	3.84	12.00	
1.92							

V V I SSSSS U U A L (v 6.0.2001)  
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 TTTT TTTT 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  
6.0\VO2\voim.dat  
Output filename:  
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
0af8143f9a42\bcb7b2e6-7542-4eae-ba17-f65582c7dea5\  
Summary filename:  
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
0af8143f9a42\bcb7b2e6-7542-4eae-ba17-f65582c7dea5\  
DATE: 02/19/2021 TIME: 05:01:36  
USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
\*\* SIMULATION : Run 06: 12 hr SCS 100yr \*\*  
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| MASS STORM | Filename: C:\Users\mmacdonald\AppData\Local\Temp\  
| |

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| CALIB |

| NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0  
 |ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00  
 ----- U.H. Tp(hrs)= 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----									
RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.84	0.033	0.64	3.033	3.84	6.033	63.35	9.03	0.733	1.92
3.84	0.067	0.64	3.067	3.84	6.067	63.35	9.07	0.767	1.92
3.84	0.100	0.64	3.100	3.84	6.100	63.35	9.10	0.800	1.92
3.84	0.133	0.64	3.133	3.84	6.133	63.35	9.13	0.833	1.92
3.84	0.167	0.64	3.167	3.84	6.167	63.35	9.17	0.867	1.92
3.84	0.200	1.28	3.200	3.84	6.200	40.32	9.20	0.900	1.92
3.84	0.233	1.28	3.233	3.84	6.233	40.31	9.23	0.933	1.92
3.84	0.267	1.28	3.267	3.84	6.267	40.31	9.27	0.967	1.92
3.84	0.300	1.28	3.300	3.84	6.300	40.31	9.30	1.000	1.92
3.84	0.333	1.28	3.333	3.84	6.333	40.31	9.33	1.033	1.92
3.84	0.367	1.92	3.367	3.84	6.367	17.28	9.37	1.067	1.92
3.84	0.400	1.92	3.400	3.84	6.400	17.28	9.40	1.100	1.92
3.84	0.433	1.92	3.433	3.84	6.433	17.28	9.43	1.133	1.92
3.84	0.467	1.92	3.467	3.84	6.467	17.28	9.47	1.167	1.92
3.84	0.500	1.92	3.500	3.84	6.500	17.28	9.50	1.200	1.92
3.20	0.533	1.92	3.533	3.84	6.533	14.08	9.53	1.233	1.92
3.20	0.567	1.92	3.567	3.84	6.567	14.08	9.57	1.267	1.92
3.20	0.600	1.92	3.600	3.84	6.600	14.08	9.60	1.300	1.92
3.20	0.633	1.92	3.633	3.84	6.633	14.08	9.63	1.333	1.92
3.20	0.667	1.92	3.667	3.84	6.667	14.08	9.67	1.367	1.92
2.56	0.700	1.92	3.700	3.84	6.700	10.88	9.70	1.400	1.92
								1.433	1.92
								1.467	1.92
								1.500	1.92
								1.533	1.92
								1.567	1.92
								1.600	1.92

1.92	1.633	1.92	4.633	6.40	7.633	5.76	10.63
1.92	1.667	1.92	4.667	6.40	7.667	5.76	10.67
1.92	1.700	1.92	4.700	7.04	7.700	5.76	10.70
1.92	1.733	1.92	4.733	7.04	7.733	5.76	10.73
1.92	1.767	1.92	4.767	7.04	7.767	5.76	10.77
1.92	1.800	1.92	4.800	7.04	7.800	5.76	10.80
1.92	1.833	1.92	4.833	7.04	7.833	5.76	10.83
1.92	1.867	1.92	4.867	7.68	7.867	5.76	10.87
1.92	1.900	1.92	4.900	7.68	7.900	5.76	10.90
1.92	1.933	1.92	4.933	7.68	7.933	5.76	10.93
1.92	1.967	1.92	4.967	7.68	7.967	5.76	10.97
1.92	2.000	1.92	5.000	7.68	8.000	5.76	11.00
1.92	2.033	2.56	5.033	8.96	8.033	5.12	11.03
1.92	2.067	2.56	5.067	8.96	8.067	5.12	11.07
1.92	2.100	2.56	5.100	8.96	8.100	5.12	11.10
1.92	2.133	2.56	5.133	8.96	8.133	5.12	11.13
1.92	2.167	2.56	5.167	8.96	8.167	5.12	11.17
1.92	2.200	3.20	5.200	10.24	8.200	4.48	11.20
1.92	2.233	3.20	5.233	10.24	8.233	4.48	11.23
1.92	2.267	3.20	5.267	10.24	8.267	4.48	11.27
1.92	2.300	3.20	5.300	10.24	8.300	4.48	11.30
1.92	2.333	3.20	5.333	10.24	8.333	4.48	11.33
1.92	2.367	3.84	5.367	11.52	8.367	3.84	11.37
1.92	2.400	3.84	5.400	11.52	8.400	3.84	11.40
1.92	2.433	3.84	5.433	11.52	8.433	3.84	11.43
1.92	2.467	3.84	5.467	11.52	8.467	3.84	11.47
1.92	2.500	3.84	5.500	11.52	8.500	3.84	11.50

1.92	2.533	3.84	5.533	36.47	8.533	3.84	11.53
1.92	2.567	3.84	5.567	36.47	8.567	3.84	11.57
1.92	2.600	3.84	5.600	36.47	8.600	3.84	11.60
1.92	2.633	3.84	5.633	36.47	8.633	3.84	11.63
1.92	2.667	3.84	5.667	36.47	8.667	3.84	11.67
1.92	2.700	3.84	5.700	61.42	8.700	3.84	11.70
1.92	2.733	3.84	5.733	61.43	8.733	3.84	11.73
1.92	2.767	3.84	5.767	61.43	8.767	3.84	11.77
1.92	2.800	3.84	5.800	61.43	8.800	3.84	11.80
1.92	2.833	3.84	5.833	61.43	8.833	3.84	11.83
1.92	2.867	3.84	5.867	86.38	8.867	3.84	11.87
1.92	2.900	3.84	5.900	86.38	8.900	3.84	11.90
1.92	2.933	3.84	5.933	86.38	8.933	3.84	11.93
1.92	2.967	3.84	5.967	86.38	8.967	3.84	11.97
1.92	3.000	3.84	6.000	86.38	9.000	3.84	12.00

Unit Hyd Qpeak (cms)= 0.366

PEAK FLOW (cms)= 0.307 (i)  
 TIME TO PEAK (hrs)= 6.500  
 RUNOFF VOLUME (mm)= 45.808  
 TOTAL RAINFALL (mm)= 95.660  
 RUNOFF COEFFICIENT = 0.479

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

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| CALIB |
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.16

```

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.453 (i)  
 TIME TO PEAK (hrs)= 6.167  
 RUNOFF VOLUME (mm)= 52.729

TOTAL RAINFALL (mm) = 95.660  
RUNOFF COEFFICIENT = 0.551

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

-----  
-----  
| CALIB |  
| NASHYD ( 0103) | Area (ha) = 2.39 Curve Number (CN) = 80.0  
| ID= 1 DT= 2.0 min | Ia (mm) = 4.80 # of Linear Res. (N) = 3.00  
----- U.H. Tp (hrs) = 0.12

Unit Hyd Qpeak (cms) = 0.761

PEAK FLOW (cms) = 0.317 (i)  
TIME TO PEAK (hrs) = 6.100  
RUNOFF VOLUME (mm) = 53.461  
TOTAL RAINFALL (mm) = 95.660  
RUNOFF COEFFICIENT = 0.559

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

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# Existing Hydrology 24hr SCS Type II

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Duration of storm = 24.00 hrs  
Mass curve time step = 15.00 min

```
V V I SSSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL
```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
0.93	0.25	0.58	6.25	0.00	12.25	7.46	18.25
0.93	0.50	0.56	6.50	0.00	12.50	7.46	18.50
0.93	0.75	0.58	6.75	0.00	12.75	3.83	18.75
0.93	1.00	0.56	7.00	0.00	13.00	3.83	19.00
0.93	1.25	0.58	7.25	2.07	13.25	0.73	19.25
0.93	1.50	0.56	7.50	2.07	13.50	0.73	19.50
0.93	1.75	0.58	7.75	2.07	13.75	4.25	19.75
0.93	2.00	0.56	8.00	2.07	14.00	4.25	20.00
0.62	2.25	0.68	8.25	0.00	14.25	1.55	20.25
0.62	2.50	0.66	8.50	0.00	14.50	1.55	20.50
0.62	2.75	0.68	8.75	2.80	14.75	1.55	20.75
0.62	3.00	0.66	9.00	2.80	15.00	1.55	21.00
0.62	3.25	0.68	9.25	1.66	15.25	1.55	21.25
0.62	3.50	0.66	9.50	1.66	15.50	1.55	21.50
0.62	3.75	0.68	9.75	1.87	15.75	1.55	21.75
0.62	4.00	0.66	10.00	1.87	16.00	1.55	22.00
0.62	4.25	0.83	10.25	2.38	16.25	0.93	22.25
0.62	4.50	0.83	10.50	2.38	16.50	0.93	22.50
0.62	4.75	0.83	10.75	3.21	16.75	0.93	22.75
0.62	5.00	0.83	11.00	3.21	17.00	0.93	23.00
0.62	5.25	0.83	11.25	4.97	17.25	0.93	23.25
0.62	5.50	0.83	11.50	4.97	17.50	0.93	23.50
0.62	5.75	0.83	11.75	21.56	17.75	0.93	23.75

```
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
6.0\VO2\voain.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-
0af8143f9a42\bef369bf-9bcf-48ff-b1db-3b8b32b49228\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-
0af8143f9a42\bef369bf-9bcf-48ff-b1db-3b8b32b49228\s
```

DATE: 02/22/2021 TIME: 03:09:34

USER:

COMMENTS: \_\_\_\_\_

```
*****
** SIMULATION : Run 01 **
*****
```

```
-----
| MASS STORM | Filename: C:\Users\mmacdonald\AppData
| | ata\Local\Temp\
| | 7d6438e7-05a4-431a-956f-
0ab001e613ed\c4edde2e
| Ptotal= 51.82 mm | Comments: SCS 24 HOUR TYPE II STORM DISTRIBUTION
1
-----
```

0.62            6.00    0.83 | 12.00    57.21 | 18.00    0.93 | 24.00

```

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-----
| CALIB          |
| NASHYD ( 0101)| Area   (ha)=  4.12  Curve Number (CN)= 75.0
|ID= 1 DT= 2.0 min | Ia     (mm)=  6.40  # of Linear Res.(N)= 3.00
-----
                    U.H. Tp(hrs)=  0.43

```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

RAIN	---- TRANSFORMED HYETOGRAPH ----							
	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.93	0.033	0.58	6.033	0.00	12.033	7.46	18.03	
0.93	0.067	0.58	6.067	0.00	12.067	7.46	18.07	
0.93	0.100	0.58	6.100	0.00	12.100	7.46	18.10	
0.93	0.133	0.58	6.133	0.00	12.133	7.46	18.13	
0.93	0.167	0.58	6.167	0.00	12.167	7.46	18.17	
0.93	0.200	0.58	6.200	0.00	12.200	7.46	18.20	
0.93	0.233	0.58	6.233	0.00	12.233	7.46	18.23	
0.93	0.267	0.57	6.267	0.00	12.267	7.46	18.27	
0.93	0.300	0.56	6.300	0.00	12.300	7.46	18.30	
0.93	0.333	0.56	6.333	0.00	12.333	7.46	18.33	
0.93	0.367	0.56	6.367	0.00	12.367	7.46	18.37	
0.93	0.400	0.56	6.400	0.00	12.400	7.46	18.40	
0.93	0.433	0.56	6.433	0.00	12.433	7.46	18.43	
0.93	0.467	0.56	6.467	0.00	12.467	7.46	18.47	
0.93	0.500	0.56	6.500	0.00	12.500	7.46	18.50	
0.93	0.533	0.58	6.533	0.00	12.533	3.83	18.53	
0.93	0.567	0.58	6.567	0.00	12.567	3.83	18.57	

0.93	0.600	0.58	6.600	0.00	12.600	3.83	18.60
0.93	0.633	0.58	6.633	0.00	12.633	3.83	18.63
0.93	0.667	0.58	6.667	0.00	12.667	3.83	18.67
0.93	0.700	0.58	6.700	0.00	12.700	3.83	18.70
0.93	0.733	0.58	6.733	0.00	12.733	3.83	18.73
0.93	0.767	0.57	6.767	0.00	12.767	3.83	18.77
0.93	0.800	0.56	6.800	0.00	12.800	3.83	18.80
0.93	0.833	0.56	6.833	0.00	12.833	3.83	18.83
0.93	0.867	0.56	6.867	0.00	12.867	3.83	18.87
0.93	0.900	0.56	6.900	0.00	12.900	3.83	18.90
0.93	0.933	0.56	6.933	0.00	12.933	3.83	18.93
0.93	0.967	0.56	6.967	0.00	12.967	3.83	18.97
0.93	1.000	0.56	7.000	0.00	13.000	3.83	19.00
0.93	1.033	0.58	7.033	2.07	13.033	0.73	19.03
0.93	1.067	0.58	7.067	2.07	13.067	0.73	19.07
0.93	1.100	0.58	7.100	2.07	13.100	0.73	19.10
0.93	1.133	0.58	7.133	2.07	13.133	0.73	19.13
0.93	1.167	0.58	7.167	2.07	13.167	0.73	19.17
0.93	1.200	0.58	7.200	2.07	13.200	0.73	19.20
0.93	1.233	0.58	7.233	2.07	13.233	0.73	19.23
0.93	1.267	0.57	7.267	2.07	13.267	0.73	19.27
0.93	1.300	0.56	7.300	2.07	13.300	0.73	19.30
0.93	1.333	0.56	7.333	2.07	13.333	0.73	19.33
0.93	1.367	0.56	7.367	2.07	13.367	0.73	19.37
0.93	1.400	0.56	7.400	2.07	13.400	0.73	19.40
0.93	1.433	0.56	7.433	2.07	13.433	0.73	19.43
0.93	1.467	0.56	7.467	2.07	13.467	0.73	19.47

0.93	1.500	0.56   7.500	2.07   13.500	0.73   19.50	0.62	2.400	0.66   8.400	0.00   14.400	1.55   20.40
0.93	1.533	0.58   7.533	2.07   13.533	4.25   19.53	0.62	2.433	0.66   8.433	0.00   14.433	1.55   20.43
0.93	1.567	0.58   7.567	2.07   13.567	4.25   19.57	0.62	2.467	0.66   8.467	0.00   14.467	1.55   20.47
0.93	1.600	0.58   7.600	2.07   13.600	4.25   19.60	0.62	2.500	0.66   8.500	0.00   14.500	1.55   20.50
0.93	1.633	0.58   7.633	2.07   13.633	4.25   19.63	0.62	2.533	0.68   8.533	2.80   14.533	1.55   20.53
0.93	1.667	0.58   7.667	2.07   13.667	4.25   19.67	0.62	2.567	0.68   8.567	2.80   14.567	1.55   20.57
0.93	1.700	0.58   7.700	2.07   13.700	4.25   19.70	0.62	2.600	0.68   8.600	2.80   14.600	1.55   20.60
0.93	1.733	0.58   7.733	2.07   13.733	4.25   19.73	0.62	2.633	0.68   8.633	2.80   14.633	1.55   20.63
0.93	1.767	0.57   7.767	2.07   13.767	4.25   19.77	0.62	2.667	0.68   8.667	2.80   14.667	1.55   20.67
0.93	1.800	0.56   7.800	2.07   13.800	4.25   19.80	0.62	2.700	0.68   8.700	2.80   14.700	1.55   20.70
0.93	1.833	0.56   7.833	2.07   13.833	4.25   19.83	0.62	2.733	0.68   8.733	2.80   14.733	1.55   20.73
0.93	1.867	0.56   7.867	2.07   13.867	4.25   19.87	0.62	2.767	0.67   8.767	2.80   14.767	1.55   20.77
0.93	1.900	0.56   7.900	2.07   13.900	4.25   19.90	0.62	2.800	0.66   8.800	2.80   14.800	1.55   20.80
0.93	1.933	0.56   7.933	2.07   13.933	4.25   19.93	0.62	2.833	0.66   8.833	2.80   14.833	1.55   20.83
0.93	1.967	0.56   7.967	2.07   13.967	4.25   19.97	0.62	2.867	0.66   8.867	2.80   14.867	1.55   20.87
0.93	2.000	0.56   8.000	2.07   14.000	4.24   20.00	0.62	2.900	0.66   8.900	2.80   14.900	1.55   20.90
0.62	2.033	0.68   8.033	0.00   14.033	1.55   20.03	0.62	2.933	0.66   8.933	2.80   14.933	1.55   20.93
0.62	2.067	0.68   8.067	0.00   14.067	1.55   20.07	0.62	2.967	0.66   8.967	2.80   14.967	1.55   20.97
0.62	2.100	0.68   8.100	0.00   14.100	1.55   20.10	0.62	3.000	0.66   9.000	2.80   15.000	1.55   21.00
0.62	2.133	0.68   8.133	0.00   14.133	1.55   20.13	0.62	3.033	0.68   9.033	1.66   15.033	1.55   21.03
0.62	2.167	0.68   8.167	0.00   14.167	1.55   20.17	0.62	3.067	0.68   9.067	1.66   15.067	1.55   21.07
0.62	2.200	0.68   8.200	0.00   14.200	1.55   20.20	0.62	3.100	0.68   9.100	1.66   15.100	1.55   21.10
0.62	2.233	0.68   8.233	0.00   14.233	1.55   20.23	0.62	3.133	0.68   9.133	1.66   15.133	1.55   21.13
0.62	2.267	0.67   8.267	0.00   14.267	1.55   20.27	0.62	3.167	0.68   9.167	1.66   15.167	1.55   21.17
0.62	2.300	0.66   8.300	0.00   14.300	1.55   20.30	0.62	3.200	0.68   9.200	1.66   15.200	1.55   21.20
0.62	2.333	0.66   8.333	0.00   14.333	1.55   20.33	0.62	3.233	0.68   9.233	1.66   15.233	1.55   21.23
0.62	2.367	0.66   8.367	0.00   14.367	1.55   20.37	0.62	3.267	0.67   9.267	1.66   15.267	1.55   21.27

0.62	3.300	0.66   9.300	1.66  15.300	1.55   21.30	0.62	4.200	0.83  10.200	2.38  16.200	0.93   22.20
0.62	3.333	0.66   9.333	1.66  15.333	1.55   21.33	0.62	4.233	0.83  10.233	2.38  16.233	0.93   22.23
0.62	3.367	0.66   9.367	1.66  15.367	1.55   21.37	0.62	4.267	0.83  10.267	2.38  16.267	0.93   22.27
0.62	3.400	0.66   9.400	1.66  15.400	1.55   21.40	0.62	4.300	0.83  10.300	2.38  16.300	0.93   22.30
0.62	3.433	0.66   9.433	1.66  15.433	1.55   21.43	0.62	4.333	0.83  10.333	2.38  16.333	0.93   22.33
0.62	3.467	0.66   9.467	1.66  15.467	1.55   21.47	0.62	4.367	0.83  10.367	2.38  16.367	0.93   22.37
0.62	3.500	0.66   9.500	1.66  15.500	1.55   21.50	0.62	4.400	0.83  10.400	2.38  16.400	0.93   22.40
0.62	3.533	0.68   9.533	1.87  15.533	1.55   21.53	0.62	4.433	0.83  10.433	2.38  16.433	0.93   22.43
0.62	3.567	0.68   9.567	1.87  15.567	1.55   21.57	0.62	4.467	0.83  10.467	2.38  16.467	0.93   22.47
0.62	3.600	0.68   9.600	1.87  15.600	1.55   21.60	0.62	4.500	0.83  10.500	2.38  16.500	0.93   22.50
0.62	3.633	0.68   9.633	1.87  15.633	1.55   21.63	0.62	4.533	0.83  10.533	3.21  16.533	0.93   22.53
0.62	3.667	0.68   9.667	1.87  15.667	1.55   21.67	0.62	4.567	0.83  10.567	3.21  16.567	0.93   22.57
0.62	3.700	0.68   9.700	1.87  15.700	1.55   21.70	0.62	4.600	0.83  10.600	3.21  16.600	0.93   22.60
0.62	3.733	0.68   9.733	1.87  15.733	1.55   21.73	0.62	4.633	0.83  10.633	3.21  16.633	0.93   22.63
0.62	3.767	0.67   9.767	1.87  15.767	1.55   21.77	0.62	4.667	0.83  10.667	3.21  16.667	0.93   22.67
0.62	3.800	0.66   9.800	1.87  15.800	1.55   21.80	0.62	4.700	0.83  10.700	3.21  16.700	0.93   22.70
0.62	3.833	0.66   9.833	1.87  15.833	1.55   21.83	0.62	4.733	0.83  10.733	3.21  16.733	0.93   22.73
0.62	3.867	0.66   9.867	1.87  15.867	1.55   21.87	0.62	4.767	0.83  10.767	3.21  16.767	0.93   22.77
0.62	3.900	0.66   9.900	1.87  15.900	1.55   21.90	0.62	4.800	0.83  10.800	3.21  16.800	0.93   22.80
0.62	3.933	0.66   9.933	1.87  15.933	1.55   21.93	0.62	4.833	0.83  10.833	3.21  16.833	0.93   22.83
0.62	3.967	0.66   9.967	1.87  15.967	1.55   21.97	0.62	4.867	0.83  10.867	3.21  16.867	0.93   22.87
0.62	4.000	0.66  10.000	1.87  16.000	1.55   22.00	0.62	4.900	0.83  10.900	3.21  16.900	0.93   22.90
0.62	4.033	0.83  10.033	2.38  16.033	0.93   22.03	0.62	4.933	0.83  10.933	3.21  16.933	0.93   22.93
0.62	4.067	0.83  10.067	2.38  16.067	0.93   22.07	0.62	4.967	0.83  10.967	3.21  16.967	0.93   22.97
0.62	4.100	0.83  10.100	2.38  16.100	0.93   22.10	0.62	5.000	0.83  11.000	3.21  17.000	0.93   23.00
0.62	4.133	0.83  10.133	2.38  16.133	0.93   22.13	0.62	5.033	0.83  11.033	4.97  17.033	0.93   23.03
0.62	4.167	0.83  10.167	2.38  16.167	0.93   22.17	0.62	5.067	0.83  11.067	4.97  17.067	0.93   23.07

0.62 5.100 0.83 |11.100 4.97 |17.100 0.93 | 23.10  
0.62 5.133 0.83 |11.133 4.97 |17.133 0.93 | 23.13  
0.62 5.167 0.83 |11.167 4.97 |17.167 0.93 | 23.17  
0.62 5.200 0.83 |11.200 4.97 |17.200 0.93 | 23.20  
0.62 5.233 0.83 |11.233 4.97 |17.233 0.93 | 23.23  
0.62 5.267 0.83 |11.267 4.97 |17.267 0.93 | 23.27  
0.62 5.300 0.83 |11.300 4.97 |17.300 0.93 | 23.30  
0.62 5.333 0.83 |11.333 4.97 |17.333 0.93 | 23.33  
0.62 5.367 0.83 |11.367 4.97 |17.367 0.93 | 23.37  
0.62 5.400 0.83 |11.400 4.97 |17.400 0.93 | 23.40  
0.62 5.433 0.83 |11.433 4.97 |17.433 0.93 | 23.43  
0.62 5.467 0.83 |11.467 4.97 |17.467 0.93 | 23.47  
0.62 5.500 0.83 |11.500 4.99 |17.500 0.93 | 23.50  
0.62 5.533 0.83 |11.533 21.56 |17.533 0.93 | 23.53  
0.62 5.567 0.83 |11.567 21.56 |17.567 0.93 | 23.57  
0.62 5.600 0.83 |11.600 21.56 |17.600 0.93 | 23.60  
0.62 5.633 0.83 |11.633 21.56 |17.633 0.93 | 23.63  
0.62 5.667 0.83 |11.667 21.56 |17.667 0.93 | 23.67  
0.62 5.700 0.83 |11.700 21.56 |17.700 0.93 | 23.70  
0.62 5.733 0.83 |11.733 21.56 |17.733 0.93 | 23.73  
0.62 5.767 0.83 |11.767 39.43 |17.767 0.93 | 23.77  
0.62 5.800 0.83 |11.800 57.21 |17.800 0.93 | 23.80  
0.62 5.833 0.83 |11.833 57.21 |17.833 0.93 | 23.83  
0.62 5.867 0.83 |11.867 57.21 |17.867 0.93 | 23.87  
0.62 5.900 0.83 |11.900 57.21 |17.900 0.93 | 23.90  
0.62 5.933 0.83 |11.933 57.21 |17.933 0.93 | 23.93  
0.62 5.967 0.83 |11.967 57.21 |17.967 0.93 | 23.97

0.62 6.000 0.83 |12.000 57.14 |18.000 0.93 | 24.00

Unit Hyd Qpeak (cms)= 0.366  
PEAK FLOW (cms)= 0.093 (i)  
TIME TO PEAK (hrs)= 12.333  
RUNOFF VOLUME (mm)= 15.858  
TOTAL RAINFALL (mm)= 51.820  
RUNOFF COEFFICIENT = 0.306

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

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| CALIB |  
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0  
|ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00  
----- U.H. Tp(hrs)= 0.16

Unit Hyd Qpeak (cms)= 0.864  
PEAK FLOW (cms)= 0.195 (i)  
TIME TO PEAK (hrs)= 12.067  
RUNOFF VOLUME (mm)= 19.401  
TOTAL RAINFALL (mm)= 51.820  
RUNOFF COEFFICIENT = 0.374

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

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| CALIB |  
| NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0  
|ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00  
----- U.H. Tp(hrs)= 0.12

Unit Hyd Qpeak (cms)= 0.761  
PEAK FLOW (cms)= 0.152 (i)  
TIME TO PEAK (hrs)= 12.033  
RUNOFF VOLUME (mm)= 19.996  
TOTAL RAINFALL (mm)= 51.820  
RUNOFF COEFFICIENT = 0.386

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

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V V I SSSS U U A L (v 6.0.2001)
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 SSSS UUUU A A LLLLL

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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 \*\*\*\*\*

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Input filename: C:\Program Files (x86)\Visual OTTHYMO
6.0\VO2\voin.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-
0af8143f9a42\52cce98f-3eaf-4f60-b72e-35b24f743dc4\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-
0af8143f9a42\52cce98f-3eaf-4f60-b72e-35b24f743dc4\s

```

DATE: 02/22/2021 TIME: 03:09:34

USER:

COMMENTS: \_\_\_\_\_

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*****
** SIMULATION : Run 02 **
*****

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| MASS STORM | Filename: C:\Users\mmacdonald\AppData
| | ata\Local\Temp\
| | 7d6438e7-05a4-431a-956f-
0ab001e613ed\559910ac
| Ptotal= 67.18 mm | Comments: SCS 24 HOUR TYPE II STORM DISTRIBUTION
1
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Duration of storm = 24.00 hrs  
 Mass curve time step = 15.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.21	0.25	0.75	6.25	0.00	12.25	9.67	18.25
1.21	0.50	0.73	6.50	0.00	12.50	9.67	18.50
1.21	0.75	0.75	6.75	0.00	12.75	4.97	18.75
1.21	1.00	0.73	7.00	0.00	13.00	4.97	19.00
1.21	1.25	0.75	7.25	2.69	13.25	0.94	19.25
1.21	1.50	0.73	7.50	2.69	13.50	0.94	19.50
1.21	1.75	0.75	7.75	2.69	13.75	5.51	19.75
1.21	2.00	0.73	8.00	2.69	14.00	5.51	20.00
0.81	2.25	0.89	8.25	0.00	14.25	2.02	20.25
0.81	2.50	0.86	8.50	0.00	14.50	2.02	20.50
0.81	2.75	0.89	8.75	3.63	14.75	2.02	20.75
0.81	3.00	0.86	9.00	3.63	15.00	2.02	21.00
0.81	3.25	0.89	9.25	2.15	15.25	2.02	21.25
0.81	3.50	0.86	9.50	2.15	15.50	2.02	21.50
0.81	3.75	0.89	9.75	2.42	15.75	2.02	21.75
0.81	4.00	0.86	10.00	2.42	16.00	2.02	22.00
0.81	4.25	1.07	10.25	3.09	16.25	1.21	22.25
0.81	4.50	1.07	10.50	3.09	16.50	1.21	22.50
0.81	4.75	1.07	10.75	4.17	16.75	1.21	22.75
0.81	5.00	1.07	11.00	4.17	17.00	1.21	23.00
0.81	5.25	1.07	11.25	6.45	17.25	1.21	23.25
0.81	5.50	1.07	11.50	6.45	17.50	1.21	23.50
0.81	5.75	1.07	11.75	27.95	17.75	1.21	23.75
0.81	6.00	1.07	12.00	74.17	18.00	1.21	24.00

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| CALIB |
| NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0
| ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00
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U.H. Tp(hrs)= 0.43

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NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.21	0.033	0.75	6.033	0.00	12.033	9.67	18.03
1.21	0.067	0.75	6.067	0.00	12.067	9.67	18.07
1.21	0.100	0.75	6.100	0.00	12.100	9.67	18.10
1.21	0.133	0.75	6.133	0.00	12.133	9.67	18.13
1.21	0.167	0.75	6.167	0.00	12.167	9.67	18.17
1.21	0.200	0.75	6.200	0.00	12.200	9.67	18.20
1.21	0.233	0.75	6.233	0.00	12.233	9.67	18.23
1.21	0.267	0.74	6.267	0.00	12.267	9.67	18.27
1.21	0.300	0.73	6.300	0.00	12.300	9.67	18.30
1.21	0.333	0.73	6.333	0.00	12.333	9.67	18.33
1.21	0.367	0.73	6.367	0.00	12.367	9.67	18.37
1.21	0.400	0.73	6.400	0.00	12.400	9.67	18.40
1.21	0.433	0.73	6.433	0.00	12.433	9.67	18.43
1.21	0.467	0.73	6.467	0.00	12.467	9.67	18.47
1.21	0.500	0.73	6.500	0.00	12.500	9.67	18.50
1.21	0.533	0.75	6.533	0.00	12.533	4.97	18.53
1.21	0.567	0.75	6.567	0.00	12.567	4.97	18.57
1.21	0.600	0.75	6.600	0.00	12.600	4.97	18.60
1.21	0.633	0.75	6.633	0.00	12.633	4.97	18.63

1.21	0.667	0.75	6.667	0.00	12.667	4.97	18.67
1.21	0.700	0.75	6.700	0.00	12.700	4.97	18.70
1.21	0.733	0.75	6.733	0.00	12.733	4.97	18.73
1.21	0.767	0.74	6.767	0.00	12.767	4.97	18.77
1.21	0.800	0.73	6.800	0.00	12.800	4.97	18.80
1.21	0.833	0.73	6.833	0.00	12.833	4.97	18.83
1.21	0.867	0.73	6.867	0.00	12.867	4.97	18.87
1.21	0.900	0.73	6.900	0.00	12.900	4.97	18.90
1.21	0.933	0.73	6.933	0.00	12.933	4.97	18.93
1.21	0.967	0.73	6.967	0.00	12.967	4.97	18.97
1.21	1.000	0.73	7.000	0.00	13.000	4.96	19.00
1.21	1.033	0.75	7.033	2.69	13.033	0.94	19.03
1.21	1.067	0.75	7.067	2.69	13.067	0.94	19.07
1.21	1.100	0.75	7.100	2.69	13.100	0.94	19.10
1.21	1.133	0.75	7.133	2.69	13.133	0.94	19.13
1.21	1.167	0.75	7.167	2.69	13.167	0.94	19.17
1.21	1.200	0.75	7.200	2.69	13.200	0.94	19.20
1.21	1.233	0.75	7.233	2.69	13.233	0.94	19.23
1.21	1.267	0.74	7.267	2.69	13.267	0.94	19.27
1.21	1.300	0.73	7.300	2.69	13.300	0.94	19.30
1.21	1.333	0.73	7.333	2.69	13.333	0.94	19.33
1.21	1.367	0.73	7.367	2.69	13.367	0.94	19.37
1.21	1.400	0.73	7.400	2.69	13.400	0.94	19.40
1.21	1.433	0.73	7.433	2.69	13.433	0.94	19.43
1.21	1.467	0.73	7.467	2.69	13.467	0.94	19.47
1.21	1.500	0.73	7.500	2.69	13.500	0.95	19.50
1.21	1.533	0.75	7.533	2.69	13.533	5.51	19.53

1.21	1.567	0.75   7.567	2.69  13.567	5.51   19.57	0.81	2.467	0.86   8.467	0.00  14.467	2.02   20.47
1.21	1.600	0.75   7.600	2.69  13.600	5.51   19.60	0.81	2.500	0.86   8.500	0.00  14.500	2.02   20.50
1.21	1.633	0.75   7.633	2.69  13.633	5.51   19.63	0.81	2.533	0.89   8.533	3.63  14.533	2.02   20.53
1.21	1.667	0.75   7.667	2.69  13.667	5.51   19.67	0.81	2.567	0.89   8.567	3.63  14.567	2.02   20.57
1.21	1.700	0.75   7.700	2.69  13.700	5.51   19.70	0.81	2.600	0.89   8.600	3.63  14.600	2.02   20.60
1.21	1.733	0.75   7.733	2.69  13.733	5.51   19.73	0.81	2.633	0.89   8.633	3.63  14.633	2.02   20.63
1.21	1.767	0.74   7.767	2.69  13.767	5.51   19.77	0.81	2.667	0.89   8.667	3.63  14.667	2.02   20.67
1.21	1.800	0.73   7.800	2.69  13.800	5.51   19.80	0.81	2.700	0.89   8.700	3.63  14.700	2.02   20.70
1.21	1.833	0.73   7.833	2.69  13.833	5.51   19.83	0.81	2.733	0.89   8.733	3.63  14.733	2.02   20.73
1.21	1.867	0.73   7.867	2.69  13.867	5.51   19.87	0.81	2.767	0.87   8.767	3.63  14.767	2.02   20.77
1.21	1.900	0.73   7.900	2.69  13.900	5.51   19.90	0.81	2.800	0.86   8.800	3.63  14.800	2.02   20.80
1.21	1.933	0.73   7.933	2.69  13.933	5.51   19.93	0.81	2.833	0.86   8.833	3.63  14.833	2.02   20.83
1.21	1.967	0.73   7.967	2.69  13.967	5.51   19.97	0.81	2.867	0.86   8.867	3.63  14.867	2.02   20.87
1.21	2.000	0.73   8.000	2.69  14.000	5.50   20.00	0.81	2.900	0.86   8.900	3.63  14.900	2.02   20.90
0.81	2.033	0.89   8.033	0.00  14.033	2.02   20.03	0.81	2.933	0.86   8.933	3.63  14.933	2.02   20.93
0.81	2.067	0.89   8.067	0.00  14.067	2.02   20.07	0.81	2.967	0.86   8.967	3.63  14.967	2.02   20.97
0.81	2.100	0.89   8.100	0.00  14.100	2.02   20.10	0.81	3.000	0.86   9.000	3.63  15.000	2.02   21.00
0.81	2.133	0.89   8.133	0.00  14.133	2.02   20.13	0.81	3.033	0.89   9.033	2.15  15.033	2.02   21.03
0.81	2.167	0.89   8.167	0.00  14.167	2.02   20.17	0.81	3.067	0.89   9.067	2.15  15.067	2.02   21.07
0.81	2.200	0.89   8.200	0.00  14.200	2.02   20.20	0.81	3.100	0.89   9.100	2.15  15.100	2.02   21.10
0.81	2.233	0.89   8.233	0.00  14.233	2.02   20.23	0.81	3.133	0.89   9.133	2.15  15.133	2.02   21.13
0.81	2.267	0.87   8.267	0.00  14.267	2.02   20.27	0.81	3.167	0.89   9.167	2.15  15.167	2.02   21.17
0.81	2.300	0.86   8.300	0.00  14.300	2.02   20.30	0.81	3.200	0.89   9.200	2.15  15.200	2.02   21.20
0.81	2.333	0.86   8.333	0.00  14.333	2.02   20.33	0.81	3.233	0.89   9.233	2.15  15.233	2.02   21.23
0.81	2.367	0.86   8.367	0.00  14.367	2.02   20.37	0.81	3.267	0.87   9.267	2.15  15.267	2.02   21.27
0.81	2.400	0.86   8.400	0.00  14.400	2.02   20.40	0.81	3.300	0.86   9.300	2.15  15.300	2.02   21.30
0.81	2.433	0.86   8.433	0.00  14.433	2.02   20.43	0.81	3.333	0.86   9.333	2.15  15.333	2.02   21.33



0.81	3.367	0.86   9.367	2.15  15.367	2.02   21.37	0.81	4.267	1.07  10.267	3.09  16.267	1.21   22.27
0.81	3.400	0.86   9.400	2.15  15.400	2.02   21.40	0.81	4.300	1.07  10.300	3.09  16.300	1.21   22.30
0.81	3.433	0.86   9.433	2.15  15.433	2.02   21.43	0.81	4.333	1.07  10.333	3.09  16.333	1.21   22.33
0.81	3.467	0.86   9.467	2.15  15.467	2.02   21.47	0.81	4.367	1.07  10.367	3.09  16.367	1.21   22.37
0.81	3.500	0.86   9.500	2.15  15.500	2.02   21.50	0.81	4.400	1.07  10.400	3.09  16.400	1.21   22.40
0.81	3.533	0.89   9.533	2.42  15.533	2.02   21.53	0.81	4.433	1.07  10.433	3.09  16.433	1.21   22.43
0.81	3.567	0.89   9.567	2.42  15.567	2.02   21.57	0.81	4.467	1.07  10.467	3.09  16.467	1.21   22.47
0.81	3.600	0.89   9.600	2.42  15.600	2.02   21.60	0.81	4.500	1.07  10.500	3.09  16.500	1.21   22.50
0.81	3.633	0.89   9.633	2.42  15.633	2.02   21.63	0.81	4.533	1.07  10.533	4.17  16.533	1.21   22.53
0.81	3.667	0.89   9.667	2.42  15.667	2.02   21.67	0.81	4.567	1.07  10.567	4.17  16.567	1.21   22.57
0.81	3.700	0.89   9.700	2.42  15.700	2.02   21.70	0.81	4.600	1.07  10.600	4.17  16.600	1.21   22.60
0.81	3.733	0.89   9.733	2.42  15.733	2.02   21.73	0.81	4.633	1.07  10.633	4.17  16.633	1.21   22.63
0.81	3.767	0.87   9.767	2.42  15.767	2.02   21.77	0.81	4.667	1.07  10.667	4.17  16.667	1.21   22.67
0.81	3.800	0.86   9.800	2.42  15.800	2.02   21.80	0.81	4.700	1.07  10.700	4.17  16.700	1.21   22.70
0.81	3.833	0.86   9.833	2.42  15.833	2.02   21.83	0.81	4.733	1.07  10.733	4.17  16.733	1.21   22.73
0.81	3.867	0.86   9.867	2.42  15.867	2.02   21.87	0.81	4.767	1.07  10.767	4.17  16.767	1.21   22.77
0.81	3.900	0.86   9.900	2.42  15.900	2.02   21.90	0.81	4.800	1.07  10.800	4.17  16.800	1.21   22.80
0.81	3.933	0.86   9.933	2.42  15.933	2.02   21.93	0.81	4.833	1.07  10.833	4.17  16.833	1.21   22.83
0.81	3.967	0.86   9.967	2.42  15.967	2.02   21.97	0.81	4.867	1.07  10.867	4.17  16.867	1.21   22.87
0.81	4.000	0.86  10.000	2.42  16.000	2.01   22.00	0.81	4.900	1.07  10.900	4.17  16.900	1.21   22.90
0.81	4.033	1.07  10.033	3.09  16.033	1.21   22.03	0.81	4.933	1.07  10.933	4.17  16.933	1.21   22.93
0.81	4.067	1.07  10.067	3.09  16.067	1.21   22.07	0.81	4.967	1.07  10.967	4.17  16.967	1.21   22.97
0.81	4.100	1.07  10.100	3.09  16.100	1.21   22.10	0.81	5.000	1.07  11.000	4.17  17.000	1.21   23.00
0.81	4.133	1.07  10.133	3.09  16.133	1.21   22.13	0.81	5.033	1.07  11.033	6.45  17.033	1.21   23.03
0.81	4.167	1.07  10.167	3.09  16.167	1.21   22.17	0.81	5.067	1.07  11.067	6.45  17.067	1.21   23.07
0.81	4.200	1.07  10.200	3.09  16.200	1.21   22.20	0.81	5.100	1.07  11.100	6.45  17.100	1.21   23.10
0.81	4.233	1.07  10.233	3.09  16.233	1.21   22.23	0.81	5.133	1.07  11.133	6.45  17.133	1.21   23.13

0.81 5.167 1.07 |11.167 6.45 |17.167 1.21 | 23.17  
0.81 5.200 1.07 |11.200 6.45 |17.200 1.21 | 23.20  
0.81 5.233 1.07 |11.233 6.45 |17.233 1.21 | 23.23  
0.81 5.267 1.07 |11.267 6.45 |17.267 1.21 | 23.27  
0.81 5.300 1.07 |11.300 6.45 |17.300 1.21 | 23.30  
0.81 5.333 1.07 |11.333 6.45 |17.333 1.21 | 23.33  
0.81 5.367 1.07 |11.367 6.45 |17.367 1.21 | 23.37  
0.81 5.400 1.07 |11.400 6.45 |17.400 1.21 | 23.40  
0.81 5.433 1.07 |11.433 6.45 |17.433 1.21 | 23.43  
0.81 5.467 1.07 |11.467 6.45 |17.467 1.21 | 23.47  
0.81 5.500 1.07 |11.500 6.48 |17.500 1.21 | 23.50  
0.81 5.533 1.07 |11.533 27.95 |17.533 1.21 | 23.53  
0.81 5.567 1.07 |11.567 27.95 |17.567 1.21 | 23.57  
0.81 5.600 1.07 |11.600 27.95 |17.600 1.21 | 23.60  
0.81 5.633 1.07 |11.633 27.95 |17.633 1.21 | 23.63  
0.81 5.667 1.07 |11.667 27.95 |17.667 1.21 | 23.67  
0.81 5.700 1.07 |11.700 27.95 |17.700 1.21 | 23.70  
0.81 5.733 1.07 |11.733 27.95 |17.733 1.21 | 23.73  
0.81 5.767 1.07 |11.767 51.12 |17.767 1.21 | 23.77  
0.81 5.800 1.07 |11.800 74.17 |17.800 1.21 | 23.80  
0.81 5.833 1.07 |11.833 74.17 |17.833 1.21 | 23.83  
0.81 5.867 1.07 |11.867 74.17 |17.867 1.21 | 23.87  
0.81 5.900 1.07 |11.900 74.17 |17.900 1.21 | 23.90  
0.81 5.933 1.07 |11.933 74.17 |17.933 1.21 | 23.93  
0.81 5.967 1.07 |11.967 74.17 |17.967 1.21 | 23.97  
0.81 6.000 1.07 |12.000 74.08 |18.000 1.21 | 24.00

PEAK FLOW (cms)= 0.152 (i)  
TIME TO PEAK (hrs)= 12.333  
RUNOFF VOLUME (mm)= 25.398  
TOTAL RAINFALL (mm)= 67.180  
RUNOFF COEFFICIENT = 0.378

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

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| CALIB |  
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0  
|ID= 1 DT= 2.0 min | Ta (mm)= 5.70 # of Linear Res.(N)= 3.00  
----- U.H. Tp(hrs)= 0.16

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.307 (i)  
TIME TO PEAK (hrs)= 12.067  
RUNOFF VOLUME (mm)= 30.239  
TOTAL RAINFALL (mm)= 67.180  
RUNOFF COEFFICIENT = 0.450

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

-----  
-----  
| CALIB |  
| NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0  
|ID= 1 DT= 2.0 min | Ta (mm)= 4.80 # of Linear Res.(N)= 3.00  
----- U.H. Tp(hrs)= 0.12

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.235 (i)  
TIME TO PEAK (hrs)= 12.033  
RUNOFF VOLUME (mm)= 30.900  
TOTAL RAINFALL (mm)= 67.180  
RUNOFF COEFFICIENT = 0.460

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

Unit Hyd Qpeak (cms)= 0.366

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=====

V	V	I	SSSSS	U	U	A	L	(v 6.0.2001)
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  TTTT  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
6.0\VO2\voin.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\78ae455f-3a34-45e8-8e4a-ef2ef467e4df\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\78ae455f-3a34-45e8-8e4a-ef2ef467e4df\s

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DATE: 02/22/2021                    TIME: 03:09:34

USER:

COMMENTS: \_\_\_\_\_

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*****
** SIMULATION : Run 03                    **
*****

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| MASS STORM                    |                    |                    |
|                               |                    |                    |
|                               |                    |                    |
| 0ab001e613ed\20b79a9c       |                    |                    |
| Ptotal= 79.96 mm |                    |                    |
| 1                              |                    |                    |
-----

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Duration of storm = 24.00 hrs  
 Mass curve time step = 15.00 min

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RAIN                    TIME    RAIN |    TIME    RAIN |'    TIME    RAIN |    TIME
mm/hr                    hrs   mm/hr |    hrs   mm/hr |'    hrs   mm/hr |    hrs

```

1.44	0.25	0.90	6.25	0.00	12.25	11.51	18.25
1.44	0.50	0.86	6.50	0.00	12.50	11.51	18.50
1.44	0.75	0.90	6.75	0.00	12.75	5.92	18.75
1.44	1.00	0.86	7.00	0.00	13.00	5.92	19.00
1.44	1.25	0.90	7.25	3.20	13.25	1.12	19.25
1.44	1.50	0.86	7.50	3.20	13.50	1.12	19.50
1.44	1.75	0.90	7.75	3.20	13.75	6.56	19.75
1.44	2.00	0.86	8.00	3.20	14.00	6.56	20.00
0.96	2.25	1.06	8.25	0.00	14.25	2.40	20.25
0.96	2.50	1.02	8.50	0.00	14.50	2.40	20.50
0.96	2.75	1.06	8.75	4.32	14.75	2.40	20.75
0.96	3.00	1.02	9.00	4.32	15.00	2.40	21.00
0.96	3.25	1.06	9.25	2.56	15.25	2.40	21.25
0.96	3.50	1.02	9.50	2.56	15.50	2.40	21.50
0.96	3.75	1.06	9.75	2.88	15.75	2.40	21.75
0.96	4.00	1.02	10.00	2.88	16.00	2.40	22.00
0.96	4.25	1.28	10.25	3.68	16.25	1.44	22.25
0.96	4.50	1.28	10.50	3.68	16.50	1.44	22.50
0.96	4.75	1.28	10.75	4.96	16.75	1.44	22.75
0.96	5.00	1.28	11.00	4.96	17.00	1.44	23.00
0.96	5.25	1.28	11.25	7.68	17.25	1.44	23.25
0.96	5.50	1.28	11.50	7.68	17.50	1.44	23.50
0.96	5.75	1.28	11.75	33.26	17.75	1.44	23.75
0.96	6.00	1.28	12.00	88.28	18.00	1.44	24.00

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| CALIB                        |                    |
| NASHYD    ( 0101) |    Area    (ha)=    4.12    Curve Number    (CN)= 75.0

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|ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00  
 ----- U.H. Tp(hrs)= 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

		---- TRANSFORMED HYETOGRAPH ----													
RAIN		TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME							
mm/hr		hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs							
1.44	0.033	0.90	6.033	0.00	12.033	11.51	18.03	1.44	0.733	0.90	6.733	0.00	12.733	5.92	18.73
1.44	0.067	0.90	6.067	0.00	12.067	11.51	18.07	1.44	0.767	0.88	6.767	0.00	12.767	5.92	18.77
1.44	0.100	0.90	6.100	0.00	12.100	11.51	18.10	1.44	0.800	0.86	6.800	0.00	12.800	5.92	18.80
1.44	0.133	0.90	6.133	0.00	12.133	11.51	18.13	1.44	0.833	0.86	6.833	0.00	12.833	5.92	18.83
1.44	0.167	0.90	6.167	0.00	12.167	11.51	18.17	1.44	0.867	0.86	6.867	0.00	12.867	5.92	18.87
1.44	0.200	0.90	6.200	0.00	12.200	11.51	18.20	1.44	0.900	0.86	6.900	0.00	12.900	5.92	18.90
1.44	0.233	0.90	6.233	0.00	12.233	11.51	18.23	1.44	0.933	0.86	6.933	0.00	12.933	5.92	18.93
1.44	0.267	0.88	6.267	0.00	12.267	11.51	18.27	1.44	0.967	0.86	6.967	0.00	12.967	5.92	18.97
1.44	0.300	0.86	6.300	0.00	12.300	11.51	18.30	1.44	1.000	0.86	7.000	0.00	13.000	5.91	19.00
1.44	0.333	0.86	6.333	0.00	12.333	11.51	18.33	1.44	1.033	0.90	7.033	3.20	13.033	1.12	19.03
1.44	0.367	0.86	6.367	0.00	12.367	11.51	18.37	1.44	1.067	0.90	7.067	3.20	13.067	1.12	19.07
1.44	0.400	0.86	6.400	0.00	12.400	11.51	18.40	1.44	1.100	0.90	7.100	3.20	13.100	1.12	19.10
1.44	0.433	0.86	6.433	0.00	12.433	11.51	18.43	1.44	1.133	0.90	7.133	3.20	13.133	1.12	19.13
1.44	0.467	0.86	6.467	0.00	12.467	11.51	18.47	1.44	1.167	0.90	7.167	3.20	13.167	1.12	19.17
1.44	0.500	0.86	6.500	0.00	12.500	11.51	18.50	1.44	1.200	0.90	7.200	3.20	13.200	1.12	19.20
1.44	0.533	0.90	6.533	0.00	12.533	5.92	18.53	1.44	1.233	0.90	7.233	3.20	13.233	1.12	19.23
1.44	0.567	0.90	6.567	0.00	12.567	5.92	18.57	1.44	1.267	0.88	7.267	3.20	13.267	1.12	19.27
1.44	0.600	0.90	6.600	0.00	12.600	5.92	18.60	1.44	1.300	0.86	7.300	3.20	13.300	1.12	19.30
1.44	0.633	0.90	6.633	0.00	12.633	5.92	18.63	1.44	1.333	0.86	7.333	3.20	13.333	1.12	19.33
1.44	0.667	0.90	6.667	0.00	12.667	5.92	18.67	1.44	1.367	0.86	7.367	3.20	13.367	1.12	19.37
1.44	0.700	0.90	6.700	0.00	12.700	5.92	18.70	1.44	1.400	0.86	7.400	3.20	13.400	1.12	19.40
1.44								1.44	1.433	0.86	7.433	3.20	13.433	1.12	19.43
								1.44	1.467	0.86	7.467	3.20	13.467	1.12	19.47
								1.44	1.500	0.86	7.500	3.20	13.500	1.13	19.50
								1.44	1.533	0.90	7.533	3.20	13.533	6.56	19.53
								1.44	1.567	0.90	7.567	3.20	13.567	6.56	19.57
								1.44	1.600	0.90	7.600	3.20	13.600	6.56	19.60
								1.44							

1.44	1.633	0.90		7.633	3.20		13.633	6.56		19.63	0.96	2.533	1.06		8.533	4.32		14.533	2.40		20.53
1.44	1.667	0.90		7.667	3.20		13.667	6.56		19.67	0.96	2.567	1.06		8.567	4.32		14.567	2.40		20.57
1.44	1.700	0.90		7.700	3.20		13.700	6.56		19.70	0.96	2.600	1.06		8.600	4.32		14.600	2.40		20.60
1.44	1.733	0.90		7.733	3.20		13.733	6.56		19.73	0.96	2.633	1.06		8.633	4.32		14.633	2.40		20.63
1.44	1.767	0.88		7.767	3.20		13.767	6.56		19.77	0.96	2.667	1.06		8.667	4.32		14.667	2.40		20.67
1.44	1.800	0.86		7.800	3.20		13.800	6.56		19.80	0.96	2.700	1.06		8.700	4.32		14.700	2.40		20.70
1.44	1.833	0.86		7.833	3.20		13.833	6.56		19.83	0.96	2.733	1.06		8.733	4.32		14.733	2.40		20.73
1.44	1.867	0.86		7.867	3.20		13.867	6.56		19.87	0.96	2.767	1.04		8.767	4.32		14.767	2.40		20.77
1.44	1.900	0.86		7.900	3.20		13.900	6.56		19.90	0.96	2.800	1.02		8.800	4.32		14.800	2.40		20.80
1.44	1.933	0.86		7.933	3.20		13.933	6.56		19.93	0.96	2.833	1.02		8.833	4.32		14.833	2.40		20.83
1.44	1.967	0.86		7.967	3.20		13.967	6.56		19.97	0.96	2.867	1.02		8.867	4.32		14.867	2.40		20.87
1.44	2.000	0.86		8.000	3.20		14.000	6.55		20.00	0.96	2.900	1.02		8.900	4.32		14.900	2.40		20.90
0.96	2.033	1.06		8.033	0.00		14.033	2.40		20.03	0.96	2.933	1.02		8.933	4.32		14.933	2.40		20.93
0.96	2.067	1.06		8.067	0.00		14.067	2.40		20.07	0.96	2.967	1.02		8.967	4.32		14.967	2.40		20.97
0.96	2.100	1.06		8.100	0.00		14.100	2.40		20.10	0.96	3.000	1.02		9.000	4.32		15.000	2.40		21.00
0.96	2.133	1.06		8.133	0.00		14.133	2.40		20.13	0.96	3.033	1.06		9.033	2.56		15.033	2.40		21.03
0.96	2.167	1.06		8.167	0.00		14.167	2.40		20.17	0.96	3.067	1.06		9.067	2.56		15.067	2.40		21.07
0.96	2.200	1.06		8.200	0.00		14.200	2.40		20.20	0.96	3.100	1.06		9.100	2.56		15.100	2.40		21.10
0.96	2.233	1.06		8.233	0.00		14.233	2.40		20.23	0.96	3.133	1.06		9.133	2.56		15.133	2.40		21.13
0.96	2.267	1.04		8.267	0.00		14.267	2.40		20.27	0.96	3.167	1.06		9.167	2.56		15.167	2.40		21.17
0.96	2.300	1.02		8.300	0.00		14.300	2.40		20.30	0.96	3.200	1.06		9.200	2.56		15.200	2.40		21.20
0.96	2.333	1.02		8.333	0.00		14.333	2.40		20.33	0.96	3.233	1.06		9.233	2.56		15.233	2.40		21.23
0.96	2.367	1.02		8.367	0.00		14.367	2.40		20.37	0.96	3.267	1.04		9.267	2.56		15.267	2.40		21.27
0.96	2.400	1.02		8.400	0.00		14.400	2.40		20.40	0.96	3.300	1.02		9.300	2.56		15.300	2.40		21.30
0.96	2.433	1.02		8.433	0.00		14.433	2.40		20.43	0.96	3.333	1.02		9.333	2.56		15.333	2.40		21.33
0.96	2.467	1.02		8.467	0.00		14.467	2.40		20.47	0.96	3.367	1.02		9.367	2.56		15.367	2.40		21.37
0.96	2.500	1.02		8.500	0.00		14.500	2.40		20.50	0.96	3.400	1.02		9.400	2.56		15.400	2.40		21.40

0.96	3.433	1.02   9.433	2.56  15.433	2.40   21.43
0.96	3.467	1.02   9.467	2.56  15.467	2.40   21.47
0.96	3.500	1.02   9.500	2.56  15.500	2.40   21.50
0.96	3.533	1.06   9.533	2.88  15.533	2.40   21.53
0.96	3.567	1.06   9.567	2.88  15.567	2.40   21.57
0.96	3.600	1.06   9.600	2.88  15.600	2.40   21.60
0.96	3.633	1.06   9.633	2.88  15.633	2.40   21.63
0.96	3.667	1.06   9.667	2.88  15.667	2.40   21.67
0.96	3.700	1.06   9.700	2.88  15.700	2.40   21.70
0.96	3.733	1.06   9.733	2.88  15.733	2.40   21.73
0.96	3.767	1.04   9.767	2.88  15.767	2.40   21.77
0.96	3.800	1.02   9.800	2.88  15.800	2.40   21.80
0.96	3.833	1.02   9.833	2.88  15.833	2.40   21.83
0.96	3.867	1.02   9.867	2.88  15.867	2.40   21.87
0.96	3.900	1.02   9.900	2.88  15.900	2.40   21.90
0.96	3.933	1.02   9.933	2.88  15.933	2.40   21.93
0.96	3.967	1.02   9.967	2.88  15.967	2.40   21.97
0.96	4.000	1.02  10.000	2.88  16.000	2.40   22.00
0.96	4.033	1.28  10.033	3.68  16.033	1.44   22.03
0.96	4.067	1.28  10.067	3.68  16.067	1.44   22.07
0.96	4.100	1.28  10.100	3.68  16.100	1.44   22.10
0.96	4.133	1.28  10.133	3.68  16.133	1.44   22.13
0.96	4.167	1.28  10.167	3.68  16.167	1.44   22.17
0.96	4.200	1.28  10.200	3.68  16.200	1.44   22.20
0.96	4.233	1.28  10.233	3.68  16.233	1.44   22.23
0.96	4.267	1.28  10.267	3.68  16.267	1.44   22.27
0.96	4.300	1.28  10.300	3.68  16.300	1.44   22.30

0.96	4.333	1.28  10.333	3.68  16.333	1.44   22.33
0.96	4.367	1.28  10.367	3.68  16.367	1.44   22.37
0.96	4.400	1.28  10.400	3.68  16.400	1.44   22.40
0.96	4.433	1.28  10.433	3.68  16.433	1.44   22.43
0.96	4.467	1.28  10.467	3.68  16.467	1.44   22.47
0.96	4.500	1.28  10.500	3.68  16.500	1.44   22.50
0.96	4.533	1.28  10.533	4.96  16.533	1.44   22.53
0.96	4.567	1.28  10.567	4.96  16.567	1.44   22.57
0.96	4.600	1.28  10.600	4.96  16.600	1.44   22.60
0.96	4.633	1.28  10.633	4.96  16.633	1.44   22.63
0.96	4.667	1.28  10.667	4.96  16.667	1.44   22.67
0.96	4.700	1.28  10.700	4.96  16.700	1.44   22.70
0.96	4.733	1.28  10.733	4.96  16.733	1.44   22.73
0.96	4.767	1.28  10.767	4.96  16.767	1.44   22.77
0.96	4.800	1.28  10.800	4.96  16.800	1.44   22.80
0.96	4.833	1.28  10.833	4.96  16.833	1.44   22.83
0.96	4.867	1.28  10.867	4.96  16.867	1.44   22.87
0.96	4.900	1.28  10.900	4.96  16.900	1.44   22.90
0.96	4.933	1.28  10.933	4.96  16.933	1.44   22.93
0.96	4.967	1.28  10.967	4.96  16.967	1.44   22.97
0.96	5.000	1.28  11.000	4.96  17.000	1.44   23.00
0.96	5.033	1.28  11.033	7.68  17.033	1.44   23.03
0.96	5.067	1.28  11.067	7.68  17.067	1.44   23.07
0.96	5.100	1.28  11.100	7.68  17.100	1.44   23.10
0.96	5.133	1.28  11.133	7.68  17.133	1.44   23.13
0.96	5.167	1.28  11.167	7.68  17.167	1.44   23.17
0.96	5.200	1.28  11.200	7.68  17.200	1.44   23.20

0.96 5.233 1.28 |11.233 7.68 |17.233 1.44 | 23.23  
0.96 5.267 1.28 |11.267 7.68 |17.267 1.44 | 23.27  
0.96 5.300 1.28 |11.300 7.68 |17.300 1.44 | 23.30  
0.96 5.333 1.28 |11.333 7.68 |17.333 1.44 | 23.33  
0.96 5.367 1.28 |11.367 7.68 |17.367 1.44 | 23.37  
0.96 5.400 1.28 |11.400 7.68 |17.400 1.44 | 23.40  
0.96 5.433 1.28 |11.433 7.68 |17.433 1.44 | 23.43  
0.96 5.467 1.28 |11.467 7.68 |17.467 1.44 | 23.47  
0.96 5.500 1.28 |11.500 7.71 |17.500 1.44 | 23.50  
0.96 5.533 1.28 |11.533 33.26 |17.533 1.44 | 23.53  
0.96 5.567 1.28 |11.567 33.26 |17.567 1.44 | 23.57  
0.96 5.600 1.28 |11.600 33.26 |17.600 1.44 | 23.60  
0.96 5.633 1.28 |11.633 33.26 |17.633 1.44 | 23.63  
0.96 5.667 1.28 |11.667 33.26 |17.667 1.44 | 23.67  
0.96 5.700 1.28 |11.700 33.26 |17.700 1.44 | 23.70  
0.96 5.733 1.28 |11.733 33.26 |17.733 1.44 | 23.73  
0.96 5.767 1.28 |11.767 60.84 |17.767 1.44 | 23.77  
0.96 5.800 1.28 |11.800 88.28 |17.800 1.44 | 23.80  
0.96 5.833 1.28 |11.833 88.28 |17.833 1.44 | 23.83  
0.96 5.867 1.28 |11.867 88.28 |17.867 1.44 | 23.87  
0.96 5.900 1.28 |11.900 88.28 |17.900 1.44 | 23.90  
0.96 5.933 1.28 |11.933 88.28 |17.933 1.44 | 23.93  
0.96 5.967 1.28 |11.967 88.28 |17.967 1.44 | 23.97  
0.96 6.000 1.28 |12.000 88.17 |18.000 1.44 | 24.00

Unit Hyd Qpeak (cms)= 0.366  
PEAK FLOW (cms)= 0.207 (i)  
TIME TO PEAK (hrs)= 12.333  
RUNOFF VOLUME (mm)= 34.197

TOTAL RAINFALL (mm)= 79.959  
RUNOFF COEFFICIENT = 0.428

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

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| CALIB |  
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0  
| ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00  
----- U.H. Tp(hrs)= 0.16

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.407 (i)  
TIME TO PEAK (hrs)= 12.067  
RUNOFF VOLUME (mm)= 40.024  
TOTAL RAINFALL (mm)= 79.959  
RUNOFF COEFFICIENT = 0.501

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

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-----  
| CALIB |  
| NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0  
| ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00  
----- U.H. Tp(hrs)= 0.12

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.310 (i)  
TIME TO PEAK (hrs)= 12.033  
RUNOFF VOLUME (mm)= 40.724  
TOTAL RAINFALL (mm)= 79.959  
RUNOFF COEFFICIENT = 0.509

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

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V V I SSSSS U U A L (v 6.0.2001)  
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  
 6.0\VO2\voain.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\b4439f16-a6c3-4983-9a08-b989c29b89e7\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\b4439f16-a6c3-4983-9a08-b989c29b89e7\s

DATE: 02/22/2021 TIME: 03:09:34

USER:

COMMENTS: \_\_\_\_\_

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\*\*\*\*\*  
 \*\* SIMULATION : Run 04 \*\*  
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-----  
 | MASS STORM | Filename: C:\Users\mmacdonald\AppData  
 | | ata\Local\Temp\  
 | | 7d6438e7-05a4-431a-956f-  
 0ab001e613ed\da15e4b2  
 | Ptotal= 93.38 mm | Comments: SCS 24 HOUR TYPE II STORM DISTRIBUTION  
 1

Duration of storm = 24.00 hrs  
 Mass curve time step = 15.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.68	0.25	1.05	6.25	0.00	12.25	13.45	18.25
1.68	0.50	1.01	6.50	0.00	12.50	13.45	18.50

1.68	0.75	1.05	6.75	0.00	12.75	6.91	18.75
1.68	1.00	1.01	7.00	0.00	13.00	6.91	19.00
1.68	1.25	1.05	7.25	3.74	13.25	1.31	19.25
1.68	1.50	1.01	7.50	3.74	13.50	1.31	19.50
1.68	1.75	1.05	7.75	3.74	13.75	7.66	19.75
1.68	2.00	1.01	8.00	3.74	14.00	7.66	20.00
1.12	2.25	1.23	8.25	0.00	14.25	2.80	20.25
1.12	2.50	1.20	8.50	0.00	14.50	2.80	20.50
1.12	2.75	1.23	8.75	5.04	14.75	2.80	20.75
1.12	3.00	1.20	9.00	5.04	15.00	2.80	21.00
1.12	3.25	1.23	9.25	2.99	15.25	2.80	21.25
1.12	3.50	1.20	9.50	2.99	15.50	2.80	21.50
1.12	3.75	1.23	9.75	3.36	15.75	2.80	21.75
1.12	4.00	1.20	10.00	3.36	16.00	2.80	22.00
1.12	4.25	1.49	10.25	4.30	16.25	1.68	22.25
1.12	4.50	1.49	10.50	4.30	16.50	1.68	22.50
1.12	4.75	1.49	10.75	5.79	16.75	1.68	22.75
1.12	5.00	1.49	11.00	5.79	17.00	1.68	23.00
1.12	5.25	1.49	11.25	8.96	17.25	1.68	23.25
1.12	5.50	1.49	11.50	8.96	17.50	1.68	23.50
1.12	5.75	1.49	11.75	38.85	17.75	1.68	23.75
1.12	6.00	1.49	12.00	103.09	18.00	1.68	24.00

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| CALIB |  
 | NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0  
 | ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00  
 ----- U.H. Tp(hrs)= 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.



---- TRANSFORMED HYETOGRAPH ----											
RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME		
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs		
1.68	0.033	1.05	6.033	0.00	12.033	13.45	18.03	0.800	1.01   6.800	0.00   12.800	6.91   18.80
1.68	0.067	1.05	6.067	0.00	12.067	13.45	18.07	0.833	1.01   6.833	0.00   12.833	6.91   18.83
1.68	0.100	1.05	6.100	0.00	12.100	13.45	18.10	0.867	1.01   6.867	0.00   12.867	6.91   18.87
1.68	0.133	1.05	6.133	0.00	12.133	13.45	18.13	0.900	1.01   6.900	0.00   12.900	6.91   18.90
1.68	0.167	1.05	6.167	0.00	12.167	13.45	18.17	0.933	1.01   6.933	0.00   12.933	6.91   18.93
1.68	0.200	1.05	6.200	0.00	12.200	13.45	18.20	0.967	1.01   6.967	0.00   12.967	6.91   18.97
1.68	0.233	1.05	6.233	0.00	12.233	13.45	18.23	1.000	1.01   7.000	0.00   13.000	6.90   19.00
1.68	0.267	1.03	6.267	0.00	12.267	13.45	18.27	1.033	1.05   7.033	3.73   13.033	1.31   19.03
1.68	0.300	1.01	6.300	0.00	12.300	13.45	18.30	1.067	1.05   7.067	3.74   13.067	1.31   19.07
1.68	0.333	1.01	6.333	0.00	12.333	13.45	18.33	1.100	1.05   7.100	3.74   13.100	1.31   19.10
1.68	0.367	1.01	6.367	0.00	12.367	13.45	18.37	1.133	1.05   7.133	3.74   13.133	1.31   19.13
1.68	0.400	1.01	6.400	0.00	12.400	13.45	18.40	1.167	1.05   7.167	3.74   13.167	1.31   19.17
1.68	0.433	1.01	6.433	0.00	12.433	13.45	18.43	1.200	1.05   7.200	3.74   13.200	1.31   19.20
1.68	0.467	1.01	6.467	0.00	12.467	13.45	18.47	1.233	1.05   7.233	3.74   13.233	1.31   19.23
1.68	0.500	1.01	6.500	0.00	12.500	13.44	18.50	1.267	1.03   7.267	3.74   13.267	1.31   19.27
1.68	0.533	1.05	6.533	0.00	12.533	6.91	18.53	1.300	1.01   7.300	3.74   13.300	1.31   19.30
1.68	0.567	1.05	6.567	0.00	12.567	6.91	18.57	1.333	1.01   7.333	3.74   13.333	1.31   19.33
1.68	0.600	1.05	6.600	0.00	12.600	6.91	18.60	1.367	1.01   7.367	3.74   13.367	1.31   19.37
1.68	0.633	1.05	6.633	0.00	12.633	6.91	18.63	1.400	1.01   7.400	3.74   13.400	1.31   19.40
1.68	0.667	1.05	6.667	0.00	12.667	6.91	18.67	1.433	1.01   7.433	3.74   13.433	1.31   19.43
1.68	0.700	1.05	6.700	0.00	12.700	6.91	18.70	1.467	1.01   7.467	3.74   13.467	1.31   19.47
1.68	0.733	1.05	6.733	0.00	12.733	6.91	18.73	1.500	1.01   7.500	3.74   13.500	1.32   19.50
1.68	0.767	1.03	6.767	0.00	12.767	6.91	18.77	1.533	1.05   7.533	3.74   13.533	7.66   19.53
1.68								1.567	1.05   7.567	3.74   13.567	7.66   19.57
								1.600	1.05   7.600	3.74   13.600	7.66   19.60
								1.633	1.05   7.633	3.74   13.633	7.66   19.63
								1.667	1.05   7.667	3.74   13.667	7.66   19.67

1.68	1.700	1.05   7.700	3.74  13.700	7.66   19.70	1.12	2.600	1.23   8.600	5.04  14.600	2.80   20.60
1.68	1.733	1.05   7.733	3.74  13.733	7.66   19.73	1.12	2.633	1.23   8.633	5.04  14.633	2.80   20.63
1.68	1.767	1.03   7.767	3.74  13.767	7.66   19.77	1.12	2.667	1.23   8.667	5.04  14.667	2.80   20.67
1.68	1.800	1.01   7.800	3.74  13.800	7.66   19.80	1.12	2.700	1.23   8.700	5.04  14.700	2.80   20.70
1.68	1.833	1.01   7.833	3.74  13.833	7.66   19.83	1.12	2.733	1.23   8.733	5.04  14.733	2.80   20.73
1.68	1.867	1.01   7.867	3.74  13.867	7.66   19.87	1.12	2.767	1.21   8.767	5.04  14.767	2.80   20.77
1.68	1.900	1.01   7.900	3.74  13.900	7.66   19.90	1.12	2.800	1.20   8.800	5.04  14.800	2.80   20.80
1.68	1.933	1.01   7.933	3.74  13.933	7.66   19.93	1.12	2.833	1.20   8.833	5.04  14.833	2.80   20.83
1.68	1.967	1.01   7.967	3.74  13.967	7.66   19.97	1.12	2.867	1.20   8.867	5.04  14.867	2.80   20.87
1.68	2.000	1.01   8.000	3.74  14.000	7.65   20.00	1.12	2.900	1.20   8.900	5.04  14.900	2.80   20.90
1.12	2.033	1.23   8.033	0.00  14.033	2.80   20.03	1.12	2.933	1.20   8.933	5.04  14.933	2.80   20.93
1.12	2.067	1.23   8.067	0.00  14.067	2.80   20.07	1.12	2.967	1.20   8.967	5.04  14.967	2.80   20.97
1.12	2.100	1.23   8.100	0.00  14.100	2.80   20.10	1.12	3.000	1.20   9.000	5.04  15.000	2.80   21.00
1.12	2.133	1.23   8.133	0.00  14.133	2.80   20.13	1.12	3.033	1.23   9.033	2.99  15.033	2.80   21.03
1.12	2.167	1.23   8.167	0.00  14.167	2.80   20.17	1.12	3.067	1.23   9.067	2.99  15.067	2.80   21.07
1.12	2.200	1.23   8.200	0.00  14.200	2.80   20.20	1.12	3.100	1.23   9.100	2.99  15.100	2.80   21.10
1.12	2.233	1.23   8.233	0.00  14.233	2.80   20.23	1.12	3.133	1.23   9.133	2.99  15.133	2.80   21.13
1.12	2.267	1.21   8.267	0.00  14.267	2.80   20.27	1.12	3.167	1.23   9.167	2.99  15.167	2.80   21.17
1.12	2.300	1.20   8.300	0.00  14.300	2.80   20.30	1.12	3.200	1.23   9.200	2.99  15.200	2.80   21.20
1.12	2.333	1.20   8.333	0.00  14.333	2.80   20.33	1.12	3.233	1.23   9.233	2.99  15.233	2.80   21.23
1.12	2.367	1.20   8.367	0.00  14.367	2.80   20.37	1.12	3.267	1.21   9.267	2.99  15.267	2.80   21.27
1.12	2.400	1.20   8.400	0.00  14.400	2.80   20.40	1.12	3.300	1.20   9.300	2.99  15.300	2.80   21.30
1.12	2.433	1.20   8.433	0.00  14.433	2.80   20.43	1.12	3.333	1.20   9.333	2.99  15.333	2.80   21.33
1.12	2.467	1.20   8.467	0.00  14.467	2.80   20.47	1.12	3.367	1.20   9.367	2.99  15.367	2.80   21.37
1.12	2.500	1.20   8.500	0.00  14.500	2.80   20.50	1.12	3.400	1.20   9.400	2.99  15.400	2.80   21.40
1.12	2.533	1.23   8.533	5.04  14.533	2.80   20.53	1.12	3.433	1.20   9.433	2.99  15.433	2.80   21.43
1.12	2.567	1.23   8.567	5.04  14.567	2.80   20.57	1.12	3.467	1.20   9.467	2.99  15.467	2.80   21.47

1.12 3.500 1.20 | 9.500 2.99 |15.500 2.80 | 21.50  
1.12 3.533 1.23 | 9.533 3.36 |15.533 2.80 | 21.53  
1.12 3.567 1.23 | 9.567 3.36 |15.567 2.80 | 21.57  
1.12 3.600 1.23 | 9.600 3.36 |15.600 2.80 | 21.60  
1.12 3.633 1.23 | 9.633 3.36 |15.633 2.80 | 21.63  
1.12 3.667 1.23 | 9.667 3.36 |15.667 2.80 | 21.67  
1.12 3.700 1.23 | 9.700 3.36 |15.700 2.80 | 21.70  
1.12 3.733 1.23 | 9.733 3.36 |15.733 2.80 | 21.73  
1.12 3.767 1.21 | 9.767 3.36 |15.767 2.80 | 21.77  
1.12 3.800 1.20 | 9.800 3.36 |15.800 2.80 | 21.80  
1.12 3.833 1.20 | 9.833 3.36 |15.833 2.80 | 21.83  
1.12 3.867 1.20 | 9.867 3.36 |15.867 2.80 | 21.87  
1.12 3.900 1.20 | 9.900 3.36 |15.900 2.80 | 21.90  
1.12 3.933 1.20 | 9.933 3.36 |15.933 2.80 | 21.93  
1.12 3.967 1.20 | 9.967 3.36 |15.967 2.80 | 21.97  
1.12 4.000 1.20 |10.000 3.36 |16.000 2.80 | 22.00  
1.12 4.033 1.49 |10.033 4.30 |16.033 1.68 | 22.03  
1.12 4.067 1.49 |10.067 4.30 |16.067 1.68 | 22.07  
1.12 4.100 1.49 |10.100 4.30 |16.100 1.68 | 22.10  
1.12 4.133 1.49 |10.133 4.30 |16.133 1.68 | 22.13  
1.12 4.167 1.49 |10.167 4.30 |16.167 1.68 | 22.17  
1.12 4.200 1.49 |10.200 4.30 |16.200 1.68 | 22.20  
1.12 4.233 1.49 |10.233 4.30 |16.233 1.68 | 22.23  
1.12 4.267 1.49 |10.267 4.30 |16.267 1.68 | 22.27  
1.12 4.300 1.49 |10.300 4.30 |16.300 1.68 | 22.30  
1.12 4.333 1.49 |10.333 4.30 |16.333 1.68 | 22.33  
1.12 4.367 1.49 |10.367 4.30 |16.367 1.68 | 22.37

1.12 4.400 1.49 |10.400 4.30 |16.400 1.68 | 22.40  
1.12 4.433 1.49 |10.433 4.30 |16.433 1.68 | 22.43  
1.12 4.467 1.49 |10.467 4.30 |16.467 1.68 | 22.47  
1.12 4.500 1.49 |10.500 4.30 |16.500 1.68 | 22.50  
1.12 4.533 1.49 |10.533 5.79 |16.533 1.68 | 22.53  
1.12 4.567 1.49 |10.567 5.79 |16.567 1.68 | 22.57  
1.12 4.600 1.49 |10.600 5.79 |16.600 1.68 | 22.60  
1.12 4.633 1.49 |10.633 5.79 |16.633 1.68 | 22.63  
1.12 4.667 1.49 |10.667 5.79 |16.667 1.68 | 22.67  
1.12 4.700 1.49 |10.700 5.79 |16.700 1.68 | 22.70  
1.12 4.733 1.49 |10.733 5.79 |16.733 1.68 | 22.73  
1.12 4.767 1.49 |10.767 5.79 |16.767 1.68 | 22.77  
1.12 4.800 1.49 |10.800 5.79 |16.800 1.68 | 22.80  
1.12 4.833 1.49 |10.833 5.79 |16.833 1.68 | 22.83  
1.12 4.867 1.49 |10.867 5.79 |16.867 1.68 | 22.87  
1.12 4.900 1.49 |10.900 5.79 |16.900 1.68 | 22.90  
1.12 4.933 1.49 |10.933 5.79 |16.933 1.68 | 22.93  
1.12 4.967 1.49 |10.967 5.79 |16.967 1.68 | 22.97  
1.12 5.000 1.49 |11.000 5.79 |17.000 1.68 | 23.00  
1.12 5.033 1.49 |11.033 8.96 |17.033 1.68 | 23.03  
1.12 5.067 1.49 |11.067 8.96 |17.067 1.68 | 23.07  
1.12 5.100 1.49 |11.100 8.96 |17.100 1.68 | 23.10  
1.12 5.133 1.49 |11.133 8.96 |17.133 1.68 | 23.13  
1.12 5.167 1.49 |11.167 8.96 |17.167 1.68 | 23.17  
1.12 5.200 1.49 |11.200 8.96 |17.200 1.68 | 23.20  
1.12 5.233 1.49 |11.233 8.96 |17.233 1.68 | 23.23  
1.12 5.267 1.49 |11.267 8.96 |17.267 1.68 | 23.27

1.12 5.300 1.49 |11.300 8.96 |17.300 1.68 | 23.30  
 1.12 5.333 1.49 |11.333 8.96 |17.333 1.68 | 23.33  
 1.12 5.367 1.49 |11.367 8.96 |17.367 1.68 | 23.37  
 1.12 5.400 1.49 |11.400 8.96 |17.400 1.68 | 23.40  
 1.12 5.433 1.49 |11.433 8.96 |17.433 1.68 | 23.43  
 1.12 5.467 1.49 |11.467 8.96 |17.467 1.68 | 23.47  
 1.12 5.500 1.49 |11.500 9.00 |17.500 1.68 | 23.50  
 1.12 5.533 1.49 |11.533 38.85 |17.533 1.68 | 23.53  
 1.12 5.567 1.49 |11.567 38.85 |17.567 1.68 | 23.57  
 1.12 5.600 1.49 |11.600 38.85 |17.600 1.68 | 23.60  
 1.12 5.633 1.49 |11.633 38.85 |17.633 1.68 | 23.63  
 1.12 5.667 1.49 |11.667 38.85 |17.667 1.68 | 23.67  
 1.12 5.700 1.49 |11.700 38.85 |17.700 1.68 | 23.70  
 1.12 5.733 1.49 |11.733 38.85 |17.733 1.68 | 23.73  
 1.12 5.767 1.49 |11.767 71.05 |17.767 1.68 | 23.77  
 1.12 5.800 1.49 |11.800 103.09 |17.800 1.68 | 23.80  
 1.12 5.833 1.49 |11.833 103.09 |17.833 1.68 | 23.83  
 1.12 5.867 1.49 |11.867 103.09 |17.867 1.68 | 23.87  
 1.12 5.900 1.49 |11.900 103.09 |17.900 1.68 | 23.90  
 1.12 5.933 1.49 |11.933 103.09 |17.933 1.68 | 23.93  
 1.12 5.967 1.49 |11.967 103.09 |17.967 1.68 | 23.97  
 1.12 6.000 1.49 |12.000 102.97 |18.000 1.68 | 24.00

Unit Hyd Qpeak (cms)= 0.366  
 PEAK FLOW (cms)= 0.269 (i)  
 TIME TO PEAK (hrs)= 12.333  
 RUNOFF VOLUME (mm)= 44.075  
 TOTAL RAINFALL (mm)= 93.379  
 RUNOFF COEFFICIENT = 0.472

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

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| CALIB |
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00
-----
U.H. Tp (hrs)= 0.16
  
```

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.517 (i)  
 TIME TO PEAK (hrs)= 12.067  
 RUNOFF VOLUME (mm)= 50.845  
 TOTAL RAINFALL (mm)= 93.379  
 RUNOFF COEFFICIENT = 0.545

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

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-----
| CALIB |
| NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0
| ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00
-----
U.H. Tp (hrs)= 0.12
  
```

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.392 (i)  
 TIME TO PEAK (hrs)= 12.033  
 RUNOFF VOLUME (mm)= 51.574  
 TOTAL RAINFALL (mm)= 93.379  
 RUNOFF COEFFICIENT = 0.552

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

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V V I SSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLL

OOO TTTT TTTT 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
6.0\VO2\voin.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\30e417ee-553a-4eal-91db-462286001a56\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\30e417ee-553a-4eal-91db-462286001a56\s

DATE: 02/22/2021 TIME: 03:09:34

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*
\*\* SIMULATION : Run 05 \*\*
\*\*\*\*\*

-----
| MASS STORM | Filename: C:\Users\mmacdonald\AppData
| | ata\Local\Temp\
| | 7d6438e7-05a4-431a-956f-
0ab001e613ed\0ad1c211
| Ptotal=100.95 mm | Comments: SCS 24 HOUR TYPE II STORM DISTRIBUTION
1

-----
Duration of storm = 24.00 hrs
Mass curve time step = 15.00 min

Table with 8 columns: RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME. Rows show rainfall intensity (mm/hr) and time intervals (hrs).

Table with 8 columns: RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME. Rows show rainfall intensity (mm/hr) and time intervals (hrs) for a different simulation run.

-----
| CALIB |
| NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0
| ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME		
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs		
1.82	0.033	1.13	6.033	0.00	12.033	14.54	18.03	1.82	0.867	1.09	6.867	0.00	12.867	7.47	18.87
1.82	0.067	1.13	6.067	0.00	12.067	14.54	18.07	1.82	0.900	1.09	6.900	0.00	12.900	7.47	18.90
1.82	0.100	1.13	6.100	0.00	12.100	14.54	18.10	1.82	0.933	1.09	6.933	0.00	12.933	7.47	18.93
1.82	0.133	1.13	6.133	0.00	12.133	14.54	18.13	1.82	0.967	1.09	6.967	0.00	12.967	7.47	18.97
1.82	0.167	1.13	6.167	0.00	12.167	14.54	18.17	1.82	1.000	1.09	7.000	0.00	13.000	7.46	19.00
1.82	0.200	1.13	6.200	0.00	12.200	14.54	18.20	1.82	1.033	1.13	7.033	4.04	13.033	1.41	19.03
1.82	0.233	1.13	6.233	0.00	12.233	14.54	18.23	1.82	1.067	1.13	7.067	4.04	13.067	1.41	19.07
1.82	0.267	1.11	6.267	0.00	12.267	14.54	18.27	1.82	1.100	1.13	7.100	4.04	13.100	1.41	19.10
1.82	0.300	1.09	6.300	0.00	12.300	14.54	18.30	1.82	1.133	1.13	7.133	4.04	13.133	1.41	19.13
1.82	0.333	1.09	6.333	0.00	12.333	14.54	18.33	1.82	1.167	1.13	7.167	4.04	13.167	1.41	19.17
1.82	0.367	1.09	6.367	0.00	12.367	14.54	18.37	1.82	1.200	1.13	7.200	4.04	13.200	1.41	19.20
1.82	0.400	1.09	6.400	0.00	12.400	14.54	18.40	1.82	1.233	1.13	7.233	4.04	13.233	1.41	19.23
1.82	0.433	1.09	6.433	0.00	12.433	14.54	18.43	1.82	1.267	1.11	7.267	4.04	13.267	1.41	19.27
1.82	0.467	1.09	6.467	0.00	12.467	14.54	18.47	1.82	1.300	1.09	7.300	4.04	13.300	1.41	19.30
1.82	0.500	1.09	6.500	0.00	12.500	14.53	18.50	1.82	1.333	1.09	7.333	4.04	13.333	1.41	19.33
1.82	0.533	1.13	6.533	0.00	12.533	7.47	18.53	1.82	1.367	1.09	7.367	4.04	13.367	1.41	19.37
1.82	0.567	1.13	6.567	0.00	12.567	7.47	18.57	1.82	1.400	1.09	7.400	4.04	13.400	1.41	19.40
1.82	0.600	1.13	6.600	0.00	12.600	7.47	18.60	1.82	1.433	1.09	7.433	4.04	13.433	1.41	19.43
1.82	0.633	1.13	6.633	0.00	12.633	7.47	18.63	1.82	1.467	1.09	7.467	4.04	13.467	1.41	19.47
1.82	0.667	1.13	6.667	0.00	12.667	7.47	18.67	1.82	1.500	1.09	7.500	4.04	13.500	1.43	19.50
1.82	0.700	1.13	6.700	0.00	12.700	7.47	18.70	1.82	1.533	1.13	7.533	4.04	13.533	8.28	19.53
1.82	0.733	1.13	6.733	0.00	12.733	7.47	18.73	1.82	1.567	1.13	7.567	4.04	13.567	8.28	19.57
1.82	0.767	1.11	6.767	0.00	12.767	7.47	18.77	1.82	1.600	1.13	7.600	4.04	13.600	8.28	19.60
1.82	0.800	1.09	6.800	0.00	12.800	7.47	18.80	1.82	1.633	1.13	7.633	4.04	13.633	8.28	19.63
1.82	0.833	1.09	6.833	0.00	12.833	7.47	18.83	1.82	1.667	1.13	7.667	4.04	13.667	8.28	19.67
1.82								1.82	1.700	1.13	7.700	4.04	13.700	8.28	19.70
								1.82	1.733	1.13	7.733	4.04	13.733	8.28	19.73

1.82	1.767	1.11		7.767	4.04		13.767	8.28		19.77	1.21	2.667	1.33		8.667	5.45		14.667	3.03		20.67
1.82	1.800	1.09		7.800	4.04		13.800	8.28		19.80	1.21	2.700	1.33		8.700	5.45		14.700	3.03		20.70
1.82	1.833	1.09		7.833	4.04		13.833	8.28		19.83	1.21	2.733	1.33		8.733	5.45		14.733	3.03		20.73
1.82	1.867	1.09		7.867	4.04		13.867	8.28		19.87	1.21	2.767	1.31		8.767	5.45		14.767	3.03		20.77
1.82	1.900	1.09		7.900	4.04		13.900	8.28		19.90	1.21	2.800	1.29		8.800	5.45		14.800	3.03		20.80
1.82	1.933	1.09		7.933	4.04		13.933	8.28		19.93	1.21	2.833	1.29		8.833	5.45		14.833	3.03		20.83
1.82	1.967	1.09		7.967	4.04		13.967	8.28		19.97	1.21	2.867	1.29		8.867	5.45		14.867	3.03		20.87
1.82	2.000	1.09		8.000	4.04		14.000	8.27		20.00	1.21	2.900	1.29		8.900	5.45		14.900	3.03		20.90
1.21	2.033	1.33		8.033	0.00		14.033	3.03		20.03	1.21	2.933	1.29		8.933	5.45		14.933	3.03		20.93
1.21	2.067	1.33		8.067	0.00		14.067	3.03		20.07	1.21	2.967	1.29		8.967	5.45		14.967	3.03		20.97
1.21	2.100	1.33		8.100	0.00		14.100	3.03		20.10	1.21	3.000	1.29		9.000	5.45		15.000	3.03		21.00
1.21	2.133	1.33		8.133	0.00		14.133	3.03		20.13	1.21	3.033	1.33		9.033	3.23		15.033	3.03		21.03
1.21	2.167	1.33		8.167	0.00		14.167	3.03		20.17	1.21	3.067	1.33		9.067	3.23		15.067	3.03		21.07
1.21	2.200	1.33		8.200	0.00		14.200	3.03		20.20	1.21	3.100	1.33		9.100	3.23		15.100	3.03		21.10
1.21	2.233	1.33		8.233	0.00		14.233	3.03		20.23	1.21	3.133	1.33		9.133	3.23		15.133	3.03		21.13
1.21	2.267	1.31		8.267	0.00		14.267	3.03		20.27	1.21	3.167	1.33		9.167	3.23		15.167	3.03		21.17
1.21	2.300	1.29		8.300	0.00		14.300	3.03		20.30	1.21	3.200	1.33		9.200	3.23		15.200	3.03		21.20
1.21	2.333	1.29		8.333	0.00		14.333	3.03		20.33	1.21	3.233	1.33		9.233	3.23		15.233	3.03		21.23
1.21	2.367	1.29		8.367	0.00		14.367	3.03		20.37	1.21	3.267	1.31		9.267	3.23		15.267	3.03		21.27
1.21	2.400	1.29		8.400	0.00		14.400	3.03		20.40	1.21	3.300	1.29		9.300	3.23		15.300	3.03		21.30
1.21	2.433	1.29		8.433	0.00		14.433	3.03		20.43	1.21	3.333	1.29		9.333	3.23		15.333	3.03		21.33
1.21	2.467	1.29		8.467	0.00		14.467	3.03		20.47	1.21	3.367	1.29		9.367	3.23		15.367	3.03		21.37
1.21	2.500	1.29		8.500	0.00		14.500	3.03		20.50	1.21	3.400	1.29		9.400	3.23		15.400	3.03		21.40
1.21	2.533	1.33		8.533	5.45		14.533	3.03		20.53	1.21	3.433	1.29		9.433	3.23		15.433	3.03		21.43
1.21	2.567	1.33		8.567	5.45		14.567	3.03		20.57	1.21	3.467	1.29		9.467	3.23		15.467	3.03		21.47
1.21	2.600	1.33		8.600	5.45		14.600	3.03		20.60	1.21	3.500	1.29		9.500	3.23		15.500	3.03		21.50
1.21	2.633	1.33		8.633	5.45		14.633	3.03		20.63	1.21	3.533	1.33		9.533	3.63		15.533	3.03		21.53

1.21 3.567 1.33 | 9.567 3.63 |15.567 3.03 | 21.57  
1.21 3.600 1.33 | 9.600 3.63 |15.600 3.03 | 21.60  
1.21 3.633 1.33 | 9.633 3.63 |15.633 3.03 | 21.63  
1.21 3.667 1.33 | 9.667 3.63 |15.667 3.03 | 21.67  
1.21 3.700 1.33 | 9.700 3.63 |15.700 3.03 | 21.70  
1.21 3.733 1.33 | 9.733 3.63 |15.733 3.03 | 21.73  
1.21 3.767 1.31 | 9.767 3.63 |15.767 3.03 | 21.77  
1.21 3.800 1.29 | 9.800 3.63 |15.800 3.03 | 21.80  
1.21 3.833 1.29 | 9.833 3.63 |15.833 3.03 | 21.83  
1.21 3.867 1.29 | 9.867 3.63 |15.867 3.03 | 21.87  
1.21 3.900 1.29 | 9.900 3.63 |15.900 3.03 | 21.90  
1.21 3.933 1.29 | 9.933 3.63 |15.933 3.03 | 21.93  
1.21 3.967 1.29 | 9.967 3.63 |15.967 3.03 | 21.97  
1.21 4.000 1.29 |10.000 3.63 |16.000 3.02 | 22.00  
1.21 4.033 1.62 |10.033 4.64 |16.033 1.82 | 22.03  
1.21 4.067 1.62 |10.067 4.64 |16.067 1.82 | 22.07  
1.21 4.100 1.62 |10.100 4.64 |16.100 1.82 | 22.10  
1.21 4.133 1.62 |10.133 4.64 |16.133 1.82 | 22.13  
1.21 4.167 1.62 |10.167 4.64 |16.167 1.82 | 22.17  
1.21 4.200 1.62 |10.200 4.64 |16.200 1.82 | 22.20  
1.21 4.233 1.62 |10.233 4.64 |16.233 1.82 | 22.23  
1.21 4.267 1.62 |10.267 4.64 |16.267 1.82 | 22.27  
1.21 4.300 1.62 |10.300 4.64 |16.300 1.82 | 22.30  
1.21 4.333 1.62 |10.333 4.64 |16.333 1.82 | 22.33  
1.21 4.367 1.62 |10.367 4.64 |16.367 1.82 | 22.37  
1.21 4.400 1.62 |10.400 4.64 |16.400 1.82 | 22.40  
1.21 4.433 1.62 |10.433 4.64 |16.433 1.82 | 22.43  
1.21

1.21 4.467 1.62 |10.467 4.64 |16.467 1.82 | 22.47  
1.21 4.500 1.62 |10.500 4.65 |16.500 1.82 | 22.50  
1.21 4.533 1.62 |10.533 6.26 |16.533 1.82 | 22.53  
1.21 4.567 1.62 |10.567 6.26 |16.567 1.82 | 22.57  
1.21 4.600 1.62 |10.600 6.26 |16.600 1.82 | 22.60  
1.21 4.633 1.62 |10.633 6.26 |16.633 1.82 | 22.63  
1.21 4.667 1.62 |10.667 6.26 |16.667 1.82 | 22.67  
1.21 4.700 1.62 |10.700 6.26 |16.700 1.82 | 22.70  
1.21 4.733 1.62 |10.733 6.26 |16.733 1.82 | 22.73  
1.21 4.767 1.62 |10.767 6.26 |16.767 1.82 | 22.77  
1.21 4.800 1.62 |10.800 6.26 |16.800 1.82 | 22.80  
1.21 4.833 1.62 |10.833 6.26 |16.833 1.82 | 22.83  
1.21 4.867 1.62 |10.867 6.26 |16.867 1.82 | 22.87  
1.21 4.900 1.62 |10.900 6.26 |16.900 1.82 | 22.90  
1.21 4.933 1.62 |10.933 6.26 |16.933 1.82 | 22.93  
1.21 4.967 1.62 |10.967 6.26 |16.967 1.82 | 22.97  
1.21 5.000 1.62 |11.000 6.26 |17.000 1.82 | 23.00  
1.21 5.033 1.62 |11.033 9.69 |17.033 1.82 | 23.03  
1.21 5.067 1.62 |11.067 9.69 |17.067 1.82 | 23.07  
1.21 5.100 1.62 |11.100 9.69 |17.100 1.82 | 23.10  
1.21 5.133 1.62 |11.133 9.69 |17.133 1.82 | 23.13  
1.21 5.167 1.62 |11.167 9.69 |17.167 1.82 | 23.17  
1.21 5.200 1.62 |11.200 9.69 |17.200 1.82 | 23.20  
1.21 5.233 1.62 |11.233 9.69 |17.233 1.82 | 23.23  
1.21 5.267 1.62 |11.267 9.69 |17.267 1.82 | 23.27  
1.21 5.300 1.62 |11.300 9.69 |17.300 1.82 | 23.30  
1.21 5.333 1.62 |11.333 9.69 |17.333 1.82 | 23.33  
1.21



1.21 5.367 1.62 |11.367 9.69 |17.367 1.82 | 23.37  
 1.21 5.400 1.62 |11.400 9.69 |17.400 1.82 | 23.40  
 1.21 5.433 1.62 |11.433 9.69 |17.433 1.82 | 23.43  
 1.21 5.467 1.62 |11.467 9.69 |17.467 1.82 | 23.47  
 1.21 5.500 1.62 |11.500 9.73 |17.500 1.82 | 23.50  
 1.21 5.533 1.62 |11.533 42.00 |17.533 1.82 | 23.53  
 1.21 5.567 1.62 |11.567 42.00 |17.567 1.82 | 23.57  
 1.21 5.600 1.62 |11.600 42.00 |17.600 1.82 | 23.60  
 1.21 5.633 1.62 |11.633 42.00 |17.633 1.82 | 23.63  
 1.21 5.667 1.62 |11.667 42.00 |17.667 1.82 | 23.67  
 1.21 5.700 1.62 |11.700 42.00 |17.700 1.82 | 23.70  
 1.21 5.733 1.62 |11.733 42.00 |17.733 1.82 | 23.73  
 1.21 5.767 1.62 |11.767 76.81 |17.767 1.82 | 23.77  
 1.21 5.800 1.62 |11.800 111.45 |17.800 1.82 | 23.80  
 1.21 5.833 1.62 |11.833 111.45 |17.833 1.82 | 23.83  
 1.21 5.867 1.62 |11.867 111.45 |17.867 1.82 | 23.87  
 1.21 5.900 1.62 |11.900 111.45 |17.900 1.82 | 23.90  
 1.21 5.933 1.62 |11.933 111.45 |17.933 1.82 | 23.93  
 1.21 5.967 1.62 |11.967 111.45 |17.967 1.82 | 23.97  
 1.21 6.000 1.62 |12.000 111.31 |18.000 1.82 | 24.00

Unit Hyd Qpeak (cms)= 0.366  
 PEAK FLOW (cms)= 0.306 (i)  
 TIME TO PEAK (hrs)= 12.300  
 RUNOFF VOLUME (mm)= 49.881  
 TOTAL RAINFALL (mm)= 100.949  
 RUNOFF COEFFICIENT = 0.494

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

| CALIB |  
 | NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0  
 |ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00  
 ----- U.H. Tp(hrs)= 0.16

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.581 (i)  
 TIME TO PEAK (hrs)= 12.033  
 RUNOFF VOLUME (mm)= 57.142  
 TOTAL RAINFALL (mm)= 100.949  
 RUNOFF COEFFICIENT = 0.566

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

-----  
 -----  
 | CALIB |  
 | NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0  
 |ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00  
 ----- U.H. Tp(hrs)= 0.12

Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.439 (i)  
 TIME TO PEAK (hrs)= 12.033  
 RUNOFF VOLUME (mm)= 57.884  
 TOTAL RAINFALL (mm)= 100.949  
 RUNOFF COEFFICIENT = 0.573

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

-----  
 =====  
 V V I SSSSS U U A L (v 6.0.2001)  
 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 TTTT TTTT H H Y Y M M OOO TM  
 O O T T H H Y Y M M 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  
 6.0\VO2\voin.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\2491f8bb-c06b-4e22-9f52-f9ee4bbe4e90\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\2491f8bb-c06b-4e22-9f52-f9ee4bbe4e90\s

DATE: 02/22/2021 TIME: 03:09:34

USER:

COMMENTS: \_\_\_\_\_

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 \*\* SIMULATION : Run 06 \*\*  
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-----  
 | MASS STORM | Filename: C:\Users\mmacdonald\AppData  
 | | ata\Local\Temp\  
 | | 7d6438e7-05a4-431a-956f-  
 0ab001e613ed\916a0673  
 | Ptotal=109.98 mm |  
 1  
 -----  
 Comments: SCS 24 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 24.00 hrs  
 Mass curve time step = 15.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.98	0.25	1.23	6.25	0.00	12.25	15.84	18.25
1.98	0.50	1.19	6.50	0.00	12.50	15.84	18.50
1.98	0.75	1.23	6.75	0.00	12.75	8.14	18.75
1.98	1.00	1.19	7.00	0.00	13.00	8.14	19.00
1.98	1.25	1.23	7.25	4.40	13.25	1.54	19.25
1.98	1.50	1.19	7.50	4.40	13.50	1.54	19.50

1.98	1.75	1.23	7.75	4.40	13.75	9.02	19.75
1.98	2.00	1.19	8.00	4.40	14.00	9.02	20.00
1.32	2.25	1.45	8.25	0.00	14.25	3.30	20.25
1.32	2.50	1.41	8.50	0.00	14.50	3.30	20.50
1.32	2.75	1.45	8.75	5.94	14.75	3.30	20.75
1.32	3.00	1.41	9.00	5.94	15.00	3.30	21.00
1.32	3.25	1.45	9.25	3.52	15.25	3.30	21.25
1.32	3.50	1.41	9.50	3.52	15.50	3.30	21.50
1.32	3.75	1.45	9.75	3.96	15.75	3.30	21.75
1.32	4.00	1.41	10.00	3.96	16.00	3.30	22.00
1.32	4.25	1.76	10.25	5.06	16.25	1.98	22.25
1.32	4.50	1.76	10.50	5.06	16.50	1.98	22.50
1.32	4.75	1.76	10.75	6.82	16.75	1.98	22.75
1.32	5.00	1.76	11.00	6.82	17.00	1.98	23.00
1.32	5.25	1.76	11.25	10.56	17.25	1.98	23.25
1.32	5.50	1.76	11.50	10.56	17.50	1.98	23.50
1.32	5.75	1.76	11.75	45.75	17.75	1.98	23.75
1.32	6.00	1.76	12.00	121.42	18.00	1.98	24.00

-----  
 | CALIB |  
 | NASHYD ( 0101) | Area (ha)= 4.12 Curve Number (CN)= 75.0  
 | ID= 1 DT= 2.0 min | Ia (mm)= 6.40 # of Linear Res.(N)= 3.00  
 -----  
 U.H. Tp (hrs)= 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.98	0.25	1.23	6.25	0.00	12.25	15.84	18.25
1.98	0.50	1.19	6.50	0.00	12.50	15.84	18.50
1.98	0.75	1.23	6.75	0.00	12.75	8.14	18.75
1.98	1.00	1.19	7.00	0.00	13.00	8.14	19.00
1.98	1.25	1.23	7.25	4.40	13.25	1.54	19.25
1.98	1.50	1.19	7.50	4.40	13.50	1.54	19.50

1.98	0.033	1.23		6.033	0.00	12.033	15.84		18.03
1.98	0.067	1.23		6.067	0.00	12.067	15.84		18.07
1.98	0.100	1.23		6.100	0.00	12.100	15.84		18.10
1.98	0.133	1.23		6.133	0.00	12.133	15.84		18.13
1.98	0.167	1.23		6.167	0.00	12.167	15.84		18.17
1.98	0.200	1.23		6.200	0.00	12.200	15.84		18.20
1.98	0.233	1.23		6.233	0.00	12.233	15.84		18.23
1.98	0.267	1.21		6.267	0.00	12.267	15.84		18.27
1.98	0.300	1.19		6.300	0.00	12.300	15.84		18.30
1.98	0.333	1.19		6.333	0.00	12.333	15.84		18.33
1.98	0.367	1.19		6.367	0.00	12.367	15.84		18.37
1.98	0.400	1.19		6.400	0.00	12.400	15.84		18.40
1.98	0.433	1.19		6.433	0.00	12.433	15.84		18.43
1.98	0.467	1.19		6.467	0.00	12.467	15.84		18.47
1.98	0.500	1.19		6.500	0.00	12.500	15.83		18.50
1.98	0.533	1.23		6.533	0.00	12.533	8.14		18.53
1.98	0.567	1.23		6.567	0.00	12.567	8.14		18.57
1.98	0.600	1.23		6.600	0.00	12.600	8.14		18.60
1.98	0.633	1.23		6.633	0.00	12.633	8.14		18.63
1.98	0.667	1.23		6.667	0.00	12.667	8.14		18.67
1.98	0.700	1.23		6.700	0.00	12.700	8.14		18.70
1.98	0.733	1.23		6.733	0.00	12.733	8.14		18.73
1.98	0.767	1.21		6.767	0.00	12.767	8.14		18.77
1.98	0.800	1.19		6.800	0.00	12.800	8.14		18.80
1.98	0.833	1.19		6.833	0.00	12.833	8.14		18.83
1.98	0.867	1.19		6.867	0.00	12.867	8.14		18.87
1.98	0.900	1.19		6.900	0.00	12.900	8.14		18.90

1.98	0.933	1.19		6.933	0.00	12.933	8.14		18.93
1.98	0.967	1.19		6.967	0.00	12.967	8.14		18.97
1.98	1.000	1.19		7.000	0.00	13.000	8.13		19.00
1.98	1.033	1.23		7.033	4.40	13.033	1.54		19.03
1.98	1.067	1.23		7.067	4.40	13.067	1.54		19.07
1.98	1.100	1.23		7.100	4.40	13.100	1.54		19.10
1.98	1.133	1.23		7.133	4.40	13.133	1.54		19.13
1.98	1.167	1.23		7.167	4.40	13.167	1.54		19.17
1.98	1.200	1.23		7.200	4.40	13.200	1.54		19.20
1.98	1.233	1.23		7.233	4.40	13.233	1.54		19.23
1.98	1.267	1.21		7.267	4.40	13.267	1.54		19.27
1.98	1.300	1.19		7.300	4.40	13.300	1.54		19.30
1.98	1.333	1.19		7.333	4.40	13.333	1.54		19.33
1.98	1.367	1.19		7.367	4.40	13.367	1.54		19.37
1.98	1.400	1.19		7.400	4.40	13.400	1.54		19.40
1.98	1.433	1.19		7.433	4.40	13.433	1.54		19.43
1.98	1.467	1.19		7.467	4.40	13.467	1.54		19.47
1.98	1.500	1.19		7.500	4.40	13.500	1.55		19.50
1.98	1.533	1.23		7.533	4.40	13.533	9.02		19.53
1.98	1.567	1.23		7.567	4.40	13.567	9.02		19.57
1.98	1.600	1.23		7.600	4.40	13.600	9.02		19.60
1.98	1.633	1.23		7.633	4.40	13.633	9.02		19.63
1.98	1.667	1.23		7.667	4.40	13.667	9.02		19.67
1.98	1.700	1.23		7.700	4.40	13.700	9.02		19.70
1.98	1.733	1.23		7.733	4.40	13.733	9.02		19.73
1.98	1.767	1.21		7.767	4.40	13.767	9.02		19.77
1.98	1.800	1.19		7.800	4.40	13.800	9.02		19.80

1.98	1.833	1.19		7.833	4.40		13.833	9.02		19.83	1.32	2.733	1.45		8.733	5.94		14.733	3.30		20.73
1.98	1.867	1.19		7.867	4.40		13.867	9.02		19.87	1.32	2.767	1.43		8.767	5.94		14.767	3.30		20.77
1.98	1.900	1.19		7.900	4.40		13.900	9.02		19.90	1.32	2.800	1.41		8.800	5.94		14.800	3.30		20.80
1.98	1.933	1.19		7.933	4.40		13.933	9.02		19.93	1.32	2.833	1.41		8.833	5.94		14.833	3.30		20.83
1.98	1.967	1.19		7.967	4.40		13.967	9.02		19.97	1.32	2.867	1.41		8.867	5.94		14.867	3.30		20.87
1.98	2.000	1.19		8.000	4.40		14.000	9.01		20.00	1.32	2.900	1.41		8.900	5.94		14.900	3.30		20.90
1.32	2.033	1.45		8.033	0.00		14.033	3.30		20.03	1.32	2.933	1.41		8.933	5.94		14.933	3.30		20.93
1.32	2.067	1.45		8.067	0.00		14.067	3.30		20.07	1.32	2.967	1.41		8.967	5.94		14.967	3.30		20.97
1.32	2.100	1.45		8.100	0.00		14.100	3.30		20.10	1.32	3.000	1.41		9.000	5.94		15.000	3.30		21.00
1.32	2.133	1.45		8.133	0.00		14.133	3.30		20.13	1.32	3.033	1.45		9.033	3.52		15.033	3.30		21.03
1.32	2.167	1.45		8.167	0.00		14.167	3.30		20.17	1.32	3.067	1.45		9.067	3.52		15.067	3.30		21.07
1.32	2.200	1.45		8.200	0.00		14.200	3.30		20.20	1.32	3.100	1.45		9.100	3.52		15.100	3.30		21.10
1.32	2.233	1.45		8.233	0.00		14.233	3.30		20.23	1.32	3.133	1.45		9.133	3.52		15.133	3.30		21.13
1.32	2.267	1.43		8.267	0.00		14.267	3.30		20.27	1.32	3.167	1.45		9.167	3.52		15.167	3.30		21.17
1.32	2.300	1.41		8.300	0.00		14.300	3.30		20.30	1.32	3.200	1.45		9.200	3.52		15.200	3.30		21.20
1.32	2.333	1.41		8.333	0.00		14.333	3.30		20.33	1.32	3.233	1.45		9.233	3.52		15.233	3.30		21.23
1.32	2.367	1.41		8.367	0.00		14.367	3.30		20.37	1.32	3.267	1.43		9.267	3.52		15.267	3.30		21.27
1.32	2.400	1.41		8.400	0.00		14.400	3.30		20.40	1.32	3.300	1.41		9.300	3.52		15.300	3.30		21.30
1.32	2.433	1.41		8.433	0.00		14.433	3.30		20.43	1.32	3.333	1.41		9.333	3.52		15.333	3.30		21.33
1.32	2.467	1.41		8.467	0.00		14.467	3.30		20.47	1.32	3.367	1.41		9.367	3.52		15.367	3.30		21.37
1.32	2.500	1.41		8.500	0.00		14.500	3.30		20.50	1.32	3.400	1.41		9.400	3.52		15.400	3.30		21.40
1.32	2.533	1.45		8.533	5.94		14.533	3.30		20.53	1.32	3.433	1.41		9.433	3.52		15.433	3.30		21.43
1.32	2.567	1.45		8.567	5.94		14.567	3.30		20.57	1.32	3.467	1.41		9.467	3.52		15.467	3.30		21.47
1.32	2.600	1.45		8.600	5.94		14.600	3.30		20.60	1.32	3.500	1.41		9.500	3.52		15.500	3.30		21.50
1.32	2.633	1.45		8.633	5.94		14.633	3.30		20.63	1.32	3.533	1.45		9.533	3.96		15.533	3.30		21.53
1.32	2.667	1.45		8.667	5.94		14.667	3.30		20.67	1.32	3.567	1.45		9.567	3.96		15.567	3.30		21.57
1.32	2.700	1.45		8.700	5.94		14.700	3.30		20.70	1.32	3.600	1.45		9.600	3.96		15.600	3.30		21.60

1.32 3.633 1.45 | 9.633 3.96 |15.633 3.30 | 21.63  
1.32 3.667 1.45 | 9.667 3.96 |15.667 3.30 | 21.67  
1.32 3.700 1.45 | 9.700 3.96 |15.700 3.30 | 21.70  
1.32 3.733 1.45 | 9.733 3.96 |15.733 3.30 | 21.73  
1.32 3.767 1.43 | 9.767 3.96 |15.767 3.30 | 21.77  
1.32 3.800 1.41 | 9.800 3.96 |15.800 3.30 | 21.80  
1.32 3.833 1.41 | 9.833 3.96 |15.833 3.30 | 21.83  
1.32 3.867 1.41 | 9.867 3.96 |15.867 3.30 | 21.87  
1.32 3.900 1.41 | 9.900 3.96 |15.900 3.30 | 21.90  
1.32 3.933 1.41 | 9.933 3.96 |15.933 3.30 | 21.93  
1.32 3.967 1.41 | 9.967 3.96 |15.967 3.30 | 21.97  
1.32 4.000 1.41 |10.000 3.96 |16.000 3.30 | 22.00  
1.32 4.033 1.76 |10.033 5.06 |16.033 1.98 | 22.03  
1.32 4.067 1.76 |10.067 5.06 |16.067 1.98 | 22.07  
1.32 4.100 1.76 |10.100 5.06 |16.100 1.98 | 22.10  
1.32 4.133 1.76 |10.133 5.06 |16.133 1.98 | 22.13  
1.32 4.167 1.76 |10.167 5.06 |16.167 1.98 | 22.17  
1.32 4.200 1.76 |10.200 5.06 |16.200 1.98 | 22.20  
1.32 4.233 1.76 |10.233 5.06 |16.233 1.98 | 22.23  
1.32 4.267 1.76 |10.267 5.06 |16.267 1.98 | 22.27  
1.32 4.300 1.76 |10.300 5.06 |16.300 1.98 | 22.30  
1.32 4.333 1.76 |10.333 5.06 |16.333 1.98 | 22.33  
1.32 4.367 1.76 |10.367 5.06 |16.367 1.98 | 22.37  
1.32 4.400 1.76 |10.400 5.06 |16.400 1.98 | 22.40  
1.32 4.433 1.76 |10.433 5.06 |16.433 1.98 | 22.43  
1.32 4.467 1.76 |10.467 5.06 |16.467 1.98 | 22.47  
1.32 4.500 1.76 |10.500 5.06 |16.500 1.98 | 22.50

1.32 4.533 1.76 |10.533 6.82 |16.533 1.98 | 22.53  
1.32 4.567 1.76 |10.567 6.82 |16.567 1.98 | 22.57  
1.32 4.600 1.76 |10.600 6.82 |16.600 1.98 | 22.60  
1.32 4.633 1.76 |10.633 6.82 |16.633 1.98 | 22.63  
1.32 4.667 1.76 |10.667 6.82 |16.667 1.98 | 22.67  
1.32 4.700 1.76 |10.700 6.82 |16.700 1.98 | 22.70  
1.32 4.733 1.76 |10.733 6.82 |16.733 1.98 | 22.73  
1.32 4.767 1.76 |10.767 6.82 |16.767 1.98 | 22.77  
1.32 4.800 1.76 |10.800 6.82 |16.800 1.98 | 22.80  
1.32 4.833 1.76 |10.833 6.82 |16.833 1.98 | 22.83  
1.32 4.867 1.76 |10.867 6.82 |16.867 1.98 | 22.87  
1.32 4.900 1.76 |10.900 6.82 |16.900 1.98 | 22.90  
1.32 4.933 1.76 |10.933 6.82 |16.933 1.98 | 22.93  
1.32 4.967 1.76 |10.967 6.82 |16.967 1.98 | 22.97  
1.32 5.000 1.76 |11.000 6.82 |17.000 1.98 | 23.00  
1.32 5.033 1.76 |11.033 10.56 |17.033 1.98 | 23.03  
1.32 5.067 1.76 |11.067 10.56 |17.067 1.98 | 23.07  
1.32 5.100 1.76 |11.100 10.56 |17.100 1.98 | 23.10  
1.32 5.133 1.76 |11.133 10.56 |17.133 1.98 | 23.13  
1.32 5.167 1.76 |11.167 10.56 |17.167 1.98 | 23.17  
1.32 5.200 1.76 |11.200 10.56 |17.200 1.98 | 23.20  
1.32 5.233 1.76 |11.233 10.56 |17.233 1.98 | 23.23  
1.32 5.267 1.76 |11.267 10.56 |17.267 1.98 | 23.27  
1.32 5.300 1.76 |11.300 10.56 |17.300 1.98 | 23.30  
1.32 5.333 1.76 |11.333 10.56 |17.333 1.98 | 23.33  
1.32 5.367 1.76 |11.367 10.56 |17.367 1.98 | 23.37  
1.32 5.400 1.76 |11.400 10.56 |17.400 1.98 | 23.40

1.32 5.433 1.76 |11.433 10.56 |17.433 1.98 | 23.43  
1.32 5.467 1.76 |11.467 10.56 |17.467 1.98 | 23.47  
1.32 5.500 1.76 |11.500 10.60 |17.500 1.98 | 23.50  
1.32 5.533 1.76 |11.533 45.75 |17.533 1.98 | 23.53  
1.32 5.567 1.76 |11.567 45.75 |17.567 1.98 | 23.57  
1.32 5.600 1.76 |11.600 45.75 |17.600 1.98 | 23.60  
1.32 5.633 1.76 |11.633 45.75 |17.633 1.98 | 23.63  
1.32 5.667 1.76 |11.667 45.75 |17.667 1.98 | 23.67  
1.32 5.700 1.76 |11.700 45.75 |17.700 1.98 | 23.70  
1.32 5.733 1.76 |11.733 45.75 |17.733 1.98 | 23.73  
1.32 5.767 1.76 |11.767 83.68 |17.767 1.98 | 23.77  
1.32 5.800 1.76 |11.800 121.42 |17.800 1.98 | 23.80  
1.32 5.833 1.76 |11.833 121.42 |17.833 1.98 | 23.83  
1.32 5.867 1.76 |11.867 121.42 |17.867 1.98 | 23.87  
1.32 5.900 1.76 |11.900 121.42 |17.900 1.98 | 23.90  
1.32 5.933 1.76 |11.933 121.42 |17.933 1.98 | 23.93  
1.32 5.967 1.76 |11.967 121.42 |17.967 1.98 | 23.97  
1.32 6.000 1.76 |12.000 121.27 |18.000 1.98 | 24.00

Unit Hyd Qpeak (cms)= 0.864

PEAK FLOW (cms)= 0.659 (i)  
TIME TO PEAK (hrs)= 12.033  
RUNOFF VOLUME (mm)= 64.804  
TOTAL RAINFALL (mm)= 109.979  
RUNOFF COEFFICIENT = 0.589

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

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| CALIB |
| NASHYD ( 0103) | Area (ha)= 2.39 Curve Number (CN)= 80.0
|ID= 1 DT= 2.0 min | Ia (mm)= 4.80 # of Linear Res.(N)= 3.00
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U.H. Tp (hrs)= 0.12

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Unit Hyd Qpeak (cms)= 0.761

PEAK FLOW (cms)= 0.496 (i)  
TIME TO PEAK (hrs)= 12.033  
RUNOFF VOLUME (mm)= 65.558  
TOTAL RAINFALL (mm)= 109.979  
RUNOFF COEFFICIENT = 0.596

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

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FINISH
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Unit Hyd Qpeak (cms)= 0.366

PEAK FLOW (cms)= 0.351 (i)  
TIME TO PEAK (hrs)= 12.300  
RUNOFF VOLUME (mm)= 56.992  
TOTAL RAINFALL (mm)= 109.979  
RUNOFF COEFFICIENT = 0.518

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

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| CALIB |
| NASHYD ( 0102) | Area (ha)= 3.62 Curve Number (CN)= 80.0
|ID= 1 DT= 2.0 min | Ia (mm)= 5.70 # of Linear Res.(N)= 3.00
-----
U.H. Tp (hrs)= 0.16

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Shining Hill Estates PH3 (Aurora)  
Existing Hydrology Schematic  
February 2021



101



102



103



## Existing Conditions VO2 Parameter Summary

Shining Hill Estates PH3 (Aurora)  
Project Number: 2183  
Date: February 2021  
Designer Initials: E.A.S.

### NASHYD

Number	101	102	103
Description			
DT(min)	2	2	2
Area (ha)	4.12	3.62	2.39
CN*	75.0	80.0	80.0
IA(mm)	6.4	5.7	4.8
TP Method	Uplands	Uplands	Uplands
TP (hr)	0.43	0.16	0.12

Total Area = 10.1 ha



Site Soils: (per OMAFRA County Soils Mapping)

**Soil Type**  
Schomberg Clay Loam

**Hydrologic Soil Group**  
C

TABLE OF CURVE NUMBERS (CN's)**										
Land Use	Hydrologic Soil Type								Manning's 'n'	Source
	A	AB	B	BC	C	CD	D			
Meadow "Good"	30	44	58	64.5	71	74.5	78	0.40	MTO	
Woodlot "Fair"	36	48	60	66.5	73	76	79	0.40	MTO	
Gravel	76	80.5	85	87	89	90	91	0.30	USDA	
Lawns "Good"	39	50	61	67.5	74	77	80	0.25	USDA	
Pasture/Range	58	61.5	65	70.5	76	78.5	81	0.17	MTO	
Crop	66	70	74	78	82	84	86	0.13	MTO	
Fallow (Bare)	77	82	86	89	91	93	94	0.05	MTO	
Low Density Residences	57	64.5	72	76.5	81	83.5	86	0.25	USDA	
Streets, paved	98	98	98	98	98	98	98	0.01	USDA	

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. USDA (1986), Urban Hydrology for Small Watersheds, Table 2.2-Runoff Curve Numbers for Urban Areas

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
101	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
102	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
103	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
101					100			100
102					100			100
103					100			100

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101	3.1	29.1	0.0	61.6	0.0	0.0	0.0	0.0	6.2	100.0
102	0.0	26.4	0.3	52.5	0.0	0.0	0.0	0.0	20.8	100.0
103	0.0	10.1	0.0	67.1	0.0	0.0	0.0	0.0	22.8	100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101	3.1	29.1		61.6					6.2	100.0
102		26.4	0.3	52.5					20.8	100.0
103		10.1		67.1					22.8	100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Weighted CN
101	2.2	21.2	0.0	45.6	0.0	0.0	0.0	0.0	6.1	75
102	0.0	19.3	0.3	38.8	0.0	0.0	0.0	0.0	20.4	79
103	0.0	7.4	0.0	49.7	0.0	0.0	0.0	0.0	22.3	79



## Existing Conditions CN Calculations

Shining Hill Estates PH3 (Aurora)

Project Number: 2183

Date: February 2021

Designer Initials: E.A.S.

---

\*\* AMC II assumed

Input Values					
Step	Subcatchment:	101		102	103
1	<b>CN (AMC II):</b>	<b>75</b>		<b>79</b>	<b>79</b>
2	CN (AMC III) =	88		91	91
3	100 Year Precipitation, P =	95.98	mm	95.98	95.98

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S}$$

$$S = \frac{(P - I_a)^2}{Q} - (P - I_a)$$

Q = rainfall excess or runoff, mm

S = potential maximum retention or available storage, mm

$$CN = \frac{25400}{S + 254}$$

$$S = \frac{25400}{CN} - 254$$

CN\* = modified SCS curve # that better reflects I<sub>a</sub> conditions in Ontario

Output Values					
	Subcatchment:	101		102	103
	S <sub>III</sub> =	34.64	mm	25.12	25.12
	SCS Assumption of 0.2 S = I <sub>a</sub> =	6.93	mm	5.02	5.02
4	Q <sub>III</sub> =	64.12	mm	71.27	71.27
	Preferred Initial Abstraction, I <sub>a</sub> =	6.4	mm	5.7	4.8
5	S* <sub>III</sub> =	35.65	mm	24.10	25.44
6	CN* <sub>III</sub> =	87.69	mm	91.33	90.90
	<b>CN*<sub>III</sub> =</b>	<b>88</b>	Rounded	<b>91</b>	<b>91</b>
7	<b>CN*<sub>II</sub> =</b>	<b>75</b>	convert	<b>80</b>	<b>80</b>

### Explanation of Procedure

- 1 Determine CN based on typical AMC II conditions (attached)
- 2 Convert CN from AMC II to AMC III conditions (standard SCS tables)
- 3 Get precipitation depth P for 100 year storm
- 4 Using CN<sub>III</sub> with I<sub>a</sub> = 0.2S, compute Q<sub>III</sub> for 100 year precipitation
- 5 For the same Q<sub>III</sub>, compute S\*<sub>III</sub> using I<sub>a</sub>=1.5mm (or otherwise determined)
- 6 Compute CN\*<sub>III</sub> using S\*<sub>III</sub>
- 7 Calculate CN\*<sub>II</sub> using SCS conversion table



## Existing Conditions CN Calculations

Shining Hill Estates PH3 (Aurora)  
Project Number: 2183  
Date: February 2021  
Designer Initials: E.A.S.

HYDROLOGIC SOIL TYPE (ha) - Existing Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
101					4.12			4.12
102					3.62			3.62
103					2.39			2.39

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
101	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0
102	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0
103	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
101					100.0			100.0
102					100.0			100.0
103					100.0			100.0

## Existing Conditions CN Calculations

LAND USE (ha) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101	0.13	1.20		2.54					0.26	4.12
102		0.95	0.01	1.90					0.75	3.62
103		0.24		1.60					0.54	2.39

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101	3.1	29.1	0.0	61.6	0.0	0.0	0.0	0.0	6.2	100.0
102	0.0	26.4	0.3	52.5	0.0	0.0	0.0	0.0	20.8	100.0
103	0.0	10.1	0.0	67.1	0.0	0.0	0.0	0.0	22.8	100.0

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101	3.1	29.1		61.6					6.2	100.0
102		26.4	0.3	52.5					20.8	100.0
103		10.1		67.1					22.8	100.0

## Existing Conditions IA Calculations

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101	3.1	29.1		61.6					6.2	100.0

IA VALUES (mm) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
IA (mm)	8	10	2	5	8	8	3	2	2	
101	0.2	2.9		3.1					0.1	6.4

\* IA values based on LRSCA guidelines



## Existing Conditions Time to Peak Calculations

Shining Hill Estates PH3 (Aurora)  
Project Number: 2183  
Date: February 2021  
Designer Initials: E.A.S.

**Uplands Method:**

Catchment ID	High Elevation	Low Elevation	Length (m)	Slope (%)	Land Cover Type	Velocity (m/s)	Time of Concentration (s)	Time of Concentration (hr)	Time to Peak (hr)
101a	268.05	267.39	41	1.62	Woodland	0.19	211.8	0.06	0.04
101b	267.39	265.41	126	1.57	Pasture	0.27	461.0	0.13	0.09
101c	265.41	265.39	37	0.05	Woodland	0.04	1032.8	0.29	0.19
101d	265.39	265.38	25	0.04	Pasture	0.04	588.0	0.16	0.11
101e	265.38	263.67	19	9.10	Woodland	0.45	41.3	0.01	0.01
<b>101</b>									<b>0.43</b>
102a	273.25	271.07	45	4.81	Pasture	0.48	94.4	0.03	0.02
102b	271.07	270.02	22	4.88	Small Upland Gullies and Paved Areas	1.34	16.1	0.00	0.00
102c	270.02	269.68	22	1.55	Woodland	0.19	117.1	0.03	0.02
102d	269.68	266.03	156	2.33	Pasture	0.33	468.7	0.13	0.09
102e	266.03	263.27	33	8.29	Woodland	0.43	76.7	0.02	0.01
102f	263.27	262.13	12	9.64	Small Upland Gullies and Paved Areas	1.88	6.3	0.00	0.00
102g	262.13	261.46	26	2.56	Pasture	0.35	74.9	0.02	0.01
<b>102</b>									<b>0.16</b>
103a	269.57	269.32	16	1.58	Woodland	0.19	83.4	0.02	0.02
103b	269.32	264.27	201	2.51	Pasture	0.35	581.2	0.16	0.11
<b>103</b>									<b>0.12</b>

---

**APPENDIX C2**

**PROPOSED HYDROLOGY**

---



# Proposed Hydrology 4hr Chicago Storm

```

=====
V V I SSSSS U U A L (v 6.0.2001)
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
6.0\VO2\voim.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-
0af8143f9a42\1642ee72-1f90-4c2d-b181-553c9edd210e\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-
0af8143f9a42\1642ee72-1f90-4c2d-b181-553c9edd210e\s
  
```

```

DATE: 02/25/2021 TIME: 12:17:28
USER:
  
```

COMMENTS: \_\_\_\_\_

```

*****
** SIMULATION : Run 01: 4hr Chicago 2yr **
*****
  
```

```

-----
| CHICAGO STORM | IDF curve parameters: A= 647.700
| Ptotal= 34.80 mm | B= 4.000
| | C= 0.784
-----
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
  
```

Time to peak ratio = 0.33

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
2.69	0.17	2.27	1.17	17.17	2.17	5.25	3.17
2.50	0.33	2.59	1.33	81.81	2.33	4.49	3.33
2.34	0.50	3.04	1.50	22.50	2.50	3.93	3.50
2.20	0.67	3.72	1.67	11.86	2.67	3.51	3.67
2.08	0.83	4.86	1.83	8.23	2.83	3.18	3.83
1.98	1.00	7.29	2.00	6.38	3.00	2.91	4.00

```

-----
| CALIB |
| STANDHYD ( 0205) | Area (ha)= 0.23
| ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00
-----

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.14 0.09
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 39.16 40.00
Mannings n = 0.013 0.250
  
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```

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

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
2.69	0.033	2.27	1.033	17.17	2.033	5.25	3.03
2.69	0.067	2.27	1.067	17.17	2.067	5.25	3.07
2.69	0.100	2.27	1.100	17.17	2.100	5.25	3.10
2.69	0.133	2.27	1.133	17.17	2.133	5.25	3.13
2.69	0.167	2.27	1.167	17.17	2.167	5.25	3.17
2.50	0.200	2.59	1.200	81.81	2.200	4.49	3.20

2.50	0.233	2.59	1.233	81.81	2.233	4.49	3.23
	0.267	2.59	1.267	81.81	2.267	4.49	3.27
2.50	0.300	2.59	1.300	81.81	2.300	4.49	3.30
2.50	0.333	2.59	1.333	81.81	2.333	4.49	3.33
2.50	0.367	3.04	1.367	22.50	2.367	3.93	3.37
2.34	0.400	3.04	1.400	22.50	2.400	3.93	3.40
2.34	0.433	3.04	1.433	22.50	2.433	3.93	3.43
2.34	0.467	3.04	1.467	22.50	2.467	3.93	3.47
2.34	0.500	3.04	1.500	22.50	2.500	3.93	3.50
2.34	0.533	3.72	1.533	11.86	2.533	3.51	3.53
2.20	0.567	3.72	1.567	11.86	2.567	3.51	3.57
2.20	0.600	3.72	1.600	11.86	2.600	3.51	3.60
2.20	0.633	3.72	1.633	11.86	2.633	3.51	3.63
2.20	0.667	3.72	1.667	11.86	2.667	3.51	3.67
2.08	0.700	4.86	1.700	8.23	2.700	3.18	3.70
2.08	0.733	4.86	1.733	8.23	2.733	3.18	3.73
2.08	0.767	4.86	1.767	8.23	2.767	3.18	3.77
2.08	0.800	4.86	1.800	8.23	2.800	3.18	3.80
2.08	0.833	4.86	1.833	8.23	2.833	3.18	3.83
2.08	0.867	7.29	1.867	6.38	2.867	2.91	3.87
1.98	0.900	7.29	1.900	6.38	2.900	2.91	3.90
1.98	0.933	7.29	1.933	6.38	2.933	2.91	3.93
1.98	0.967	7.29	1.967	6.38	2.967	2.91	3.97
1.98	1.000	7.29	2.000	6.38	3.000	2.91	4.00

\*TOTALS\*  
 0.012 (iii)  
 1.43  
 15.69  
 34.80  
 0.45

PEAK FLOW (cms)= 0.00 0.01  
 TIME TO PEAK (hrs)= 1.33 1.47  
 RUNOFF VOLUME (mm)= 33.80 14.36  
 TOTAL RAINFALL (mm)= 34.80 34.80  
 RUNOFF COEFFICIENT = 0.97 0.41

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0204) | Area (ha)= 0.24  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
 -----

Surface Area (ha)=	0.18	PERVIOUS (i)	0.06
Dep. Storage (mm)=	1.00		5.00
Average Slope (%)=	1.00		2.00
Length (m)=	40.00		40.00
Mannings n =	0.013		0.250
Max.Eff.Inten.(mm/hr)=	81.81		71.27
over (min)	5.00		10.00
Storage Coeff. (min)=	1.60 (ii)		8.27 (ii)
Unit Hyd. Tpeak (min)=	4.00		10.00
Unit Hyd. peak (cms)=	0.45		0.13

\*TOTALS\*  
 0.026 (iii)  
 1.33  
 21.80  
 34.80  
 0.63

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!  
 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Max.Eff.Inten.(mm/hr)=	81.81	69.70
over (min)	5.00	10.00
Storage Coeff. (min)=	1.58 (ii)	9.73 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.45	0.12

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

```

| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
TOTAL HYD.(ID= 1):  0.24      0.03      1.33      21.80
=====
MAJOR SYS.(ID= 2):  0.00      0.00      0.00      0.00
MINOR SYS.(ID= 3):  0.24      0.03      1.33      21.80

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0203) | Area (ha)= 2.45
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00
-----

```

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.59	0.86	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	127.80	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	81.81	61.27	
over (min)	5.00	12.00	
Storage Coeff. (min)=	3.21 (ii)	11.79 (ii)	
Unit Hyd. Tpeak (min)=	4.00	12.00	
Unit Hyd. peak (cms)=	0.32	0.10	
			*TOTALS*
PEAK FLOW (cms)=	0.14	0.08	0.178 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	33.80	13.69	18.91
TOTAL RAINFALL (mm)=	34.80	34.80	34.80
RUNOFF COEFFICIENT =	0.97	0.39	0.54

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0202) | Area (ha)= 0.92
| ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29

```

Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 78.32 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 81.81 47.32
    over (min) 5.00 10.00
Storage Coeff. (min)= 2.39 (ii) 9.32 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.38 0.12

PEAK FLOW (cms)= 0.08 0.02 0.099 (iii)
TIME TO PEAK (hrs)= 1.33 1.47 1.33
RUNOFF VOLUME (mm)= 33.80 12.40 21.17
TOTAL RAINFALL (mm)= 34.80 34.80 34.80
RUNOFF COEFFICIENT = 0.97 0.36 0.61

```

\*TOTALS\*  
0.099 (iii)

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
TOTAL HYD.(ID= 1):  0.92      0.10      1.33      21.17
=====
MAJOR SYS.(ID= 2):  0.00      0.00      0.00      0.00
MINOR SYS.(ID= 3):  0.92      0.10      1.33      21.17

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
*** W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001
ID1= 1 ( 0203):  2.45 0.178 1.33 18.91
+ ID2= 2 ( 0006):  0.00 0.000 0.00 0.00
=====
ID = 3 ( 0007):  2.45 0.178 1.33 18.91

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | ADD HYD ( 0007) |  
 | 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 ( 0007):	2.45	0.178	1.33	18.91
+ ID2= 2 ( 0009):	0.24	0.026	1.33	21.80
=====				
ID = 1 ( 0007):	2.69	0.204	1.33	19.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | RESERVOIR( 0008) |  
 | IN= 2---> OUT= 1 |  
 | DT= 2.0 min |

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1750	0.0640
0.0060	0.0325	0.2000	0.0740
0.1000	0.0390	0.2300	0.0830
0.1250	0.0520	0.2750	0.0900

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0007)	2.690	0.204	1.33	19.17
OUTFLOW: ID= 1 ( 0008)	2.690	0.035	2.17	18.66

PEAK FLOW REDUCTION [Qout/Qin](%)= 17.20  
 TIME SHIFT OF PEAK FLOW (min)= 50.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.0345

-----  
 | ADD HYD ( 0003) |  
 | 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0205):	0.23	0.012	1.43	15.69
+ ID2= 2 ( 0008):	2.69	0.035	2.17	18.66
=====				
ID = 3 ( 0003):	2.92	0.038	2.17	18.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | CALIB |  
 | STANDHYD ( 0207) |  
 | ID= 1 DT= 2.0 min |

Area (ha)= 0.65  
 Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.31	0.34
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	65.83	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten. (mm/hr)=	81.81	49.37
over (min)	5.00	12.00
Storage Coeff. (min)=	2.15 (ii)	11.51 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.40	0.10

			*TOTALS*
PEAK FLOW (cms)=	0.00	0.03	0.027 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.50
RUNOFF VOLUME (mm)=	33.80	12.60	12.62
TOTAL RAINFALL (mm)=	34.80	34.80	34.80
RUNOFF COEFFICIENT =	0.97	0.36	0.36

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 | CALIB |  
 | STANDHYD ( 0206) |  
 | ID= 1 DT= 2.0 min |

Area (ha)= 2.39  
 Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.53	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	126.23	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten. (mm/hr)=	81.81	59.62
over (min)	5.00	12.00
Storage Coeff. (min)=	3.18 (ii)	11.86 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.32	0.09

			*TOTALS*
PEAK FLOW (cms)=	0.13	0.08	0.168 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	33.80	13.55	18.61
TOTAL RAINFALL (mm)=	34.80	34.80	34.80
RUNOFF COEFFICIENT =	0.97	0.39	0.53

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0004) | Area (ha)= 0.55
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00
-----

```

```

-----
| RESERVOIR( 0010) | OVERFLOW IS OFF
| IN= 2--> OUT= 1 |
| DT= 2.0 min |
-----
| OUTFLOW | STORAGE | OUTFLOW | STORAGE
| (cms) | (ha.m.) | (cms) | (ha.m.)
|-----|-----|-----|-----|
| 0.0000 | 0.0000 | 0.1400 | 0.0584
| 0.0050 | 0.0278 | 0.1700 | 0.0694
| 0.0700 | 0.0363 | 0.1900 | 0.0737
| 0.1000 | 0.0478 | 0.3000 | 0.0767
|-----|-----|-----|-----|
| AREA | QPEAK | TPEAK | R.V.
| (ha) | (cms) | (hrs) | (mm)
|-----|-----|-----|-----|
| INFLOW : ID= 2 ( 0206) | 2.390 | 0.168 | 1.33 | 18.61
| OUTFLOW: ID= 1 ( 0010) | 2.390 | 0.025 | 2.33 | 18.01
|-----|-----|-----|-----|
| PEAK FLOW REDUCTION [Qout/Qin] (%) = 15.08
| TIME SHIFT OF PEAK FLOW (min) = 60.00
| MAXIMUM STORAGE USED (ha.m.) = 0.0305
-----

```

```

-----
| CALIB |
| STANDHYD ( 0201) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00
-----
| IMPERVIOUS | PERVIOUS (i)
| Surface Area (ha)= 2.19 | 0.51
| Dep. Storage (mm)= 1.00 | 5.00
| Average Slope (%)= 1.00 | 2.00
| Length (m)= 134.16 | 40.00
| Mannings n = 0.013 | 0.250
|-----|-----|
| Max.Eff.Inten.(mm/hr)= 81.81 | 19.96
| over (min) = 5.00 | 8.00
| Storage Coeff. (min)= 3.30 (ii) | 7.67 (ii)
| Unit Hyd. Tpeak (min)= 4.00 | 8.00
| Unit Hyd. peak (cms)= 0.31 | 0.15
|-----|-----|
| PEAK FLOW (cms)= 0.08 | 0.00 | *TOTALS*
| TIME TO PEAK (hrs)= 1.33 | 1.47 | 0.083 (iii)
| RUNOFF VOLUME (mm)= 33.80 | 7.18 | 1.33
| TOTAL RAINFALL (mm)= 34.80 | 34.80 | 24.47
| RUNOFF COEFFICIENT = 0.97 | 0.21 | 34.80
| | | 0.70
-----

```

```

-----
| ADD HYD ( 0001) |
| 1 + 2 = 3 |
-----
| AREA | QPEAK | TPEAK | R.V.
| (ha) | (cms) | (hrs) | (mm)
|-----|-----|-----|-----|
| ID1= 1 ( 0010): | 2.39 | 0.025 | 2.33 | 18.01
| + ID2= 2 ( 0207): | 0.65 | 0.027 | 1.50 | 12.62
|-----|-----|-----|-----|
| ID = 3 ( 0001): | 3.04 | 0.032 | 2.23 | 16.86
|-----|-----|-----|-----|
| NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----

```

```

-----
| ADD HYD ( 0001) |
| 3 + 2 = 1 |
-----
| AREA | QPEAK | TPEAK | R.V.
| (ha) | (cms) | (hrs) | (mm)
|-----|-----|-----|-----|
| ID1= 3 ( 0001): | 3.04 | 0.032 | 2.23 | 16.86
| + ID2= 2 ( 0009): | 0.00 | 0.000 | 0.00 | 0.00
|-----|-----|-----|-----|
| ID = 1 ( 0001): | 3.04 | 0.032 | 2.23 | 16.86
|-----|-----|-----|-----|
| *** W A R N I N G : HYDROGRAPH 0009 <ID= 2> IS DRY.
| *** W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003
|-----|-----|-----|-----|
| ID = 1 ( 0001): | 3.04 | 0.032 | 2.23 | 16.86
|-----|-----|-----|-----|

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0001) |
| 3 + 2 = 1 |
-----
| AREA | QPEAK | TPEAK | R.V.
| (ha) | (cms) | (hrs) | (mm)
|-----|-----|-----|-----|
| ID1= 3 ( 0001): | 3.04 | 0.032 | 2.23 | 16.86
| + ID2= 2 ( 0009): | 0.00 | 0.000 | 0.00 | 0.00
|-----|-----|-----|-----|
| ID = 1 ( 0001): | 3.04 | 0.032 | 2.23 | 16.86
|-----|-----|-----|-----|

```

\*\*\* W A R N I N G : HYDROGRAPH 0009 <ID= 2> IS DRY.  
\*\*\* W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003

```

-----
| CALIB |
| STANDHYD ( 0201) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00
-----

```

```

-----
| IMPERVIOUS | PERVIOUS (i)
| Surface Area (ha)= 2.19 | 0.51
| Dep. Storage (mm)= 1.00 | 5.00
| Average Slope (%)= 1.00 | 2.00
| Length (m)= 134.16 | 40.00
| Mannings n = 0.013 | 0.250
|-----|-----|
| Max.Eff.Inten.(mm/hr)= 81.81 | 19.96
| over (min) = 5.00 | 8.00
| Storage Coeff. (min)= 3.30 (ii) | 7.67 (ii)
| Unit Hyd. Tpeak (min)= 4.00 | 8.00
| Unit Hyd. peak (cms)= 0.31 | 0.15
|-----|-----|

```

				*TOTALS*
PEAK FLOW	(cms)=	0.45	0.02	0.460 (iii)
TIME TO PEAK	(hrs)=	1.33	1.43	1.33
RUNOFF VOLUME	(mm)=	33.80	8.69	28.02
TOTAL RAINFALL	(mm)=	34.80	34.80	34.80
RUNOFF COEFFICIENT	=	0.97	0.25	0.81

INFLOW : ID= 2 ( 0005)	4.170	0.642	1.33	26.04
OUTFLOW: ID= 1 ( 0002)	4.170	0.054	2.13	25.68

PEAK FLOW REDUCTION [Qout/Qin] (%)=	8.41
TIME SHIFT OF PEAK FLOW (min)=	48.00
MAXIMUM STORAGE USED (ha.m.)=	0.0792

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
=====
V V I SSSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y M M 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
6.0\VO2\voin.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\64493176-0280-4303-a3bc-c05f95df6616\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\64493176-0280-4303-a3bc-c05f95df6616\s

```

DATE: 02/25/2021 TIME: 12:17:28

USER:

COMMENTS: \_\_\_\_\_

```

*****
** SIMULATION : Run 02: 4hr Chicago 5yr **
*****

```

```

-----
-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0201): 2.70 0.460 1.33 28.02
+ ID2= 2 ( 0004): 0.55 0.083 1.33 24.47
-----
ID = 3 ( 0005): 3.25 0.543 1.33 27.42

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 0005): 3.25 0.543 1.33 27.42
+ ID2= 2 ( 0006): 0.92 0.099 1.33 21.17
-----
ID = 1 ( 0005): 4.17 0.642 1.33 26.04

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
-----
| RESERVOIR ( 0002) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.3000 0.1350
0.0130 0.0746 | 0.3750 0.1510
0.1500 0.0900 | 0.4000 0.1610
0.2100 0.1200 | 0.4500 0.1725

```

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

-----  
 | CHICAGO STORM |  
Ptotal= 46.26 mm

IDF curve parameters: A= 929.800  
 B= 4.000  
 C= 0.798  
 used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs  
 Storm time step = 10.00 min  
 Time to peak ratio = 0.33

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.38	0.17	2.85	1.17	22.78	2.17	6.71	3.17
3.14	0.33	3.26	1.33	113.18	2.33	5.71	3.33
2.94	0.50	3.84	1.50	30.05	2.50	4.99	3.50
2.76	0.67	4.71	1.67	15.53	2.67	4.45	3.67
2.60	0.83	6.21	1.83	10.66	2.83	4.02	3.83
2.47	1.00	9.42	2.00	8.20	3.00	3.67	4.00

-----  
 | CALIB |  
 | STANDHYD ( 0205) |  
ID= 1 DT= 2.0 min

Area (ha)= 0.23  
 Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.09
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	39.16	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.38	0.033	2.85	1.033	22.78	2.033	6.71	3.03

3.38	0.067	2.85	1.067	22.78	2.067	6.71	3.07
3.38	0.100	2.85	1.100	22.78	2.100	6.71	3.10
3.38	0.133	2.85	1.133	22.78	2.133	6.71	3.13
3.38	0.167	2.85	1.167	22.78	2.167	6.71	3.17
3.14	0.200	3.26	1.200	113.18	2.200	5.71	3.20
3.14	0.233	3.26	1.233	113.18	2.233	5.71	3.23
3.14	0.267	3.26	1.267	113.18	2.267	5.71	3.27
3.14	0.300	3.26	1.300	113.18	2.300	5.71	3.30
3.14	0.333	3.26	1.333	113.18	2.333	5.71	3.33
2.94	0.367	3.84	1.367	30.05	2.367	4.99	3.37
2.94	0.400	3.84	1.400	30.05	2.400	4.99	3.40
2.94	0.433	3.84	1.433	30.05	2.433	4.99	3.43
2.94	0.467	3.84	1.467	30.05	2.467	4.99	3.47
2.94	0.500	3.84	1.500	30.05	2.500	4.99	3.50
2.76	0.533	4.71	1.533	15.53	2.533	4.45	3.53
2.76	0.567	4.71	1.567	15.53	2.567	4.45	3.57
2.76	0.600	4.71	1.600	15.53	2.600	4.45	3.60
2.76	0.633	4.71	1.633	15.53	2.633	4.45	3.63
2.76	0.667	4.71	1.667	15.53	2.667	4.45	3.67
2.61	0.700	6.21	1.700	10.66	2.700	4.02	3.70
2.60	0.733	6.21	1.733	10.66	2.733	4.02	3.73
2.60	0.767	6.21	1.767	10.66	2.767	4.02	3.77
2.60	0.800	6.21	1.800	10.66	2.800	4.02	3.80
2.60	0.833	6.21	1.833	10.66	2.833	4.02	3.83
2.47	0.867	9.42	1.867	8.20	2.867	3.67	3.87
2.47	0.900	9.42	1.900	8.20	2.900	3.67	3.90
2.47	0.933	9.42	1.933	8.20	2.933	3.67	3.93

2.47 0.967 9.42 | 1.967 8.20 | 2.967 3.67 | 3.97  
 2.47 1.000 9.42 | 2.000 8.20 | 3.000 3.67 | 4.00

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Max.Eff.Inten.(mm/hr)= 113.18 119.79  
 over (min) = 5.00 8.00  
 Storage Coeff. (min)= 1.39 (ii) 7.95 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 8.00  
 Unit Hyd. peak (cms)= 0.47 0.14

\*TOTALS\*

PEAK FLOW (cms)= 0.01 0.02 0.024 (iii)  
 TIME TO PEAK (hrs)= 1.33 1.40 1.37  
 RUNOFF VOLUME (mm)= 45.26 22.71 24.26  
 TOTAL RAINFALL (mm)= 46.26 46.26 46.26  
 RUNOFF COEFFICIENT = 0.98 0.49 0.52

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| DUHYD ( 0009)|
| Inlet Cap.= 0.041|
| #of Inlets= 1|
| Total(cms)= 0.0|
-----
TOTAL HYD.(ID= 1): 0.24 0.04 1.33 31.35
-----
MAJOR SYS.(ID= 2): 0.00 0.00 1.33 31.35
MINOR SYS.(ID= 3): 0.24 0.04 1.33 31.35
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
-----
| CALIB |
| STANDHYD ( 0203)| Area (ha)= 2.45
|ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00
  
```

```

-----
-----
| CALIB |
| STANDHYD ( 0204)| Area (ha)= 0.24
|ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00
  
```

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.18	0.06	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	40.00	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	113.18	122.29	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.40 (ii)	7.26 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.47	0.15	
			*TOTALS*
PEAK FLOW (cms)=	0.03	0.02	0.041 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.33
RUNOFF VOLUME (mm)=	45.26	22.86	31.35
TOTAL RAINFALL (mm)=	46.26	46.26	46.26
RUNOFF COEFFICIENT =	0.98	0.49	0.68

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

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.59	0.86	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	127.80	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	113.18	106.30	
over (min)	5.00	12.00	
Storage Coeff. (min)=	2.82 (ii)	10.38 (ii)	
Unit Hyd. Tpeak (min)=	4.00	12.00	
Unit Hyd. peak (cms)=	0.34	0.10	
			*TOTALS*
PEAK FLOW (cms)=	0.19	0.15	0.272 (iii)
TIME TO PEAK (hrs)=	1.33	1.47	1.33
RUNOFF VOLUME (mm)=	45.26	21.81	27.90
TOTAL RAINFALL (mm)=	46.26	46.26	46.26
RUNOFF COEFFICIENT =	0.98	0.47	0.60

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



```

-----
| CALIB |
| STANHYD ( 0202) | Area (ha)= 0.92
| ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00
-----

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.63 0.29
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 78.32 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 113.18 83.72
over (min) 5.00 10.00
Storage Coeff. (min)= 2.10 (ii) 8.18 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.40 0.13

```

```

*TOTALS*
PEAK FLOW (cms)= 0.12 0.05 0.147 (iii)
TIME TO PEAK (hrs)= 1.33 1.43 1.33
RUNOFF VOLUME (mm)= 45.26 20.07 30.39
TOTAL RAINFALL (mm)= 46.26 46.26 46.26
RUNOFF COEFFICIENT = 0.98 0.43 0.66

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 | AREA QPEAK TPEAK R.V.
| | (ha) (cms) (hrs) (mm)
-----
TOTAL HYD.(ID= 1): 0.92 0.15 1.33 30.39
-----
MAJOR SYS.(ID= 2): 0.00 0.00 0.00 0.00
MINOR SYS.(ID= 3): 0.92 0.15 1.33 30.39

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 0007) |

```

```

| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| | (ha) (cms) (hrs) (mm)
*** W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001
ID1= 1 ( 0203): 2.45 0.272 1.33 27.90
+ ID2= 2 ( 0006): 0.00 0.000 0.00 0.00
=====
ID = 3 ( 0007): 2.45 0.272 1.33 27.90

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 0007) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
| | (ha) (cms) (hrs) (mm)
ID1= 3 ( 0007): 2.45 0.272 1.33 27.90
+ ID2= 2 ( 0009): 0.24 0.041 1.33 31.35
=====
ID = 1 ( 0007): 2.69 0.313 1.33 28.21

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| RESERVOIR( 0008) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
| | OUTFLOW STORAGE | OUTFLOW STORAGE
| | (cms) (ha.m.) | (cms) (ha.m.)
-----
0.0000 0.0000 | 0.1750 0.0640
0.0060 0.0325 | 0.2000 0.0740
0.1000 0.0390 | 0.2300 0.0830
0.1250 0.0520 | 0.2750 0.0900

```

```

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0007) 2.690 0.313 1.33 28.21
OUTFLOW: ID= 1 ( 0008) 2.690 0.102 1.80 27.70
PEAK FLOW REDUCTION [Qout/Qin] (%)= 32.48
TIME SHIFT OF PEAK FLOW (min)= 28.00
MAXIMUM STORAGE USED (ha.m.)= 0.0398

```

```

| ADD HYD ( 0003) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| | (ha) (cms) (hrs) (mm)
ID1= 1 ( 0205): 0.23 0.024 1.37 24.26
+ ID2= 2 ( 0008): 2.69 0.102 1.80 27.70
=====

```

ID = 3 ( 0003): 2.92 0.111 1.67 27.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD ( 0207) Area (ha)= 0.65
ID= 1 DT= 2.0 min Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.31 0.34
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 65.83 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 113.18 87.05
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.89 (ii) 9.35 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.42 0.12

\*TOTALS\*
0.052 (iii)
1.43
20.36
46.26
0.44

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN\* = 73.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD ( 0206) Area (ha)= 2.39
ID= 1 DT= 2.0 min Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.53 0.86
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 126.23 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 113.18 103.65

over (min) 5.00 12.00
Storage Coeff. (min)= 2.80 (ii) 10.57 (ii)
Unit Hyd. Tpeak (min)= 4.00 12.00
Unit Hyd. peak (cms)= 0.35 0.10

PEAK FLOW (cms)= 0.18 0.14 0.258 (iii)
TIME TO PEAK (hrs)= 1.33 1.47 1.37
RUNOFF VOLUME (mm)= 45.26 21.62 27.53
TOTAL RAINFALL (mm)= 46.26 46.26 46.26
RUNOFF COEFFICIENT = 0.98 0.47 0.60

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN\* = 73.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR( 0010) OVERFLOW IS OFF
IN= 2--> OUT= 1
DT= 2.0 min
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1400 0.0584
0.0050 0.0278 | 0.1700 0.0694
0.0700 0.0363 | 0.1900 0.0737
0.1000 0.0478 | 0.3000 0.0767

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0206) 2.390 0.258 1.37 27.53
OUTFLOW: ID= 1 ( 0010) 2.390 0.071 1.90 26.94

PEAK FLOW REDUCTION [Qout/Qin](%)= 27.57
TIME SHIFT OF PEAK FLOW (min)= 32.00
MAXIMUM STORAGE USED (ha.m.)= 0.0367

ADD HYD ( 0001)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0010): 2.39 0.071 1.90 26.94
+ ID2= 2 ( 0207): 0.65 0.052 1.43 20.36
ID = 3 ( 0001): 3.04 0.092 1.77 25.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0001) |
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 0001):  3.04  0.092  1.77  25.53
+ ID2= 2 ( 0009):  0.00  0.000  1.33  31.35
=====
ID = 1 ( 0001):  3.04  0.092  1.77  25.53

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0004) |
| ID= 1 DT= 2.0 min |
-----
          Area   (ha)=  0.55
          Total Imp(%)= 65.00  Dir. Conn.(%)= 65.00

```

```

          IMPERVIOUS   PERVIOUS (i)
          (ha)         (mm)
Surface Area   (ha)=  0.36   0.19
Dep. Storage   (mm)=  1.00   5.00
Average Slope  (%)=  1.00   2.00
Length         (m)=  60.55  40.00
Mannings n    =  0.013   0.250

Max.Eff.Inten.(mm/hr)= 113.18  25.61
                   over (min)=  5.00   8.00
Storage Coeff. (min)=  1.80 (ii)  7.04 (ii)
Unit Hyd. Tpeak (min)=  4.00   8.00
Unit Hyd. peak (cms)=  0.43   0.15

          *TOTALS*
PEAK FLOW      (cms)=  0.11   0.01   0.119 (iii)
TIME TO PEAK   (hrs)=  1.33   1.43   1.33
RUNOFF VOLUME  (mm)=  45.26  12.59  33.82
TOTAL RAINFALL (mm)=  46.26  46.26  46.26
RUNOFF COEFFICIENT =  0.98   0.27   0.73

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0201) |
| ID= 1 DT= 2.0 min |
-----
          Area   (ha)=  2.70
          Total Imp(%)= 81.00  Dir. Conn.(%)= 77.00

```

```

          IMPERVIOUS   PERVIOUS (i)
          (ha)         (mm)
Surface Area   (ha)=  2.19   0.51

```

```

Dep. Storage (mm)=  1.00   5.00
Average Slope (%)=  1.00   2.00
Length (m)=  134.16  40.00
Mannings n    =  0.013   0.250

```

```

Max.Eff.Inten.(mm/hr)= 113.18  37.94
                   over (min)=  5.00   8.00
Storage Coeff. (min)=  2.90 (ii)  6.74 (ii)
Unit Hyd. Tpeak (min)=  4.00   8.00
Unit Hyd. peak (cms)=  0.34   0.16

```

\*TOTALS\*

```

PEAK FLOW      (cms)=  0.63   0.04   0.657 (iii)
TIME TO PEAK   (hrs)=  1.33   1.40   1.33
RUNOFF VOLUME  (mm)=  45.26  14.82  38.25
TOTAL RAINFALL (mm)=  46.26  46.26  46.26
RUNOFF COEFFICIENT =  0.98   0.32   0.83

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0201):  2.70  0.657  1.33  38.25
+ ID2= 2 ( 0004):  0.55  0.119  1.33  33.82
=====
ID = 3 ( 0005):  3.25  0.776  1.33  37.50

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 0005):  3.25  0.776  1.33  37.50
+ ID2= 2 ( 0006):  0.92  0.147  1.33  30.39
=====
ID = 1 ( 0005):  4.17  0.923  1.33  35.93

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR ( 0002) |
OVERFLOW IS OFF

```

```

| IN= 2--> OUT= 1 |
| DT= 2.0 min |
-----
      OUTFLOW   STORAGE | OUTFLOW   STORAGE
      (cms)     (ha.m.) | (cms)     (ha.m.)
      0.0000    0.0000 | 0.3000    0.1350
      0.0130    0.0746 | 0.3750    0.1510
      0.1500    0.0900 | 0.4000    0.1610
      0.2100    0.1200 | 0.4500    0.1725

      AREA      QPEAK    TPEAK      R.V.
      (ha)      (cms)    (hrs)     (mm)
INFLOW : ID= 2 ( 0005)  4.170    0.923    1.33    35.93
OUTFLOW: ID= 1 ( 0002)  4.170    0.155    1.70    35.58

```

```

      PEAK FLOW REDUCTION [Qout/Qin] (%) = 16.74
      TIME SHIFT OF PEAK FLOW (min) = 22.00
      MAXIMUM STORAGE USED (ha.m.) = 0.0923

```

```

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

```

```

V V I SSSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT 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
6.0\VO2\voin.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\83a6b779-8e71-4964-94e9-92861f9f1e2a\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\83a6b779-8e71-4964-94e9-92861f9f1e2a\s

```

DATE: 02/25/2021 TIME: 12:17:28  
 USER:

COMMENTS: \_\_\_\_\_

```

-----

```

```

*****
** SIMULATION : Run 03: 4hr Chicago 10yr **
*****

```

```

| CHICAGO STORM | IDF curve parameters: A=1021.000
| Ptotal= 54.13 mm | B= 3.000
| | C= 0.787
-----
used in: INTENSITY = A / (t + B)^C

```

```

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
4.06	0.17	3.43	1.17	25.32	2.17	7.85	3.17
3.78	0.33	3.92	1.33	135.63	2.33	6.73	3.33
3.54	0.50	4.59	1.50	33.17	2.50	5.91	3.50
3.33	0.67	5.59	1.67	17.50	2.67	5.29	3.67
3.15	0.83	7.28	1.83	12.21	2.83	4.79	3.83
2.99	1.00	10.84	2.00	9.50	3.00	4.39	4.00

```

-----

```

```

| CALIB |
| STANDHYD ( 0205) | Area (ha)= 0.23
| ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.09
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	39.16	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
4.06	0.033	3.43	1.033	25.32	2.033	7.85	3.03
4.06	0.067	3.43	1.067	25.32	2.067	7.85	3.07
4.06	0.100	3.43	1.100	25.32	2.100	7.85	3.10
4.06	0.133	3.43	1.133	25.32	2.133	7.85	3.13
4.06	0.167	3.43	1.167	25.32	2.167	7.85	3.17
3.78	0.200	3.92	1.200	135.63	2.200	6.73	3.20
3.78	0.233	3.92	1.233	135.63	2.233	6.73	3.23
3.78	0.267	3.92	1.267	135.63	2.267	6.73	3.27
3.78	0.300	3.92	1.300	135.63	2.300	6.73	3.30
3.78	0.333	3.92	1.333	135.63	2.333	6.73	3.33
3.54	0.367	4.59	1.367	33.17	2.367	5.91	3.37
3.54	0.400	4.59	1.400	33.17	2.400	5.91	3.40
3.54	0.433	4.59	1.433	33.17	2.433	5.91	3.43
3.54	0.467	4.59	1.467	33.17	2.467	5.91	3.47
3.54	0.500	4.59	1.500	33.17	2.500	5.91	3.50
3.33	0.533	5.59	1.533	17.50	2.533	5.29	3.53
3.33	0.567	5.59	1.567	17.50	2.567	5.29	3.57
3.33	0.600	5.59	1.600	17.50	2.600	5.29	3.60
3.33	0.633	5.59	1.633	17.50	2.633	5.29	3.63
3.33	0.667	5.59	1.667	17.50	2.667	5.29	3.67
3.15	0.700	7.28	1.700	12.21	2.700	4.79	3.70
3.15	0.733	7.28	1.733	12.21	2.733	4.79	3.73
3.15	0.767	7.28	1.767	12.21	2.767	4.79	3.77

3.15	0.800	7.28	1.800	12.21	2.800	4.79	3.80
3.15	0.833	7.28	1.833	12.21	2.833	4.79	3.83
2.99	0.867	10.84	1.867	9.50	2.867	4.39	3.87
2.99	0.900	10.84	1.900	9.50	2.900	4.39	3.90
2.99	0.933	10.84	1.933	9.50	2.933	4.39	3.93
2.99	0.967	10.84	1.967	9.50	2.967	4.39	3.97
2.99	1.000	10.84	2.000	9.50	3.000	4.39	4.00
Max.Eff.Inten.(mm/hr)= 135.63 159.16							
over (min) 5.00 8.00							
Storage Coeff. (min)= 1.29 (ii) 7.15 (ii)							
Unit Hyd. Tpeak (min)= 4.00 8.00							
Unit Hyd. peak (cms)= 0.48 0.15							
*TOTALS*							
PEAK FLOW (cms)= 0.01 0.03 0.033 (iii)							
TIME TO PEAK (hrs)= 1.33 1.40 1.37							
RUNOFF VOLUME (mm)= 53.13 28.89 30.57							
TOTAL RAINFALL (mm)= 54.13 54.13 54.13							
RUNOFF COEFFICIENT = 0.98 0.53 0.56							

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0204) | Area (ha)= 0.24  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
 -----  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.18	0.06
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)= 135.63 162.34		
over (min) 5.00 8.00		
Storage Coeff. (min)= 1.31 (ii) 6.75 (ii)		

Unit Hyd. Tpeak (min)= 4.00 8.00  
 Unit Hyd. peak (cms)= 0.48 0.16

\*TOTALS\*  
 PEAK FLOW (cms)= 0.03 0.02 0.052 (iii)  
 TIME TO PEAK (hrs)= 1.33 1.40 1.33  
 RUNOFF VOLUME (mm)= 53.13 29.07 38.20  
 TOTAL RAINFALL (mm)= 54.13 54.13 54.13  
 RUNOFF COEFFICIENT = 0.98 0.54 0.71

RUNOFF VOLUME (mm)= 53.13 27.86 34.43  
 TOTAL RAINFALL (mm)= 54.13 54.13 54.13  
 RUNOFF COEFFICIENT = 0.98 0.51 0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0202) | Area (ha)= 0.92  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	78.32	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr)=	135.63	112.84
over (min)	5.00	8.00
Storage Coeff. (min)=	1.95 (ii)	7.61 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.41	0.15

\*TOTALS\*  
 PEAK FLOW (cms)= 0.14 0.06 0.191 (iii)  
 TIME TO PEAK (hrs)= 1.33 1.40 1.33  
 RUNOFF VOLUME (mm)= 53.13 25.83 37.02  
 TOTAL RAINFALL (mm)= 54.13 54.13 54.13  
 RUNOFF COEFFICIENT = 0.98 0.48 0.68

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 -----  
 | DUHYD ( 0006) |  
 | Inlet Cap.= 0.147 |  
 | #of Inlets= 1 |  
 | Total(cms)= 0.1 | AREA QPEAK TPEAK R.V.  
 ----- (ha) (cms) (hrs) (mm)  
 TOTAL HYD. (ID= 1): 0.92 0.19 1.33 37.02

-----  
 -----  
 | DUHYD ( 0009) |  
 | Inlet Cap.= 0.041 |  
 | #of Inlets= 1 |  
 | Total(cms)= 0.0 | AREA QPEAK TPEAK R.V.  
 ----- (ha) (cms) (hrs) (mm)  
 TOTAL HYD. (ID= 1): 0.24 0.05 1.33 38.20  
 MAJOR SYS. (ID= 2): 0.01 0.01 1.33 38.20  
 MINOR SYS. (ID= 3): 0.23 0.04 1.27 38.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0203) | Area (ha)= 2.45  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.59	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	127.80	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr)=	135.63	141.91
over (min)	5.00	10.00
Storage Coeff. (min)=	2.62 (ii)	9.66 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.36	0.12

\*TOTALS\*  
 PEAK FLOW (cms)= 0.23 0.21 0.370 (iii)  
 TIME TO PEAK (hrs)= 1.33 1.43 1.37

```

=====
MAJOR SYS. (ID= 2):  0.03   0.04   1.33  37.02
MINOR SYS. (ID= 3):  0.89   0.15   1.27  37.02

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0203):  2.45  0.370  1.37  34.43
+ ID2= 2 ( 0006):  0.03  0.044  1.33  37.02
=====
ID = 3 ( 0007):  2.48  0.413  1.33  34.46

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 0007):  2.48  0.413  1.33  34.46
+ ID2= 2 ( 0009):  0.23  0.041  1.27  38.20
=====
ID = 1 ( 0007):  2.72  0.454  1.33  34.78

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0008) | OVERFLOW IS OFF
| IN= 2--> OUT= 1 |
| DT= 2.0 min |
-----
          OUTFLOW   STORAGE | OUTFLOW   STORAGE
          (cms)     (ha.m.) | (cms)     (ha.m.)
0.0000  0.0000 | 0.1750  0.0640
0.0060  0.0325 | 0.2000  0.0740
0.1000  0.0390 | 0.2300  0.0830
0.1250  0.0520 | 0.2750  0.0900
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
INFLOW : ID= 2 ( 0007)  2.717  0.454  1.33  34.78
OUTFLOW: ID= 1 ( 0008)  2.717  0.117  1.80  34.28

```

PEAK FLOW REDUCTION [Qout/Qin] (%) = 25.69  
TIME SHIFT OF PEAK FLOW (min) = 28.00  
MAXIMUM STORAGE USED (ha.m.) = 0.0477

```

-----
| ADD HYD ( 0003) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0205):  0.23  0.033  1.37  30.57
+ ID2= 2 ( 0008):  2.72  0.117  1.80  34.28
=====
ID = 3 ( 0003):  2.95  0.129  1.60  33.99

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0207) | Area (ha)= 0.65
| ID= 1 DT= 2.0 min | Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10
-----

```

```

          IMPERVIOUS   PERVIOUS (i)
Surface Area (ha)= 0.31 0.34
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 65.83 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 135.63 117.15
over (min) = 5.00 10.00
Storage Coeff. (min)= 1.76 (ii) 8.38 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.43 0.13

```

\*TOTALS\*

```

PEAK FLOW (cms)= 0.00 0.07 0.073 (iii)
TIME TO PEAK (hrs)= 1.33 1.43 1.43
RUNOFF VOLUME (mm)= 53.13 26.16 26.18
TOTAL RAINFALL (mm)= 54.13 54.13 54.13
RUNOFF COEFFICIENT = 0.98 0.48 0.48

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0206) | Area (ha)= 2.39
-----

```

|ID= 1 DT= 2.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.53	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	126.23	40.00
Mannings n	=	0.013	0.250

Max.Eff.Inten.(mm/hr)=	135.63	138.51
over (min)	5.00	10.00
Storage Coeff. (min)=	2.60 (ii)	9.83 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.36	0.11

			*TOTALS*
PEAK FLOW	(cms)=	0.22	0.20
TIME TO PEAK	(hrs)=	1.33	1.37
RUNOFF VOLUME	(mm)=	53.13	34.01
TOTAL RAINFALL	(mm)=	54.13	54.13
RUNOFF COEFFICIENT	=	0.98	0.63

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----

RESERVOIR( 0010)	OVERFLOW IS OFF			
IN= 2--> OUT= 1				
DT= 2.0 min				
	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
	0.0000	0.0000	0.1400	0.0584
	0.0050	0.0278	0.1700	0.0694
	0.0700	0.0363	0.1900	0.0737
	0.1000	0.0478	0.3000	0.0767
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 ( 0206)	2.390	0.352	1.37	34.01
OUTFLOW: ID= 1 ( 0010)	2.390	0.088	1.87	33.42

PEAK FLOW REDUCTION [Qout/Qin] (%)= 24.98  
 TIME SHIFT OF PEAK FLOW (min)= 30.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.0432

-----

| ADD HYD ( 0001) |

1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 ( 0010):	2.39	0.088	1.87	33.42
+ ID2= 2 ( 0207):	0.65	0.073	1.43	26.18
ID = 3 ( 0001):	3.04	0.129	1.53	31.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----

ADD HYD ( 0001)				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 ( 0001):	3.04	0.129	1.53	31.87
+ ID2= 2 ( 0009):	0.01	0.011	1.33	38.20
ID = 1 ( 0001):	3.05	0.129	1.53	31.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----

CALIB			
STANDHYD ( 0004)	Area	(ha)=	0.55
ID= 1 DT= 2.0 min	Total Imp(%)=	65.00	Dir. Conn.(%)= 65.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.36	0.19
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	60.55	40.00
Mannings n	=	0.013	0.250

Max.Eff.Inten.(mm/hr)=	135.63	36.39
over (min)	5.00	8.00
Storage Coeff. (min)=	1.67 (ii)	6.55 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.44	0.16

			*TOTALS*
PEAK FLOW	(cms)=	0.13	0.01
TIME TO PEAK	(hrs)=	1.33	1.33
RUNOFF VOLUME	(mm)=	53.13	40.44
TOTAL RAINFALL	(mm)=	54.13	54.13
RUNOFF COEFFICIENT	=	0.98	0.75

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



```

-----
| CALIB |
| STANDHYD ( 0201) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00
-----

```

```

-----
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.19 0.51
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 134.16 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 135.63 52.90
over (min) 5.00 8.00
Storage Coeff. (min)= 2.70 (ii) 6.27 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.35 0.16

*TOTALS*
PEAK FLOW (cms)= 0.76 0.06 0.802 (iii)
TIME TO PEAK (hrs)= 1.33 1.40 1.33
RUNOFF VOLUME (mm)= 53.13 19.59 45.42
TOTAL RAINFALL (mm)= 54.13 54.13 54.13
RUNOFF COEFFICIENT = 0.98 0.36 0.84
-----

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
ID1= 1 ( 0201): 2.70 0.802 1.33 45.42
+ ID2= 2 ( 0004): 0.55 0.145 1.33 40.44
=====
ID = 3 ( 0005): 3.25 0.947 1.33 44.58
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
-----

```

```

ID1= 3 ( 0005): 3.25 0.947 1.33 44.58
+ ID2= 2 ( 0006): 0.89 0.147 1.27 37.02
=====
ID = 1 ( 0005): 4.14 1.094 1.33 42.96
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0002) | OVERFLOW IS OFF
| IN= 2--> OUT= 1 |
| DT= 2.0 min |
-----
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.3000 0.1350
0.0130 0.0746 | 0.3750 0.1510
0.1500 0.0900 | 0.4000 0.1610
0.2100 0.1200 | 0.4500 0.1725

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0005) 4.135 1.094 1.33 42.96
OUTFLOW: ID= 1 ( 0002) 4.135 0.181 1.70 42.59
-----

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 16.53  
TIME SHIFT OF PEAK FLOW (min)= 22.00  
MAXIMUM STORAGE USED (ha.m.)= 0.1054

```

-----
V V I SSSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y M M 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  
6.0\VO2\voin.dat

Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-0af8143f9a42\216ebed7-3277-4311-941d-32d3a9d2f272\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-0af8143f9a42\216ebed7-3277-4311-941d-32d3a9d2f272\s

DATE: 02/25/2021 TIME: 12:17:28  
 USER:

CALIB				
STANDHYD ( 0205)		Area (ha)=	0.23	
ID= 1 DT= 2.0 min		Total Imp(%)=	59.00	Dir. Conn.(%)= 7.00
-----				
		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.14	0.09	
Dep. Storage	(mm)=	1.00	5.00	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	39.16	40.00	
Mannings n	=	0.013	0.250	

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
 \*\* SIMULATION : Run 04: 4hr Chicago 25yr \*\*  
 \*\*\*\*\*

-----  
 | CHICAGO STORM | IDF curve parameters: A=1100.000  
 | Ptotal= 62.15 mm | B= 2.000  
 C= 0.776  
 -----  
 used in: INTENSITY = A / (t + B)^C  
  
 Duration of storm = 4.00 hrs  
 Storm time step = 10.00 min  
 Time to peak ratio = 0.33

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
4.78	0.17	4.06	1.17	27.34	2.17	9.00	3.17
4.46	0.33	4.62	1.33	159.94	2.33	7.77	3.33
4.19	0.50	5.38	1.50	35.45	2.50	6.86	3.50
3.95	0.67	6.51	1.67	19.27	2.67	6.16	3.67
3.74	0.83	8.38	1.83	13.70	2.83	5.61	3.83
3.55	1.00	12.24	2.00	10.80	3.00	5.16	4.00

----- TRANSFORMED HYETOGRAPH -----							
RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
4.78	0.033	4.06	1.033	27.34	2.033	9.00	3.03
4.78	0.067	4.06	1.067	27.34	2.067	9.00	3.07
4.78	0.100	4.06	1.100	27.34	2.100	9.00	3.10
4.78	0.133	4.06	1.133	27.34	2.133	9.00	3.13
4.78	0.167	4.06	1.167	27.34	2.167	9.00	3.17
4.78	0.200	4.62	1.200	159.94	2.200	7.77	3.20
4.46	0.233	4.62	1.233	159.94	2.233	7.77	3.23
4.46	0.267	4.62	1.267	159.94	2.267	7.77	3.27
4.46	0.300	4.62	1.300	159.94	2.300	7.77	3.30
4.46	0.333	4.62	1.333	159.94	2.333	7.77	3.33
4.19	0.367	5.38	1.367	35.45	2.367	6.86	3.37
4.19	0.400	5.38	1.400	35.45	2.400	6.86	3.40
4.19	0.433	5.38	1.433	35.45	2.433	6.86	3.43
4.19	0.467	5.38	1.467	35.45	2.467	6.86	3.47
4.19	0.500	5.38	1.500	35.45	2.500	6.86	3.50
3.95	0.533	6.51	1.533	19.27	2.533	6.16	3.53
3.95	0.567	6.51	1.567	19.27	2.567	6.16	3.57
3.95							

3.95	0.600	6.51	1.600	19.27	2.600	6.16	3.60
3.95	0.633	6.51	1.633	19.27	2.633	6.16	3.63
3.95	0.667	6.51	1.667	19.27	2.667	6.16	3.67
3.74	0.700	8.38	1.700	13.70	2.700	5.61	3.70
3.74	0.733	8.38	1.733	13.70	2.733	5.61	3.73
3.74	0.767	8.38	1.767	13.70	2.767	5.61	3.77
3.74	0.800	8.38	1.800	13.70	2.800	5.61	3.80
3.74	0.833	8.38	1.833	13.70	2.833	5.61	3.83
3.55	0.867	12.24	1.867	10.80	2.867	5.16	3.87
3.55	0.900	12.24	1.900	10.80	2.900	5.16	3.90
3.55	0.933	12.24	1.933	10.80	2.933	5.16	3.93
3.55	0.967	12.24	1.967	10.80	2.967	5.16	3.97
3.55	1.000	12.24	2.000	10.80	3.000	5.16	4.00

Max.Eff.Inten. (mm/hr)=	159.94	203.77	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.21 (ii)	6.52 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.49	0.16	
*TOTALS*			
PEAK FLOW (cms)=	0.01	0.04	0.043 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.37
RUNOFF VOLUME (mm)=	61.15	35.46	37.24
TOTAL RAINFALL (mm)=	62.15	62.15	62.15
RUNOFF COEFFICIENT =	0.98	0.57	0.60

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0204) | Area (ha)= 0.24
```

|ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00

```
-----
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.18 0.06
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten. (mm/hr)= 159.94 207.70
over (min) 5.00 8.00
Storage Coeff. (min)= 1.22 (ii) 6.32 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.49 0.16

PEAK FLOW (cms)= 0.04 0.03 0.064 (iii)
TIME TO PEAK (hrs)= 1.33 1.40 1.33
RUNOFF VOLUME (mm)= 61.15 35.66 45.33
TOTAL RAINFALL (mm)= 62.15 62.15 62.15
RUNOFF COEFFICIENT = 0.98 0.57 0.73
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
TOTAL HYD.(ID= 1): 0.24 0.06 1.33 45.33
=====
MAJOR SYS.(ID= 2): 0.02 0.02 1.33 45.33
MINOR SYS.(ID= 3): 0.22 0.04 1.23 45.33
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0203) | Area (ha)= 2.45
|ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.59 0.86
Dep. Storage (mm)= 1.00 5.00
```

Average Slope (%) = 1.00 2.00  
 Length (m) = 127.80 40.00  
 Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr) = 159.94 182.42  
 over (min) = 5.00 10.00  
 Storage Coeff. (min) = 2.45 (ii) 9.04 (ii)  
 Unit Hyd. Tpeak (min) = 4.00 10.00  
 Unit Hyd. peak (cms) = 0.37 0.12

\*TOTALS\*  
 PEAK FLOW (cms) = 0.28 0.27 0.460 (iii)  
 TIME TO PEAK (hrs) = 1.33 1.43 1.37  
 RUNOFF VOLUME (mm) = 61.15 34.30 41.28  
 TOTAL RAINFALL (mm) = 62.15 62.15 62.15  
 RUNOFF COEFFICIENT = 0.98 0.55 0.66

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
TOTAL HYD.(ID= 1): 0.92 0.23 1.33 43.95
=====
MAJOR SYS.(ID= 2): 0.07 0.09 1.33 43.95
MINOR SYS.(ID= 3): 0.85 0.15 1.23 43.95
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0203): 2.45 0.460 1.37 41.28
+ ID2= 2 ( 0006): 0.07 0.088 1.33 43.95
=====
ID = 3 ( 0007): 2.52 0.547 1.33 41.36
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 3 + 2 = 1 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 0007): 2.52 0.547 1.33 41.36
+ ID2= 2 ( 0009): 0.22 0.041 1.23 45.33
=====
ID = 1 ( 0007): 2.75 0.588 1.33 41.68
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0008) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1750 0.0640
0.0060 0.0325 | 0.2000 0.0740
0.1000 0.0390 | 0.2300 0.0830
  
```

```

-----
| CALIB |
| STANDHYD ( 0202) | Area (ha)= 0.92
| ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00
-----
  
```

IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha) = 0.63 0.29  
 Dep. Storage (mm) = 1.00 5.00  
 Average Slope (%) = 1.00 2.00  
 Length (m) = 78.32 40.00  
 Mannings n = 0.013 0.250  
 Max.Eff.Inten.(mm/hr) = 159.94 146.22  
 over (min) = 5.00 8.00  
 Storage Coeff. (min) = 1.83 (ii) 7.13 (ii)  
 Unit Hyd. Tpeak (min) = 4.00 8.00  
 Unit Hyd. peak (cms) = 0.42 0.15

\*TOTALS\*  
 PEAK FLOW (cms) = 0.17 0.09 0.235 (iii)  
 TIME TO PEAK (hrs) = 1.33 1.40 1.33  
 RUNOFF VOLUME (mm) = 61.15 32.01 43.95  
 TOTAL RAINFALL (mm) = 62.15 62.15 62.15  
 RUNOFF COEFFICIENT = 0.98 0.51 0.71

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

	0.1250	0.0520	0.2750	0.0900
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 ( 0007)	2.747	0.588	1.33	41.68
OUTFLOW: ID= 1 ( 0008)	2.747	0.146	1.77	41.18

PEAK FLOW REDUCTION [Qout/Qin] (%) = 24.78  
 TIME SHIFT OF PEAK FLOW (min) = 26.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0570

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 ( 0205):	0.23	0.043	1.37	37.24
+ ID2= 2 ( 0008):	2.75	0.146	1.77	41.18
=====				
ID = 3 ( 0003):	2.98	0.158	1.70	40.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	Area	(ha)	Total Imp(%)	Dir. Conn.(%)
CALIB				
STANDHYD ( 0207)	0.65			
ID= 1 DT= 2.0 min	47.00		0.10	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)	0.31	0.34
Dep. Storage (mm)	1.00	5.00
Average Slope (%)	1.00	2.00
Length (m)	65.83	40.00
Mannings n	0.013	0.250
Max.Eff.Inten. (mm/hr)	159.94	151.61
over (min)	5.00	8.00
Storage Coeff. (min)	1.65 (ii)	7.62 (ii)
Unit Hyd. Tpeak (min)	4.00	8.00
Unit Hyd. peak (cms)	0.44	0.15

\*TOTALS\*  
 PEAK FLOW (cms) = 0.00 0.10 0.101 (iii)  
 TIME TO PEAK (hrs) = 1.33 1.40 1.40  
 RUNOFF VOLUME (mm) = 61.15 32.38 32.40  
 TOTAL RAINFALL (mm) = 62.15 62.15 62.15  
 RUNOFF COEFFICIENT = 0.98 0.52 0.52

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	Area	(ha)	Total Imp(%)	Dir. Conn.(%)
CALIB				
STANDHYD ( 0206)	2.39			
ID= 1 DT= 2.0 min	64.00		25.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)	1.53	0.86
Dep. Storage (mm)	1.00	5.00
Average Slope (%)	1.00	2.00
Length (m)	126.23	40.00
Mannings n	0.013	0.250
Max.Eff.Inten. (mm/hr)	159.94	178.19
over (min)	5.00	10.00
Storage Coeff. (min)	2.43 (ii)	9.20 (ii)
Unit Hyd. Tpeak (min)	4.00	10.00
Unit Hyd. peak (cms)	0.37	0.12

\*TOTALS\*  
 PEAK FLOW (cms) = 0.26 0.26 0.439 (iii)  
 TIME TO PEAK (hrs) = 1.33 1.43 1.37  
 RUNOFF VOLUME (mm) = 61.15 34.05 40.83  
 TOTAL RAINFALL (mm) = 62.15 62.15 62.15  
 RUNOFF COEFFICIENT = 0.98 0.55 0.66

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
RESERVOIR( 0010)				
IN= 2---> OUT= 1				
DT= 2.0 min				
OVERFLOW IS OFF				
	0.0000	0.0000	0.1400	0.0584
	0.0050	0.0278	0.1700	0.0694
	0.0700	0.0363	0.1900	0.0737
	0.1000	0.0478	0.3000	0.0767

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 ( 0206)	2.390	0.439	1.37	40.83

OUTFLOW: ID= 1 ( 0010) 2.390 0.110 1.83 40.24

PEAK FLOW REDUCTION [Qout/Qin] (%) = 25.07  
 TIME SHIFT OF PEAK FLOW (min) = 28.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0505

RUNOFF VOLUME (mm) = 61.15 21.62 47.31  
 TOTAL RAINFALL (mm) = 62.15 62.15 62.15  
 RUNOFF COEFFICIENT = 0.98 0.35 0.76

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0001) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0010):  2.39  0.110  1.83  40.24
+ ID2= 2 ( 0207):  0.65  0.101  1.40  32.40
=====
ID = 3 ( 0001):  3.04  0.160  1.47  38.56
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB          |
| STANDHYD ( 0201) | Area (ha) = 2.70
| ID= 1 DT= 2.0 min | Total Imp(%) = 81.00 Dir. Conn.(%) = 77.00
-----
  
```

```

-----
          IMPERVIOUS   PERVIOUS (i)
Surface Area (ha) = 2.19 0.51
Dep. Storage (mm) = 1.00 5.00
Average Slope (%) = 1.00 2.00
Length (m) = 134.16 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr) = 159.94 70.48
over (min) = 5.00 6.00
Storage Coeff. (min) = 2.53 (ii) 5.87 (ii)
Unit Hyd. Tpeak (min) = 4.00 6.00
Unit Hyd. peak (cms) = 0.36 0.19
  
```

\*TOTALS\*

```

PEAK FLOW (cms) = 0.90 0.08 0.971 (iii)
TIME TO PEAK (hrs) = 1.33 1.37 1.33
RUNOFF VOLUME (mm) = 61.15 24.82 52.80
TOTAL RAINFALL (mm) = 62.15 62.15 62.15
RUNOFF COEFFICIENT = 0.98 0.40 0.85
  
```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0001) |
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 0001):  3.04  0.160  1.47  38.56
+ ID2= 2 ( 0009):  0.02  0.023  1.33  45.33
=====
ID = 1 ( 0001):  3.06  0.160  1.47  38.60
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB          |
| STANDHYD ( 0004) | Area (ha) = 0.55
| ID= 1 DT= 2.0 min | Total Imp(%) = 65.00 Dir. Conn.(%) = 65.00
-----
  
```

```

-----
          IMPERVIOUS   PERVIOUS (i)
Surface Area (ha) = 0.36 0.19
Dep. Storage (mm) = 1.00 5.00
Average Slope (%) = 1.00 2.00
Length (m) = 60.55 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr) = 159.94 49.22
over (min) = 5.00 8.00
Storage Coeff. (min) = 1.57 (ii) 6.13 (ii)
Unit Hyd. Tpeak (min) = 4.00 8.00
Unit Hyd. peak (cms) = 0.45 0.17
  
```

\*TOTALS\*

```

PEAK FLOW (cms) = 0.16 0.02 0.174 (iii)
TIME TO PEAK (hrs) = 1.33 1.40 1.33
  
```

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0201):  2.70  0.971  1.33  52.80
+ ID2= 2 ( 0004):  0.55  0.174  1.33  47.31
  
```

=====  
 ID = 3 ( 0005): 3.25 1.145 1.33 51.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | ADD HYD ( 0005) |  
3 + 2 = 1

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 ( 0005):	3.25	1.145	1.33	51.87
+ ID2= 2 ( 0006):	0.85	0.147	1.23	43.95

-----  
 ID = 1 ( 0005): 4.10 1.292 1.33 50.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | RESERVOIR( 0002) | OVERFLOW IS OFF  
 | IN= 2---> OUT= 1 |  
DT= 2.0 min

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.3000	0.1350
	0.0130	0.0746	0.3750	0.1510
	0.1500	0.0900	0.4000	0.1610
	0.2100	0.1200	0.4500	0.1725

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0005)	4.095	1.292	1.33	50.23
OUTFLOW: ID= 1 ( 0002)	4.095	0.210	1.70	49.87

PEAK FLOW REDUCTION [Qout/Qin] (%) = 16.22  
 TIME SHIFT OF PEAK FLOW (min) = 22.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.1198

-----  
 V V I SSSSS U U A L (v 6.0.2001)  
 V V I SS U U A A L  
 V V I SS U U A A A A L  
 V V I SS U U A A L  
 VV I SSSSS UUUUU A A LLLLL  
  
 OOO TTTTT TTTTT H H Y Y M M OOO TM  
 O O T T H H Y Y MM MM O O  
 O O T T H H Y M M O O  
 OOO T T H H Y M M OOO

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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  
 6.0\VO2\voim.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\b55279ea-64ee-4c1d-be37-98f5e7498f97\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\b55279ea-64ee-4c1d-be37-98f5e7498f97\s

DATE: 02/25/2021

TIME: 12:17:28

USER:

COMMENTS: \_\_\_\_\_

-----  
 \*\*\*\*\*  
 \*\* SIMULATION : Run 05: 4hr Chicago 50yr \*\*  
 \*\*\*\*\*

-----  
 | CHICAGO STORM | IDF curve parameters: A=1448.000  
 | Ptotal= 70.32 mm | B= 3.000  
 ----- C= 0.803

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

Duration of storm = 4.00 hrs  
 Storm time step = 10.00 min  
 Time to peak ratio = 0.33

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
0.17	4.16	1.17	32.64	2.17	9.72	3.17	
4.94	0.33	4.76	1.33	184.62	2.33	8.29	3.33
4.59	0.50	5.60	1.50	43.10	2.50	7.26	3.50
4.29	0.67	6.86	1.67	22.23	2.67	6.47	3.67
4.03							

3.81	0.83	9.00	1.83	15.32	2.83	5.85	3.83
3.61	1.00	13.56	2.00	11.84	3.00	5.35	4.00

4.29	0.467	5.60	1.467	43.10	2.467	7.26	3.47
4.29	0.500	5.60	1.500	43.10	2.500	7.26	3.50
4.03	0.533	6.86	1.533	22.23	2.533	6.47	3.53
4.03	0.567	6.86	1.567	22.23	2.567	6.47	3.57
4.03	0.600	6.86	1.600	22.23	2.600	6.47	3.60
4.03	0.633	6.86	1.633	22.23	2.633	6.47	3.63
4.03	0.667	6.86	1.667	22.23	2.667	6.47	3.67
4.03	0.700	9.00	1.700	15.32	2.700	5.85	3.70
3.81	0.733	9.00	1.733	15.32	2.733	5.85	3.73
3.81	0.767	9.00	1.767	15.32	2.767	5.85	3.77
3.81	0.800	9.00	1.800	15.32	2.800	5.85	3.80
3.81	0.833	9.00	1.833	15.32	2.833	5.85	3.83
3.81	0.867	13.56	1.867	11.84	2.867	5.35	3.87
3.61	0.900	13.56	1.900	11.84	2.900	5.35	3.90
3.61	0.933	13.56	1.933	11.84	2.933	5.35	3.93
3.61	0.967	13.56	1.967	11.84	2.967	5.35	3.97
3.61	1.000	13.56	2.000	11.84	3.000	5.35	4.00

```

-----
-----
| CALIB |
| STANDHYD ( 0205) | Area (ha)= 0.23
| ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.09
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	39.16	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```

----- TRANSFORMED HYETOGRAPH -----
RAIN      TIME      RAIN | TIME      RAIN | TIME      RAIN | TIME
mm/hr     hrs    mm/hr | hrs    mm/hr | hrs    mm/hr | hrs
-----
4.94      0.033  4.16 | 1.033  32.64 | 2.033  9.72 | 3.03
4.94      0.067  4.16 | 1.067  32.64 | 2.067  9.72 | 3.07
4.94      0.100  4.16 | 1.100  32.64 | 2.100  9.72 | 3.10
4.94      0.133  4.16 | 1.133  32.64 | 2.133  9.72 | 3.13
4.94      0.167  4.16 | 1.167  32.64 | 2.167  9.72 | 3.17
4.94      0.200  4.76 | 1.200 184.62 | 2.200  8.29 | 3.20
4.59      0.233  4.76 | 1.233 184.62 | 2.233  8.29 | 3.23
4.59      0.267  4.76 | 1.267 184.62 | 2.267  8.29 | 3.27
4.59      0.300  4.76 | 1.300 184.62 | 2.300  8.29 | 3.30
4.59      0.333  4.76 | 1.333 184.62 | 2.333  8.29 | 3.33
4.59      0.367  5.60 | 1.367  43.10 | 2.367  7.26 | 3.37
4.29      0.400  5.60 | 1.400  43.10 | 2.400  7.26 | 3.40
4.29      0.433  5.60 | 1.433  43.10 | 2.433  7.26 | 3.43

```

Max.Eff.Inten. (mm/hr)=	184.62	251.73
over (min)	5.00	8.00
Storage Coeff. (min)=	1.14 (ii)	6.02 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.50	0.17

	(i)	(ii)	(iii)
PEAK FLOW (cms)=	0.01	0.05	0.055 (iii)
TIME TO PEAK (hrs)=	1.33	1.40	1.37
RUNOFF VOLUME (mm)=	69.32	42.36	44.23
TOTAL RAINFALL (mm)=	70.32	70.32	70.32
RUNOFF COEFFICIENT =	0.99	0.60	0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL



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

```

-----
| CALIB
| STANDHYD ( 0204)| Area (ha)= 0.24
|ID= 1 DT= 2.0 min| Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.18	0.06
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	184.62	256.44
over (min)	5.00	6.00
Storage Coeff. (min)=	1.15 (ii)	5.97 (ii)
Unit Hyd. Tpeak (min)=	4.00	6.00
Unit Hyd. peak (cms)=	0.50	0.19
PEAK FLOW (cms)=	0.05	0.04
TIME TO PEAK (hrs)=	1.33	1.37
RUNOFF VOLUME (mm)=	69.32	42.58
TOTAL RAINFALL (mm)=	70.32	70.32
RUNOFF COEFFICIENT =	0.99	0.61

\*TOTALS\*  
0.081 (iii)

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0009)|
| Inlet Cap.= 0.041|
| #of Inlets= 1|
| Total(cms)= 0.0| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
-----
TOTAL HYD.(ID= 1): 0.24 0.08 1.33 52.72
=====
MAJOR SYS.(ID= 2): 0.03 0.04 1.33 52.72
MINOR SYS.(ID= 3): 0.21 0.04 1.23 52.72
-----
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----

```

```

-----
| CALIB
| STANDHYD ( 0203)| Area (ha)= 2.45
|ID= 1 DT= 2.0 min| Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.59	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	127.80	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	184.62	226.14
over (min)	5.00	10.00
Storage Coeff. (min)=	2.32 (ii)	8.54 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.38	0.13
PEAK FLOW (cms)=	0.32	0.34
TIME TO PEAK (hrs)=	1.33	1.43
RUNOFF VOLUME (mm)=	69.32	41.09
TOTAL RAINFALL (mm)=	70.32	70.32
RUNOFF COEFFICIENT =	0.99	0.58

\*TOTALS\*  
0.562 (iii)

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB
| STANDHYD ( 0202)| Area (ha)= 0.92
|ID= 1 DT= 2.0 min| Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	78.32	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	184.62	182.54
over (min)	5.00	8.00
Storage Coeff. (min)=	1.73 (ii)	6.73 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.43	0.16
PEAK FLOW (cms)=	0.19	0.11
TIME TO PEAK (hrs)=	1.33	1.40
RUNOFF VOLUME (mm)=	69.32	38.55

\*TOTALS\*  
0.281 (iii)

TOTAL RAINFALL (mm) = 70.32 70.32 70.32  
 RUNOFF COEFFICIENT = 0.99 0.55 0.73

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	0.92	0.28	1.33	51.16
MAJOR SYS. (ID= 2):	0.12	0.13	1.33	51.16
MINOR SYS. (ID= 3):	0.80	0.15	1.23	51.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0203):	2.45	0.562	1.37	48.42
+ ID2= 2 ( 0006):	0.12	0.134	1.33	51.16
ID = 3 ( 0007):	2.57	0.691	1.33	48.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 3 + 2 = 1 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 ( 0007):	2.57	0.691	1.33	48.55
+ ID2= 2 ( 0009):	0.21	0.041	1.23	52.72
ID = 1 ( 0007):	2.78	0.732	1.33	48.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR ( 0008) |
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----

```

OVERFLOW IS OFF

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1750	0.0640
	0.0060	0.0325	0.2000	0.0740
	0.1000	0.0390	0.2300	0.0830
	0.1250	0.0520	0.2750	0.0900

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0007)	2.777	0.732	1.33	48.86
OUTFLOW: ID= 1 ( 0008)	2.777	0.186	1.73	48.37

PEAK FLOW REDUCTION [Qout/Qin] (%) = 25.41  
 TIME SHIFT OF PEAK FLOW (min) = 24.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0684

```

-----
| ADD HYD ( 0003) |
| 1 + 2 = 3 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0205):	0.23	0.055	1.37	44.23
+ ID2= 2 ( 0008):	2.78	0.186	1.73	48.37
ID = 3 ( 0003):	3.01	0.204	1.60	48.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0207) |
| ID= 1 DT= 2.0 min |
-----

```

	Area (ha)	Imp (%)	Dir. Conn. (%)
	0.65	47.00	0.10

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.31	0.34
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	65.83	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr)=	184.62	189.04
over (min)	5.00	8.00
Storage Coeff. (min)=	1.56 (ii)	7.03 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.45	0.15

\*TOTALS\*

	(cms)	(hrs)	(mm)
PEAK FLOW	0.00	0.13	0.130 (iii)
TIME TO PEAK	1.33	1.40	1.40

RUNOFF VOLUME (mm) = 69.32 38.96 38.99  
 TOTAL RAINFALL (mm) = 70.32 70.32 70.32  
 RUNOFF COEFFICIENT = 0.99 0.55 0.55

0.0000 0.0000 | 0.1400 0.0584  
 0.0050 0.0278 | 0.1700 0.0694  
 0.0700 0.0363 | 0.1900 0.0737  
 0.1000 0.0478 | 0.3000 0.0767

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0206)	2.390	0.537	1.37	47.94
OUTFLOW: ID= 1 ( 0010)	2.390	0.143	1.80	47.35

PEAK FLOW REDUCTION [Qout/Qin] (%) = 26.56  
 TIME SHIFT OF PEAK FLOW (min) = 26.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0594

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0206) | Area (ha) = 2.39  
 | ID= 1 DT= 2.0 min | Total Imp(%) = 64.00 Dir. Conn.(%) = 25.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha) =	1.53	0.86
Dep. Storage (mm) =	1.00	5.00
Average Slope (%) =	1.00	2.00
Length (m) =	126.23	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten. (mm/hr) =	184.62	221.06
over (min)	5.00	10.00
Storage Coeff. (min) =	2.30 (ii)	8.69 (ii)
Unit Hyd. Tpeak (min) =	4.00	10.00
Unit Hyd. peak (cms) =	0.38	0.12

\*TOTALS\*  
 0.537 (iii)  
 1.37  
 47.94  
 70.32  
 0.68

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 -----  
 | RESERVOIR ( 0010) | OVERFLOW IS OFF  
 | IN= 2---> OUT= 1 |  
 | DT= 2.0 min | OUTFLOW STORAGE | OUTFLOW STORAGE  
 | | (cms) (ha.m.) | | (cms) (ha.m.)  
 -----

-----  
 -----  
 | ADD HYD ( 0001) |  
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.  
 | | (ha) (cms) (hrs) (mm)  
 ID1= 1 ( 0010): 2.39 0.143 1.80 47.35  
 + ID2= 2 ( 0207): 0.65 0.130 1.40 38.99  
 =====  
 ID = 3 ( 0001): 3.04 0.208 1.43 45.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 -----  
 | ADD HYD ( 0001) |  
 | 3 + 2 = 1 | AREA QPEAK TPEAK R.V.  
 | | (ha) (cms) (hrs) (mm)  
 ID1= 3 ( 0001): 3.04 0.208 1.43 45.56  
 + ID2= 2 ( 0009): 0.03 0.040 1.33 52.72  
 =====  
 ID = 1 ( 0001): 3.07 0.211 1.40 45.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0004) | Area (ha) = 0.55  
 | ID= 1 DT= 2.0 min | Total Imp(%) = 65.00 Dir. Conn.(%) = 65.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha) =	0.36	0.19
Dep. Storage (mm) =	1.00	5.00
Average Slope (%) =	1.00	2.00
Length (m) =	60.55	40.00
Mannings n =	0.013	0.250

```

Max.Eff.Inten.(mm/hr)= 184.62      63.69
                    over (min)      5.00      6.00
Storage Coeff. (min)= 1.48 (ii)    5.79 (ii)
Unit Hyd. Tpeak (min)= 4.00      6.00
Unit Hyd. peak (cms)= 0.46      0.19

                    *TOTALS*
PEAK FLOW (cms)= 0.18      0.03      0.208 (iii)
TIME TO PEAK (hrs)= 1.33      1.37      1.33
RUNOFF VOLUME (mm)= 69.32    26.79    54.42
TOTAL RAINFALL (mm)= 70.32    70.32    70.32
RUNOFF COEFFICIENT = 0.99      0.38      0.77

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0201) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00
-----

```

```

                    IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)= 2.19      0.51
Dep. Storage (mm)= 1.00      5.00
Average Slope (%)= 1.00      2.00
Length (m)= 134.16    40.00
Mannings n = 0.013    0.250

Max.Eff.Inten.(mm/hr)= 184.62    90.09
                    over (min)    5.00      6.00
Storage Coeff. (min)= 2.38 (ii)    5.54 (ii)
Unit Hyd. Tpeak (min)= 4.00      6.00
Unit Hyd. peak (cms)= 0.38      0.20

                    *TOTALS*
PEAK FLOW (cms)= 1.04      0.11      1.138 (iii)
TIME TO PEAK (hrs)= 1.33      1.37      1.33
RUNOFF VOLUME (mm)= 69.32    30.46    60.38
TOTAL RAINFALL (mm)= 70.32    70.32    70.32
RUNOFF COEFFICIENT = 0.99      0.43      0.86

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
                    (ha) (cms) (hrs) (mm)
ID1= 1 ( 0201): 2.70 1.138 1.33 60.38
+ ID2= 2 ( 0004): 0.55 0.208 1.33 54.42
=====
ID = 3 ( 0005): 3.25 1.346 1.33 59.37

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
                    (ha) (cms) (hrs) (mm)
ID1= 3 ( 0005): 3.25 1.346 1.33 59.37
+ ID2= 2 ( 0006): 0.80 0.147 1.23 51.16
=====
ID = 1 ( 0005): 4.05 1.493 1.33 57.75

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0002) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.3000 0.1350
0.0130 0.0746 | 0.3750 0.1510
0.1500 0.0900 | 0.4000 0.1610
0.2100 0.1200 | 0.4500 0.1725

```

```

                    AREA QPEAK TPEAK R.V.
                    (ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0005) 4.049 1.493 1.33 57.75
OUTFLOW: ID= 1 ( 0002) 4.049 0.296 1.60 57.38

PEAK FLOW REDUCTION [Qout/Qin](%)= 19.84
TIME SHIFT OF PEAK FLOW (min)= 16.00
MAXIMUM STORAGE USED (ha.m.)= 0.1344

```

```

-----
FINISH
=====

```

=====

```
V V I SSSSS U U A L (v 6.0.2001)
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  
 6.0\VO2\voim.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\2897fe6f-48b3-47f6-807f-88acc70342e9\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\VH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\2897fe6f-48b3-47f6-807f-88acc70342e9\s

DATE: 02/25/2021 TIME: 12:17:28

USER:

COMMENTS: \_\_\_\_\_

```
*****
** SIMULATION : Run 06: 4hr Chicago 100yr **
*****
```

```
-----
| CHICAGO STORM | IDF curve parameters: A=1770.000
| Ptotal= 78.03 mm | B= 4.000
| | C= 0.820
-----
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
```

Time to peak ratio = 0.33

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
5.19	0.17	4.34	1.17	38.21	2.17	10.60	3.17
4.81	0.33	5.00	1.33	203.31	2.33	8.96	3.33
4.48	0.50	5.92	1.50	50.96	2.50	7.78	3.50
4.20	0.67	7.33	1.67	25.51	2.67	6.90	3.67
3.96	0.83	9.77	1.83	17.18	2.83	6.21	3.83
3.74	1.00	15.10	2.00	13.06	3.00	5.65	4.00

```
-----
| CALIB |
| STANDHYD ( 0205) | Area (ha)= 0.23
| ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00
-----
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.09
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	39.16	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

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

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
5.19	0.033	4.34	1.033	38.21	2.033	10.60	3.03
5.19	0.067	4.34	1.067	38.21	2.067	10.60	3.07
5.19	0.100	4.34	1.100	38.21	2.100	10.60	3.10
5.19	0.133	4.34	1.133	38.21	2.133	10.60	3.13
5.19	0.167	4.34	1.167	38.21	2.167	10.60	3.17
4.81	0.200	5.00	1.200	203.31	2.200	8.96	3.20

4.81	0.233	5.00	1.233	203.31	2.233	8.96	3.23
	0.267	5.00	1.267	203.31	2.267	8.96	3.27
4.81							
4.81	0.300	5.00	1.300	203.31	2.300	8.96	3.30
	0.333	5.00	1.333	203.31	2.333	8.96	3.33
4.81							
4.81	0.367	5.92	1.367	50.96	2.367	7.78	3.37
4.48							
4.48	0.400	5.92	1.400	50.96	2.400	7.78	3.40
	0.433	5.92	1.433	50.96	2.433	7.78	3.43
4.48							
4.48	0.467	5.92	1.467	50.96	2.467	7.78	3.47
	0.500	5.92	1.500	50.96	2.500	7.78	3.50
4.48							
4.20	0.533	7.33	1.533	25.51	2.533	6.90	3.53
	0.567	7.33	1.567	25.51	2.567	6.90	3.57
4.20							
4.20	0.600	7.33	1.600	25.51	2.600	6.90	3.60
	0.633	7.33	1.633	25.51	2.633	6.90	3.63
4.20							
4.20	0.667	7.33	1.667	25.51	2.667	6.90	3.67
	0.700	9.77	1.700	17.18	2.700	6.21	3.70
3.96							
3.96	0.733	9.77	1.733	17.18	2.733	6.21	3.73
	0.767	9.77	1.767	17.18	2.767	6.21	3.77
3.96							
3.96	0.800	9.77	1.800	17.18	2.800	6.21	3.80
	0.833	9.77	1.833	17.18	2.833	6.21	3.83
3.96							
3.96	0.867	15.10	1.867	13.06	2.867	5.65	3.87
3.74							
3.74	0.900	15.10	1.900	13.06	2.900	5.65	3.90
	0.933	15.10	1.933	13.06	2.933	5.65	3.93
3.74							
3.74	0.967	15.10	1.967	13.06	2.967	5.65	3.97
	1.000	15.10	2.000	13.06	3.000	5.65	4.00

Max.Eff.Inten. (mm/hr)=	203.31	291.90
over (min)	5.00	6.00
Storage Coeff. (min)=	1.10 (ii)	5.69 (ii)
Unit Hyd. Tpeak (min)=	4.00	6.00
Unit Hyd. peak (cms)=	0.50	0.19

PEAK FLOW (cms)=	0.01	0.06	0.069 (iii)
TIME TO PEAK (hrs)=	1.33	1.37	1.37
RUNOFF VOLUME (mm)=	77.03	49.04	50.98
TOTAL RAINFALL (mm)=	78.03	78.03	78.03
RUNOFF COEFFICIENT =	0.99	0.63	0.65

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
-----  
-----  
| CALIB |  
| STANDHYD ( 0204) | Area (ha)= 0.24  
|ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
-----

		IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.18		0.06
Dep. Storage (mm)=	1.00		5.00
Average Slope (%)=	1.00		2.00
Length (m)=	40.00		40.00
Mannings n =	0.013		0.250
Max.Eff.Inten. (mm/hr)=	203.31		297.22
over (min)	5.00		6.00
Storage Coeff. (min)=	1.11 (ii)		5.74 (ii)
Unit Hyd. Tpeak (min)=	4.00		6.00
Unit Hyd. peak (cms)=	0.50		0.19

PEAK FLOW (cms)=	0.05	0.04	0.092 (iii)
TIME TO PEAK (hrs)=	1.33	1.37	1.33
RUNOFF VOLUME (mm)=	77.03	49.27	59.80
TOTAL RAINFALL (mm)=	78.03	78.03	78.03
RUNOFF COEFFICIENT =	0.99	0.63	0.77

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

```

| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 |
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
TOTAL HYD.(ID= 1): 0.24 0.09 1.33 59.80
-----
MAJOR SYS.(ID= 2): 0.04 0.05 1.33 59.80
MINOR SYS.(ID= 3): 0.20 0.04 1.23 59.80

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0203) | Area (ha)= 2.45
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00
-----

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.59 0.86
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 127.80 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 203.31 262.92
over (min) 5.00 10.00
Storage Coeff. (min)= 2.23 (ii) 8.21 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.39 0.13

PEAK FLOW (cms)= 0.35 0.41 *TOTALS* 0.648 (iii)
TIME TO PEAK (hrs)= 1.33 1.43 1.37
RUNOFF VOLUME (mm)= 77.03 47.67 55.30
TOTAL RAINFALL (mm)= 78.03 78.03 78.03
RUNOFF COEFFICIENT = 0.99 0.61 0.71

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0202) | Area (ha)= 0.92
| ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00
-----

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.63 0.29

```

```

Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 78.32 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 203.31 213.37
over (min) 5.00 8.00
Storage Coeff. (min)= 1.66 (ii) 6.47 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.44 0.16

PEAK FLOW (cms)= 0.21 0.13 *TOTALS* 0.319 (iii)
TIME TO PEAK (hrs)= 1.33 1.40 1.33
RUNOFF VOLUME (mm)= 77.03 44.92 58.08
TOTAL RAINFALL (mm)= 78.03 78.03 78.03
RUNOFF COEFFICIENT = 0.99 0.58 0.74

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
TOTAL HYD.(ID= 1): 0.92 0.32 1.33 58.08
-----
MAJOR SYS.(ID= 2): 0.16 0.17 1.33 58.08
MINOR SYS.(ID= 3): 0.76 0.15 1.23 58.08

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 1 ( 0203): 2.45 0.648 1.37 55.30
+ ID2= 2 ( 0006): 0.16 0.172 1.33 58.08
-----
ID = 3 ( 0007): 2.61 0.811 1.33 55.47

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | ADD HYD ( 0007) |  
 | 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 ( 0007):	2.61	0.811	1.33	55.47
+ ID2= 2 ( 0009):	0.20	0.041	1.23	59.80
=====				
ID = 1 ( 0007):	2.80	0.852	1.33	55.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | RESERVOIR( 0008) |  
 | IN= 2---> OUT= 1 |  
 | DT= 2.0 min |

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1750	0.0640
0.0060	0.0325	0.2000	0.0740
0.1000	0.0390	0.2300	0.0830
0.1250	0.0520	0.2750	0.0900

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0007)	2.803	0.852	1.33	55.77
OUTFLOW: ID= 1 ( 0008)	2.803	0.219	1.73	55.28

PEAK FLOW REDUCTION [Qout/Qin](%)= 25.64  
 TIME SHIFT OF PEAK FLOW (min)= 24.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.0796

-----  
 | ADD HYD ( 0003) |  
 | 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0205):	0.23	0.069	1.37	50.98
+ ID2= 2 ( 0008):	2.80	0.219	1.73	55.28
=====				
ID = 3 ( 0003):	3.03	0.236	1.67	54.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | CALIB |  
 | STANDHYD ( 0207) |  
 | ID= 1 DT= 2.0 min |

Area (ha)= 0.65  
 Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10

-----  
 IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 0.31 0.34  
 Dep. Storage (mm)= 1.00 5.00  
 Average Slope (%)= 1.00 2.00  
 Length (m)= 65.83 40.00  
 Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 203.31 220.78  
 over (min)= 5.00 8.00  
 Storage Coeff. (min)= 1.50 (ii) 6.64 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 8.00  
 Unit Hyd. peak (cms)= 0.46 0.16

-----  
 PEAK FLOW (cms)= 0.00 0.16 \*TOTALS\*  
 TIME TO PEAK (hrs)= 1.33 1.40 0.155 (iii)  
 RUNOFF VOLUME (mm)= 77.03 45.37 1.40  
 TOTAL RAINFALL (mm)= 78.03 78.03 45.40  
 RUNOFF COEFFICIENT = 0.99 0.58 78.03 0.58

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 | CALIB |  
 | STANDHYD ( 0206) |  
 | ID= 1 DT= 2.0 min |

Area (ha)= 2.39  
 Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00

-----  
 IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 1.53 0.86  
 Dep. Storage (mm)= 1.00 5.00  
 Average Slope (%)= 1.00 2.00  
 Length (m)= 126.23 40.00  
 Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 203.31 257.16  
 over (min)= 5.00 10.00  
 Storage Coeff. (min)= 2.21 (ii) 8.36 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 10.00  
 Unit Hyd. peak (cms)= 0.39 0.13

-----  
 PEAK FLOW (cms)= 0.33 0.40 \*TOTALS\*  
 TIME TO PEAK (hrs)= 1.33 1.43 0.620 (iii)  
 RUNOFF VOLUME (mm)= 77.03 47.38 1.37  
 TOTAL RAINFALL (mm)= 78.03 78.03 54.79  
 RUNOFF COEFFICIENT = 0.99 0.61 78.03 0.70



- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR ( 0010) | OVERFLOW IS OFF
| IN= 2--> OUT= 1 |
| DT= 2.0 min |
-----

```

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1400	0.0584
	0.0050	0.0278	0.1700	0.0694
	0.0700	0.0363	0.1900	0.0737
	0.1000	0.0478	0.3000	0.0767

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0206)	2.390	0.620	1.37	54.79
OUTFLOW: ID= 1 ( 0010)	2.390	0.166	1.80	54.20

PEAK FLOW REDUCTION [Qout/Qin] (%) = 26.84  
TIME SHIFT OF PEAK FLOW (min) = 26.00  
MAXIMUM STORAGE USED (ha.m.) = 0.0681

```

-----
| ADD HYD ( 0001) |
| 1 + 2 = 3 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0010):	2.39	0.166	1.80	54.20
+ ID2= 2 ( 0207):	0.65	0.155	1.40	45.40
=====				
ID = 3 ( 0001):	3.04	0.247	1.43	52.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0001) |
| 3 + 2 = 1 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 ( 0001):	3.04	0.247	1.43	52.32
+ ID2= 2 ( 0009):	0.04	0.051	1.33	59.80
=====				
ID = 1 ( 0001):	3.08	0.258	1.37	52.42

```

-----
| CALIB |
| STANDHYD ( 0004) | Area (ha)= 0.55
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00
-----

```

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.36	0.19	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	60.55	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	203.31	76.52	
over (min)	5.00	6.00	
Storage Coeff. (min)=	1.42 (ii)	5.57 (ii)	
Unit Hyd. Tpeak (min)=	4.00	6.00	
Unit Hyd. peak (cms)=	0.47	0.20	
		<b>*TOTALS*</b>	
PEAK FLOW (cms)=	0.20	0.03	0.232 (iii)
TIME TO PEAK (hrs)=	1.33	1.37	1.33
RUNOFF VOLUME (mm)=	77.03	31.94	61.24
TOTAL RAINFALL (mm)=	78.03	78.03	78.03
RUNOFF COEFFICIENT =	0.99	0.41	0.78

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0201) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.19	0.51
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	134.16	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	203.31	107.24
over (min)	5.00	6.00
Storage Coeff. (min)=	2.29 (ii)	5.33 (ii)
Unit Hyd. Tpeak (min)=	4.00	6.00
Unit Hyd. peak (cms)=	0.38	0.20

				*TOTALS*
PEAK FLOW	(cms)=	1.15	0.13	1.268 (iii)
TIME TO PEAK	(hrs)=	1.33	1.37	1.33
RUNOFF VOLUME	(mm)=	77.03	36.04	67.60
TOTAL RAINFALL	(mm)=	78.03	78.03	78.03
RUNOFF COEFFICIENT	=	0.99	0.46	0.87

INFLOW : ID= 2 ( 0005)	4.015	1.647	1.33	64.92
OUTFLOW: ID= 1 ( 0002)	4.015	0.357	1.60	64.54

PEAK FLOW REDUCTION [Qout/Qin] (%)=	21.70
TIME SHIFT OF PEAK FLOW (min)=	16.00
MAXIMUM STORAGE USED (ha.m.)=	0.1473

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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=====
=====

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V V I SSSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

```

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0201):  2.70  1.268  1.33  67.60
+ ID2= 2 ( 0004):  0.55  0.232  1.33  61.24
-----
ID = 3 ( 0005):  3.25  1.500  1.33  66.52

```

```

OOO TTTT TTTT 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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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

```

-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 0005):  3.25  1.500  1.33  66.52
+ ID2= 2 ( 0006):  0.76  0.147  1.23  58.08
-----
ID = 1 ( 0005):  4.01  1.647  1.33  64.92

```

```

Input filename: C:\Program Files (x86)\Visual OTTHYMO
6.0\VO2\voin.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\0686d763-7490-4e68-8b8c-d1f183b0d1b5\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\0686d763-7490-4e68-8b8c-d1f183b0d1b5\s

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DATE: 02/25/2021 TIME: 12:17:28

USER:

```

-----
| RESERVOIR ( 0002) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
          OUTFLOW   STORAGE   OUTFLOW   STORAGE
          (cms)   (ha.m.)   (cms)   (ha.m.)
0.0000  0.0000 | 0.3000  0.1350
0.0130  0.0746 | 0.3750  0.1510
0.1500  0.0900 | 0.4000  0.1610
0.2100  0.1200 | 0.4500  0.1725

```

COMMENTS: \_\_\_\_\_

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

```

-----
*****
** SIMULATION : Run 07: 25mm 4hr **
*****

```

```

-----
| READ STORM |
|           |
|           |
|           |
| c8ba888d7cad\d4c2113e |
| Ptotal= 25.00 mm |
-----

```

```

Filename: C:\Users\mmacdonald\AppData\Local\Temp\
          737e0740-2d12-4069-a5fa-

```

Comments: 25MM4HR

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
2.80	0.17	2.07	1.17	5.70	2.17	5.19	3.17
2.62	0.33	2.27	1.33	10.78	2.33	4.47	3.33
2.48	0.50	2.52	1.50	50.21	2.50	3.95	3.50
2.35	0.67	2.88	1.67	13.37	2.67	3.56	3.67
2.23	0.83	3.38	1.83	8.29	2.83	3.25	3.83
2.14	1.00	4.18	2.00	6.30	3.00	3.01	4.00

```

-----
| CALIB |
| STANDBYD ( 0205) |
| ID= 1 DT= 2.0 min |
-----

```

```

Area (ha)= 0.23
Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.09
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	39.16	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
2.80	0.033	2.07	1.033	5.70	2.033	5.19	3.03
2.80	0.067	2.07	1.067	5.70	2.067	5.19	3.07

2.80	0.100	2.07	1.100	5.70	2.100	5.19	3.10
2.80	0.133	2.07	1.133	5.70	2.133	5.19	3.13
2.80	0.167	2.07	1.167	5.70	2.167	5.19	3.17
2.80	0.200	2.27	1.200	10.78	2.200	4.47	3.20
2.62	0.233	2.27	1.233	10.78	2.233	4.47	3.23
2.62	0.267	2.27	1.267	10.78	2.267	4.47	3.27
2.62	0.300	2.27	1.300	10.78	2.300	4.47	3.30
2.62	0.333	2.27	1.333	10.78	2.333	4.47	3.33
2.48	0.367	2.52	1.367	50.21	2.367	3.95	3.37
2.48	0.400	2.52	1.400	50.21	2.400	3.95	3.40
2.48	0.433	2.52	1.433	50.21	2.433	3.95	3.43
2.48	0.467	2.52	1.467	50.21	2.467	3.95	3.47
2.48	0.500	2.52	1.500	50.21	2.500	3.95	3.50
2.35	0.533	2.88	1.533	13.37	2.533	3.56	3.53
2.35	0.567	2.88	1.567	13.37	2.567	3.56	3.57
2.35	0.600	2.88	1.600	13.37	2.600	3.56	3.60
2.35	0.633	2.88	1.633	13.37	2.633	3.56	3.63
2.35	0.667	2.88	1.667	13.37	2.667	3.56	3.67
2.23	0.700	3.38	1.700	8.29	2.700	3.25	3.70
2.23	0.733	3.38	1.733	8.29	2.733	3.25	3.73
2.23	0.767	3.38	1.767	8.29	2.767	3.25	3.77
2.23	0.800	3.38	1.800	8.29	2.800	3.25	3.80
2.23	0.833	3.38	1.833	8.29	2.833	3.25	3.83
2.14	0.867	4.18	1.867	6.30	2.867	3.01	3.87
2.14	0.900	4.18	1.900	6.30	2.900	3.01	3.90
2.14	0.933	4.18	1.933	6.30	2.933	3.01	3.93
2.14	0.967	4.18	1.967	6.30	2.967	3.01	3.97

2.14 1.000 4.18 | 2.000 6.30 | 3.000 3.01 | 4.00

Max.Eff.Inten.(mm/hr)= 50.21 28.70  
 over (min) 5.00 14.00  
 Storage Coeff. (min)= 1.92 (ii) 13.55 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 14.00  
 Unit Hyd. peak (cms)= 0.42 0.08

\*TOTALS\*

PEAK FLOW (cms)= 0.00 0.00 0.005 (iii)  
 TIME TO PEAK (hrs)= 1.50 1.70 1.67  
 RUNOFF VOLUME (mm)= 24.00 8.09 9.17  
 TOTAL RAINFALL (mm)= 25.00 25.00 25.00  
 RUNOFF COEFFICIENT = 0.96 0.32 0.37

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----

-----  
 | CALIB |  
 | STANDHYD ( 0204) | Area (ha)= 0.24  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.18	0.06
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	50.21	29.40
over (min)	5.00	14.00
Storage Coeff. (min)=	1.94 (ii)	13.46 (ii)
Unit Hyd. Tpeak (min)=	4.00	14.00
Unit Hyd. peak (cms)=	0.41	0.08
		*TOTALS*
PEAK FLOW (cms)=	0.01	0.00 0.014 (iii)
TIME TO PEAK (hrs)=	1.50	1.70 1.50
RUNOFF VOLUME (mm)=	24.00	8.17 14.15
TOTAL RAINFALL (mm)=	25.00	25.00 25.00
RUNOFF COEFFICIENT =	0.96	0.33 0.57

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

- CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----

-----  
 | DUHYD ( 0009) |  
 | Inlet Cap.= 0.041 |  
 | #of Inlets= 1 |  
 | Total(cms)= 0.0 | AREA QPEAK TPEAK R.V.  
 (ha) (cms) (hrs) (mm)  
 -----  
 TOTAL HYD.(ID= 1): 0.24 0.01 1.50 14.15  
 =====  
 MAJOR SYS.(ID= 2): 0.00 0.00 0.00 0.00  
 MINOR SYS.(ID= 3): 0.24 0.01 1.50 14.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----

-----  
 | CALIB |  
 | STANDHYD ( 0203) | Area (ha)= 2.45  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.59	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	127.80	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	50.21	22.93
over (min)	5.00	18.00
Storage Coeff. (min)=	3.90 (ii)	16.62 (ii)
Unit Hyd. Tpeak (min)=	4.00	18.00
Unit Hyd. peak (cms)=	0.28	0.07
		*TOTALS*
PEAK FLOW (cms)=	0.08	0.03 0.091 (iii)
TIME TO PEAK (hrs)=	1.50	1.77 1.50
RUNOFF VOLUME (mm)=	24.00	7.64 11.89
TOTAL RAINFALL (mm)=	25.00	25.00 25.00
RUNOFF COEFFICIENT =	0.96	0.31 0.48

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0202) | Area (ha)= 0.92
| ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	78.32	40.00
Mannings n =	0.013	0.250

Max. Eff. Inten. (mm/hr)=	50.21	16.24
over (min)	5.00	18.00
Storage Coeff. (min)=	2.91 (ii)	17.51 (ii)
Unit Hyd. Tpeak (min)=	4.00	18.00
Unit Hyd. peak (cms)=	0.34	0.06

\*TOTALS\*

PEAK FLOW (cms)=	0.05	0.01	0.053 (iii)
TIME TO PEAK (hrs)=	1.50	1.77	1.50
RUNOFF VOLUME (mm)=	24.00	6.78	13.83
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.96	0.27	0.55

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 |
-----
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
-----
TOTAL HYD.(ID= 1): 0.92 0.05 1.50 13.83
=====
MAJOR SYS.(ID= 2): 0.00 0.00 0.00 0.00
MINOR SYS.(ID= 3): 0.92 0.05 1.50 13.83
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
| AREA QPEAK TPEAK R.V. |

```

```

-----
(ha) (cms) (hrs) (mm)
*** W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001
ID1= 1 ( 0203): 2.45 0.091 1.50 11.89
+ ID2= 2 ( 0006): 0.00 0.000 0.00 0.00
=====
ID = 3 ( 0007): 2.45 0.091 1.50 11.89
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 3 + 2 = 1 |
-----
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
-----
ID1= 3 ( 0007): 2.45 0.091 1.50 11.89
+ ID2= 2 ( 0009): 0.24 0.014 1.50 14.15
=====
ID = 1 ( 0007): 2.69 0.105 1.50 12.09
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0008) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
| OUTFLOW STORAGE | OUTFLOW STORAGE |
| (cms) (ha.m.) | (cms) (ha.m.) |
-----
0.0000 0.0000 | 0.1750 0.0640
0.0060 0.0325 | 0.2000 0.0740
0.1000 0.0390 | 0.2300 0.0830
0.1250 0.0520 | 0.2750 0.0900
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0007)	2.690	0.105	1.50	12.09
OUTFLOW: ID= 1 ( 0008)	2.690	0.005	4.23	11.58
PEAK FLOW REDUCTION [Qout/Qin](%)=	4.91			
TIME SHIFT OF PEAK FLOW (min)=	164.00			
MAXIMUM STORAGE USED (ha.m.)=	0.0279			

```

-----
| ADD HYD ( 0003) |
| 1 + 2 = 3 |
-----
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
-----
ID1= 1 ( 0205): 0.23 0.005 1.67 9.17
+ ID2= 2 ( 0008): 2.69 0.005 4.23 11.58
=====
ID = 3 ( 0003): 2.92 0.007 1.70 11.39
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Unit Hyd. Tpeak (min)= 4.00 18.00  
 Unit Hyd. peak (cms)= 0.29 0.07

PEAK FLOW (cms)= 0.08 0.03 0.086 (iii)  
 TIME TO PEAK (hrs)= 1.50 1.77 1.50  
 RUNOFF VOLUME (mm)= 24.00 7.54 11.65  
 TOTAL RAINFALL (mm)= 25.00 25.00 25.00  
 RUNOFF COEFFICIENT = 0.96 0.30 0.47

\*TOTALS\*

-----  
 | CALIB |  
 | STANDHYD ( 0207) | Area (ha)= 0.65  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.31	0.34
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	65.83	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	50.21	18.13
over (min)	5.00	18.00
Storage Coeff. (min)=	2.62 (ii)	16.59 (ii)
Unit Hyd. Tpeak (min)=	4.00	18.00
Unit Hyd. peak (cms)=	0.36	0.07

\*TOTALS\*

PEAK FLOW (cms)=	0.00	0.01	0.010 (iii)
TIME TO PEAK (hrs)=	1.50	1.77	1.77
RUNOFF VOLUME (mm)=	24.00	6.92	6.92
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.96	0.28	0.28

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 | RESERVOIR ( 0010) | OVERFLOW IS OFF  
 | IN= 2---> OUT= 1 |  
DT= 2.0 min

	OUTFLOW	STORAGE		OUTFLOW	STORAGE
	(cms)	(ha.m.)		(cms)	(ha.m.)
	0.0000	0.0000		0.1400	0.0584
	0.0050	0.0278		0.1700	0.0694
	0.0700	0.0363		0.1900	0.0737
	0.1000	0.0478		0.3000	0.0767

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 ( 0206)	2.390	0.086	1.50	11.65
OUTFLOW: ID= 1 ( 0010)	2.390	0.004	4.27	11.06

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.03  
 TIME SHIFT OF PEAK FLOW (min)=166.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.0240

-----  
 | CALIB |  
 | STANDHYD ( 0206) | Area (ha)= 2.39  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.53	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	126.23	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	50.21	22.26
over (min)	5.00	18.00
Storage Coeff. (min)=	3.87 (ii)	16.74 (ii)

-----  
 | ADD HYD ( 0001) |  
1 + 2 = 3

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 ( 0010):	2.39	0.004	4.27	11.06
+ ID2= 2 ( 0207):	0.65	0.010	1.77	6.92
=====				
ID = 3 ( 0001):	3.04	0.012	1.77	10.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 0001) |
| 3 + 2 = 1 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
*** W A R N I N G : HYDROGRAPH 0009 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003
ID1= 3 ( 0001): 3.04 0.012 1.77 10.18
+ ID2= 2 ( 0009): 0.00 0.000 0.00 0.00
=====
ID = 1 ( 0001): 3.04 0.012 1.77 10.18

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| CALIB |
| STANDHYD ( 0004) | Area (ha)= 0.55
|ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.36	0.19
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	60.55	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr)=	50.21	4.84
over (min)	5.00	10.00
Storage Coeff. (min)=	2.49 (ii)	9.75 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.37	0.11
PEAK FLOW (cms)=	0.05	0.00
TIME TO PEAK (hrs)=	1.50	1.50
RUNOFF VOLUME (mm)=	24.00	3.51
TOTAL RAINFALL (mm)=	25.00	25.00
RUNOFF COEFFICIENT =	0.96	0.14

\*TOTALS\*  
0.049 (iii)  
1.50  
16.81  
25.00  
0.67

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

| CALIB |
| STANDHYD ( 0201) | Area (ha)= 2.70
|ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.19	0.51
Dep. Storage (mm)=	1.00	5.00

```

Average Slope (%)= 1.00 2.00
Length (m)= 134.16 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten. (mm/hr)= 50.21 7.88
over (min) 5.00 10.00
Storage Coeff. (min)= 4.01 (ii) 9.33 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.28 0.12

```

\*TOTALS\*  
0.268 (iii)  
1.50  
19.49  
25.00  
0.78

```

PEAK FLOW (cms)= 0.26 0.01
TIME TO PEAK (hrs)= 1.50 1.63
RUNOFF VOLUME (mm)= 24.00 4.42
TOTAL RAINFALL (mm)= 25.00 25.00
RUNOFF COEFFICIENT = 0.96 0.18

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0201): 2.70 0.268 1.50 19.49
+ ID2= 2 ( 0004): 0.55 0.049 1.50 16.81
=====
ID = 3 ( 0005): 3.25 0.317 1.50 19.04

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 0005) |
| 3 + 2 = 1 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 0005): 3.25 0.317 1.50 19.04
+ ID2= 2 ( 0006): 0.92 0.053 1.50 13.83
=====
ID = 1 ( 0005): 4.17 0.370 1.50 17.89

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| RESERVOIR( 0002) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |

```

DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.3000	0.1350
	0.0130	0.0746	0.3750	0.1510
	0.1500	0.0900	0.4000	0.1610
	0.2100	0.1200	0.4500	0.1725

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0005)	4.170	0.370	1.50	17.89
OUTFLOW: ID= 1 ( 0002)	4.170	0.011	4.07	17.54

PEAK FLOW REDUCTION [Qout/Qin] (%) = 3.05  
 TIME SHIFT OF PEAK FLOW (min) = 154.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0648

-----  
-----







0.89 1.600 0.89 | 4.600 2.97 | 7.600 2.67 | 10.60  
0.89 1.633 0.89 | 4.633 2.97 | 7.633 2.67 | 10.63  
0.89 1.667 0.89 | 4.667 2.97 | 7.667 2.67 | 10.67  
0.89 1.700 0.89 | 4.700 3.26 | 7.700 2.67 | 10.70  
0.89 1.733 0.89 | 4.733 3.26 | 7.733 2.67 | 10.73  
0.89 1.767 0.89 | 4.767 3.26 | 7.767 2.67 | 10.77  
0.89 1.800 0.89 | 4.800 3.26 | 7.800 2.67 | 10.80  
0.89 1.833 0.89 | 4.833 3.26 | 7.833 2.67 | 10.83  
0.89 1.867 0.89 | 4.867 3.56 | 7.867 2.67 | 10.87  
0.89 1.900 0.89 | 4.900 3.56 | 7.900 2.67 | 10.90  
0.89 1.933 0.89 | 4.933 3.56 | 7.933 2.67 | 10.93  
0.89 1.967 0.89 | 4.967 3.56 | 7.967 2.67 | 10.97  
0.89 2.000 0.89 | 5.000 3.56 | 8.000 2.67 | 11.00  
0.89 2.033 1.19 | 5.033 4.16 | 8.033 2.37 | 11.03  
0.89 2.067 1.19 | 5.067 4.16 | 8.067 2.37 | 11.07  
0.89 2.100 1.19 | 5.100 4.16 | 8.100 2.37 | 11.10  
0.89 2.133 1.19 | 5.133 4.16 | 8.133 2.37 | 11.13  
0.89 2.167 1.19 | 5.167 4.16 | 8.167 2.37 | 11.17  
0.89 2.200 1.48 | 5.200 4.75 | 8.200 2.08 | 11.20  
0.89 2.233 1.48 | 5.233 4.75 | 8.233 2.08 | 11.23  
0.89 2.267 1.48 | 5.267 4.75 | 8.267 2.08 | 11.27  
0.89 2.300 1.48 | 5.300 4.75 | 8.300 2.08 | 11.30  
0.89 2.333 1.48 | 5.333 4.75 | 8.333 2.08 | 11.33  
0.89 2.367 1.78 | 5.367 5.34 | 8.367 1.78 | 11.37  
0.89 2.400 1.78 | 5.400 5.34 | 8.400 1.78 | 11.40  
0.89 2.433 1.78 | 5.433 5.34 | 8.433 1.78 | 11.43  
0.89 2.467 1.78 | 5.467 5.34 | 8.467 1.78 | 11.47

0.89 2.500 1.78 | 5.500 5.34 | 8.500 1.78 | 11.50  
0.89 2.533 1.78 | 5.533 16.92 | 8.533 1.78 | 11.53  
0.89 2.567 1.78 | 5.567 16.92 | 8.567 1.78 | 11.57  
0.89 2.600 1.78 | 5.600 16.92 | 8.600 1.78 | 11.60  
0.89 2.633 1.78 | 5.633 16.92 | 8.633 1.78 | 11.63  
0.89 2.667 1.78 | 5.667 16.92 | 8.667 1.78 | 11.67  
0.89 2.700 1.78 | 5.700 28.49 | 8.700 1.78 | 11.70  
0.89 2.733 1.78 | 5.733 28.49 | 8.733 1.78 | 11.73  
0.89 2.767 1.78 | 5.767 28.49 | 8.767 1.78 | 11.77  
0.89 2.800 1.78 | 5.800 28.49 | 8.800 1.78 | 11.80  
0.89 2.833 1.78 | 5.833 28.49 | 8.833 1.78 | 11.83  
0.89 2.867 1.78 | 5.867 40.07 | 8.867 1.78 | 11.87  
0.89 2.900 1.78 | 5.900 40.07 | 8.900 1.78 | 11.90  
0.89 2.933 1.78 | 5.933 40.07 | 8.933 1.78 | 11.93  
0.89 2.967 1.78 | 5.967 40.07 | 8.967 1.78 | 11.97  
0.89 3.000 1.78 | 6.000 40.07 | 9.000 1.78 | 12.00

Max.Eff.Inten.(mm/hr)= 40.07 47.96  
over (min) 5.00 12.00  
Storage Coeff. (min)= 2.10 (ii) 11.57 (ii)  
Unit Hyd. Tpeak (min)= 4.00 12.00  
Unit Hyd. peak (cms)= 0.40 0.10

\*TOTALS\*  
PEAK FLOW (cms)= 0.00 0.01 0.011 (iii)  
TIME TO PEAK (hrs)= 6.00 6.20 6.17  
RUNOFF VOLUME (mm)= 43.37 21.27 22.79  
TOTAL RAINFALL (mm)= 44.37 44.37 44.37  
RUNOFF COEFFICIENT = 0.98 0.48 0.51

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

(i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0204) | Area (ha)= 0.24
| ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.18	0.06
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr)=	40.07	48.93
over (min)	5.00	12.00
Storage Coeff. (min)=	2.13 (ii)	11.52 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.40	0.10

```

*TOTALS*
PEAK FLOW (cms)= 0.01 0.01 0.015 (iii)
TIME TO PEAK (hrs)= 6.00 6.20 6.00
RUNOFF VOLUME (mm)= 43.37 21.42 29.73
TOTAL RAINFALL (mm)= 44.37 44.37 44.37
RUNOFF COEFFICIENT = 0.98 0.48 0.67

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	0.24	0.02	6.00	29.73
MAJOR SYS. (ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS. (ID= 3):	0.24	0.02	6.00	29.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0203) | Area (ha)= 2.45
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00
-----

```

```

-----
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.59 0.86
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 127.80 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten. (mm/hr)= 40.07 42.74
over (min) 5.00 16.00
Storage Coeff. (min)= 4.27 (ii) 14.18 (ii)
Unit Hyd. Tpeak (min)= 4.00 16.00
Unit Hyd. peak (cms)= 0.27 0.08

```

```

*TOTALS*
PEAK FLOW (cms)= 0.07 0.08 0.125 (iii)
TIME TO PEAK (hrs)= 6.00 6.30 6.17
RUNOFF VOLUME (mm)= 43.37 20.41 26.38
TOTAL RAINFALL (mm)= 44.37 44.37 44.37
RUNOFF COEFFICIENT = 0.98 0.46 0.59

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0202) | Area (ha)= 0.92
| ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00
-----

```

```

-----
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.63 0.29
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 78.32 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten. (mm/hr)= 40.07 32.95
over (min) 5.00 16.00
Storage Coeff. (min)= 3.18 (ii) 14.18 (ii)
Unit Hyd. Tpeak (min)= 4.00 16.00
Unit Hyd. peak (cms)= 0.32 0.08

```

```

*TOTALS*
PEAK FLOW (cms)= 0.04 0.02 0.054 (iii)
TIME TO PEAK (hrs)= 6.00 6.30 6.00
RUNOFF VOLUME (mm)= 43.37 18.74 28.83
TOTAL RAINFALL (mm)= 44.37 44.37 44.37
RUNOFF COEFFICIENT = 0.98 0.42 0.65

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1750	0.0640
	0.0060	0.0325	0.2000	0.0740
	0.1000	0.0390	0.2300	0.0830
	0.1250	0.0520	0.2750	0.0900

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0007)	2.690	0.139	6.17	26.68
OUTFLOW: ID= 1 ( 0008)	2.690	0.073	6.57	26.17

PEAK FLOW REDUCTION [Qout/Qin] (%) = 52.31  
 TIME SHIFT OF PEAK FLOW (min) = 24.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0371

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	0.92	0.05	6.00	28.83
MAJOR SYS. (ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS. (ID= 3):	0.92	0.05	6.00	28.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0205):	0.23	0.011	6.17	22.79
+ ID2= 2 ( 0008):	2.69	0.073	6.57	26.17
ID = 3 ( 0003):	2.92	0.079	6.57	25.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0203):	2.45	0.125	6.17	26.38
+ ID2= 2 ( 0006):	0.00	0.000	0.00	0.00
ID = 3 ( 0007):	2.45	0.125	6.17	26.38

\*\*\* W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.  
 \*\*\* W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	Area (ha)	Imp (%)	Dir. Conn. (%)
STANDHYD ( 0207)	0.65	47.00	0.10

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.31	0.34
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	65.83	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr)=	40.07	34.20
over (min)	5.00	14.00
Storage Coeff. (min)=	2.87 (ii)	13.71 (ii)
Unit Hyd. Tpeak (min)=	4.00	14.00
Unit Hyd. peak (cms)=	0.34	0.08

\*TOTALS\*

PEAK FLOW (cms)=	0.00	0.03	0.025 (iii)
TIME TO PEAK (hrs)=	6.00	6.27	6.27
RUNOFF VOLUME (mm)=	43.37	19.01	19.02
TOTAL RAINFALL (mm)=	44.37	44.37	44.37
RUNOFF COEFFICIENT =	0.98	0.43	0.43

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 ( 0007):	2.45	0.125	6.17	26.38
+ ID2= 2 ( 0009):	0.24	0.015	6.00	29.73
ID = 1 ( 0007):	2.69	0.139	6.17	26.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR ( 0008) | OVERFLOW IS OFF  
 IN= 2---> OUT= 1 |

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0206)	2.390	0.119	6.17	26.01
OUTFLOW: ID= 1 ( 0010)	2.390	0.050	6.73	25.42

PEAK FLOW REDUCTION [Qout/Qin] (%) = 41.89  
 TIME SHIFT OF PEAK FLOW (min) = 34.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0337

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0206) | Area (ha)= 2.39  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.53	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	126.23	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	40.07	40.43
over (min)	5.00	16.00
Storage Coeff. (min)=	4.24 (ii)	14.37 (ii)
Unit Hyd. Tpeak (min)=	4.00	16.00
Unit Hyd. peak (cms)=	0.27	0.08

\*TOTALS\*  
 PEAK FLOW (cms)= 0.06 0.07 0.119 (iii)  
 TIME TO PEAK (hrs)= 6.00 6.30 6.17  
 RUNOFF VOLUME (mm)= 43.37 20.23 26.01  
 TOTAL RAINFALL (mm)= 44.37 44.37 44.37  
 RUNOFF COEFFICIENT = 0.98 0.46 0.59

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 -----

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ADD HYD ( 0001)				
1 + 2 = 3				
ID1= 1 ( 0010):	2.39	0.050	6.73	25.42
+ ID2= 2 ( 0207):	0.65	0.025	6.27	19.02
=====				
ID = 3 ( 0001):	3.04	0.064	6.63	24.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 -----

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ADD HYD ( 0001)				
3 + 2 = 1				
*** W A R N I N G : HYDROGRAPH 0009 <ID= 2> IS DRY.				
*** W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003				
ID1= 3 ( 0001):	3.04	0.064	6.63	24.05
+ ID2= 2 ( 0009):	0.00	0.000	0.00	0.00
=====				
ID = 1 ( 0001):	3.04	0.064	6.63	24.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0201) | Area (ha)= 2.70  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.19	0.51
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	134.16	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	40.07	15.84
over (min)	5.00	12.00

-----  
 -----  
 | RESERVOIR( 0010) | OVERFLOW IS OFF  
 | IN= 2---> OUT= 1 |  
DT= 2.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1400	0.0584
0.0050	0.0278	0.1700	0.0694
0.0700	0.0363	0.1900	0.0737
0.1000	0.0478	0.3000	0.0767

Storage Coeff. (min)= 4.39 (ii) 10.21 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 12.00  
 Unit Hyd. peak (cms)= 0.26 0.10

\*TOTALS\*

PEAK FLOW (cms)= 0.22 0.02 0.234 (iii)  
 TIME TO PEAK (hrs)= 6.00 6.23 6.00  
 RUNOFF VOLUME (mm)= 43.37 13.74 36.55  
 TOTAL RAINFALL (mm)= 44.37 44.37 44.37  
 RUNOFF COEFFICIENT = 0.98 0.31 0.82

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0201): 2.70 0.234 6.00 36.55
+ ID2= 2 ( 0004): 0.55 0.042 6.00 32.25
=====
ID = 3 ( 0005): 3.25 0.276 6.00 35.83
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 0005) |
| 3 + 2 = 1 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 0005): 3.25 0.276 6.00 35.83
+ ID2= 2 ( 0006): 0.92 0.054 6.00 28.83
=====
ID = 1 ( 0005): 4.17 0.330 6.00 34.28
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB |
| STANDHYD ( 0004) | Area (ha)= 0.55
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.36	0.19
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	60.55	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	40.07	10.86
over (min)	5.00	12.00
Storage Coeff. (min)=	2.73 (ii)	10.67 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.35	0.10

\*TOTALS\*

PEAK FLOW (cms)= 0.04 0.00 0.042 (iii)  
 TIME TO PEAK (hrs)= 6.00 6.27 6.00  
 RUNOFF VOLUME (mm)= 43.37 11.63 32.25  
 TOTAL RAINFALL (mm)= 44.37 44.37 44.37  
 RUNOFF COEFFICIENT = 0.98 0.26 0.73

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| RESERVOIR ( 0002) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.3000 0.1350
0.0130 0.0746 | 0.3750 0.1510
0.1500 0.0900 | 0.4000 0.1610
0.2100 0.1200 | 0.4500 0.1725
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0005)	4.170	0.330	6.00	34.28
OUTFLOW: ID= 1 ( 0002)	4.170	0.114	6.47	33.72

PEAK FLOW REDUCTION [Qout/Qin](%)= 34.50  
 TIME SHIFT OF PEAK FLOW (min)= 28.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.0859

```
V V I SSSSS U U A L (v 6.0.2001)
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 TTTT TTTT 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
6.0\VO2\voim.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\83de7572-b39c-4c5a-b845-1dbb8d076e2f\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\83de7572-b39c-4c5a-b845-1dbb8d076e2f\s

```

DATE: 02/25/2021 TIME: 12:17:49

USER:

COMMENTS: \_\_\_\_\_

```

*****
** SIMULATION : Run 02: 12 hr SCS 5yr **
*****

```

```

-----
| MASS STORM | Filename: C:\Users\mmacdonald\AppData
| | ata\Local\Temp\
| | fc827793-7400-4dac-9d1b-
f97a5e84f410\50d26708
| Ptotal= 58.28 mm |
-----
Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION

```

```

Duration of storm = 12.00 hrs
Mass curve time step = 30.00 min
New Storm time step = 10.00 min

```

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

2.33	0.17	0.39	3.17	2.33	6.17	38.46	9.17
2.33	0.33	0.78	3.33	2.33	6.33	24.48	9.33
2.33	0.50	1.17	3.50	2.33	6.50	10.49	9.50
2.33	0.67	1.17	3.67	2.33	6.67	8.55	9.67
1.94	0.83	1.17	3.83	2.33	6.83	6.61	9.83
1.55	1.00	1.17	4.00	2.33	7.00	4.66	10.00
1.17	1.17	1.17	4.17	2.72	7.17	4.27	10.17
1.17	1.17	1.17	4.17	2.72	7.17	4.27	10.17
1.17	1.33	1.17	4.33	3.11	7.33	3.89	10.33
1.17	1.50	1.17	4.50	3.50	7.50	3.50	10.50
1.17	1.67	1.17	4.67	3.89	7.67	3.50	10.67
1.17	1.83	1.17	4.83	4.27	7.83	3.50	10.83
1.17	2.00	1.17	5.00	4.66	8.00	3.50	11.00
1.17	2.17	1.55	5.17	5.44	8.17	3.11	11.17
1.17	2.33	1.94	5.33	6.22	8.33	2.72	11.33
1.17	2.50	2.33	5.50	6.99	8.50	2.33	11.50
1.17	2.67	2.33	5.67	22.15	8.67	2.33	11.67
1.17	2.83	2.33	5.83	37.30	8.83	2.33	11.83
1.17	3.00	2.33	6.00	52.45	9.00	2.33	12.00
1.17							

```

-----
| CALIB |
| STANDHYD ( 0205) | Area (ha)= 0.23
| ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00
-----
Surface Area (ha)= 0.14 IMPERVIOUS PERVIOUS (i)
Dep. Storage (mm)= 1.00 0.09
Average Slope (%)= 1.00 5.00
Length (m)= 39.16 2.00
Mannings n = 0.013 0.250

```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.





1.17	1.733	1.17	4.733	4.27	7.733	3.50	10.73
1.17	1.767	1.17	4.767	4.27	7.767	3.50	10.77
1.17	1.800	1.17	4.800	4.27	7.800	3.50	10.80
1.17	1.833	1.17	4.833	4.27	7.833	3.50	10.83
1.17	1.867	1.17	4.867	4.66	7.867	3.50	10.87
1.17	1.900	1.17	4.900	4.66	7.900	3.50	10.90
1.17	1.933	1.17	4.933	4.66	7.933	3.50	10.93
1.17	1.967	1.17	4.967	4.66	7.967	3.50	10.97
1.17	2.000	1.17	5.000	4.66	8.000	3.50	11.00
1.17	2.033	1.55	5.033	5.44	8.033	3.11	11.03
1.17	2.067	1.55	5.067	5.44	8.067	3.11	11.07
1.17	2.100	1.55	5.100	5.44	8.100	3.11	11.10
1.17	2.133	1.55	5.133	5.44	8.133	3.11	11.13
1.17	2.167	1.55	5.167	5.44	8.167	3.11	11.17
1.17	2.200	1.94	5.200	6.22	8.200	2.72	11.20
1.17	2.233	1.94	5.233	6.22	8.233	2.72	11.23
1.17	2.267	1.94	5.267	6.22	8.267	2.72	11.27
1.17	2.300	1.94	5.300	6.22	8.300	2.72	11.30
1.17	2.333	1.94	5.333	6.22	8.333	2.72	11.33
1.17	2.367	2.33	5.367	6.99	8.367	2.33	11.37
1.17	2.400	2.33	5.400	6.99	8.400	2.33	11.40
1.17	2.433	2.33	5.433	6.99	8.433	2.33	11.43
1.17	2.467	2.33	5.467	6.99	8.467	2.33	11.47
1.17	2.500	2.33	5.500	6.99	8.500	2.33	11.50
1.17	2.533	2.33	5.533	22.14	8.533	2.33	11.53
1.17	2.567	2.33	5.567	22.15	8.567	2.33	11.57
1.17	2.600	2.33	5.600	22.15	8.600	2.33	11.60

1.17	2.633	2.33	5.633	22.15	8.633	2.33	11.63
1.17	2.667	2.33	5.667	22.15	8.667	2.33	11.67
1.17	2.700	2.33	5.700	37.30	8.700	2.33	11.70
1.17	2.733	2.33	5.733	37.30	8.733	2.33	11.73
1.17	2.767	2.33	5.767	37.30	8.767	2.33	11.77
1.17	2.800	2.33	5.800	37.30	8.800	2.33	11.80
1.17	2.833	2.33	5.833	37.30	8.833	2.33	11.83
1.17	2.867	2.33	5.867	52.45	8.867	2.33	11.87
1.17	2.900	2.33	5.900	52.45	8.900	2.33	11.90
1.17	2.933	2.33	5.933	52.45	8.933	2.33	11.93
1.17	2.967	2.33	5.967	52.45	8.967	2.33	11.97
1.16	3.000	2.33	6.000	52.45	9.000	2.33	12.00

Max.Eff.Inten. (mm/hr)=	52.45	73.17
over (min)	5.00	10.00
Storage Coeff. (min)=	1.88 (ii)	9.88 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.42	0.11
PEAK FLOW (cms)=	0.00	0.02
TIME TO PEAK (hrs)=	6.00	6.17
RUNOFF VOLUME (mm)=	57.09	32.09
TOTAL RAINFALL (mm)=	58.09	58.09
RUNOFF COEFFICIENT =	0.98	0.55

\*TOTALS\*  
0.017 (iii)  
6.17  
33.82  
58.09  
0.58

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

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
-----  
| CALIB |  
| STANDHYD ( 0204)| Area (ha)= 0.24  
|ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
-----

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.18	0.06
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	40.00	40.00
Mannings n	=	0.013	0.250

Max.Eff.Inten. (mm/hr)=	52.45	74.54
over (min)	5.00	10.00
Storage Coeff. (min)=	1.91 (ii)	9.88 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.42	0.11

PEAK FLOW	(cms)=	0.01	0.01	0.022 (iii)
TIME TO PEAK	(hrs)=	6.00	6.17	6.00
RUNOFF VOLUME	(mm)=	57.09	32.28	41.69
TOTAL RAINFALL	(mm)=	58.09	58.09	58.09
RUNOFF COEFFICIENT	=	0.98	0.56	0.72

\*TOTALS\*

Mannings n	=	0.013	0.250
Max.Eff.Inten. (mm/hr)=	52.45	65.72	
over (min)	5.00	14.00	
Storage Coeff. (min)=	3.83 (ii)	12.18 (ii)	
Unit Hyd. Tpeak (min)=	4.00	14.00	
Unit Hyd. peak (cms)=	0.29	0.09	

\*TOTALS\*

PEAK FLOW	(cms)=	0.09	0.12	0.189 (iii)
TIME TO PEAK	(hrs)=	6.00	6.20	6.17
RUNOFF VOLUME	(mm)=	57.09	31.00	37.78
TOTAL RAINFALL	(mm)=	58.09	58.09	58.09
RUNOFF COEFFICIENT	=	0.98	0.53	0.65

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| CALIB |
| STANDHYD ( 0202) | Area (ha)= 0.92
| ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.63	0.29
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	78.32	40.00
Mannings n	=	0.013	0.250

Max.Eff.Inten. (mm/hr)=	52.45	53.01
over (min)	5.00	12.00
Storage Coeff. (min)=	2.86 (ii)	11.95 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.34	0.09

\*TOTALS\*

PEAK FLOW	(cms)=	0.05	0.03	0.079 (iii)
TIME TO PEAK	(hrs)=	6.00	6.20	6.03
RUNOFF VOLUME	(mm)=	57.09	28.84	40.41
TOTAL RAINFALL	(mm)=	58.09	58.09	58.09
RUNOFF COEFFICIENT	=	0.98	0.50	0.70

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 |
-----

```

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
TOTAL HYD. (ID= 1):	0.24	0.02	6.00	41.69
MAJOR SYS. (ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS. (ID= 3):	0.24	0.02	6.00	41.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
-----
| CALIB |
| STANDHYD ( 0203) | Area (ha)= 2.45
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00
-----

```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.59	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	127.80	40.00

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
TOTAL HYD. (ID= 1):  0.92      0.08      6.03      40.41
=====
MAJOR SYS. (ID= 2):  0.00      0.00      0.00      0.00
MINOR SYS. (ID= 3):  0.92      0.08      6.03      40.41

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
*** W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001
ID1= 1 ( 0203):  2.45      0.189      6.17      37.78
+ ID2= 2 ( 0006):  0.00      0.000      0.00      0.00
=====
ID = 3 ( 0007):  2.45      0.189      6.17      37.78

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0007):  2.45      0.189      6.17      37.78
+ ID2= 2 ( 0009):  0.24      0.022      6.00      41.69
=====
ID = 1 ( 0007):  2.69      0.209      6.17      38.13

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0008) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
          OUTFLOW      STORAGE      OUTFLOW      STORAGE
          (cms)      (ha.m.)      (cms)      (ha.m.)
0.0000      0.0000      | 0.1750      0.0640
0.0060      0.0325      | 0.2000      0.0740
0.1000      0.0390      | 0.2300      0.0830
0.1250      0.0520      | 0.2750      0.0900

```

```

          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
INFLOW : ID= 2 ( 0007)  2.690      0.209      6.17      38.13
OUTFLOW: ID= 1 ( 0008)  2.690      0.113      6.53      37.62

```

```

PEAK FLOW REDUCTION [Qout/Qin] (%)= 54.01
TIME SHIFT OF PEAK FLOW (min)= 22.00
MAXIMUM STORAGE USED (ha.m.)= 0.0458

```

```

-----
| ADD HYD ( 0003) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0205):  0.23      0.017      6.17      33.82
+ ID2= 2 ( 0008):  2.69      0.113      6.53      37.62
=====
ID = 3 ( 0003):  2.92      0.124      6.40      37.32

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0207) | Area (ha)= 0.65
| ID= 1 DT= 2.0 min | Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10
-----

```

```

          IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)= 0.31      0.34
Dep. Storage (mm)= 1.00      5.00
Average Slope (%)= 1.00      2.00
Length (m)= 65.83      40.00
Mannings n = 0.013      0.250

Max.Eff.Inten.(mm/hr)= 52.45      54.90
over (min) = 5.00      12.00
Storage Coeff. (min)= 2.57 (ii)      11.54 (ii)
Unit Hyd. Tpeak (min)= 4.00      12.00
Unit Hyd. peak (cms)= 0.36      0.10

```

```

          PEAK FLOW (cms)= 0.00      0.04      0.041 (iii)
          TIME TO PEAK (hrs)= 6.00      6.20      6.20
          RUNOFF VOLUME (mm)= 57.09      29.19      29.21
          TOTAL RAINFALL (mm)= 58.09      58.09      58.09
          RUNOFF COEFFICIENT = 0.98      0.50      0.50

```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)

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

PEAK FLOW REDUCTION [Qout/Qin](%)= 47.40  
 TIME SHIFT OF PEAK FLOW (min)= 26.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.0425

```

-----
| CALIB |
| STANDHYD ( 0206) | Area (ha)= 2.39
| ID= 1 DT= 2.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00
-----
                IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)= 1.53      0.86
Dep. Storage (mm)= 1.00     5.00
Average Slope (%)= 1.00     2.00
Length (m)= 126.23         40.00
Mannings n = 0.013        0.250

Max.Eff.Inten.(mm/hr)= 52.45    64.24
                    over (min)= 5.00    14.00
Storage Coeff. (min)= 3.80 (ii) 12.23 (ii)
Unit Hyd. Tpeak (min)= 4.00     14.00
Unit Hyd. peak (cms)= 0.29      0.09

                *TOTALS*
PEAK FLOW (cms)= 0.08      0.12      0.182 (iii)
TIME TO PEAK (hrs)= 6.00    6.23    6.17
RUNOFF VOLUME (mm)= 57.09   30.77   37.35
TOTAL RAINFALL (mm)= 58.09   58.09   58.09
RUNOFF COEFFICIENT = 0.98    0.53    0.64
  
```

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0001) |
| 1 + 2 = 3 |
-----
                AREA    QPEAK    TPEAK    R.V.
                (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0010): 2.39    0.086   6.60    36.75
+ ID2= 2 ( 0207): 0.65    0.041   6.20    29.21
=====
ID = 3 ( 0001): 3.04    0.117   6.40    35.14
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0001) |
| 3 + 2 = 1 |
-----
                AREA    QPEAK    TPEAK    R.V.
                (ha)    (cms)    (hrs)    (mm)
*** W A R N I N G : HYDROGRAPH 0009 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003
ID1= 3 ( 0001): 3.04    0.117   6.40    35.14
+ ID2= 2 ( 0009): 0.00    0.000   0.00    0.00
=====
ID = 1 ( 0001): 3.04    0.117   6.40    35.14
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0010) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
                OUTFLOW    STORAGE    OUTFLOW    STORAGE
                (cms)    (ha.m.) | (cms)    (ha.m.)
0.0000    0.0000 | 0.1400    0.0584
0.0050    0.0278 | 0.1700    0.0694
0.0700    0.0363 | 0.1900    0.0737
0.1000    0.0478 | 0.3000    0.0767

                AREA    QPEAK    TPEAK    R.V.
                (ha)    (cms)    (hrs)    (mm)
INFLOW : ID= 2 ( 0206) 2.390    0.182    6.17    37.35
OUTFLOW: ID= 1 ( 0010) 2.390    0.086    6.60    36.75
  
```

```

-----
| CALIB |
| STANDHYD ( 0201) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00
-----
                IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)= 2.19      0.51
Dep. Storage (mm)= 1.00     5.00
Average Slope (%)= 1.00     2.00
Length (m)= 134.16         40.00
Mannings n = 0.013        0.250

Max.Eff.Inten.(mm/hr)= 52.45    26.05
                    over (min)= 5.00    10.00
Storage Coeff. (min)= 3.94 (ii) 9.16 (ii)
Unit Hyd. Tpeak (min)= 4.00     10.00
Unit Hyd. peak (cms)= 0.28      0.12

                *TOTALS*
PEAK FLOW (cms)= 0.29      0.03      0.317 (iii)
TIME TO PEAK (hrs)= 6.00    6.20    6.00
  
```

RUNOFF VOLUME (mm) = 57.09 22.13 49.04  
 TOTAL RAINFALL (mm) = 58.09 58.09 58.09  
 RUNOFF COEFFICIENT = 0.98 0.38 0.84

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ID = 3 ( 0005): 3.25 0.375 6.00 48.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 |
-----
| ID1= 3 ( 0005): | AREA QPEAK TPEAK R.V.
|                   | (ha) (cms) (hrs) (mm)
+ ID2= 2 ( 0006): | 3.25 0.375 6.00 48.16
|                   | 0.92 0.079 6.03 40.41
=====
| ID = 1 ( 0005): | 4.17 0.454 6.00 46.45
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR ( 0002) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
| OUTFLOW STORAGE | OUTFLOW STORAGE
| (cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.3000 0.1350
0.0130 0.0746 | 0.3750 0.1510
0.1500 0.0900 | 0.4000 0.1610
0.2100 0.1200 | 0.4500 0.1725
  
```

```

-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0005) 4.170 0.454 6.00 46.45
OUTFLOW: ID= 1 ( 0002) 4.170 0.179 6.43 45.87
  
```

PEAK FLOW REDUCTION [Qout/Qin] (%) = 39.49  
 TIME SHIFT OF PEAK FLOW (min) = 26.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.1046

```

-----
| CALIB |
| STANDHYD ( 0004) | Area (ha) = 0.55
| ID= 1 DT= 2.0 min | Total Imp(%) = 65.00 Dir. Conn.(%) = 65.00
-----
  
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha) =	0.36	0.19
Dep. Storage (mm) =	1.00	5.00
Average Slope (%) =	1.00	2.00
Length (m) =	60.55	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr) =	52.45	18.37
over (min) =	5.00	10.00
Storage Coeff. (min) =	2.45 (ii)	9.58 (ii)
Unit Hyd. Tpeak (min) =	4.00	10.00
Unit Hyd. peak (cms) =	0.37	0.12
		<b>*TOTALS*</b>
PEAK FLOW (cms) =	0.05	0.01
TIME TO PEAK (hrs) =	6.00	6.20
RUNOFF VOLUME (mm) =	57.09	19.17
TOTAL RAINFALL (mm) =	58.09	58.09
RUNOFF COEFFICIENT =	0.98	0.33
		0.75

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
V V I SSSSS U U A L (v 6.0.2001)
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
  
```

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
| ID1= 1 ( 0201): | AREA QPEAK TPEAK R.V.
|                   | (ha) (cms) (hrs) (mm)
+ ID2= 2 ( 0004): | 2.70 0.317 6.00 49.04
|                   | 0.55 0.058 6.00 43.80
=====
  
```

```

-----
OOO TTTT TTTT 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
6.0\VO2\voim.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\ca2fe160-7ff9-45bc-bb82-29e5679b9e73\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\ca2fe160-7ff9-45bc-bb82-29e5679b9e73\s

DATE: 02/25/2021 TIME: 12:17:49

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*
\*\* SIMULATION : Run 03: 12 hr SCS 10yr \*\*
\*\*\*\*\*

| MASS STORM | Filename: C:\Users\mmacdonald\AppData
| | ata\Local\Temp\
| | fc827793-7400-4dac-9d1b-
f97a5e84f410\09e2f1c6
| Ptotal= 68.88 mm | Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION
-----
Duration of storm = 12.00 hrs
Mass curve time step = 30.00 min
New Storm time step = 10.00 min

Table with 8 columns: TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN. Rows show rainfall intensity (mm/hr) at various time intervals (0.17, 0.33, 0.50 hrs).

Table with 8 columns: TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN. Rows show rainfall intensity (mm/hr) at various time intervals (0.67, 0.83, 1.00, 1.17, 1.38, 1.50, 1.67, 1.83, 2.00, 2.17, 2.33, 2.50, 2.67, 2.83, 3.00 hrs).

Table with 3 columns: IMPERVIOUS, PERVIOUS (i). Rows show Surface Area (ha)= 0.14, Dep. Storage (mm)= 1.00, Average Slope (%)= 1.00, Length (m)= 39.16, Mannings n = 0.013.

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Table with 8 columns: TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN. Rows show transformed rainfall intensity (mm/hr) at various time intervals (0.17, 0.33, 0.50 hrs).

2.76	0.033	0.46   3.033	2.76   6.033	45.46   9.03	1.38	0.933	1.38   3.933	2.76   6.933	5.51   9.93
2.76	0.067	0.46   3.067	2.76   6.067	45.46   9.07	1.38	0.967	1.38   3.967	2.76   6.967	5.51   9.97
2.76	0.100	0.46   3.100	2.76   6.100	45.46   9.10	1.38	1.000	1.38   4.000	2.76   7.000	5.51   10.00
2.76	0.133	0.46   3.133	2.76   6.133	45.46   9.13	1.38	1.033	1.38   4.033	3.21   7.033	5.05   10.03
2.76	0.167	0.46   3.167	2.76   6.167	45.46   9.17	1.38	1.067	1.38   4.067	3.21   7.067	5.05   10.07
2.76	0.200	0.92   3.200	2.76   6.200	28.93   9.20	1.38	1.100	1.38   4.100	3.21   7.100	5.05   10.10
2.76	0.233	0.92   3.233	2.76   6.233	28.93   9.23	1.38	1.133	1.38   4.133	3.21   7.133	5.05   10.13
2.76	0.267	0.92   3.267	2.76   6.267	28.93   9.27	1.38	1.167	1.38   4.167	3.21   7.167	5.05   10.17
2.76	0.300	0.92   3.300	2.76   6.300	28.93   9.30	1.38	1.200	1.38   4.200	3.67   7.200	4.59   10.20
2.76	0.333	0.92   3.333	2.76   6.333	28.93   9.33	1.38	1.233	1.38   4.233	3.67   7.233	4.59   10.23
2.76	0.367	1.38   3.367	2.76   6.367	12.40   9.37	1.38	1.267	1.38   4.267	3.67   7.267	4.59   10.27
2.76	0.400	1.38   3.400	2.76   6.400	12.40   9.40	1.38	1.300	1.38   4.300	3.67   7.300	4.59   10.30
2.76	0.433	1.38   3.433	2.76   6.433	12.40   9.43	1.38	1.333	1.38   4.333	3.67   7.333	4.59   10.33
2.76	0.467	1.38   3.467	2.76   6.467	12.40   9.47	1.38	1.367	1.38   4.367	4.13   7.367	4.13   10.37
2.76	0.500	1.38   3.500	2.76   6.500	12.40   9.50	1.38	1.400	1.38   4.400	4.13   7.400	4.13   10.40
2.30	0.533	1.38   3.533	2.76   6.533	10.10   9.53	1.38	1.433	1.38   4.433	4.13   7.433	4.13   10.43
2.30	0.567	1.38   3.567	2.76   6.567	10.10   9.57	1.38	1.467	1.38   4.467	4.13   7.467	4.13   10.47
2.30	0.600	1.38   3.600	2.76   6.600	10.10   9.60	1.38	1.500	1.38   4.500	4.13   7.500	4.13   10.50
2.30	0.633	1.38   3.633	2.76   6.633	10.10   9.63	1.38	1.533	1.38   4.533	4.59   7.533	4.13   10.53
2.30	0.667	1.38   3.667	2.76   6.667	10.10   9.67	1.38	1.567	1.38   4.567	4.59   7.567	4.13   10.57
1.84	0.700	1.38   3.700	2.76   6.700	7.81   9.70	1.38	1.600	1.38   4.600	4.59   7.600	4.13   10.60
1.84	0.733	1.38   3.733	2.76   6.733	7.81   9.73	1.38	1.633	1.38   4.633	4.59   7.633	4.13   10.63
1.84	0.767	1.38   3.767	2.76   6.767	7.81   9.77	1.38	1.667	1.38   4.667	4.59   7.667	4.13   10.67
1.84	0.800	1.38   3.800	2.76   6.800	7.81   9.80	1.38	1.700	1.38   4.700	5.05   7.700	4.13   10.70
1.84	0.833	1.38   3.833	2.76   6.833	7.81   9.83	1.38	1.733	1.38   4.733	5.05   7.733	4.13   10.73
1.38	0.867	1.38   3.867	2.76   6.867	5.51   9.87	1.38	1.767	1.38   4.767	5.05   7.767	4.13   10.77
1.38	0.900	1.38   3.900	2.76   6.900	5.51   9.90	1.38	1.800	1.38   4.800	5.05   7.800	4.13   10.80



1.38 1.833 1.38 | 4.833 5.05 | 7.833 4.13 | 10.83  
1.38 1.867 1.38 | 4.867 5.51 | 7.867 4.13 | 10.87  
1.38 1.900 1.38 | 4.900 5.51 | 7.900 4.13 | 10.90  
1.38 1.933 1.38 | 4.933 5.51 | 7.933 4.13 | 10.93  
1.38 1.967 1.38 | 4.967 5.51 | 7.967 4.13 | 10.97  
1.38 2.000 1.38 | 5.000 5.51 | 8.000 4.13 | 11.00  
1.38 2.033 1.84 | 5.033 6.43 | 8.033 3.67 | 11.03  
1.38 2.067 1.84 | 5.067 6.43 | 8.067 3.67 | 11.07  
1.38 2.100 1.84 | 5.100 6.43 | 8.100 3.67 | 11.10  
1.38 2.133 1.84 | 5.133 6.43 | 8.133 3.67 | 11.13  
1.38 2.167 1.84 | 5.167 6.43 | 8.167 3.67 | 11.17  
1.38 2.200 2.30 | 5.200 7.35 | 8.200 3.21 | 11.20  
1.38 2.233 2.30 | 5.233 7.35 | 8.233 3.21 | 11.23  
1.38 2.267 2.30 | 5.267 7.35 | 8.267 3.21 | 11.27  
1.38 2.300 2.30 | 5.300 7.35 | 8.300 3.21 | 11.30  
1.38 2.333 2.30 | 5.333 7.35 | 8.333 3.21 | 11.33  
1.38 2.367 2.76 | 5.367 8.27 | 8.367 2.76 | 11.37  
1.38 2.400 2.76 | 5.400 8.27 | 8.400 2.76 | 11.40  
1.38 2.433 2.76 | 5.433 8.27 | 8.433 2.76 | 11.43  
1.38 2.467 2.76 | 5.467 8.27 | 8.467 2.76 | 11.47  
1.38 2.500 2.76 | 5.500 8.27 | 8.500 2.76 | 11.50  
1.38 2.533 2.76 | 5.533 26.17 | 8.533 2.76 | 11.53  
1.38 2.567 2.76 | 5.567 26.17 | 8.567 2.76 | 11.57  
1.38 2.600 2.76 | 5.600 26.17 | 8.600 2.76 | 11.60  
1.38 2.633 2.76 | 5.633 26.17 | 8.633 2.76 | 11.63  
1.38 2.667 2.76 | 5.667 26.17 | 8.667 2.76 | 11.67  
1.38 2.700 2.76 | 5.700 44.08 | 8.700 2.76 | 11.70

1.38 2.733 2.76 | 5.733 44.08 | 8.733 2.76 | 11.73  
1.38 2.767 2.76 | 5.767 44.08 | 8.767 2.76 | 11.77  
1.38 2.800 2.76 | 5.800 44.08 | 8.800 2.76 | 11.80  
1.38 2.833 2.76 | 5.833 44.08 | 8.833 2.76 | 11.83  
1.38 2.867 2.76 | 5.867 61.99 | 8.867 2.76 | 11.87  
1.38 2.900 2.76 | 5.900 61.99 | 8.900 2.76 | 11.90  
1.38 2.933 2.76 | 5.933 61.99 | 8.933 2.76 | 11.93  
1.38 2.967 2.76 | 5.967 61.99 | 8.967 2.76 | 11.97  
1.38 3.000 2.76 | 6.000 61.99 | 9.000 2.76 | 12.00

Max.Eff.Inten.(mm/hr)= 61.99 93.75  
over (min) 5.00 10.00  
Storage Coeff. (min)= 1.76 (ii) 9.00 (ii)  
Unit Hyd. Tpeak (min)= 4.00 10.00  
Unit Hyd. peak (cms)= 0.43 0.12

\*TOTALS\*  
PEAK FLOW (cms)= 0.00 0.02 0.022 (iii)  
TIME TO PEAK (hrs)= 6.00 6.13 6.13  
RUNOFF VOLUME (mm)= 67.65 40.93 42.78  
TOTAL RAINFALL (mm)= 68.65 68.65 68.65  
RUNOFF COEFFICIENT = 0.99 0.60 0.62

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
-----  
| CALIB |  
| STANDHYD ( 0204) | Area (ha)= 0.24  
| ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
-----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.18	0.06
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten. (mm/hr)=	61.99	95.44	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.79 (ii)	9.24 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.43	0.12	
			*TOTALS*
PEAK FLOW (cms)=	0.02	0.01	0.028 (iii)
TIME TO PEAK (hrs)=	6.00	6.13	6.00
RUNOFF VOLUME (mm)=	67.65	41.15	51.19
TOTAL RAINFALL (mm)=	68.65	68.65	68.65
RUNOFF COEFFICIENT =	0.99	0.60	0.75

Unit Hyd. peak (cms)=	0.30	0.10	
PEAK FLOW (cms)=	0.11	0.16	0.242 (iii)
TIME TO PEAK (hrs)=	6.00	6.17	6.17
RUNOFF VOLUME (mm)=	67.65	39.68	46.95
TOTAL RAINFALL (mm)=	68.65	68.65	68.65
RUNOFF COEFFICIENT =	0.99	0.58	0.68

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 |
-----

```

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
TOTAL HYD. (ID= 1):	0.24	0.03	6.00	51.19
MAJOR SYS. (ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS. (ID= 3):	0.24	0.03	6.00	51.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0203) |
| ID= 1 DT= 2.0 min |
-----

```

Area (ha)=	2.45	
Total Imp(%)=	65.00	Dir. Conn.(%)= 26.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.59	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	127.80	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten. (mm/hr)=	61.99	84.58
over (min)	5.00	12.00
Storage Coeff. (min)=	3.58 (ii)	11.13 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0202) |
| ID= 1 DT= 2.0 min |
-----

```

Area (ha)=	0.92	
Total Imp(%)=	68.00	Dir. Conn.(%)= 41.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	78.32	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten. (mm/hr)=	61.99	68.84
over (min)	5.00	12.00
Storage Coeff. (min)=	2.67 (ii)	10.41 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.35	0.10

PEAK FLOW (cms)=	0.06	0.05	0.099 (iii)
TIME TO PEAK (hrs)=	6.00	6.17	6.03
RUNOFF VOLUME (mm)=	67.65	37.20	49.68
TOTAL RAINFALL (mm)=	68.65	68.65	68.65
RUNOFF COEFFICIENT =	0.99	0.54	0.72

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
Total(cms)= 0.1				
TOTAL HYD.(ID= 1):	0.92	0.10	6.03	49.68
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	0.92	0.10	6.03	49.68

PEAK FLOW REDUCTION [Qout/Qin](%)= 52.37  
 TIME SHIFT OF PEAK FLOW (min)= 20.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.0556

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ADD HYD ( 0007)				
1 + 2 = 3				
*** W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.				
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001				
ID1= 1 ( 0203):	2.45	0.242	6.17	46.95
+ ID2= 2 ( 0006):	0.00	0.000	0.00	0.00
ID = 3 ( 0007):	2.45	0.242	6.17	46.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ADD HYD ( 0007)				
3 + 2 = 1				
ID1= 3 ( 0007):	2.45	0.242	6.17	46.95
+ ID2= 2 ( 0009):	0.24	0.028	6.00	51.19
ID = 1 ( 0007):	2.69	0.267	6.17	47.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR ( 0008)   OVERFLOW IS OFF				
IN= 2---> OUT= 1				
DT= 2.0 min				
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1750	0.0640
	0.0060	0.0325	0.2000	0.0740
	0.1000	0.0390	0.2300	0.0830
	0.1250	0.0520	0.2750	0.0900
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0007)	2.690	0.267	6.17	47.33
OUTFLOW: ID= 1 ( 0008)	2.690	0.140	6.50	46.82

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ADD HYD ( 0003)				
1 + 2 = 3				
ID1= 1 ( 0205):	0.23	0.022	6.13	42.78
+ ID2= 2 ( 0008):	2.69	0.140	6.50	46.82
ID = 3 ( 0003):	2.92	0.153	6.43	46.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	Area (ha)	Dir. Conn. (%)
CALIB		
STANDHYD ( 0207)	0.65	
ID= 1 DT= 2.0 min	47.00	0.10

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.31	0.34
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	65.83	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	61.99	71.20
over (min)	5.00	12.00
Storage Coeff. (min)=	2.41 (ii)	10.49 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.37	0.10

	PEAK FLOW (cms)	TIME TO PEAK (hrs)	RUNOFF VOLUME (mm)	TOTAL RAINFALL (mm)	RUNOFF COEFFICIENT
	0.00	6.00	67.65	68.65	0.99
	0.05	6.17	37.60	68.65	0.55
	0.055 (iii)	6.17	37.62	68.65	0.55

\*TOTALS\*

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| CALIB |
| STANDHYD ( 0206) | Area (ha)= 2.39
| ID= 1 DT= 2.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00
-----

```

```

                IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)= 1.53      0.86
Dep. Storage (mm)= 1.00     5.00
Average Slope (%)= 1.00     2.00
Length (m)= 126.23        40.00
Mannings n = 0.013        0.250

```

```

Max.Eff.Inten.(mm/hr)= 61.99    82.75
over (min) 5.00    12.00
Storage Coeff. (min)= 3.56 (ii) 11.17 (ii)
Unit Hyd. Tpeak (min)= 4.00    12.00
Unit Hyd. peak (cms)= 0.30     0.10

```

```

                *TOTALS*
PEAK FLOW (cms)= 0.10      0.16      0.233 (iii)
TIME TO PEAK (hrs)= 6.00    6.17    6.17
RUNOFF VOLUME (mm)= 67.65   39.42   46.47
TOTAL RAINFALL (mm)= 68.65   68.65   68.65
RUNOFF COEFFICIENT = 0.99    0.57    0.68

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| RESERVOIR( 0010) | OVERFLOW IS OFF
| IN= 2--> OUT= 1 |
| DT= 2.0 min |
-----
                OUTFLOW    STORAGE | OUTFLOW    STORAGE
                (cms)    (ha.m.) | (cms)    (ha.m.)
0.0000    0.0000 | 0.1400    0.0584
0.0050    0.0278 | 0.1700    0.0694
0.0700    0.0363 | 0.1900    0.0737
0.1000    0.0478 | 0.3000    0.0767
                AREA    QPEAK    TPEAK    R.V.
                (ha)    (cms)    (hrs)    (mm)
INFLOW : ID= 2 ( 0206) 2.390    0.233    6.17    46.47
OUTFLOW: ID= 1 ( 0010) 2.390    0.113    6.53    45.88

```

```

PEAK FLOW REDUCTION [Qout/Qin] (%)= 48.21
TIME SHIFT OF PEAK FLOW (min)= 22.00
MAXIMUM STORAGE USED (ha.m.)= 0.0512

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-----
| ADD HYD ( 0001) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
                (ha) (cms) (hrs) (mm)
ID1= 1 ( 0010): 2.39 0.113 6.53 45.88
+ ID2= 2 ( 0207): 0.65 0.055 6.17 37.62
=====
ID = 3 ( 0001): 3.04 0.152 6.40 44.12

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| ADD HYD ( 0001) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
                (ha) (cms) (hrs) (mm)
*** W A R N I N G : HYDROGRAPH 0009 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003
ID1= 3 ( 0001): 3.04 0.152 6.40 44.12
+ ID2= 2 ( 0009): 0.00 0.000 0.00 0.00
=====
ID = 1 ( 0001): 3.04 0.152 6.40 44.12

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| CALIB |
| STANDHYD ( 0201) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00
-----

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```

                IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)= 2.19      0.51
Dep. Storage (mm)= 1.00     5.00
Average Slope (%)= 1.00     2.00
Length (m)= 134.16        40.00
Mannings n = 0.013        0.250

```

```

Max.Eff.Inten.(mm/hr)= 61.99    34.87
over (min) 5.00    10.00
Storage Coeff. (min)= 3.69 (ii) 8.57 (ii)
Unit Hyd. Tpeak (min)= 4.00    10.00
Unit Hyd. peak (cms)= 0.29     0.12

```

```

                *TOTALS*
PEAK FLOW (cms)= 0.35      0.04      0.381 (iii)
TIME TO PEAK (hrs)= 6.00    6.17    6.00
RUNOFF VOLUME (mm)= 67.65   29.29   58.83
TOTAL RAINFALL (mm)= 68.65   68.65   68.65
RUNOFF COEFFICIENT = 0.99    0.43    0.86

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 0005): 3.25 0.451 6.00 57.83
+ ID2= 2 ( 0006): 0.92 0.099 6.03 49.68
=====
ID = 1 ( 0005): 4.17 0.550 6.00 56.03

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0002) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.3000 0.1350
0.0130 0.0746 | 0.3750 0.1510
0.1500 0.0900 | 0.4000 0.1610
0.2100 0.1200 | 0.4500 0.1725
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0005) 4.170 0.550 6.00 56.03
OUTFLOW: ID= 1 ( 0002) 4.170 0.222 6.40 55.45
-----
PEAK FLOW REDUCTION [Qout/Qin] (%) = 40.45
TIME SHIFT OF PEAK FLOW (min) = 24.00
MAXIMUM STORAGE USED (ha.m.) = 0.1222

```

FINISH

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-----
V V I SSSSS U U A L (v 6.0.2001)
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 TTTT TTTT 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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-----
| CALIB |
| STANDHYD ( 0004) |
| ID= 1 DT= 2.0 min |
-----
Area (ha)= 0.55
Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.36	0.19
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	60.55	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	61.99	24.96
over (min)	5.00	10.00
Storage Coeff. (min)=	2.29 (ii)	8.96 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.38	0.12
*TOTALS*		
PEAK FLOW (cms)=	0.06	0.01
TIME TO PEAK (hrs)=	6.00	6.20
RUNOFF VOLUME (mm)=	67.65	25.71
TOTAL RAINFALL (mm)=	68.65	68.65
RUNOFF COEFFICIENT =	0.99	0.37

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0201): 2.70 0.381 6.00 58.83
+ ID2= 2 ( 0004): 0.55 0.070 6.00 52.96
=====
ID = 3 ( 0005): 3.25 0.451 6.00 57.83

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO  
 6.0\VO2\voin.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\83b08cf0-49ba-41f6-893d-a1e4c3282694\  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\83b08cf0-49ba-41f6-893d-a1e4c3282694\  
 \s

DATE: 02/25/2021 TIME: 12:17:49

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
 \*\* SIMULATION : Run 04: 12 hr SCS 25yr \*\*  
 \*\*\*\*\*

-----  
 | MASS STORM | Filename: C:\Users\mmacdonald\AppData\Local\Temp\  
 | | | fc827793-7400-4dac-9d1b-  
 | | | f97a5e84f410\672af8e8  
Ptotal= 79.86 mm
 Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 12.00 hrs  
 Mass curve time step = 30.00 min  
 New Storm time step = 10.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
0.17	0.53	3.17	3.19	6.17	52.71	9.17	
3.19	0.33	1.06	3.33	3.19	6.33	33.54	9.33
3.19	0.50	1.60	3.50	3.19	6.50	14.38	9.50
3.19	0.67	1.60	3.67	3.19	6.67	11.71	9.67
2.66							

2.13	0.83	1.60	3.83	3.19	6.83	9.05	9.83
1.60	1.00	1.60	4.00	3.19	7.00	6.39	10.00
1.60	1.17	1.60	4.17	3.73	7.17	5.86	10.17
1.60	1.33	1.60	4.33	4.26	7.33	5.32	10.33
1.60	1.50	1.60	4.50	4.79	7.50	4.79	10.50
1.60	1.67	1.60	4.67	5.32	7.67	4.79	10.67
1.60	1.83	1.60	4.83	5.86	7.83	4.79	10.83
1.60	2.00	1.60	5.00	6.39	8.00	4.79	11.00
1.60	2.17	2.13	5.17	7.45	8.17	4.26	11.17
1.60	2.33	2.66	5.33	8.52	8.33	3.73	11.33
1.60	2.50	3.19	5.50	9.58	8.50	3.19	11.50
1.60	2.67	3.19	5.67	30.35	8.67	3.19	11.67
1.60	2.83	3.19	5.83	51.11	8.83	3.19	11.83
1.60	3.00	3.19	6.00	71.87	9.00	3.19	12.00

-----  
 | CALIB |  
 | STANDHYD ( 0205) | Area (ha)= 0.23  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.09
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	39.16	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.19	0.033	0.53	3.033	3.19	6.033	52.71	9.03

3.19	0.067	0.53   3.067	3.19   6.067	52.71   9.07	1.60	0.967	1.60   3.967	3.19   6.967	6.39   9.97
3.19	0.100	0.53   3.100	3.19   6.100	52.71   9.10	1.60	1.000	1.60   4.000	3.19   7.000	6.39   10.00
3.19	0.133	0.53   3.133	3.19   6.133	52.71   9.13	1.60	1.033	1.60   4.033	3.73   7.033	5.86   10.03
3.19	0.167	0.53   3.167	3.19   6.167	52.71   9.17	1.60	1.067	1.60   4.067	3.73   7.067	5.86   10.07
3.19	0.200	1.06   3.200	3.19   6.200	33.54   9.20	1.60	1.100	1.60   4.100	3.73   7.100	5.86   10.10
3.19	0.233	1.06   3.233	3.19   6.233	33.54   9.23	1.60	1.133	1.60   4.133	3.73   7.133	5.86   10.13
3.19	0.267	1.06   3.267	3.19   6.267	33.54   9.27	1.60	1.167	1.60   4.167	3.73   7.167	5.86   10.17
3.19	0.300	1.06   3.300	3.19   6.300	33.54   9.30	1.60	1.200	1.60   4.200	4.26   7.200	5.32   10.20
3.19	0.333	1.06   3.333	3.19   6.333	33.54   9.33	1.60	1.233	1.60   4.233	4.26   7.233	5.32   10.23
3.19	0.367	1.60   3.367	3.19   6.367	14.38   9.37	1.60	1.267	1.60   4.267	4.26   7.267	5.32   10.27
3.19	0.400	1.60   3.400	3.19   6.400	14.38   9.40	1.60	1.300	1.60   4.300	4.26   7.300	5.32   10.30
3.19	0.433	1.60   3.433	3.19   6.433	14.38   9.43	1.60	1.333	1.60   4.333	4.26   7.333	5.32   10.33
3.19	0.467	1.60   3.467	3.19   6.467	14.38   9.47	1.60	1.367	1.60   4.367	4.79   7.367	4.79   10.37
3.19	0.500	1.60   3.500	3.19   6.500	14.38   9.50	1.60	1.400	1.60   4.400	4.79   7.400	4.79   10.40
2.66	0.533	1.60   3.533	3.19   6.533	11.71   9.53	1.60	1.433	1.60   4.433	4.79   7.433	4.79   10.43
2.66	0.567	1.60   3.567	3.19   6.567	11.71   9.57	1.60	1.467	1.60   4.467	4.79   7.467	4.79   10.47
2.66	0.600	1.60   3.600	3.19   6.600	11.71   9.60	1.60	1.500	1.60   4.500	4.79   7.500	4.79   10.50
2.66	0.633	1.60   3.633	3.19   6.633	11.71   9.63	1.60	1.533	1.60   4.533	5.32   7.533	4.79   10.53
2.66	0.667	1.60   3.667	3.19   6.667	11.71   9.67	1.60	1.567	1.60   4.567	5.32   7.567	4.79   10.57
2.13	0.700	1.60   3.700	3.19   6.700	9.05   9.70	1.60	1.600	1.60   4.600	5.32   7.600	4.79   10.60
2.13	0.733	1.60   3.733	3.19   6.733	9.05   9.73	1.60	1.633	1.60   4.633	5.32   7.633	4.79   10.63
2.13	0.767	1.60   3.767	3.19   6.767	9.05   9.77	1.60	1.667	1.60   4.667	5.32   7.667	4.79   10.67
2.13	0.800	1.60   3.800	3.19   6.800	9.05   9.80	1.60	1.700	1.60   4.700	5.86   7.700	4.79   10.70
2.13	0.833	1.60   3.833	3.19   6.833	9.05   9.83	1.60	1.733	1.60   4.733	5.86   7.733	4.79   10.73
1.60	0.867	1.60   3.867	3.19   6.867	6.39   9.87	1.60	1.767	1.60   4.767	5.86   7.767	4.79   10.77
1.60	0.900	1.60   3.900	3.19   6.900	6.39   9.90	1.60	1.800	1.60   4.800	5.86   7.800	4.79   10.80
1.60	0.933	1.60   3.933	3.19   6.933	6.39   9.93	1.60	1.833	1.60   4.833	5.86   7.833	4.79   10.83

1.60 1.867 1.60 | 4.867 6.39 | 7.867 4.79 | 10.87  
 1.60 1.900 1.60 | 4.900 6.39 | 7.900 4.79 | 10.90  
 1.60 1.933 1.60 | 4.933 6.39 | 7.933 4.79 | 10.93  
 1.60 1.967 1.60 | 4.967 6.39 | 7.967 4.79 | 10.97  
 1.60 2.000 1.60 | 5.000 6.39 | 8.000 4.79 | 11.00  
 1.60 2.033 2.13 | 5.033 7.45 | 8.033 4.26 | 11.03  
 1.60 2.067 2.13 | 5.067 7.45 | 8.067 4.26 | 11.07  
 1.60 2.100 2.13 | 5.100 7.45 | 8.100 4.26 | 11.10  
 1.60 2.133 2.13 | 5.133 7.45 | 8.133 4.26 | 11.13  
 1.60 2.167 2.13 | 5.167 7.45 | 8.167 4.26 | 11.17  
 1.60 2.200 2.66 | 5.200 8.52 | 8.200 3.73 | 11.20  
 1.60 2.233 2.66 | 5.233 8.52 | 8.233 3.73 | 11.23  
 1.60 2.267 2.66 | 5.267 8.52 | 8.267 3.73 | 11.27  
 1.60 2.300 2.66 | 5.300 8.52 | 8.300 3.73 | 11.30  
 1.60 2.333 2.66 | 5.333 8.52 | 8.333 3.73 | 11.33  
 1.60 2.367 3.19 | 5.367 9.58 | 8.367 3.19 | 11.37  
 1.60 2.400 3.19 | 5.400 9.58 | 8.400 3.19 | 11.40  
 1.60 2.433 3.19 | 5.433 9.58 | 8.433 3.19 | 11.43  
 1.60 2.467 3.19 | 5.467 9.58 | 8.467 3.19 | 11.47  
 1.60 2.500 3.19 | 5.500 9.58 | 8.500 3.19 | 11.50  
 1.60 2.533 3.19 | 5.533 30.34 | 8.533 3.19 | 11.53  
 1.60 2.567 3.19 | 5.567 30.35 | 8.567 3.19 | 11.57  
 1.60 2.600 3.19 | 5.600 30.35 | 8.600 3.19 | 11.60  
 1.60 2.633 3.19 | 5.633 30.35 | 8.633 3.19 | 11.63  
 1.60 2.667 3.19 | 5.667 30.35 | 8.667 3.19 | 11.67  
 1.60 2.700 3.19 | 5.700 51.11 | 8.700 3.19 | 11.70  
 1.60 2.733 3.19 | 5.733 51.11 | 8.733 3.19 | 11.73

1.60 2.767 3.19 | 5.767 51.11 | 8.767 3.19 | 11.77  
 1.60 2.800 3.19 | 5.800 51.11 | 8.800 3.19 | 11.80  
 1.60 2.833 3.19 | 5.833 51.11 | 8.833 3.19 | 11.83  
 1.60 2.867 3.19 | 5.867 71.87 | 8.867 3.19 | 11.87  
 1.60 2.900 3.19 | 5.900 71.87 | 8.900 3.19 | 11.90  
 1.60 2.933 3.19 | 5.933 71.87 | 8.933 3.19 | 11.93  
 1.60 2.967 3.19 | 5.967 71.87 | 8.967 3.19 | 11.97  
 1.60 3.000 3.19 | 6.000 71.87 | 9.000 3.19 | 12.00  
 1.59

Max.Eff.Inten.(mm/hr)= 71.87 115.76  
 over (min) 5.00 10.00  
 Storage Coeff. (min)= 1.66 (ii) 8.32 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 10.00  
 Unit Hyd. peak (cms)= 0.44 0.13

\*TOTALS\*  
 0.028 (iii)  
 6.13  
 52.36  
 79.59  
 0.66

PEAK FLOW (cms)= 0.00 0.03  
 TIME TO PEAK (hrs)= 6.00 6.13  
 RUNOFF VOLUME (mm)= 78.59 50.41  
 TOTAL RAINFALL (mm)= 79.59 79.59  
 RUNOFF COEFFICIENT = 0.99 0.63

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0204) | Area (ha)= 0.24  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
 -----

IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 0.18 0.06  
 Dep. Storage (mm)= 1.00 5.00  
 Average Slope (%)= 1.00 2.00  
 Length (m)= 40.00 40.00  
 Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 71.87 117.76



over (min) 5.00 10.00  
 Storage Coeff. (min)= 1.68 (ii) 8.71 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 10.00  
 Unit Hyd. peak (cms)= 0.44 0.12

\*TOTALS\*

PEAK FLOW (cms)= 0.02 0.02 0.033 (iii)  
 TIME TO PEAK (hrs)= 6.00 6.13 6.00  
 RUNOFF VOLUME (mm)= 78.59 50.65 61.25  
 TOTAL RAINFALL (mm)= 79.59 79.59 79.59  
 RUNOFF COEFFICIENT = 0.99 0.64 0.77

PEAK FLOW (cms)= 0.12 0.20 0.296 (iii)  
 TIME TO PEAK (hrs)= 6.00 6.17 6.17  
 RUNOFF VOLUME (mm)= 78.59 49.02 56.71  
 TOTAL RAINFALL (mm)= 79.59 79.59 79.59  
 RUNOFF COEFFICIENT = 0.99 0.62 0.71

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0202) | Area (ha)= 0.92  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	78.32	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 71.87 85.96  
 over (min) 5.00 10.00  
 Storage Coeff. (min)= 2.52 (ii) 9.81 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 10.00  
 Unit Hyd. peak (cms)= 0.37 0.11

\*TOTALS\*

PEAK FLOW (cms)= 0.07 0.06 0.122 (iii)  
 TIME TO PEAK (hrs)= 6.00 6.13 6.03  
 RUNOFF VOLUME (mm)= 78.59 46.24 59.50  
 TOTAL RAINFALL (mm)= 79.59 79.59 79.59  
 RUNOFF COEFFICIENT = 0.99 0.58 0.75

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 -----  
 | DUHYD ( 0006) |  
 | Inlet Cap.= 0.147 |  
 | #of Inlets= 1 |  
 | Total(cms)= 0.1 | AREA QPEAK TPEAK R.V.  
 ----- (ha) (cms) (hrs) (mm)

-----  
 -----  
 | DUHYD ( 0009) |  
 | Inlet Cap.= 0.041 |  
 | #of Inlets= 1 |  
 | Total(cms)= 0.0 | AREA QPEAK TPEAK R.V.  
 ----- (ha) (cms) (hrs) (mm)

TOTAL HYD.(ID= 1):	0.24	0.03	6.00	61.25
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	0.24	0.03	6.00	61.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0203) | Area (ha)= 2.45  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.59	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	127.80	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 71.87 104.82  
 over (min) 5.00 12.00  
 Storage Coeff. (min)= 3.38 (ii) 10.30 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 12.00  
 Unit Hyd. peak (cms)= 0.31 0.10

\*TOTALS\*

TOTAL HYD. (ID= 1): 0.92 0.12 6.03 59.50  
 MAJOR SYS. (ID= 2): 0.00 0.00 0.00 0.00  
 MINOR SYS. (ID= 3): 0.92 0.12 6.03 59.50

MAXIMUM STORAGE USED (ha.m.)= 0.0650

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 0003) |
| 1 + 2 = 3 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0205): 0.23 0.028 6.13 52.36
+ ID2= 2 ( 0008): 2.69 0.177 6.50 56.60
=====
ID = 3 ( 0003): 2.92 0.195 6.40 56.27
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| CALIB |
| STANDHYD ( 0207) | Area (ha)= 0.65
| ID= 1 DT= 2.0 min | Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10
  
```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.31 0.34
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 65.83 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 71.87 88.80
over (min) 5.00 10.00
Storage Coeff. (min)= 2.27 (ii) 9.67 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.39 0.12
  
```

```

*TOTALS*
PEAK FLOW (cms)= 0.00 0.07 0.069 (iii)
TIME TO PEAK (hrs)= 6.00 6.13 6.13
RUNOFF VOLUME (mm)= 78.59 46.69 46.72
TOTAL RAINFALL (mm)= 79.59 79.59 79.59
RUNOFF COEFFICIENT = 0.99 0.59 0.59
  
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |

```

| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
*** W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001
ID1= 1 ( 0203): 2.45 0.296 6.17 56.71
+ ID2= 2 ( 0006): 0.00 0.000 0.00 0.00
=====
ID = 3 ( 0007): 2.45 0.296 6.17 56.71
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 0007) |
| 3 + 2 = 1 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 0007): 2.45 0.296 6.17 56.71
+ ID2= 2 ( 0009): 0.24 0.033 6.00 61.25
=====
ID = 1 ( 0007): 2.69 0.327 6.17 57.11
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| RESERVOIR( 0008) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1750 0.0640
0.0060 0.0325 | 0.2000 0.0740
0.1000 0.0390 | 0.2300 0.0830
0.1250 0.0520 | 0.2750 0.0900
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0007) 2.690 0.327 6.17 57.11
OUTFLOW: ID= 1 ( 0008) 2.690 0.177 6.50 56.60
  
```

PEAK FLOW REDUCTION [Qout/Qin] (%)= 54.25  
 TIME SHIFT OF PEAK FLOW (min)= 20.00

| STANDHYD ( 0206) | Area (ha)= 2.39  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.53	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	126.23	40.00
Mannings n	=	0.013	0.250

Max.Eff.Inten.(mm/hr)=	71.87	102.64
over (min)	5.00	12.00
Storage Coeff. (min)=	3.35 (ii)	10.34 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.31	0.10

			*TOTALS*
PEAK FLOW	(cms)=	0.12	0.20
TIME TO PEAK	(hrs)=	6.00	6.17
RUNOFF VOLUME	(mm)=	78.59	48.73
TOTAL RAINFALL	(mm)=	79.59	79.59
RUNOFF COEFFICIENT	=	0.99	0.61

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 | RESERVOIR ( 0010) | OVERFLOW IS OFF  
 | IN= 2--> OUT= 1 |  
 | DT= 2.0 min |

	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
	0.0000	0.0000	0.1400	0.0584
	0.0050	0.0278	0.1700	0.0694
	0.0700	0.0363	0.1900	0.0737
	0.1000	0.0478	0.3000	0.0767

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 ( 0206)	2.390	0.287	6.17	56.19
OUTFLOW: ID= 1 ( 0010)	2.390	0.144	6.53	55.60

PEAK FLOW REDUCTION [Qout/Qin](%)= 50.18  
 TIME SHIFT OF PEAK FLOW (min)= 22.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.0598

| ADD HYD ( 0001) |  
 | 1 + 2 = 3 |

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 ( 0010):	2.39	0.144	6.53	55.60
+ ID2= 2 ( 0207):	0.65	0.069	6.13	46.72
=====				
ID = 3 ( 0001):	3.04	0.195	6.37	53.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | ADD HYD ( 0001) |  
 | 3 + 2 = 1 |

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
*** W A R N I N G : HYDROGRAPH 0009 <ID= 2> IS DRY.				
*** W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003				
ID1= 3 ( 0001):	3.04	0.195	6.37	53.70
+ ID2= 2 ( 0009):	0.00	0.000	0.00	0.00
=====				
ID = 1 ( 0001):	3.04	0.195	6.37	53.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | CALIB |  
 | STANDHYD ( 0201) | Area (ha)= 2.70  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.19	0.51
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	134.16	40.00
Mannings n	=	0.013	0.250

Max.Eff.Inten.(mm/hr)=	71.87	44.66
over (min)	5.00	10.00
Storage Coeff. (min)=	3.48 (ii)	8.08 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.30	0.13

			*TOTALS*
PEAK FLOW	(cms)=	0.40	0.05
TIME TO PEAK	(hrs)=	6.00	6.13
RUNOFF VOLUME	(mm)=	78.59	37.20
TOTAL RAINFALL	(mm)=	79.59	79.59
RUNOFF COEFFICIENT	=	0.99	0.47

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

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

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0004) | Area (ha)= 0.55  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00  
 -----

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.36	0.19	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	60.55	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	71.87	32.38	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.16 (ii)	8.45 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.39	0.13	
			*TOTALS*
PEAK FLOW (cms)=	0.07	0.01	0.083 (iii)
TIME TO PEAK (hrs)=	6.00	6.17	6.00
RUNOFF VOLUME (mm)=	78.59	33.01	62.63
TOTAL RAINFALL (mm)=	79.59	79.59	79.59
RUNOFF COEFFICIENT =	0.99	0.41	0.79

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 -----  
 | ADD HYD ( 0005) |  
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.  
 (ha) (cms) (hrs) (mm)  
 ID1= 1 ( 0201): 2.70 0.449 6.00 69.07  
 + ID2= 2 ( 0004): 0.55 0.083 6.00 62.63  
 =====  
 ID = 3 ( 0005): 3.25 0.532 6.00 67.98  
 -----

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
ADD HYD ( 0005)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 ( 0005):	3.25	0.532	6.00	67.98
+ ID2= 2 ( 0006):	0.92	0.122	6.03	59.50
=====				
ID = 1 ( 0005):	4.17	0.654	6.00	66.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 -----  
 | RESERVOIR ( 0002) | OVERFLOW IS OFF  
 | IN= 2---> OUT= 1 |  
 | DT= 2.0 min | OUTFLOW STORAGE | OUTFLOW STORAGE  
 (cms) (ha.m.) | (cms) (ha.m.)  
 0.0000 0.0000 | 0.3000 0.1350  
 0.0130 0.0746 | 0.3750 0.1510  
 0.1500 0.0900 | 0.4000 0.1610  
 0.2100 0.1200 | 0.4500 0.1725  
 -----

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0005)	4.170	0.654	6.00	66.11
OUTFLOW: ID= 1 ( 0002)	4.170	0.309	6.40	65.52
				PEAK FLOW REDUCTION [Qout/Qin](%)= 47.21
				TIME SHIFT OF PEAK FLOW (min)= 24.00
				MAXIMUM STORAGE USED (ha.m.)= 0.1371

-----  
 -----  
 =====  
 V V I SSSSS U U A L (v 6.0.2001)  
 V V I SS U U A A L  
 V V I SS U U A A A A L  
 V V I SS U U A A L  
 VV I SSSSS UUUUU A A LLLLL  
 OOO TTTTT TTTTT H H Y Y M M OOO TM  
 O O T T H H Y Y M M O O  
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\*\*\*\*\* D E T A I L E D O U T P U T \*\*\*\*\*

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 6.0\VO2\voain.dat

Output filename:  
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 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-0af8143f9a42\902e1dfc-1be6-44a0-8448-c91f51d75a8c\  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-0af8143f9a42\902e1dfc-1be6-44a0-8448-c91f51d75a8c\  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-0af8143f9a42\902e1dfc-1be6-44a0-8448-c91f51d75a8c\

DATE: 02/25/2021 TIME: 12:17:49

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
 \*\* SIMULATION : Run 05: 12 hr SCS 50yr \*\*  
 \*\*\*\*\*

-----  
 | MASS STORM | Filename: C:\Users\mmacdonald\AppData  
 | | ata\Local\Temp\  
 | | fc827793-7400-4dac-9d1b-  
 f97a5e84f410\ac8c9659  
 | Ptotal= 87.91 mm | Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION  
 -----  
 Duration of storm = 12.00 hrs  
 Mass curve time step = 30.00 min  
 New Storm time step = 10.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
mm/hr							
3.52	0.17	0.59	3.17	3.52	6.17	58.02	9.17
3.52	0.33	1.17	3.33	3.52	6.33	36.92	9.33
3.52	0.50	1.76	3.50	3.52	6.50	15.82	9.50
2.93	0.67	1.76	3.67	3.52	6.67	12.89	9.67
2.34	0.83	1.76	3.83	3.52	6.83	9.96	9.83
1.76	1.00	1.76	4.00	3.52	7.00	7.03	10.00
1.76	1.17	1.76	4.17	4.10	7.17	6.45	10.17

1.76	1.33	1.76	4.33	4.69	7.33	5.86	10.33
1.76	1.50	1.76	4.50	5.27	7.50	5.27	10.50
1.76	1.67	1.76	4.67	5.86	7.67	5.27	10.67
1.76	1.83	1.76	4.83	6.45	7.83	5.27	10.83
1.76	2.00	1.76	5.00	7.03	8.00	5.27	11.00
1.76	2.17	2.34	5.17	8.20	8.17	4.69	11.17
1.76	2.33	2.93	5.33	9.38	8.33	4.10	11.33
1.76	2.50	3.52	5.50	10.55	8.50	3.52	11.50
1.76	2.67	3.52	5.67	33.41	8.67	3.52	11.67
1.76	2.83	3.52	5.83	56.26	8.83	3.52	11.83
1.76	3.00	3.52	6.00	79.12	9.00	3.52	12.00

-----  
 | CALIB |  
 | STANDHYD ( 0205) | Area (ha)= 0.23  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00  
 -----  
 IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 0.14 0.09  
 Dep. Storage (mm)= 1.00 5.00  
 Average Slope (%)= 1.00 2.00  
 Length (m)= 39.16 40.00  
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
mm/hr							
3.52	0.033	0.59	3.033	3.52	6.033	58.02	9.03
3.52	0.067	0.59	3.067	3.52	6.067	58.02	9.07
3.52	0.100	0.59	3.100	3.52	6.100	58.02	9.10
3.52	0.133	0.59	3.133	3.52	6.133	58.02	9.13

3.52	0.167	0.59   3.167	3.52   6.167	58.02   9.17	1.76	1.067	1.76   4.067	4.10   7.067	6.45   10.07
3.52	0.200	1.17   3.200	3.52   6.200	36.93   9.20	1.76	1.100	1.76   4.100	4.10   7.100	6.45   10.10
3.52	0.233	1.17   3.233	3.52   6.233	36.92   9.23	1.76	1.133	1.76   4.133	4.10   7.133	6.45   10.13
3.52	0.267	1.17   3.267	3.52   6.267	36.92   9.27	1.76	1.167	1.76   4.167	4.10   7.167	6.45   10.17
3.52	0.300	1.17   3.300	3.52   6.300	36.92   9.30	1.76	1.200	1.76   4.200	4.69   7.200	5.86   10.20
3.52	0.333	1.17   3.333	3.52   6.333	36.92   9.33	1.76	1.233	1.76   4.233	4.69   7.233	5.86   10.23
3.52	0.367	1.76   3.367	3.52   6.367	15.83   9.37	1.76	1.267	1.76   4.267	4.69   7.267	5.86   10.27
3.52	0.400	1.76   3.400	3.52   6.400	15.82   9.40	1.76	1.300	1.76   4.300	4.69   7.300	5.86   10.30
3.52	0.433	1.76   3.433	3.52   6.433	15.82   9.43	1.76	1.333	1.76   4.333	4.69   7.333	5.86   10.33
3.52	0.467	1.76   3.467	3.52   6.467	15.82   9.47	1.76	1.367	1.76   4.367	5.27   7.367	5.27   10.37
3.52	0.500	1.76   3.500	3.52   6.500	15.82   9.50	1.76	1.400	1.76   4.400	5.27   7.400	5.27   10.40
2.93	0.533	1.76   3.533	3.52   6.533	12.89   9.53	1.76	1.433	1.76   4.433	5.27   7.433	5.27   10.43
2.93	0.567	1.76   3.567	3.52   6.567	12.89   9.57	1.76	1.467	1.76   4.467	5.27   7.467	5.27   10.47
2.93	0.600	1.76   3.600	3.52   6.600	12.89   9.60	1.76	1.500	1.76   4.500	5.27   7.500	5.27   10.50
2.93	0.633	1.76   3.633	3.52   6.633	12.89   9.63	1.76	1.533	1.76   4.533	5.86   7.533	5.27   10.53
2.93	0.667	1.76   3.667	3.52   6.667	12.89   9.67	1.76	1.567	1.76   4.567	5.86   7.567	5.27   10.57
2.34	0.700	1.76   3.700	3.52   6.700	9.96   9.70	1.76	1.600	1.76   4.600	5.86   7.600	5.27   10.60
2.34	0.733	1.76   3.733	3.52   6.733	9.96   9.73	1.76	1.633	1.76   4.633	5.86   7.633	5.27   10.63
2.34	0.767	1.76   3.767	3.52   6.767	9.96   9.77	1.76	1.667	1.76   4.667	5.86   7.667	5.27   10.67
2.34	0.800	1.76   3.800	3.52   6.800	9.96   9.80	1.76	1.700	1.76   4.700	6.45   7.700	5.27   10.70
2.34	0.833	1.76   3.833	3.52   6.833	9.96   9.83	1.76	1.733	1.76   4.733	6.45   7.733	5.27   10.73
1.76	0.867	1.76   3.867	3.52   6.867	7.03   9.87	1.76	1.767	1.76   4.767	6.45   7.767	5.27   10.77
1.76	0.900	1.76   3.900	3.52   6.900	7.03   9.90	1.76	1.800	1.76   4.800	6.45   7.800	5.27   10.80
1.76	0.933	1.76   3.933	3.52   6.933	7.03   9.93	1.76	1.833	1.76   4.833	6.45   7.833	5.27   10.83
1.76	0.967	1.76   3.967	3.52   6.967	7.03   9.97	1.76	1.867	1.76   4.867	7.03   7.867	5.27   10.87
1.76	1.000	1.76   4.000	3.52   7.000	7.03   10.00	1.76	1.900	1.76   4.900	7.03   7.900	5.27   10.90
1.76	1.033	1.76   4.033	4.10   7.033	6.45   10.03	1.76	1.933	1.76   4.933	7.03   7.933	5.27   10.93
1.76					1.76				

1.76 1.967 1.76 | 4.967 7.03 | 7.967 5.27 | 10.97  
1.76 2.000 1.76 | 5.000 7.03 | 8.000 5.27 | 11.00  
1.76 2.033 2.34 | 5.033 8.20 | 8.033 4.69 | 11.03  
1.76 2.067 2.34 | 5.067 8.20 | 8.067 4.69 | 11.07  
1.76 2.100 2.34 | 5.100 8.20 | 8.100 4.69 | 11.10  
1.76 2.133 2.34 | 5.133 8.20 | 8.133 4.69 | 11.13  
1.76 2.167 2.34 | 5.167 8.20 | 8.167 4.69 | 11.17  
1.76 2.200 2.93 | 5.200 9.38 | 8.200 4.10 | 11.20  
1.76 2.233 2.93 | 5.233 9.38 | 8.233 4.10 | 11.23  
1.76 2.267 2.93 | 5.267 9.38 | 8.267 4.10 | 11.27  
1.76 2.300 2.93 | 5.300 9.38 | 8.300 4.10 | 11.30  
1.76 2.333 2.93 | 5.333 9.38 | 8.333 4.10 | 11.33  
1.76 2.367 3.52 | 5.367 10.55 | 8.367 3.52 | 11.37  
1.76 2.400 3.52 | 5.400 10.55 | 8.400 3.52 | 11.40  
1.76 2.433 3.52 | 5.433 10.55 | 8.433 3.52 | 11.43  
1.76 2.467 3.52 | 5.467 10.55 | 8.467 3.52 | 11.47  
1.76 2.500 3.52 | 5.500 10.55 | 8.500 3.52 | 11.50  
1.76 2.533 3.52 | 5.533 33.40 | 8.533 3.52 | 11.53  
1.76 2.567 3.52 | 5.567 33.41 | 8.567 3.52 | 11.57  
1.76 2.600 3.52 | 5.600 33.41 | 8.600 3.52 | 11.60  
1.76 2.633 3.52 | 5.633 33.41 | 8.633 3.52 | 11.63  
1.76 2.667 3.52 | 5.667 33.41 | 8.667 3.52 | 11.67  
1.76 2.700 3.52 | 5.700 56.26 | 8.700 3.52 | 11.70  
1.76 2.733 3.52 | 5.733 56.26 | 8.733 3.52 | 11.73  
1.76 2.767 3.52 | 5.767 56.26 | 8.767 3.52 | 11.77  
1.76 2.800 3.52 | 5.800 56.26 | 8.800 3.52 | 11.80  
1.76 2.833 3.52 | 5.833 56.26 | 8.833 3.52 | 11.83

1.76 2.867 3.52 | 5.867 79.12 | 8.867 3.52 | 11.87  
1.76 2.900 3.52 | 5.900 79.12 | 8.900 3.52 | 11.90  
1.76 2.933 3.52 | 5.933 79.12 | 8.933 3.52 | 11.93  
1.76 2.967 3.52 | 5.967 79.12 | 8.967 3.52 | 11.97  
1.76 3.000 3.52 | 6.000 79.12 | 9.000 3.52 | 12.00

Max.Eff.Inten. (mm/hr)= 79.12 132.19  
over (min) 5.00 8.00  
Storage Coeff. (min)= 1.60 (ii) 7.91 (ii)  
Unit Hyd. Tpeak (min)= 4.00 8.00  
Unit Hyd. peak (cms)= 0.45 0.14

\*TOTALS\*  
PEAK FLOW (cms)= 0.00 0.03 0.032 (iii)  
TIME TO PEAK (hrs)= 6.00 6.10 6.10  
RUNOFF VOLUME (mm)= 86.62 57.52 59.54  
TOTAL RAINFALL (mm)= 87.62 87.62 87.62  
RUNOFF COEFFICIENT = 0.99 0.66 0.68

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
-----  
| CALIB |  
| STANDHYD ( 0204) | Area (ha)= 0.24  
| ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
-----

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.18	0.06
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	40.00	40.00
Mannings n	=	0.013	0.250

Max.Eff.Inten. (mm/hr)= 79.12 134.43  
over (min) 5.00 10.00  
Storage Coeff. (min)= 1.62 (ii) 8.38 (ii)  
Unit Hyd. Tpeak (min)= 4.00 10.00  
Unit Hyd. peak (cms)= 0.44 0.13

\*TOTALS\*  
PEAK FLOW (cms)= 0.02 0.02 0.038 (iii)

TIME TO PEAK (hrs)= 6.00 6.13 6.00  
 RUNOFF VOLUME (mm)= 86.62 57.77 68.71  
 TOTAL RAINFALL (mm)= 87.62 87.62 87.62  
 RUNOFF COEFFICIENT = 0.99 0.66 0.78

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
TOTAL HYD. (ID= 1):  0.24      0.04      6.00      68.71
=====
MAJOR SYS. (ID= 2):  0.00      0.00      0.00      0.00
MINOR SYS. (ID= 3):  0.24      0.04      6.00      68.71
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| STANDHYD ( 0203) |
| ID= 1 DT= 2.0 min |
-----
          Area      (ha)= 2.45
          Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00
  
```

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.59	0.86	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	127.80	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten. (mm/hr)=	79.12	119.98	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.25 (ii)	9.81 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.11	
			*TOTALS*
PEAK FLOW (cms)=	0.14	0.23	0.343 (iii)
TIME TO PEAK (hrs)=	6.00	6.13	6.03
RUNOFF VOLUME (mm)=	86.62	56.04	63.99
TOTAL RAINFALL (mm)=	87.62	87.62	87.62
RUNOFF COEFFICIENT =	0.99	0.64	0.73

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB
| STANDHYD ( 0202) |
| ID= 1 DT= 2.0 min |
-----
          Area      (ha)= 0.92
          Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00
  
```

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.63	0.29	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	78.32	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten. (mm/hr)=	79.12	98.86	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.42 (ii)	9.44 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.37	0.12	
			*TOTALS*
PEAK FLOW (cms)=	0.08	0.07	0.138 (iii)
TIME TO PEAK (hrs)=	6.00	6.13	6.03
RUNOFF VOLUME (mm)=	86.62	53.06	66.81
TOTAL RAINFALL (mm)=	87.62	87.62	87.62
RUNOFF COEFFICIENT =	0.99	0.61	0.76

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
TOTAL HYD. (ID= 1):  0.92      0.14      6.03      66.81
=====
MAJOR SYS. (ID= 2):  0.00      0.00      0.00      0.00
MINOR SYS. (ID= 3):  0.92      0.14      6.03      66.81
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
*** W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001
ID1= 1 ( 0203):    2.45   0.343   6.03   63.99
+ ID2= 2 ( 0006):    0.00   0.000   0.00   0.00
=====
ID = 3 ( 0007):    2.45   0.343   6.03   63.99

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 0007):    2.45   0.343   6.03   63.99
+ ID2= 2 ( 0009):    0.24   0.038   6.00   68.71
=====
ID = 1 ( 0007):    2.69   0.380   6.03   64.41

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0008) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
          OUTFLOW   STORAGE | OUTFLOW   STORAGE
          (cms)     (ha.m.) | (cms)     (ha.m.)
0.0000   0.0000 | 0.1750   0.0640
0.0060   0.0325 | 0.2000   0.0740
0.1000   0.0390 | 0.2300   0.0830
0.1250   0.0520 | 0.2750   0.0900
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
INFLOW : ID= 2 ( 0007)  2.690   0.380   6.03   64.41
OUTFLOW: ID= 1 ( 0008)  2.690   0.197   6.47   63.90

```

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 51.85
TIME SHIFT OF PEAK FLOW (min)= 26.00
MAXIMUM STORAGE USED (ha.m.)= 0.0729

```

```

| ADD HYD ( 0003) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0205):    0.23   0.032   6.10   59.54
+ ID2= 2 ( 0008):    2.69   0.197   6.47   63.90
=====
ID = 3 ( 0003):    2.92   0.217   6.37   63.55

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0207) | Area (ha)= 0.65
| ID= 1 DT= 2.0 min | Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10
-----

```

```

IMPERVIOUS   PERVIOUS (i)
Surface Area (ha)= 0.31 0.34
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 65.83 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 79.12 102.05
over (min) 5.00 10.00
Storage Coeff. (min)= 2.18 (ii) 9.18 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.39 0.12

```

```

*TOTALS*
PEAK FLOW (cms)= 0.00 0.08 0.081 (iii)
TIME TO PEAK (hrs)= 6.00 6.13 6.13
RUNOFF VOLUME (mm)= 86.62 53.55 53.58
TOTAL RAINFALL (mm)= 87.62 87.62 87.62
RUNOFF COEFFICIENT = 0.99 0.61 0.61

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0206) | Area (ha)= 2.39
| ID= 1 DT= 2.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00
-----

```

```

IMPERVIOUS   PERVIOUS (i)
Surface Area (ha)= 1.53 0.86
Dep. Storage (mm)= 1.00 5.00

```

Average Slope (%) = 1.00 2.00  
 Length (m) = 126.23 40.00  
 Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr) = 79.12 117.55  
 over (min) = 5.00 10.00  
 Storage Coeff. (min) = 3.23 (ii) 9.84 (ii)  
 Unit Hyd. Tpeak (min) = 4.00 10.00  
 Unit Hyd. peak (cms) = 0.32 0.11

\*TOTALS\*  
 PEAK FLOW (cms) = 0.13 0.23 0.331 (iii)  
 TIME TO PEAK (hrs) = 6.00 6.13 6.03  
 RUNOFF VOLUME (mm) = 86.62 55.73 63.45  
 TOTAL RAINFALL (mm) = 87.62 87.62 87.62  
 RUNOFF COEFFICIENT = 0.99 0.64 0.72

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ID = 3 ( 0001): 3.04 0.224 6.30 60.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | ADD HYD ( 0001) |  
 | 3 + 2 = 1 | AREA QPEAK TPEAK R.V.  
 (ha) (cms) (hrs) (mm)  
 \*\*\* W A R N I N G : HYDROGRAPH 0009 <ID= 2> IS DRY.  
 \*\*\* W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003  
 ID1= 3 ( 0001): 3.04 0.224 6.30 60.87  
 + ID2= 2 ( 0009): 0.00 0.000 0.00 0.00  
 =====  
 ID = 1 ( 0001): 3.04 0.224 6.30 60.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | CALIB |  
 | STANDHYD ( 0201) | Area (ha) = 2.70  
 | ID= 1 DT= 2.0 min | Total Imp(%) = 81.00 Dir. Conn.(%) = 77.00  
 -----

IMPERVIOUS PVIOUS (i)  
 Surface Area (ha) = 2.19 0.51  
 Dep. Storage (mm) = 1.00 5.00  
 Average Slope (%) = 1.00 2.00  
 Length (m) = 134.16 40.00  
 Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr) = 79.12 52.19  
 over (min) = 5.00 8.00  
 Storage Coeff. (min) = 3.35 (ii) 7.78 (ii)  
 Unit Hyd. Tpeak (min) = 4.00 8.00  
 Unit Hyd. peak (cms) = 0.31 0.14

\*TOTALS\*  
 PEAK FLOW (cms) = 0.45 0.06 0.503 (iii)  
 TIME TO PEAK (hrs) = 6.00 6.10 6.00  
 RUNOFF VOLUME (mm) = 86.62 43.27 76.64  
 TOTAL RAINFALL (mm) = 87.62 87.62 87.62  
 RUNOFF COEFFICIENT = 0.99 0.49 0.87

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 | RESERVOIR ( 0010) | OVERFLOW IS OFF  
 | IN= 2---> OUT= 1 |  
DT= 2.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1400	0.0584
0.0050	0.0278	0.1700	0.0694
0.0700	0.0363	0.1900	0.0737
0.1000	0.0478	0.3000	0.0767

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0206)	2.390	0.331	6.03	63.45
OUTFLOW: ID= 1 ( 0010)	2.390	0.163	6.50	62.86

PEAK FLOW REDUCTION [Qout/Qin] (%) = 49.34  
 TIME SHIFT OF PEAK FLOW (min) = 28.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0669

-----  
 | ADD HYD ( 0001) |  
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.  
 (ha) (cms) (hrs) (mm)  
 ID1= 1 ( 0010): 2.39 0.163 6.50 62.86  
 + ID2= 2 ( 0207): 0.65 0.081 6.13 53.58  
 =====

| CALIB |  
 | STANDHYD ( 0004) | Area (ha)= 0.55  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.36	0.19	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	60.55	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	79.12	38.14	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.08 (ii)	8.13 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.40	0.13	
			*TOTALS*
PEAK FLOW (cms)=	0.08	0.02	0.092 (iii)
TIME TO PEAK (hrs)=	6.00	6.13	6.00
RUNOFF VOLUME (mm)=	86.62	38.66	69.82
TOTAL RAINFALL (mm)=	87.62	87.62	87.62
RUNOFF COEFFICIENT =	0.99	0.44	0.80

-----  
 | RESERVOIR ( 0002) | OVERFLOW IS OFF  
 | IN= 2---> OUT= 1 |  
 | DT= 2.0 min |

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1350
0.0130	0.0746	0.3750	0.1510
0.1500	0.0900	0.4000	0.1610
0.2100	0.1200	0.4500	0.1725

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0005)	4.170	0.733	6.00	73.58
OUTFLOW: ID= 1 ( 0002)	4.170	0.359	6.37	72.99

PEAK FLOW REDUCTION [Qout/Qin] (%)= 48.97  
 TIME SHIFT OF PEAK FLOW (min)= 22.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.1477

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 =====  
 V V I SSSSS U U A L (v 6.0.2001)  
 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 \*\*\*\*\*

-----  
 | ADD HYD ( 0005) |  
 | 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0201):	2.70	0.503	6.00	76.64
+ ID2= 2 ( 0004):	0.55	0.092	6.00	69.82
=====				
ID = 3 ( 0005):	3.25	0.596	6.00	75.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | ADD HYD ( 0005) |  
 | 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 ( 0005):	3.25	0.596	6.00	75.49
+ ID2= 2 ( 0006):	0.92	0.138	6.03	66.81
=====				
ID = 1 ( 0005):	4.17	0.733	6.00	73.58

Input filename: C:\Program Files (x86)\Visual OTTHYMO  
 6.0\VO2\voim.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-0af8143f9a42\4bc98474-13f1-49a8-ba33-5e73148fddb0\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-0af8143f9a42\4bc98474-13f1-49a8-ba33-5e73148fddb0\s

DATE: 02/25/2021

TIME: 12:17:49

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
\*\* SIMULATION : Run 06: 12 hr SCS 100yr \*\*  
\*\*\*\*\*

-----  
| MASS STORM | Filename: C:\Users\mmacdonald\AppData  
| | Local\Temp\  
| | fc827793-7400-4dac-9d1b-  
f97a5e84f410\3fa7c120  
| Ptotal= 95.98 mm | Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION  
-----

Duration of storm = 12.00 hrs  
Mass curve time step = 30.00 min  
New Storm time step = 10.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.84	0.17	0.64	3.17	3.84	6.17	63.35	9.17
3.84	0.33	1.28	3.33	3.84	6.33	40.31	9.33
3.84	0.50	1.92	3.50	3.84	6.50	17.28	9.50
3.20	0.67	1.92	3.67	3.84	6.67	14.08	9.67
2.56	0.83	1.92	3.83	3.84	6.83	10.88	9.83
1.92	1.00	1.92	4.00	3.84	7.00	7.68	10.00
1.92	1.17	1.92	4.17	4.48	7.17	7.04	10.17
1.92	1.33	1.92	4.33	5.12	7.33	6.40	10.33
1.92	1.50	1.92	4.50	5.76	7.50	5.76	10.50
1.92	1.67	1.92	4.67	6.40	7.67	5.76	10.67
1.92							

1.92	1.83	1.92	4.83	7.04	7.83	5.76	10.83
1.92	2.00	1.92	5.00	7.68	8.00	5.76	11.00
1.92	2.17	2.56	5.17	8.96	8.17	5.12	11.17
1.92	2.33	3.20	5.33	10.24	8.33	4.48	11.33
1.92	2.50	3.84	5.50	11.52	8.50	3.84	11.50
1.92	2.67	3.84	5.67	36.47	8.67	3.84	11.67
1.92	2.83	3.84	5.83	61.43	8.83	3.84	11.83
1.92	3.00	3.84	6.00	86.38	9.00	3.84	12.00

-----  
| CALIB |  
| STANDHYD ( 0205) | Area (ha)= 0.23  
| ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00  
-----

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)= 0.14	0.09
Dep. Storage	(mm)= 1.00	5.00
Average Slope	(%)= 1.00	2.00
Length	(m)= 39.16	40.00
Mannings n	= 0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
3.84	0.033	0.64	3.033	3.84	6.033	63.35	9.03
3.84	0.067	0.64	3.067	3.84	6.067	63.35	9.07
3.84	0.100	0.64	3.100	3.84	6.100	63.35	9.10
3.84	0.133	0.64	3.133	3.84	6.133	63.35	9.13
3.84	0.167	0.64	3.167	3.84	6.167	63.35	9.17
3.84	0.200	1.28	3.200	3.84	6.200	40.32	9.20
3.84	0.233	1.28	3.233	3.84	6.233	40.31	9.23
3.84							

3.84	0.267	1.28   3.267	3.84   6.267	40.31   9.27	1.92	1.167	1.92   4.167	4.48   7.167	7.04   10.17
3.84	0.300	1.28   3.300	3.84   6.300	40.31   9.30	1.92	1.200	1.92   4.200	5.12   7.200	6.40   10.20
3.84	0.333	1.28   3.333	3.84   6.333	40.31   9.33	1.92	1.233	1.92   4.233	5.12   7.233	6.40   10.23
3.84	0.367	1.92   3.367	3.84   6.367	17.28   9.37	1.92	1.267	1.92   4.267	5.12   7.267	6.40   10.27
3.84	0.400	1.92   3.400	3.84   6.400	17.28   9.40	1.92	1.300	1.92   4.300	5.12   7.300	6.40   10.30
3.84	0.433	1.92   3.433	3.84   6.433	17.28   9.43	1.92	1.333	1.92   4.333	5.12   7.333	6.40   10.33
3.84	0.467	1.92   3.467	3.84   6.467	17.28   9.47	1.92	1.367	1.92   4.367	5.76   7.367	5.76   10.37
3.84	0.500	1.92   3.500	3.84   6.500	17.28   9.50	1.92	1.400	1.92   4.400	5.76   7.400	5.76   10.40
3.20	0.533	1.92   3.533	3.84   6.533	14.08   9.53	1.92	1.433	1.92   4.433	5.76   7.433	5.76   10.43
3.20	0.567	1.92   3.567	3.84   6.567	14.08   9.57	1.92	1.467	1.92   4.467	5.76   7.467	5.76   10.47
3.20	0.600	1.92   3.600	3.84   6.600	14.08   9.60	1.92	1.500	1.92   4.500	5.76   7.500	5.76   10.50
3.20	0.633	1.92   3.633	3.84   6.633	14.08   9.63	1.92	1.533	1.92   4.533	6.40   7.533	5.76   10.53
3.20	0.667	1.92   3.667	3.84   6.667	14.08   9.67	1.92	1.567	1.92   4.567	6.40   7.567	5.76   10.57
2.56	0.700	1.92   3.700	3.84   6.700	10.88   9.70	1.92	1.600	1.92   4.600	6.40   7.600	5.76   10.60
2.56	0.733	1.92   3.733	3.84   6.733	10.88   9.73	1.92	1.633	1.92   4.633	6.40   7.633	5.76   10.63
2.56	0.767	1.92   3.767	3.84   6.767	10.88   9.77	1.92	1.667	1.92   4.667	6.40   7.667	5.76   10.67
2.56	0.800	1.92   3.800	3.84   6.800	10.88   9.80	1.92	1.700	1.92   4.700	7.04   7.700	5.76   10.70
2.56	0.833	1.92   3.833	3.84   6.833	10.88   9.83	1.92	1.733	1.92   4.733	7.04   7.733	5.76   10.73
1.92	0.867	1.92   3.867	3.84   6.867	7.68   9.87	1.92	1.767	1.92   4.767	7.04   7.767	5.76   10.77
1.92	0.900	1.92   3.900	3.84   6.900	7.68   9.90	1.92	1.800	1.92   4.800	7.04   7.800	5.76   10.80
1.92	0.933	1.92   3.933	3.84   6.933	7.68   9.93	1.92	1.833	1.92   4.833	7.04   7.833	5.76   10.83
1.92	0.967	1.92   3.967	3.84   6.967	7.68   9.97	1.92	1.867	1.92   4.867	7.68   7.867	5.76   10.87
1.92	1.000	1.92   4.000	3.84   7.000	7.68   10.00	1.92	1.900	1.92   4.900	7.68   7.900	5.76   10.90
1.92	1.033	1.92   4.033	4.48   7.033	7.04   10.03	1.92	1.933	1.92   4.933	7.68   7.933	5.76   10.93
1.92	1.067	1.92   4.067	4.48   7.067	7.04   10.07	1.92	1.967	1.92   4.967	7.68   7.967	5.76   10.97
1.92	1.100	1.92   4.100	4.48   7.100	7.04   10.10	1.92	2.000	1.92   5.000	7.68   8.000	5.76   11.00
1.92	1.133	1.92   4.133	4.48   7.133	7.04   10.13	1.92	2.033	2.56   5.033	8.96   8.033	5.12   11.03

1.92 2.067 2.56 | 5.067 8.96 | 8.067 5.12 | 11.07  
1.92 2.100 2.56 | 5.100 8.96 | 8.100 5.12 | 11.10  
1.92 2.133 2.56 | 5.133 8.96 | 8.133 5.12 | 11.13  
1.92 2.167 2.56 | 5.167 8.96 | 8.167 5.12 | 11.17  
1.92 2.200 3.20 | 5.200 10.24 | 8.200 4.48 | 11.20  
1.92 2.233 3.20 | 5.233 10.24 | 8.233 4.48 | 11.23  
1.92 2.267 3.20 | 5.267 10.24 | 8.267 4.48 | 11.27  
1.92 2.300 3.20 | 5.300 10.24 | 8.300 4.48 | 11.30  
1.92 2.333 3.20 | 5.333 10.24 | 8.333 4.48 | 11.33  
1.92 2.367 3.84 | 5.367 11.52 | 8.367 3.84 | 11.37  
1.92 2.400 3.84 | 5.400 11.52 | 8.400 3.84 | 11.40  
1.92 2.433 3.84 | 5.433 11.52 | 8.433 3.84 | 11.43  
1.92 2.467 3.84 | 5.467 11.52 | 8.467 3.84 | 11.47  
1.92 2.500 3.84 | 5.500 11.52 | 8.500 3.84 | 11.50  
1.92 2.533 3.84 | 5.533 36.47 | 8.533 3.84 | 11.53  
1.92 2.567 3.84 | 5.567 36.47 | 8.567 3.84 | 11.57  
1.92 2.600 3.84 | 5.600 36.47 | 8.600 3.84 | 11.60  
1.92 2.633 3.84 | 5.633 36.47 | 8.633 3.84 | 11.63  
1.92 2.667 3.84 | 5.667 36.47 | 8.667 3.84 | 11.67  
1.92 2.700 3.84 | 5.700 61.42 | 8.700 3.84 | 11.70  
1.92 2.733 3.84 | 5.733 61.43 | 8.733 3.84 | 11.73  
1.92 2.767 3.84 | 5.767 61.43 | 8.767 3.84 | 11.77  
1.92 2.800 3.84 | 5.800 61.43 | 8.800 3.84 | 11.80  
1.92 2.833 3.84 | 5.833 61.43 | 8.833 3.84 | 11.83  
1.92 2.867 3.84 | 5.867 86.38 | 8.867 3.84 | 11.87  
1.92 2.900 3.84 | 5.900 86.38 | 8.900 3.84 | 11.90  
1.92 2.933 3.84 | 5.933 86.38 | 8.933 3.84 | 11.93

1.92 2.967 3.84 | 5.967 86.38 | 8.967 3.84 | 11.97  
1.92 3.000 3.84 | 6.000 86.38 | 9.000 3.84 | 12.00

Max.Eff.Inten.(mm/hr)= 86.38 148.86  
over (min) 5.00 8.00  
Storage Coeff. (min)= 1.54 (ii) 7.56 (ii)  
Unit Hyd. Tpeak (min)= 4.00 8.00  
Unit Hyd. peak (cms)= 0.45 0.15

\*TOTALS\*  
PEAK FLOW (cms)= 0.00 0.03 0.036 (iii)  
TIME TO PEAK (hrs)= 6.00 6.10 6.07  
RUNOFF VOLUME (mm)= 94.66 64.76 66.83  
TOTAL RAINFALL (mm)= 95.66 95.66 95.66  
RUNOFF COEFFICIENT = 0.99 0.68 0.70

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
-----  
| CALIB |  
| STANDHYD ( 0204) | Area (ha)= 0.24  
| ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
-----

IMPERVIOUS PERVIOUS (i)  
Surface Area (ha)= 0.18 0.06  
Dep. Storage (mm)= 1.00 5.00  
Average Slope (%)= 1.00 2.00  
Length (m)= 40.00 40.00  
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 86.38 151.32  
over (min) 5.00 10.00  
Storage Coeff. (min)= 1.56 (ii) 8.09 (ii)  
Unit Hyd. Tpeak (min)= 4.00 10.00  
Unit Hyd. peak (cms)= 0.45 0.13

\*TOTALS\*  
PEAK FLOW (cms)= 0.02 0.02 0.042 (iii)  
TIME TO PEAK (hrs)= 6.00 6.13 6.00  
RUNOFF VOLUME (mm)= 94.66 65.03 76.27  
TOTAL RAINFALL (mm)= 95.66 95.66 95.66  
RUNOFF COEFFICIENT = 0.99 0.68 0.80

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 |
-----

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	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	0.24	0.04	6.00	76.27
MAJOR SYS. (ID= 2):	0.00	0.00	6.00	76.27
MINOR SYS. (ID= 3):	0.24	0.04	6.00	76.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| CALIB |
| STANDHYD ( 0203) |
| ID= 1 DT= 2.0 min |
-----

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	Area (ha)	Total Imp(%)	Dir. Conn.(%)
	2.45	65.00	26.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.59	0.86	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	127.80	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten. (mm/hr)=	86.38	135.39	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.14 (ii)	9.39 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.12	
			*TOTALS*
PEAK FLOW (cms)=	0.15	0.26	0.386 (iii)
TIME TO PEAK (hrs)=	6.00	6.13	6.03
RUNOFF VOLUME (mm)=	94.66	63.20	71.37
TOTAL RAINFALL (mm)=	95.66	95.66	95.66
RUNOFF COEFFICIENT =	0.99	0.66	0.75

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0202) |
| ID= 1 DT= 2.0 min |
-----

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	Area (ha)	Total Imp(%)	Dir. Conn.(%)
	0.92	68.00	41.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	78.32	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten. (mm/hr)=	86.38	112.02
over (min)	5.00	10.00
Storage Coeff. (min)=	2.34 (ii)	9.12 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.38	0.12

\*TOTALS\*

PEAK FLOW (cms)=	0.09	0.08	0.154 (iii)
TIME TO PEAK (hrs)=	6.00	6.13	6.00
RUNOFF VOLUME (mm)=	94.66	60.04	74.23
TOTAL RAINFALL (mm)=	95.66	95.66	95.66
RUNOFF COEFFICIENT =	0.99	0.63	0.78

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	0.92	0.15	6.00	74.23
MAJOR SYS. (ID= 2):	0.00	0.01	6.00	74.23
MINOR SYS. (ID= 3):	0.92	0.15	6.00	74.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
-----

```

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0203):	2.45	0.386	6.03	71.37
+ ID2= 2 ( 0006):	0.00	0.007	6.00	74.23
=====				
ID = 3 ( 0007):	2.45	0.393	6.03	71.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 ( 0007):	2.45	0.393	6.03	71.38
+ ID2= 2 ( 0009):	0.24	0.041	6.00	76.27
=====				
ID = 1 ( 0007):	2.69	0.434	6.03	71.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR ( 0008)   OVERFLOW IS OFF					
IN= 2---> OUT= 1	DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.1750	0.0640
		0.0060	0.0325	0.2000	0.0740
		0.1000	0.0390	0.2300	0.0830
		0.1250	0.0520	0.2750	0.0900
INFLOW : ID= 2 ( 0007)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	2.692	0.434	6.03	71.81	
OUTFLOW: ID= 1 ( 0008)	2.692	0.222	6.47	71.30	

PEAK FLOW REDUCTION [Qout/Qin] (%) = 51.10  
 TIME SHIFT OF PEAK FLOW (min) = 26.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0806

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0205):	0.23	0.036	6.07	66.83
+ ID2= 2 ( 0008):	2.69	0.222	6.47	71.30
=====				
ID = 3 ( 0003):	2.92	0.243	6.40	70.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)	Dir. Conn. (%)
STANDHYD ( 0207)	0.65	
ID= 1 DT= 2.0 min	Total Imp (%) = 47.00	Dir. Conn. (%) = 0.10

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)	0.31	0.34
Dep. Storage (mm)	1.00	5.00
Average Slope (%)	1.00	2.00
Length (m)	65.83	40.00
Mannings n	0.013	0.250
Max.Eff.Inten. (mm/hr)	86.38	115.55
over (min)	5.00	10.00
Storage Coeff. (min)	2.11 (ii)	8.77 (ii)
Unit Hyd. Tpeak (min)	4.00	10.00
Unit Hyd. peak (cms)	0.40	0.12

\*TOTALS\*

PEAK FLOW (cms)	0.00	0.09	0.092 (iii)
TIME TO PEAK (hrs)	6.00	6.13	6.13
RUNOFF VOLUME (mm)	94.66	60.56	60.58
TOTAL RAINFALL (mm)	95.66	95.66	95.66
RUNOFF COEFFICIENT	0.99	0.63	0.63

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)	Dir. Conn. (%)
STANDHYD ( 0206)	2.39	
ID= 1 DT= 2.0 min	Total Imp (%) = 64.00	Dir. Conn. (%) = 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)	1.53	0.86
Dep. Storage (mm)	1.00	5.00
Average Slope (%)	1.00	2.00
Length (m)	126.23	40.00
Mannings n	0.013	0.250
Max.Eff.Inten. (mm/hr)	86.38	132.70
over (min)	5.00	10.00
Storage Coeff. (min)	3.12 (ii)	9.42 (ii)
Unit Hyd. Tpeak (min)	4.00	10.00



Unit Hyd. peak (cms)=	0.33	0.12	
			*TOTALS*
PEAK FLOW (cms)=	0.14	0.26	0.373 (iii)
TIME TO PEAK (hrs)=	6.00	6.13	6.03
RUNOFF VOLUME (mm)=	94.66	62.86	70.81
TOTAL RAINFALL (mm)=	95.66	95.66	95.66
RUNOFF COEFFICIENT =	0.99	0.66	0.74

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
-----	(ha)	(cms)	(hrs)	(mm)
ID1= 3 ( 0001):	3.04	0.254	6.37	68.16
+ ID2= 2 ( 0009):	0.00	0.001	6.00	76.27
=====				
ID = 1 ( 0001):	3.04	0.254	6.37	68.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD ( 0201)	Area	(ha)=	2.70	
ID= 1 DT= 2.0 min	Total Imp(%)=	81.00	Dir. Conn.(%)=	77.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.19	0.51
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	134.16	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	86.38	59.98
over (min)	5.00	8.00
Storage Coeff. (min)=	3.23 (ii)	7.51 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.32	0.15

			*TOTALS*
PEAK FLOW (cms)=	0.49	0.07	0.555 (iii)
TIME TO PEAK (hrs)=	6.00	6.10	6.00
RUNOFF VOLUME (mm)=	94.66	49.53	84.28
TOTAL RAINFALL (mm)=	95.66	95.66	95.66
RUNOFF COEFFICIENT =	0.99	0.52	0.88

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD ( 0004)	Area	(ha)=	0.55	
ID= 1 DT= 2.0 min	Total Imp(%)=	65.00	Dir. Conn.(%)=	65.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.36	0.19
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	60.55	40.00
Mannings n =	0.013	0.250

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR ( 0010)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min				
-----				
	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
	0.0000	0.0000	0.1400	0.0584
	0.0050	0.0278	0.1700	0.0694
	0.0700	0.0363	0.1900	0.0737
	0.1000	0.0478	0.3000	0.0767
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 ( 0206)	2.390	0.373	6.03	70.81
OUTFLOW: ID= 1 ( 0010)	2.390	0.189	6.47	70.22

PEAK FLOW REDUCTION [Qout/Qin] (%) = 50.79  
 TIME SHIFT OF PEAK FLOW (min) = 26.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0736

ADD HYD ( 0001)				
1 + 2 = 3				
-----				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 ( 0010):	2.39	0.189	6.47	70.22
+ ID2= 2 ( 0207):	0.65	0.092	6.13	60.58
=====				
ID = 3 ( 0001):	3.04	0.254	6.37	68.16

| ADD HYD ( 0001)|

Max.Eff.Inten.(mm/hr)=	86.38	44.14	
over (min)	5.00	8.00	
Storage Coeff. (min)=	2.00 (ii)	7.85 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.41	0.14	
			*TOTALS*
PEAK FLOW (cms)=	0.09	0.02	0.103 (iii)
TIME TO PEAK (hrs)=	6.00	6.10	6.00
RUNOFF VOLUME (mm)=	94.66	44.52	77.10
TOTAL RAINFALL (mm)=	95.66	95.66	95.66
RUNOFF COEFFICIENT =	0.99	0.47	0.81

0.0130	0.0746		0.3750	0.1510
0.1500	0.0900		0.4000	0.1610
0.2100	0.1200		0.4500	0.1725

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 ( 0005)	4.168	0.805	6.00	81.12
OUTFLOW: ID= 1 ( 0002)	4.168	0.394	6.37	80.53

PEAK FLOW REDUCTION [Qout/Qin](%)= 49.00  
 TIME SHIFT OF PEAK FLOW (min)= 22.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.1589

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0201):  2.70  0.555   6.00   84.28
+ ID2= 2 ( 0004):  0.55  0.103   6.00   77.10
=====
ID = 3 ( 0005):  3.25  0.658   6.00   83.06

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 0005):  3.25  0.658   6.00   83.06
+ ID2= 2 ( 0006):  0.92  0.147   6.00   74.23
=====
ID = 1 ( 0005):  4.17  0.805   6.00   81.12

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0002) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
          OUTFLOW   STORAGE   |   OUTFLOW   STORAGE
          (cms)     (ha.m.)   |   (cms)     (ha.m.)
          0.0000    0.0000   |   0.3000    0.1350

```

# Proposed Hydrology 24hr SCS Type II

=====

Duration of storm = 24.00 hrs  
Mass curve time step = 15.00 min

```
V V I SSSSS U U A L (v 6.0.2001)
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
6.0\VO2\voain.dat
Output filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\cee8953a-7077-4cfa-b642-89a84bccb11d\s
Summary filename:
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-
0af8143f9a42\cee8953a-7077-4cfa-b642-89a84bccb11d\s
```

DATE: 02/25/2021 TIME: 12:17:59

USER:

COMMENTS: \_\_\_\_\_

-----

```
*****
** SIMULATION : 1 - 2yr 24hr SCS **
*****
```

```
-----
| MASS STORM | Filename: C:\Users\mmacdonald\AppData
| | ata\Local\Temp\
| | 598fd74c-16a6-4267-a81e-
3ca80d03e1b2\c4edde2e
| Ptotal= 51.82 mm | Comments: SCS 24 HOUR TYPE II STORM DISTRIBUTION
1
```

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
0.93	0.25	0.58	6.25	0.00	12.25	7.46	18.25
0.93	0.50	0.56	6.50	0.00	12.50	7.46	18.50
0.93	0.75	0.58	6.75	0.00	12.75	3.83	18.75
0.93	1.00	0.56	7.00	0.00	13.00	3.83	19.00
0.93	1.25	0.58	7.25	2.07	13.25	0.73	19.25
0.93	1.50	0.56	7.50	2.07	13.50	0.73	19.50
0.93	1.75	0.58	7.75	2.07	13.75	4.25	19.75
0.93	2.00	0.56	8.00	2.07	14.00	4.25	20.00
0.62	2.25	0.68	8.25	0.00	14.25	1.55	20.25
0.62	2.50	0.66	8.50	0.00	14.50	1.55	20.50
0.62	2.75	0.68	8.75	2.80	14.75	1.55	20.75
0.62	3.00	0.66	9.00	2.80	15.00	1.55	21.00
0.62	3.25	0.68	9.25	1.66	15.25	1.55	21.25
0.62	3.50	0.66	9.50	1.66	15.50	1.55	21.50
0.62	3.75	0.68	9.75	1.87	15.75	1.55	21.75
0.62	4.00	0.66	10.00	1.87	16.00	1.55	22.00
0.62	4.25	0.83	10.25	2.38	16.25	0.93	22.25
0.62	4.50	0.83	10.50	2.38	16.50	0.93	22.50
0.62	4.75	0.83	10.75	3.21	16.75	0.93	22.75
0.62	5.00	0.83	11.00	3.21	17.00	0.93	23.00
0.62	5.25	0.83	11.25	4.97	17.25	0.93	23.25
0.62	5.50	0.83	11.50	4.97	17.50	0.93	23.50
0.62	5.75	0.83	11.75	21.56	17.75	0.93	23.75

6.00 0.83 | 12.00 57.21 | 18.00 0.93 | 24.00  
 0.62

-----  
 -----  
 | CALIB |  
 | STANDHYD ( 0205) | Area (ha)= 0.23  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00  
 -----

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.14	0.09
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	39.16	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

		---- TRANSFORMED HYETOGRAPH ----							
		TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	
RAIN	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	
0.93		0.033	0.58   6.033	0.00   12.033	7.46   18.03				
0.93		0.067	0.58   6.067	0.00   12.067	7.46   18.07				
0.93		0.100	0.58   6.100	0.00   12.100	7.46   18.10				
0.93		0.133	0.58   6.133	0.00   12.133	7.46   18.13				
0.93		0.167	0.58   6.167	0.00   12.167	7.46   18.17				
0.93		0.200	0.58   6.200	0.00   12.200	7.46   18.20				
0.93		0.233	0.58   6.233	0.00   12.233	7.46   18.23				
0.93		0.267	0.57   6.267	0.00   12.267	7.46   18.27				
0.93		0.300	0.56   6.300	0.00   12.300	7.46   18.30				
0.93		0.333	0.56   6.333	0.00   12.333	7.46   18.33				
0.93		0.367	0.56   6.367	0.00   12.367	7.46   18.37				
0.93		0.400	0.56   6.400	0.00   12.400	7.46   18.40				
0.93		0.433	0.56   6.433	0.00   12.433	7.46   18.43				
0.93		0.467	0.56   6.467	0.00   12.467	7.46   18.47				
0.93									

0.93	0.500	0.56   6.500	0.00   12.500	7.46   18.50
0.93	0.533	0.58   6.533	0.00   12.533	3.83   18.53
0.93	0.567	0.58   6.567	0.00   12.567	3.83   18.57
0.93	0.600	0.58   6.600	0.00   12.600	3.83   18.60
0.93	0.633	0.58   6.633	0.00   12.633	3.83   18.63
0.93	0.667	0.58   6.667	0.00   12.667	3.83   18.67
0.93	0.700	0.58   6.700	0.00   12.700	3.83   18.70
0.93	0.733	0.58   6.733	0.00   12.733	3.83   18.73
0.93	0.767	0.57   6.767	0.00   12.767	3.83   18.77
0.93	0.800	0.56   6.800	0.00   12.800	3.83   18.80
0.93	0.833	0.56   6.833	0.00   12.833	3.83   18.83
0.93	0.867	0.56   6.867	0.00   12.867	3.83   18.87
0.93	0.900	0.56   6.900	0.00   12.900	3.83   18.90
0.93	0.933	0.56   6.933	0.00   12.933	3.83   18.93
0.93	0.967	0.56   6.967	0.00   12.967	3.83   18.97
0.93	1.000	0.56   7.000	0.00   13.000	3.83   19.00
0.93	1.033	0.58   7.033	2.07   13.033	0.73   19.03
0.93	1.067	0.58   7.067	2.07   13.067	0.73   19.07
0.93	1.100	0.58   7.100	2.07   13.100	0.73   19.10
0.93	1.133	0.58   7.133	2.07   13.133	0.73   19.13
0.93	1.167	0.58   7.167	2.07   13.167	0.73   19.17
0.93	1.200	0.58   7.200	2.07   13.200	0.73   19.20
0.93	1.233	0.58   7.233	2.07   13.233	0.73   19.23
0.93	1.267	0.57   7.267	2.07   13.267	0.73   19.27
0.93	1.300	0.56   7.300	2.07   13.300	0.73   19.30
0.93	1.333	0.56   7.333	2.07   13.333	0.73   19.33
0.93	1.367	0.56   7.367	2.07   13.367	0.73   19.37

0.93	1.400	0.56   7.400	2.07   13.400	0.73   19.40	0.62	2.300	0.66   8.300	0.00   14.300	1.55   20.30
0.93	1.433	0.56   7.433	2.07   13.433	0.73   19.43	0.62	2.333	0.66   8.333	0.00   14.333	1.55   20.33
0.93	1.467	0.56   7.467	2.07   13.467	0.73   19.47	0.62	2.367	0.66   8.367	0.00   14.367	1.55   20.37
0.93	1.500	0.56   7.500	2.07   13.500	0.73   19.50	0.62	2.400	0.66   8.400	0.00   14.400	1.55   20.40
0.93	1.533	0.58   7.533	2.07   13.533	4.25   19.53	0.62	2.433	0.66   8.433	0.00   14.433	1.55   20.43
0.93	1.567	0.58   7.567	2.07   13.567	4.25   19.57	0.62	2.467	0.66   8.467	0.00   14.467	1.55   20.47
0.93	1.600	0.58   7.600	2.07   13.600	4.25   19.60	0.62	2.500	0.66   8.500	0.00   14.500	1.55   20.50
0.93	1.633	0.58   7.633	2.07   13.633	4.25   19.63	0.62	2.533	0.68   8.533	2.80   14.533	1.55   20.53
0.93	1.667	0.58   7.667	2.07   13.667	4.25   19.67	0.62	2.567	0.68   8.567	2.80   14.567	1.55   20.57
0.93	1.700	0.58   7.700	2.07   13.700	4.25   19.70	0.62	2.600	0.68   8.600	2.80   14.600	1.55   20.60
0.93	1.733	0.58   7.733	2.07   13.733	4.25   19.73	0.62	2.633	0.68   8.633	2.80   14.633	1.55   20.63
0.93	1.767	0.57   7.767	2.07   13.767	4.25   19.77	0.62	2.667	0.68   8.667	2.80   14.667	1.55   20.67
0.93	1.800	0.56   7.800	2.07   13.800	4.25   19.80	0.62	2.700	0.68   8.700	2.80   14.700	1.55   20.70
0.93	1.833	0.56   7.833	2.07   13.833	4.25   19.83	0.62	2.733	0.68   8.733	2.80   14.733	1.55   20.73
0.93	1.867	0.56   7.867	2.07   13.867	4.25   19.87	0.62	2.767	0.67   8.767	2.80   14.767	1.55   20.77
0.93	1.900	0.56   7.900	2.07   13.900	4.25   19.90	0.62	2.800	0.66   8.800	2.80   14.800	1.55   20.80
0.93	1.933	0.56   7.933	2.07   13.933	4.25   19.93	0.62	2.833	0.66   8.833	2.80   14.833	1.55   20.83
0.93	1.967	0.56   7.967	2.07   13.967	4.25   19.97	0.62	2.867	0.66   8.867	2.80   14.867	1.55   20.87
0.93	2.000	0.56   8.000	2.07   14.000	4.24   20.00	0.62	2.900	0.66   8.900	2.80   14.900	1.55   20.90
0.62	2.033	0.68   8.033	0.00   14.033	1.55   20.03	0.62	2.933	0.66   8.933	2.80   14.933	1.55   20.93
0.62	2.067	0.68   8.067	0.00   14.067	1.55   20.07	0.62	2.967	0.66   8.967	2.80   14.967	1.55   20.97
0.62	2.100	0.68   8.100	0.00   14.100	1.55   20.10	0.62	3.000	0.66   9.000	2.80   15.000	1.55   21.00
0.62	2.133	0.68   8.133	0.00   14.133	1.55   20.13	0.62	3.033	0.68   9.033	1.66   15.033	1.55   21.03
0.62	2.167	0.68   8.167	0.00   14.167	1.55   20.17	0.62	3.067	0.68   9.067	1.66   15.067	1.55   21.07
0.62	2.200	0.68   8.200	0.00   14.200	1.55   20.20	0.62	3.100	0.68   9.100	1.66   15.100	1.55   21.10
0.62	2.233	0.68   8.233	0.00   14.233	1.55   20.23	0.62	3.133	0.68   9.133	1.66   15.133	1.55   21.13
0.62	2.267	0.67   8.267	0.00   14.267	1.55   20.27	0.62	3.167	0.68   9.167	1.66   15.167	1.55   21.17

0.62 3.200 0.68 | 9.200 1.66 |15.200 1.55 | 21.20  
0.62 3.233 0.68 | 9.233 1.66 |15.233 1.55 | 21.23  
0.62 3.267 0.67 | 9.267 1.66 |15.267 1.55 | 21.27  
0.62 3.300 0.66 | 9.300 1.66 |15.300 1.55 | 21.30  
0.62 3.333 0.66 | 9.333 1.66 |15.333 1.55 | 21.33  
0.62 3.367 0.66 | 9.367 1.66 |15.367 1.55 | 21.37  
0.62 3.400 0.66 | 9.400 1.66 |15.400 1.55 | 21.40  
0.62 3.433 0.66 | 9.433 1.66 |15.433 1.55 | 21.43  
0.62 3.467 0.66 | 9.467 1.66 |15.467 1.55 | 21.47  
0.62 3.500 0.66 | 9.500 1.66 |15.500 1.55 | 21.50  
0.62 3.533 0.68 | 9.533 1.87 |15.533 1.55 | 21.53  
0.62 3.567 0.68 | 9.567 1.87 |15.567 1.55 | 21.57  
0.62 3.600 0.68 | 9.600 1.87 |15.600 1.55 | 21.60  
0.62 3.633 0.68 | 9.633 1.87 |15.633 1.55 | 21.63  
0.62 3.667 0.68 | 9.667 1.87 |15.667 1.55 | 21.67  
0.62 3.700 0.68 | 9.700 1.87 |15.700 1.55 | 21.70  
0.62 3.733 0.68 | 9.733 1.87 |15.733 1.55 | 21.73  
0.62 3.767 0.67 | 9.767 1.87 |15.767 1.55 | 21.77  
0.62 3.800 0.66 | 9.800 1.87 |15.800 1.55 | 21.80  
0.62 3.833 0.66 | 9.833 1.87 |15.833 1.55 | 21.83  
0.62 3.867 0.66 | 9.867 1.87 |15.867 1.55 | 21.87  
0.62 3.900 0.66 | 9.900 1.87 |15.900 1.55 | 21.90  
0.62 3.933 0.66 | 9.933 1.87 |15.933 1.55 | 21.93  
0.62 3.967 0.66 | 9.967 1.87 |15.967 1.55 | 21.97  
0.62 4.000 0.66 |10.000 1.87 |16.000 1.55 | 22.00  
0.62 4.033 0.83 |10.033 2.38 |16.033 0.93 | 22.03  
0.62 4.067 0.83 |10.067 2.38 |16.067 0.93 | 22.07

0.62 4.100 0.83 |10.100 2.38 |16.100 0.93 | 22.10  
0.62 4.133 0.83 |10.133 2.38 |16.133 0.93 | 22.13  
0.62 4.167 0.83 |10.167 2.38 |16.167 0.93 | 22.17  
0.62 4.200 0.83 |10.200 2.38 |16.200 0.93 | 22.20  
0.62 4.233 0.83 |10.233 2.38 |16.233 0.93 | 22.23  
0.62 4.267 0.83 |10.267 2.38 |16.267 0.93 | 22.27  
0.62 4.300 0.83 |10.300 2.38 |16.300 0.93 | 22.30  
0.62 4.333 0.83 |10.333 2.38 |16.333 0.93 | 22.33  
0.62 4.367 0.83 |10.367 2.38 |16.367 0.93 | 22.37  
0.62 4.400 0.83 |10.400 2.38 |16.400 0.93 | 22.40  
0.62 4.433 0.83 |10.433 2.38 |16.433 0.93 | 22.43  
0.62 4.467 0.83 |10.467 2.38 |16.467 0.93 | 22.47  
0.62 4.500 0.83 |10.500 2.38 |16.500 0.93 | 22.50  
0.62 4.533 0.83 |10.533 3.21 |16.533 0.93 | 22.53  
0.62 4.567 0.83 |10.567 3.21 |16.567 0.93 | 22.57  
0.62 4.600 0.83 |10.600 3.21 |16.600 0.93 | 22.60  
0.62 4.633 0.83 |10.633 3.21 |16.633 0.93 | 22.63  
0.62 4.667 0.83 |10.667 3.21 |16.667 0.93 | 22.67  
0.62 4.700 0.83 |10.700 3.21 |16.700 0.93 | 22.70  
0.62 4.733 0.83 |10.733 3.21 |16.733 0.93 | 22.73  
0.62 4.767 0.83 |10.767 3.21 |16.767 0.93 | 22.77  
0.62 4.800 0.83 |10.800 3.21 |16.800 0.93 | 22.80  
0.62 4.833 0.83 |10.833 3.21 |16.833 0.93 | 22.83  
0.62 4.867 0.83 |10.867 3.21 |16.867 0.93 | 22.87  
0.62 4.900 0.83 |10.900 3.21 |16.900 0.93 | 22.90  
0.62 4.933 0.83 |10.933 3.21 |16.933 0.93 | 22.93  
0.62 4.967 0.83 |10.967 3.21 |16.967 0.93 | 22.97

0.62	5.000	0.83	11.000	3.21	17.000	0.93	23.00
0.62	5.033	0.83	11.033	4.97	17.033	0.93	23.03
0.62	5.067	0.83	11.067	4.97	17.067	0.93	23.07
0.62	5.100	0.83	11.100	4.97	17.100	0.93	23.10
0.62	5.133	0.83	11.133	4.97	17.133	0.93	23.13
0.62	5.167	0.83	11.167	4.97	17.167	0.93	23.17
0.62	5.200	0.83	11.200	4.97	17.200	0.93	23.20
0.62	5.233	0.83	11.233	4.97	17.233	0.93	23.23
0.62	5.267	0.83	11.267	4.97	17.267	0.93	23.27
0.62	5.300	0.83	11.300	4.97	17.300	0.93	23.30
0.62	5.333	0.83	11.333	4.97	17.333	0.93	23.33
0.62	5.367	0.83	11.367	4.97	17.367	0.93	23.37
0.62	5.400	0.83	11.400	4.97	17.400	0.93	23.40
0.62	5.433	0.83	11.433	4.97	17.433	0.93	23.43
0.62	5.467	0.83	11.467	4.97	17.467	0.93	23.47
0.62	5.500	0.83	11.500	4.99	17.500	0.93	23.50
0.62	5.533	0.83	11.533	21.56	17.533	0.93	23.53
0.62	5.567	0.83	11.567	21.56	17.567	0.93	23.57
0.62	5.600	0.83	11.600	21.56	17.600	0.93	23.60
0.62	5.633	0.83	11.633	21.56	17.633	0.93	23.63
0.62	5.667	0.83	11.667	21.56	17.667	0.93	23.67
0.62	5.700	0.83	11.700	21.56	17.700	0.93	23.70
0.62	5.733	0.83	11.733	21.56	17.733	0.93	23.73
0.62	5.767	0.83	11.767	39.43	17.767	0.93	23.77
0.62	5.800	0.83	11.800	57.21	17.800	0.93	23.80
0.62	5.833	0.83	11.833	57.21	17.833	0.93	23.83
0.62	5.867	0.83	11.867	57.21	17.867	0.93	23.87

0.62	5.900	0.83	11.900	57.21	17.900	0.93	23.90
0.62	5.933	0.83	11.933	57.21	17.933	0.93	23.93
0.62	5.967	0.83	11.967	57.21	17.967	0.93	23.97
0.62	6.000	0.83	12.000	57.14	18.000	0.93	24.00

Max.Eff.Inten. (mm/hr)=	57.21	82.50
over (min)	5.00	10.00
Storage Coeff. (min)=	1.82 (ii)	9.44 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.42	0.12

PEAK FLOW (cms)=	0.00	0.02	0.018 (iii)
TIME TO PEAK (hrs)=	12.00	12.07	12.03
RUNOFF VOLUME (mm)=	50.82	27.04	28.68
TOTAL RAINFALL (mm)=	51.82	51.82	51.82
RUNOFF COEFFICIENT =	0.98	0.52	0.55

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB |
| STANDHYD ( 0204) | Area (ha)= 0.24
|ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00
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		IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.18		0.06
Dep. Storage (mm)=	1.00		5.00
Average Slope (%)=	1.00		2.00
Length (m)=	40.00		40.00
Mannings n =	0.013		0.250

Max.Eff.Inten. (mm/hr)=	57.21	84.02
over (min)	5.00	10.00
Storage Coeff. (min)=	1.84 (ii)	9.54 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.42	0.12

PEAK FLOW (cms)=	0.01	0.01	0.025 (iii)
TIME TO PEAK (hrs)=	12.00	12.07	12.00
RUNOFF VOLUME (mm)=	50.82	27.21	36.16

TOTAL RAINFALL (mm)= 51.82 51.82 51.82  
 RUNOFF COEFFICIENT = 0.98 0.53 0.70

CN\* = 73.0 Ia = Dep. Storage (Above)  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 | CALIB |  
 | STANDHYD ( 0202) | Area (ha)= 0.92  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00  
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 | DUHYD ( 0009) |  
 | Inlet Cap.= 0.041 |  
 | #of Inlets= 1 |  
 | Total(cms)= 0.0 | AREA QPEAK TPEAK R.V.  
 (ha) (cms) (hrs) (mm)  
 -----  
 TOTAL HYD.(ID= 1): 0.24 0.02 12.00 36.16  
 =====  
 MAJOR SYS.(ID= 2): 0.00 0.00 0.00 0.00  
 MINOR SYS.(ID= 3): 0.24 0.02 12.00 36.16  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	78.32	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	57.21	60.09
over (min)	5.00	12.00
Storage Coeff. (min)=	2.76 (ii)	10.75 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.35	0.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

PEAK FLOW (cms)=	0.06	0.03	*TOTALS*
TIME TO PEAK (hrs)=	12.00	12.07	0.089 (iii)
RUNOFF VOLUME (mm)=	50.82	24.10	12.00
TOTAL RAINFALL (mm)=	51.82	51.82	35.05
RUNOFF COEFFICIENT =	0.98	0.47	51.82
			0.68

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 | CALIB |  
 | STANDHYD ( 0203) | Area (ha)= 2.45  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.59	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	127.80	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	57.21	74.23
over (min)	5.00	12.00
Storage Coeff. (min)=	3.70 (ii)	11.65 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.29	0.10

\*TOTALS\*  
 PEAK FLOW (cms)= 0.10 0.12 0.204 (iii)  
 TIME TO PEAK (hrs)= 12.00 12.10 12.00  
 RUNOFF VOLUME (mm)= 50.82 26.05 32.49  
 TOTAL RAINFALL (mm)= 51.82 51.82 51.82  
 RUNOFF COEFFICIENT = 0.98 0.50 0.63

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 | DUHYD ( 0006) |  
 | Inlet Cap.= 0.147 |  
 | #of Inlets= 1 |  
 | Total(cms)= 0.1 | AREA QPEAK TPEAK R.V.  
 (ha) (cms) (hrs) (mm)  
 -----  
 TOTAL HYD.(ID= 1): 0.92 0.09 12.00 35.05  
 =====  
 MAJOR SYS.(ID= 2): 0.00 0.00 0.00 0.00  
 MINOR SYS.(ID= 3): 0.92 0.09 12.00 35.05  
 -----

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:



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| ADD HYD ( 0007) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
*** W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001
ID1= 1 ( 0203): 2.45 0.204 12.00 32.49
+ ID2= 2 ( 0006): 0.00 0.000 0.00 0.00
=====
ID = 3 ( 0007): 2.45 0.204 12.00 32.49
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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```
| ADD HYD ( 0007) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 3 ( 0007): 2.45 0.204 12.00 32.49
+ ID2= 2 ( 0009): 0.24 0.025 12.00 36.16
=====
ID = 1 ( 0007): 2.69 0.229 12.00 32.81
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| RESERVOIR( 0008) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1750 0.0640
0.0060 0.0325 | 0.2000 0.0740
0.1000 0.0390 | 0.2300 0.0830
0.1250 0.0520 | 0.2750 0.0900
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0007) 2.690 0.229 12.00 32.81
OUTFLOW: ID= 1 ( 0008) 2.690 0.099 12.27 32.16
```

PEAK FLOW REDUCTION [Qout/Qin] (%) = 43.09  
TIME SHIFT OF PEAK FLOW (min) = 16.00  
MAXIMUM STORAGE USED (ha.m.) = 0.0389

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| ADD HYD ( 0003) |
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| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 1 ( 0205): 0.23 0.018 12.03 28.68
+ ID2= 2 ( 0008): 2.69 0.099 12.27 32.16
=====
ID = 3 ( 0003): 2.92 0.108 12.23 31.89
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB |
| STANDHYD ( 0207) | Area (ha)= 0.65
| ID= 1 DT= 2.0 min | Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10
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IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.31 0.34
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 65.83 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 57.21 62.20
over (min) 5.00 12.00
Storage Coeff. (min)= 2.49 (ii) 11.02 (ii)
Unit Hyd. Tpeak (min)= 4.00 12.00
Unit Hyd. peak (cms)= 0.37 0.10
```

\*TOTALS\*

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PEAK FLOW (cms)= 0.00 0.04 0.040 (iii)
TIME TO PEAK (hrs)= 12.00 12.07 12.07
RUNOFF VOLUME (mm)= 50.82 24.42 24.43
TOTAL RAINFALL (mm)= 51.82 51.82 51.82
RUNOFF COEFFICIENT = 0.98 0.47 0.47
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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```
| CALIB |
| STANDHYD ( 0206) | Area (ha)= 2.39
| ID= 1 DT= 2.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00
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```
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.53 0.86
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
```

Length (m) = 126.23 40.00  
 Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr) = 57.21 72.58  
 over (min) = 5.00 12.00  
 Storage Coeff. (min) = 3.67 (ii) 11.70 (ii)  
 Unit Hyd. Tpeak (min) = 4.00 12.00  
 Unit Hyd. peak (cms) = 0.29 0.10

\*TOTALS\*

PEAK FLOW (cms) = 0.09 0.11 0.196 (iii)  
 TIME TO PEAK (hrs) = 12.00 12.10 12.00  
 RUNOFF VOLUME (mm) = 50.82 25.84 32.08  
 TOTAL RAINFALL (mm) = 51.82 51.82 51.82  
 RUNOFF COEFFICIENT = 0.98 0.50 0.62

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| ADD HYD ( 0001) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
| | (ha) (cms) (hrs) (mm)
-----
*** W A R N I N G : HYDROGRAPH 0009 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0001 = HYDROGRAPH 0003
ID1= 3 ( 0001): 3.04 0.087 12.23 29.90
+ ID2= 2 ( 0009): 0.00 0.000 0.00 0.00
=====
ID = 1 ( 0001): 3.04 0.087 12.23 29.90
  
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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB |
| STANDHYD ( 0201) | Area (ha) = 2.70
| ID= 1 DT= 2.0 min | Total Imp(%) = 81.00 Dir. Conn.(%) = 77.00
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	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha) =	2.19	0.51
Dep. Storage (mm) =	1.00	5.00
Average Slope (%) =	1.00	2.00
Length (m) =	134.16	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr) = 57.21 29.90  
 over (min) = 5.00 10.00  
 Storage Coeff. (min) = 3.81 (ii) 8.85 (ii)  
 Unit Hyd. Tpeak (min) = 4.00 10.00  
 Unit Hyd. peak (cms) = 0.29 0.12

\*TOTALS\*

PEAK FLOW (cms) = 0.32 0.03 0.353 (iii)  
 TIME TO PEAK (hrs) = 12.00 12.07 12.00  
 RUNOFF VOLUME (mm) = 50.82 18.15 43.30  
 TOTAL RAINFALL (mm) = 51.82 51.82 51.82  
 RUNOFF COEFFICIENT = 0.98 0.35 0.84

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB |
  
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| RESERVOIR ( 0010) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
| OUTFLOW STORAGE | OUTFLOW STORAGE
| (cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1400 0.0584
0.0050 0.0278 | 0.1700 0.0694
0.0700 0.0363 | 0.1900 0.0737
0.1000 0.0478 | 0.3000 0.0767
  
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0206)	2.390	0.196	12.00	32.08
OUTFLOW: ID= 1 ( 0010)	2.390	0.065	12.37	31.39

PEAK FLOW REDUCTION [Qout/Qin] (%) = 33.19  
 TIME SHIFT OF PEAK FLOW (min) = 22.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0356

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-----
| ADD HYD ( 0001) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| | (ha) (cms) (hrs) (mm)
-----
ID1= 1 ( 0010): 2.39 0.065 12.37 31.39
+ ID2= 2 ( 0207): 0.65 0.040 12.07 24.43
=====
ID = 3 ( 0001): 3.04 0.087 12.23 29.90
  
```

| STANDHYD ( 0004) | Area (ha)= 0.55  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.36	0.19
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	60.55	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	57.21	21.21
over (min)	5.00	10.00
Storage Coeff. (min)=	2.36 (ii)	9.25 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.38	0.12

\*TOTALS\*

PEAK FLOW (cms)=	0.06	0.01	0.064 (iii)
TIME TO PEAK (hrs)=	12.00	12.07	12.00
RUNOFF VOLUME (mm)=	50.82	15.57	38.47
TOTAL RAINFALL (mm)=	51.82	51.82	51.82
RUNOFF COEFFICIENT =	0.98	0.30	0.74

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD ( 0005)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 ( 0201):	2.70	0.353	12.00	43.30
+ ID2= 2 ( 0004):	0.55	0.064	12.00	38.47
=====				
ID = 3 ( 0005):	3.25	0.418	12.00	42.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( 0005)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 ( 0005):	3.25	0.418	12.00	42.49
+ ID2= 2 ( 0006):	0.92	0.089	12.00	35.05
=====				
ID = 1 ( 0005):	4.17	0.507	12.00	40.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR ( 0002)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 2.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.3000	0.1350
	0.0130	0.0746	0.3750	0.1510
	0.1500	0.0900	0.4000	0.1610
	0.2100	0.1200	0.4500	0.1725

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0005)	4.170	0.507	12.00	40.85
OUTFLOW: ID= 1 ( 0002)	4.170	0.148	12.17	39.80

PEAK FLOW REDUCTION [Qout/Qin](%)= 29.12  
 TIME SHIFT OF PEAK FLOW (min)= 10.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.0897

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V V I SSSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT 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  
 6.0\VO2\voin.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-0af8143f9a42\0a3d1e10-b80a-4e0f-a4e2-c0e00645c1a9\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-0af8143f9a42\0a3d1e10-b80a-4e0f-a4e2-c0e00645c1a9\s

DATE: 02/25/2021

TIME: 12:17:59

USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
\*\* SIMULATION : 2 - 5yr 24hr SCS \*\*  
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| MASS STORM | Filename: C:\Users\mmacdonald\AppData  
| | ata\Local\Temp\  
| | 598fd74c-16a6-4267-a81e-  
3ca80d03e1b2\559910ac  
| Ptotal= 67.18 mm |  
1

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Duration of storm = 24.00 hrs  
Mass curve time step = 15.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.21	0.25	0.75	6.25	0.00	12.25	9.67	18.25
1.21	0.50	0.73	6.50	0.00	12.50	9.67	18.50
1.21	0.75	0.75	6.75	0.00	12.75	4.97	18.75
1.21	1.00	0.73	7.00	0.00	13.00	4.97	19.00
1.21	1.25	0.75	7.25	2.69	13.25	0.94	19.25
1.21	1.50	0.73	7.50	2.69	13.50	0.94	19.50
1.21	1.75	0.75	7.75	2.69	13.75	5.51	19.75
1.21	2.00	0.73	8.00	2.69	14.00	5.51	20.00
0.81	2.25	0.89	8.25	0.00	14.25	2.02	20.25
0.81	2.50	0.86	8.50	0.00	14.50	2.02	20.50
0.81	2.75	0.89	8.75	3.63	14.75	2.02	20.75

0.81	3.00	0.86	9.00	3.63	15.00	2.02	21.00
0.81	3.25	0.89	9.25	2.15	15.25	2.02	21.25
0.81	3.50	0.86	9.50	2.15	15.50	2.02	21.50
0.81	3.75	0.89	9.75	2.42	15.75	2.02	21.75
0.81	4.00	0.86	10.00	2.42	16.00	2.02	22.00
0.81	4.25	1.07	10.25	3.09	16.25	1.21	22.25
0.81	4.50	1.07	10.50	3.09	16.50	1.21	22.50
0.81	4.75	1.07	10.75	4.17	16.75	1.21	22.75
0.81	5.00	1.07	11.00	4.17	17.00	1.21	23.00
0.81	5.25	1.07	11.25	6.45	17.25	1.21	23.25
0.81	5.50	1.07	11.50	6.45	17.50	1.21	23.50
0.81	5.75	1.07	11.75	27.95	17.75	1.21	23.75
0.81	6.00	1.07	12.00	74.17	18.00	1.21	24.00

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| CALIB |  
| STANDHYD ( 0205) | Area (ha)= 0.23  
| ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00  
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	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.09
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	39.16	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

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

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.21	0.033	0.75	6.033	0.00	12.033	9.67	18.03
1.21	0.067	0.75	6.067	0.00	12.067	9.67	18.07

1.21	0.100	0.75   6.100	0.00  12.100	9.67   18.10
1.21	0.133	0.75   6.133	0.00  12.133	9.67   18.13
1.21	0.167	0.75   6.167	0.00  12.167	9.67   18.17
1.21	0.200	0.75   6.200	0.00  12.200	9.67   18.20
1.21	0.233	0.75   6.233	0.00  12.233	9.67   18.23
1.21	0.267	0.74   6.267	0.00  12.267	9.67   18.27
1.21	0.300	0.73   6.300	0.00  12.300	9.67   18.30
1.21	0.333	0.73   6.333	0.00  12.333	9.67   18.33
1.21	0.367	0.73   6.367	0.00  12.367	9.67   18.37
1.21	0.400	0.73   6.400	0.00  12.400	9.67   18.40
1.21	0.433	0.73   6.433	0.00  12.433	9.67   18.43
1.21	0.467	0.73   6.467	0.00  12.467	9.67   18.47
1.21	0.500	0.73   6.500	0.00  12.500	9.67   18.50
1.21	0.533	0.75   6.533	0.00  12.533	4.97   18.53
1.21	0.567	0.75   6.567	0.00  12.567	4.97   18.57
1.21	0.600	0.75   6.600	0.00  12.600	4.97   18.60
1.21	0.633	0.75   6.633	0.00  12.633	4.97   18.63
1.21	0.667	0.75   6.667	0.00  12.667	4.97   18.67
1.21	0.700	0.75   6.700	0.00  12.700	4.97   18.70
1.21	0.733	0.75   6.733	0.00  12.733	4.97   18.73
1.21	0.767	0.74   6.767	0.00  12.767	4.97   18.77
1.21	0.800	0.73   6.800	0.00  12.800	4.97   18.80
1.21	0.833	0.73   6.833	0.00  12.833	4.97   18.83
1.21	0.867	0.73   6.867	0.00  12.867	4.97   18.87
1.21	0.900	0.73   6.900	0.00  12.900	4.97   18.90
1.21	0.933	0.73   6.933	0.00  12.933	4.97   18.93
1.21	0.967	0.73   6.967	0.00  12.967	4.97   18.97

1.21	1.000	0.73   7.000	0.00  13.000	4.96   19.00
1.21	1.033	0.75   7.033	2.69  13.033	0.94   19.03
1.21	1.067	0.75   7.067	2.69  13.067	0.94   19.07
1.21	1.100	0.75   7.100	2.69  13.100	0.94   19.10
1.21	1.133	0.75   7.133	2.69  13.133	0.94   19.13
1.21	1.167	0.75   7.167	2.69  13.167	0.94   19.17
1.21	1.200	0.75   7.200	2.69  13.200	0.94   19.20
1.21	1.233	0.75   7.233	2.69  13.233	0.94   19.23
1.21	1.267	0.74   7.267	2.69  13.267	0.94   19.27
1.21	1.300	0.73   7.300	2.69  13.300	0.94   19.30
1.21	1.333	0.73   7.333	2.69  13.333	0.94   19.33
1.21	1.367	0.73   7.367	2.69  13.367	0.94   19.37
1.21	1.400	0.73   7.400	2.69  13.400	0.94   19.40
1.21	1.433	0.73   7.433	2.69  13.433	0.94   19.43
1.21	1.467	0.73   7.467	2.69  13.467	0.94   19.47
1.21	1.500	0.73   7.500	2.69  13.500	0.95   19.50
1.21	1.533	0.75   7.533	2.69  13.533	5.51   19.53
1.21	1.567	0.75   7.567	2.69  13.567	5.51   19.57
1.21	1.600	0.75   7.600	2.69  13.600	5.51   19.60
1.21	1.633	0.75   7.633	2.69  13.633	5.51   19.63
1.21	1.667	0.75   7.667	2.69  13.667	5.51   19.67
1.21	1.700	0.75   7.700	2.69  13.700	5.51   19.70
1.21	1.733	0.75   7.733	2.69  13.733	5.51   19.73
1.21	1.767	0.74   7.767	2.69  13.767	5.51   19.77
1.21	1.800	0.73   7.800	2.69  13.800	5.51   19.80
1.21	1.833	0.73   7.833	2.69  13.833	5.51   19.83
1.21	1.867	0.73   7.867	2.69  13.867	5.51   19.87

1.21	1.900	0.73   7.900	2.69  13.900	5.51   19.90	0.81	2.800	0.86   8.800	3.63  14.800	2.02   20.80
1.21	1.933	0.73   7.933	2.69  13.933	5.51   19.93	0.81	2.833	0.86   8.833	3.63  14.833	2.02   20.83
1.21	1.967	0.73   7.967	2.69  13.967	5.51   19.97	0.81	2.867	0.86   8.867	3.63  14.867	2.02   20.87
1.21	2.000	0.73   8.000	2.69  14.000	5.50   20.00	0.81	2.900	0.86   8.900	3.63  14.900	2.02   20.90
0.81	2.033	0.89   8.033	0.00  14.033	2.02   20.03	0.81	2.933	0.86   8.933	3.63  14.933	2.02   20.93
0.81	2.067	0.89   8.067	0.00  14.067	2.02   20.07	0.81	2.967	0.86   8.967	3.63  14.967	2.02   20.97
0.81	2.100	0.89   8.100	0.00  14.100	2.02   20.10	0.81	3.000	0.86   9.000	3.63  15.000	2.02   21.00
0.81	2.133	0.89   8.133	0.00  14.133	2.02   20.13	0.81	3.033	0.89   9.033	2.15  15.033	2.02   21.03
0.81	2.167	0.89   8.167	0.00  14.167	2.02   20.17	0.81	3.067	0.89   9.067	2.15  15.067	2.02   21.07
0.81	2.200	0.89   8.200	0.00  14.200	2.02   20.20	0.81	3.100	0.89   9.100	2.15  15.100	2.02   21.10
0.81	2.233	0.89   8.233	0.00  14.233	2.02   20.23	0.81	3.133	0.89   9.133	2.15  15.133	2.02   21.13
0.81	2.267	0.87   8.267	0.00  14.267	2.02   20.27	0.81	3.167	0.89   9.167	2.15  15.167	2.02   21.17
0.81	2.300	0.86   8.300	0.00  14.300	2.02   20.30	0.81	3.200	0.89   9.200	2.15  15.200	2.02   21.20
0.81	2.333	0.86   8.333	0.00  14.333	2.02   20.33	0.81	3.233	0.89   9.233	2.15  15.233	2.02   21.23
0.81	2.367	0.86   8.367	0.00  14.367	2.02   20.37	0.81	3.267	0.87   9.267	2.15  15.267	2.02   21.27
0.81	2.400	0.86   8.400	0.00  14.400	2.02   20.40	0.81	3.300	0.86   9.300	2.15  15.300	2.02   21.30
0.81	2.433	0.86   8.433	0.00  14.433	2.02   20.43	0.81	3.333	0.86   9.333	2.15  15.333	2.02   21.33
0.81	2.467	0.86   8.467	0.00  14.467	2.02   20.47	0.81	3.367	0.86   9.367	2.15  15.367	2.02   21.37
0.81	2.500	0.86   8.500	0.00  14.500	2.02   20.50	0.81	3.400	0.86   9.400	2.15  15.400	2.02   21.40
0.81	2.533	0.89   8.533	3.63  14.533	2.02   20.53	0.81	3.433	0.86   9.433	2.15  15.433	2.02   21.43
0.81	2.567	0.89   8.567	3.63  14.567	2.02   20.57	0.81	3.467	0.86   9.467	2.15  15.467	2.02   21.47
0.81	2.600	0.89   8.600	3.63  14.600	2.02   20.60	0.81	3.500	0.86   9.500	2.15  15.500	2.02   21.50
0.81	2.633	0.89   8.633	3.63  14.633	2.02   20.63	0.81	3.533	0.89   9.533	2.42  15.533	2.02   21.53
0.81	2.667	0.89   8.667	3.63  14.667	2.02   20.67	0.81	3.567	0.89   9.567	2.42  15.567	2.02   21.57
0.81	2.700	0.89   8.700	3.63  14.700	2.02   20.70	0.81	3.600	0.89   9.600	2.42  15.600	2.02   21.60
0.81	2.733	0.89   8.733	3.63  14.733	2.02   20.73	0.81	3.633	0.89   9.633	2.42  15.633	2.02   21.63
0.81	2.767	0.87   8.767	3.63  14.767	2.02   20.77	0.81	3.667	0.89   9.667	2.42  15.667	2.02   21.67

0.81	3.700	0.89   9.700	2.42  15.700	2.02   21.70
0.81	3.733	0.89   9.733	2.42  15.733	2.02   21.73
0.81	3.767	0.87   9.767	2.42  15.767	2.02   21.77
0.81	3.800	0.86   9.800	2.42  15.800	2.02   21.80
0.81	3.833	0.86   9.833	2.42  15.833	2.02   21.83
0.81	3.867	0.86   9.867	2.42  15.867	2.02   21.87
0.81	3.900	0.86   9.900	2.42  15.900	2.02   21.90
0.81	3.933	0.86   9.933	2.42  15.933	2.02   21.93
0.81	3.967	0.86   9.967	2.42  15.967	2.02   21.97
0.81	4.000	0.86  10.000	2.42  16.000	2.01   22.00
0.81	4.033	1.07  10.033	3.09  16.033	1.21   22.03
0.81	4.067	1.07  10.067	3.09  16.067	1.21   22.07
0.81	4.100	1.07  10.100	3.09  16.100	1.21   22.10
0.81	4.133	1.07  10.133	3.09  16.133	1.21   22.13
0.81	4.167	1.07  10.167	3.09  16.167	1.21   22.17
0.81	4.200	1.07  10.200	3.09  16.200	1.21   22.20
0.81	4.233	1.07  10.233	3.09  16.233	1.21   22.23
0.81	4.267	1.07  10.267	3.09  16.267	1.21   22.27
0.81	4.300	1.07  10.300	3.09  16.300	1.21   22.30
0.81	4.333	1.07  10.333	3.09  16.333	1.21   22.33
0.81	4.367	1.07  10.367	3.09  16.367	1.21   22.37
0.81	4.400	1.07  10.400	3.09  16.400	1.21   22.40
0.81	4.433	1.07  10.433	3.09  16.433	1.21   22.43
0.81	4.467	1.07  10.467	3.09  16.467	1.21   22.47
0.81	4.500	1.07  10.500	3.09  16.500	1.21   22.50
0.81	4.533	1.07  10.533	4.17  16.533	1.21   22.53
0.81	4.567	1.07  10.567	4.17  16.567	1.21   22.57

0.81	4.600	1.07  10.600	4.17  16.600	1.21   22.60
0.81	4.633	1.07  10.633	4.17  16.633	1.21   22.63
0.81	4.667	1.07  10.667	4.17  16.667	1.21   22.67
0.81	4.700	1.07  10.700	4.17  16.700	1.21   22.70
0.81	4.733	1.07  10.733	4.17  16.733	1.21   22.73
0.81	4.767	1.07  10.767	4.17  16.767	1.21   22.77
0.81	4.800	1.07  10.800	4.17  16.800	1.21   22.80
0.81	4.833	1.07  10.833	4.17  16.833	1.21   22.83
0.81	4.867	1.07  10.867	4.17  16.867	1.21   22.87
0.81	4.900	1.07  10.900	4.17  16.900	1.21   22.90
0.81	4.933	1.07  10.933	4.17  16.933	1.21   22.93
0.81	4.967	1.07  10.967	4.17  16.967	1.21   22.97
0.81	5.000	1.07  11.000	4.17  17.000	1.21   23.00
0.81	5.033	1.07  11.033	6.45  17.033	1.21   23.03
0.81	5.067	1.07  11.067	6.45  17.067	1.21   23.07
0.81	5.100	1.07  11.100	6.45  17.100	1.21   23.10
0.81	5.133	1.07  11.133	6.45  17.133	1.21   23.13
0.81	5.167	1.07  11.167	6.45  17.167	1.21   23.17
0.81	5.200	1.07  11.200	6.45  17.200	1.21   23.20
0.81	5.233	1.07  11.233	6.45  17.233	1.21   23.23
0.81	5.267	1.07  11.267	6.45  17.267	1.21   23.27
0.81	5.300	1.07  11.300	6.45  17.300	1.21   23.30
0.81	5.333	1.07  11.333	6.45  17.333	1.21   23.33
0.81	5.367	1.07  11.367	6.45  17.367	1.21   23.37
0.81	5.400	1.07  11.400	6.45  17.400	1.21   23.40
0.81	5.433	1.07  11.433	6.45  17.433	1.21   23.43
0.81	5.467	1.07  11.467	6.45  17.467	1.21   23.47

0.81	5.500	1.07	11.500	6.48	17.500	1.21	23.50
0.81	5.533	1.07	11.533	27.95	17.533	1.21	23.53
0.81	5.567	1.07	11.567	27.95	17.567	1.21	23.57
0.81	5.600	1.07	11.600	27.95	17.600	1.21	23.60
0.81	5.633	1.07	11.633	27.95	17.633	1.21	23.63
0.81	5.667	1.07	11.667	27.95	17.667	1.21	23.67
0.81	5.700	1.07	11.700	27.95	17.700	1.21	23.70
0.81	5.733	1.07	11.733	27.95	17.733	1.21	23.73
0.81	5.767	1.07	11.767	51.12	17.767	1.21	23.77
0.81	5.800	1.07	11.800	74.17	17.800	1.21	23.80
0.81	5.833	1.07	11.833	74.17	17.833	1.21	23.83
0.81	5.867	1.07	11.867	74.17	17.867	1.21	23.87
0.81	5.900	1.07	11.900	74.17	17.900	1.21	23.90
0.81	5.933	1.07	11.933	74.17	17.933	1.21	23.93
0.81	5.967	1.07	11.967	74.17	17.967	1.21	23.97
0.81	6.000	1.07	12.000	74.08	18.000	1.21	24.00

Max.Eff.Inten. (mm/hr)=	74.17	119.94
over (min)	5.00	10.00
Storage Coeff. (min)=	1.64 (ii)	8.20 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.44	0.13
*TOTALS*		
PEAK FLOW (cms)=	0.00	0.02
TIME TO PEAK (hrs)=	12.00	12.03
RUNOFF VOLUME (mm)=	66.18	39.68
TOTAL RAINFALL (mm)=	67.18	67.18
RUNOFF COEFFICIENT =	0.99	0.59

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
-----
| CALIB |
| STANDHYD ( 0204) | Area (ha)= 0.24
| ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00
-----
-----
Surface Area (ha)= 0.18 IMPERVIOUS PERVIOUS (i)
Dep. Storage (mm)= 1.00 0.06
Average Slope (%)= 1.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 74.17 122.01
over (min) 5.00 10.00
Storage Coeff. (min)= 1.66 (ii) 8.60 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.44 0.12
-----
*TOTALS*
PEAK FLOW (cms)= 0.02 0.02 0.035 (iii)
TIME TO PEAK (hrs)= 12.00 12.03 12.00
RUNOFF VOLUME (mm)= 66.18 39.89 49.86
TOTAL RAINFALL (mm)= 67.18 67.18 67.18
RUNOFF COEFFICIENT = 0.99 0.59 0.74

```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 | AREA QPEAK TPEAK R.V.
| | (ha) (cms) (hrs) (mm)
-----
TOTAL HYD. (ID= 1): 0.24 0.03 12.00 49.86
-----
MAJOR SYS. (ID= 2): 0.00 0.00 0.00 0.00
MINOR SYS. (ID= 3): 0.24 0.03 12.00 49.86

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| CALIB |

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| STANDHYD ( 0203) | Area (ha)= 2.45  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.59	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	127.80	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	74.17	108.64
over (min)	5.00	12.00
Storage Coeff. (min)=	3.34 (ii)	10.16 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.31	0.10

			*TOTALS*
PEAK FLOW (cms)=	0.13	0.18	0.295 (iii)
TIME TO PEAK (hrs)=	12.00	12.07	12.00
RUNOFF VOLUME (mm)=	66.18	38.45	45.66
TOTAL RAINFALL (mm)=	67.18	67.18	67.18
RUNOFF COEFFICIENT =	0.99	0.57	0.68

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |  
 | STANDHYD ( 0202) | Area (ha)= 0.92  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	78.32	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	74.17	89.15
over (min)	5.00	10.00
Storage Coeff. (min)=	2.49 (ii)	9.69 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.37	0.12

			*TOTALS*
PEAK FLOW (cms)=	0.08	0.05	0.128 (iii)
TIME TO PEAK (hrs)=	12.00	12.07	12.00
RUNOFF VOLUME (mm)=	66.18	36.01	48.37
TOTAL RAINFALL (mm)=	67.18	67.18	67.18
RUNOFF COEFFICIENT =	0.99	0.54	0.72

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

DUHYD ( 0006)				
Inlet Cap.= 0.147				
#of Inlets= 1				
Total(cms)= 0.1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
TOTAL HYD.(ID= 1):	0.92	0.13	12.00	48.37
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	0.92	0.13	12.00	48.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( 0007)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
*** W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.				
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001				
ID1= 1 ( 0203):	2.45	0.295	12.00	45.66
+ ID2= 2 ( 0006):	0.00	0.000	0.00	0.00
ID = 3 ( 0007):	2.45	0.295	12.00	45.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( 0007)				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 ( 0007):	2.45	0.295	12.00	45.66
+ ID2= 2 ( 0009):	0.24	0.035	12.00	49.86
ID = 1 ( 0007):	2.69	0.330	12.00	46.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| RESERVOIR( 0008) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
| OUTFLOW | STORAGE | OUTFLOW | STORAGE
| (cms) | (ha.m.) | (cms) | (ha.m.)
0.0000 0.0000 | 0.1750 0.0640
0.0060 0.0325 | 0.2000 0.0740
0.1000 0.0390 | 0.2300 0.0830
0.1250 0.0520 | 0.2750 0.0900
-----
| AREA | QPEAK | TPEAK | R.V.
| (ha) | (cms) | (hrs) | (mm)
INFLOW : ID= 2 ( 0007) 2.690 0.330 12.00 46.03
OUTFLOW: ID= 1 ( 0008) 2.690 0.124 12.30 45.33

```

```

PEAK FLOW REDUCTION [Qout/Qin](%) = 37.65
TIME SHIFT OF PEAK FLOW (min) = 18.00
MAXIMUM STORAGE USED (ha.m.) = 0.0517

```

```

-----
| ADD HYD ( 0003) |
| 1 + 2 = 3 |
-----
| AREA | QPEAK | TPEAK | R.V.
| (ha) | (cms) | (hrs) | (mm)
ID1= 1 ( 0205): 0.23 0.027 12.03 41.52
+ ID2= 2 ( 0008): 2.69 0.124 12.30 45.33
-----
ID = 3 ( 0003): 2.92 0.141 12.13 45.03

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| STANDHYD ( 0207) | Area (ha) = 0.65
| ID= 1 DT= 2.0 min | Total Imp(%) = 47.00 Dir. Conn.(%) = 0.10
-----

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha) = 0.31 0.34
Dep. Storage (mm) = 1.00 5.00
Average Slope (%) = 1.00 2.00
Length (m) = 65.83 40.00
Mannings n = 0.013 0.250
-----
Max.Eff.Inten.(mm/hr) = 74.17 92.08
over (min) = 5.00 10.00
Storage Coeff. (min) = 2.24 (ii) 9.54 (ii)
Unit Hyd. Tpeak (min) = 4.00 10.00
Unit Hyd. peak (cms) = 0.39 0.12

```

```

*TOTALS*
PEAK FLOW (cms) = 0.00 0.06 0.065 (iii)
TIME TO PEAK (hrs) = 12.00 12.07 12.07
RUNOFF VOLUME (mm) = 66.18 36.41 36.43

```

```

TOTAL RAINFALL (mm) = 67.18 67.18 67.18
RUNOFF COEFFICIENT = 0.99 0.54 0.54

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB
| STANDHYD ( 0206) | Area (ha) = 2.39
| ID= 1 DT= 2.0 min | Total Imp(%) = 64.00 Dir. Conn.(%) = 25.00
-----

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha) = 1.53 0.86
Dep. Storage (mm) = 1.00 5.00
Average Slope (%) = 1.00 2.00
Length (m) = 126.23 40.00
Mannings n = 0.013 0.250
-----
Max.Eff.Inten.(mm/hr) = 74.17 106.39
over (min) = 5.00 12.00
Storage Coeff. (min) = 3.31 (ii) 10.20 (ii)
Unit Hyd. Tpeak (min) = 4.00 12.00
Unit Hyd. peak (cms) = 0.31 0.10

```

```

*TOTALS*
PEAK FLOW (cms) = 0.12 0.18 0.284 (iii)
TIME TO PEAK (hrs) = 12.00 12.07 12.00
RUNOFF VOLUME (mm) = 66.18 38.19 45.19
TOTAL RAINFALL (mm) = 67.18 67.18 67.18
RUNOFF COEFFICIENT = 0.99 0.57 0.67

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| RESERVOIR( 0010) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
| OUTFLOW | STORAGE | OUTFLOW | STORAGE
| (cms) | (ha.m.) | (cms) | (ha.m.)
0.0000 0.0000 | 0.1400 0.0584
0.0050 0.0278 | 0.1700 0.0694

```

0.0700 0.0363 | 0.1900 0.0737  
 0.1000 0.0478 | 0.3000 0.0767

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0206)	2.390	0.284	12.00	45.19
OUTFLOW: ID= 1 ( 0010)	2.390	0.098	12.33	44.45

PEAK FLOW REDUCTION [Qout/Qin] (%) = 34.49  
 TIME SHIFT OF PEAK FLOW (min) = 20.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0470

Max.Eff.Inten.(mm/hr)= 74.17 46.41  
 over (min) 5.00 8.00  
 Storage Coeff. (min)= 3.43 (ii) 7.98 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 8.00  
 Unit Hyd. peak (cms)= 0.31 0.14

PEAK FLOW (cms) = 0.42 0.05 \*TOTALS\*  
 TIME TO PEAK (hrs) = 12.00 12.03 12.00 (iii)  
 RUNOFF VOLUME (mm) = 66.18 28.26 57.46  
 TOTAL RAINFALL (mm) = 67.18 67.18 67.18  
 RUNOFF COEFFICIENT = 0.99 0.42 0.86

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD ( 0001) |  
 | 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0010):	2.39	0.098	12.33	44.45
+ ID2= 2 ( 0207):	0.65	0.065	12.07	36.43
=====				
ID = 3 ( 0001):	3.04	0.148	12.10	42.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB  
 | STANDHYD ( 0004) |

Area (ha) = 0.55  
 |ID= 1 DT= 2.0 min | Total Imp(%) = 65.00 Dir. Conn.(%) = 65.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha) =	0.36	0.19
Dep. Storage (mm) =	1.00	5.00
Average Slope (%) =	1.00	2.00
Length (m) =	60.55	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 74.17 33.67  
 over (min) 5.00 10.00  
 Storage Coeff. (min)= 2.13 (ii) 8.34 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 10.00  
 Unit Hyd. peak (cms)= 0.40 0.13

PEAK FLOW (cms) = 0.07 0.01 \*TOTALS\*  
 TIME TO PEAK (hrs) = 12.00 12.07 12.00 (iii)  
 RUNOFF VOLUME (mm) = 66.18 24.76 51.67  
 TOTAL RAINFALL (mm) = 67.18 67.18 67.18  
 RUNOFF COEFFICIENT = 0.99 0.37 0.77

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD ( 0001) |  
 | 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 ( 0001):	3.04	0.148	12.10	42.74
+ ID2= 2 ( 0009):	0.00	0.000	0.00	0.00
=====				
ID = 1 ( 0001):	3.04	0.148	12.10	42.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB  
 | STANDHYD ( 0201) |

Area (ha) = 2.70  
 |ID= 1 DT= 2.0 min | Total Imp(%) = 81.00 Dir. Conn.(%) = 77.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha) =	2.19	0.51
Dep. Storage (mm) =	1.00	5.00
Average Slope (%) =	1.00	2.00
Length (m) =	134.16	40.00
Mannings n =	0.013	0.250

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0201):  2.70  0.474  12.00  57.46
+ ID2= 2 ( 0004):  0.55  0.086  12.00  51.67
=====
ID = 3 ( 0005):  3.25  0.560  12.00  56.48

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 0005):  3.25  0.560  12.00  56.48
+ ID2= 2 ( 0006):  0.92  0.128  12.00  48.37
=====
ID = 1 ( 0005):  4.17  0.688  12.00  54.69

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0002) |
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
          OVERFLOW IS OFF
          OUTFLOW   STORAGE | OUTFLOW   STORAGE
          (cms)     (ha.m.) | (cms)     (ha.m.)
          0.0000    0.0000 | 0.3000    0.1350
          0.0130    0.0746 | 0.3750    0.1510
          0.1500    0.0900 | 0.4000    0.1610
          0.2100    0.1200 | 0.4500    0.1725
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
INFLOW : ID= 2 ( 0005)  4.170  0.688  12.00  54.69
OUTFLOW: ID= 1 ( 0002)  4.170  0.198  12.17  53.55

```

PEAK FLOW REDUCTION [Qout/Qin] (%) = 28.84  
TIME SHIFT OF PEAK FLOW (min) = 10.00  
MAXIMUM STORAGE USED (ha.m.) = 0.1142

```

-----
V V I SSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L

```

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VV I SSSS UUUU A A LLLL
000 TTTT TTTT H H Y Y M M 000 TM
O O T T H H Y Y MM MM O O
O O T T H H Y Y M M O O
000 T T H H Y Y M M 000

```

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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  
6.0\VO2\voin.dat  
Output filename:  
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
0af8143f9a42\9728375e-e90e-4f0c-9bce-f0d9cd416135\s  
Summary filename:  
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
0af8143f9a42\9728375e-e90e-4f0c-9bce-f0d9cd416135\s

DATE: 02/25/2021 TIME: 12:17:59

USER:

COMMENTS: \_\_\_\_\_

```

*****
** SIMULATION : 3 - 10yr 24hr SCS **
*****

```

```

-----
| MASS STORM | Filename: C:\Users\mmacdonald\AppData
| | | ata\Local\Temp\
| | | 598fd74c-16a6-4267-a81e-
| | | 3ca80d03e1b2\20b79a9c
| Ptotal= 79.96 mm | Comments: SCS 24 HOUR TYPE II STORM DISTRIBUTION
1

```

Duration of storm = 24.00 hrs  
Mass curve time step = 15.00 min

```

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

```

1.44	0.25	0.90	6.25	0.00	12.25	11.51	18.25
1.44	0.50	0.86	6.50	0.00	12.50	11.51	18.50
1.44	0.75	0.90	6.75	0.00	12.75	5.92	18.75
1.44	1.00	0.86	7.00	0.00	13.00	5.92	19.00
1.44	1.25	0.90	7.25	3.20	13.25	1.12	19.25
1.44	1.50	0.86	7.50	3.20	13.50	1.12	19.50
1.44	1.75	0.90	7.75	3.20	13.75	6.56	19.75
1.44	2.00	0.86	8.00	3.20	14.00	6.56	20.00
1.44	2.25	1.06	8.25	0.00	14.25	2.40	20.25
0.96	2.50	1.02	8.50	0.00	14.50	2.40	20.50
0.96	2.75	1.06	8.75	4.32	14.75	2.40	20.75
0.96	3.00	1.02	9.00	4.32	15.00	2.40	21.00
0.96	3.25	1.06	9.25	2.56	15.25	2.40	21.25
0.96	3.50	1.02	9.50	2.56	15.50	2.40	21.50
0.96	3.75	1.06	9.75	2.88	15.75	2.40	21.75
0.96	4.00	1.02	10.00	2.88	16.00	2.40	22.00
0.96	4.25	1.28	10.25	3.68	16.25	1.44	22.25
0.96	4.50	1.28	10.50	3.68	16.50	1.44	22.50
0.96	4.75	1.28	10.75	4.96	16.75	1.44	22.75
0.96	5.00	1.28	11.00	4.96	17.00	1.44	23.00
0.96	5.25	1.28	11.25	7.68	17.25	1.44	23.25
0.96	5.50	1.28	11.50	7.68	17.50	1.44	23.50
0.96	5.75	1.28	11.75	33.26	17.75	1.44	23.75
0.96	6.00	1.28	12.00	88.28	18.00	1.44	24.00

|ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00  
-----  
IMPERVIOUS PERVIOUS (i)  
Surface Area (ha)= 0.14 0.09  
Dep. Storage (mm)= 1.00 5.00  
Average Slope (%)= 1.00 2.00  
Length (m)= 39.16 40.00  
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

RAIN	---- TRANSFORMED HYETOGRAPH ----							
	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	
1.44	0.033	0.90	6.033	0.00	12.033	11.51	18.03	
1.44	0.067	0.90	6.067	0.00	12.067	11.51	18.07	
1.44	0.100	0.90	6.100	0.00	12.100	11.51	18.10	
1.44	0.133	0.90	6.133	0.00	12.133	11.51	18.13	
1.44	0.167	0.90	6.167	0.00	12.167	11.51	18.17	
1.44	0.200	0.90	6.200	0.00	12.200	11.51	18.20	
1.44	0.233	0.90	6.233	0.00	12.233	11.51	18.23	
1.44	0.267	0.88	6.267	0.00	12.267	11.51	18.27	
1.44	0.300	0.86	6.300	0.00	12.300	11.51	18.30	
1.44	0.333	0.86	6.333	0.00	12.333	11.51	18.33	
1.44	0.367	0.86	6.367	0.00	12.367	11.51	18.37	
1.44	0.400	0.86	6.400	0.00	12.400	11.51	18.40	
1.44	0.433	0.86	6.433	0.00	12.433	11.51	18.43	
1.44	0.467	0.86	6.467	0.00	12.467	11.51	18.47	
1.44	0.500	0.86	6.500	0.00	12.500	11.51	18.50	
1.44	0.533	0.90	6.533	0.00	12.533	5.92	18.53	
1.44	0.567	0.90	6.567	0.00	12.567	5.92	18.57	
1.44	0.600	0.90	6.600	0.00	12.600	5.92	18.60	

-----  
-----  
| CALIB |  
| STANDHYD ( 0205) | Area (ha)= 0.23



0.96 2.433 1.02 | 8.433 0.00 |14.433 2.40 | 20.43  
0.96 2.467 1.02 | 8.467 0.00 |14.467 2.40 | 20.47  
0.96 2.500 1.02 | 8.500 0.00 |14.500 2.40 | 20.50  
0.96 2.533 1.06 | 8.533 4.32 |14.533 2.40 | 20.53  
0.96 2.567 1.06 | 8.567 4.32 |14.567 2.40 | 20.57  
0.96 2.600 1.06 | 8.600 4.32 |14.600 2.40 | 20.60  
0.96 2.633 1.06 | 8.633 4.32 |14.633 2.40 | 20.63  
0.96 2.667 1.06 | 8.667 4.32 |14.667 2.40 | 20.67  
0.96 2.700 1.06 | 8.700 4.32 |14.700 2.40 | 20.70  
0.96 2.733 1.06 | 8.733 4.32 |14.733 2.40 | 20.73  
0.96 2.767 1.04 | 8.767 4.32 |14.767 2.40 | 20.77  
0.96 2.800 1.02 | 8.800 4.32 |14.800 2.40 | 20.80  
0.96 2.833 1.02 | 8.833 4.32 |14.833 2.40 | 20.83  
0.96 2.867 1.02 | 8.867 4.32 |14.867 2.40 | 20.87  
0.96 2.900 1.02 | 8.900 4.32 |14.900 2.40 | 20.90  
0.96 2.933 1.02 | 8.933 4.32 |14.933 2.40 | 20.93  
0.96 2.967 1.02 | 8.967 4.32 |14.967 2.40 | 20.97  
0.96 3.000 1.02 | 9.000 4.32 |15.000 2.40 | 21.00  
0.96 3.033 1.06 | 9.033 2.56 |15.033 2.40 | 21.03  
0.96 3.067 1.06 | 9.067 2.56 |15.067 2.40 | 21.07  
0.96 3.100 1.06 | 9.100 2.56 |15.100 2.40 | 21.10  
0.96 3.133 1.06 | 9.133 2.56 |15.133 2.40 | 21.13  
0.96 3.167 1.06 | 9.167 2.56 |15.167 2.40 | 21.17  
0.96 3.200 1.06 | 9.200 2.56 |15.200 2.40 | 21.20  
0.96 3.233 1.06 | 9.233 2.56 |15.233 2.40 | 21.23  
0.96 3.267 1.04 | 9.267 2.56 |15.267 2.40 | 21.27  
0.96 3.300 1.02 | 9.300 2.56 |15.300 2.40 | 21.30

0.96 3.333 1.02 | 9.333 2.56 |15.333 2.40 | 21.33  
0.96 3.367 1.02 | 9.367 2.56 |15.367 2.40 | 21.37  
0.96 3.400 1.02 | 9.400 2.56 |15.400 2.40 | 21.40  
0.96 3.433 1.02 | 9.433 2.56 |15.433 2.40 | 21.43  
0.96 3.467 1.02 | 9.467 2.56 |15.467 2.40 | 21.47  
0.96 3.500 1.02 | 9.500 2.56 |15.500 2.40 | 21.50  
0.96 3.533 1.06 | 9.533 2.88 |15.533 2.40 | 21.53  
0.96 3.567 1.06 | 9.567 2.88 |15.567 2.40 | 21.57  
0.96 3.600 1.06 | 9.600 2.88 |15.600 2.40 | 21.60  
0.96 3.633 1.06 | 9.633 2.88 |15.633 2.40 | 21.63  
0.96 3.667 1.06 | 9.667 2.88 |15.667 2.40 | 21.67  
0.96 3.700 1.06 | 9.700 2.88 |15.700 2.40 | 21.70  
0.96 3.733 1.06 | 9.733 2.88 |15.733 2.40 | 21.73  
0.96 3.767 1.04 | 9.767 2.88 |15.767 2.40 | 21.77  
0.96 3.800 1.02 | 9.800 2.88 |15.800 2.40 | 21.80  
0.96 3.833 1.02 | 9.833 2.88 |15.833 2.40 | 21.83  
0.96 3.867 1.02 | 9.867 2.88 |15.867 2.40 | 21.87  
0.96 3.900 1.02 | 9.900 2.88 |15.900 2.40 | 21.90  
0.96 3.933 1.02 | 9.933 2.88 |15.933 2.40 | 21.93  
0.96 3.967 1.02 | 9.967 2.88 |15.967 2.40 | 21.97  
0.96 4.000 1.02 |10.000 2.88 |16.000 2.40 | 22.00  
0.96 4.033 1.28 |10.033 3.68 |16.033 1.44 | 22.03  
0.96 4.067 1.28 |10.067 3.68 |16.067 1.44 | 22.07  
0.96 4.100 1.28 |10.100 3.68 |16.100 1.44 | 22.10  
0.96 4.133 1.28 |10.133 3.68 |16.133 1.44 | 22.13  
0.96 4.167 1.28 |10.167 3.68 |16.167 1.44 | 22.17  
0.96 4.200 1.28 |10.200 3.68 |16.200 1.44 | 22.20

0.96	4.233	1.28	10.233	3.68	16.233	1.44	22.23
0.96	4.267	1.28	10.267	3.68	16.267	1.44	22.27
0.96	4.300	1.28	10.300	3.68	16.300	1.44	22.30
0.96	4.333	1.28	10.333	3.68	16.333	1.44	22.33
0.96	4.367	1.28	10.367	3.68	16.367	1.44	22.37
0.96	4.400	1.28	10.400	3.68	16.400	1.44	22.40
0.96	4.433	1.28	10.433	3.68	16.433	1.44	22.43
0.96	4.467	1.28	10.467	3.68	16.467	1.44	22.47
0.96	4.500	1.28	10.500	3.68	16.500	1.44	22.50
0.96	4.533	1.28	10.533	4.96	16.533	1.44	22.53
0.96	4.567	1.28	10.567	4.96	16.567	1.44	22.57
0.96	4.600	1.28	10.600	4.96	16.600	1.44	22.60
0.96	4.633	1.28	10.633	4.96	16.633	1.44	22.63
0.96	4.667	1.28	10.667	4.96	16.667	1.44	22.67
0.96	4.700	1.28	10.700	4.96	16.700	1.44	22.70
0.96	4.733	1.28	10.733	4.96	16.733	1.44	22.73
0.96	4.767	1.28	10.767	4.96	16.767	1.44	22.77
0.96	4.800	1.28	10.800	4.96	16.800	1.44	22.80
0.96	4.833	1.28	10.833	4.96	16.833	1.44	22.83
0.96	4.867	1.28	10.867	4.96	16.867	1.44	22.87
0.96	4.900	1.28	10.900	4.96	16.900	1.44	22.90
0.96	4.933	1.28	10.933	4.96	16.933	1.44	22.93
0.96	4.967	1.28	10.967	4.96	16.967	1.44	22.97
0.96	5.000	1.28	11.000	4.96	17.000	1.44	23.00
0.96	5.033	1.28	11.033	7.68	17.033	1.44	23.03
0.96	5.067	1.28	11.067	7.68	17.067	1.44	23.07
0.96	5.100	1.28	11.100	7.68	17.100	1.44	23.10

0.96	5.133	1.28	11.133	7.68	17.133	1.44	23.13
0.96	5.167	1.28	11.167	7.68	17.167	1.44	23.17
0.96	5.200	1.28	11.200	7.68	17.200	1.44	23.20
0.96	5.233	1.28	11.233	7.68	17.233	1.44	23.23
0.96	5.267	1.28	11.267	7.68	17.267	1.44	23.27
0.96	5.300	1.28	11.300	7.68	17.300	1.44	23.30
0.96	5.333	1.28	11.333	7.68	17.333	1.44	23.33
0.96	5.367	1.28	11.367	7.68	17.367	1.44	23.37
0.96	5.400	1.28	11.400	7.68	17.400	1.44	23.40
0.96	5.433	1.28	11.433	7.68	17.433	1.44	23.43
0.96	5.467	1.28	11.467	7.68	17.467	1.44	23.47
0.96	5.500	1.28	11.500	7.71	17.500	1.44	23.50
0.96	5.533	1.28	11.533	33.26	17.533	1.44	23.53
0.96	5.567	1.28	11.567	33.26	17.567	1.44	23.57
0.96	5.600	1.28	11.600	33.26	17.600	1.44	23.60
0.96	5.633	1.28	11.633	33.26	17.633	1.44	23.63
0.96	5.667	1.28	11.667	33.26	17.667	1.44	23.67
0.96	5.700	1.28	11.700	33.26	17.700	1.44	23.70
0.96	5.733	1.28	11.733	33.26	17.733	1.44	23.73
0.96	5.767	1.28	11.767	60.84	17.767	1.44	23.77
0.96	5.800	1.28	11.800	88.28	17.800	1.44	23.80
0.96	5.833	1.28	11.833	88.28	17.833	1.44	23.83
0.96	5.867	1.28	11.867	88.28	17.867	1.44	23.87
0.96	5.900	1.28	11.900	88.28	17.900	1.44	23.90
0.96	5.933	1.28	11.933	88.28	17.933	1.44	23.93
0.96	5.967	1.28	11.967	88.28	17.967	1.44	23.97
0.96	6.000	1.28	12.000	88.17	18.000	1.44	24.00



Max.Eff.Inten.(mm/hr)= 88.28 152.15  
 over (min) 5.00 8.00  
 Storage Coeff. (min)= 1.53 (ii) 7.50 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 8.00  
 Unit Hyd. peak (cms)= 0.45 0.15

PEAK FLOW (cms)= 0.00 0.03 0.036 (iii)  
 TIME TO PEAK (hrs)= 11.97 12.03 12.00  
 RUNOFF VOLUME (mm)= 78.96 50.73 52.69  
 TOTAL RAINFALL (mm)= 79.96 79.96 79.96  
 RUNOFF COEFFICIENT = 0.99 0.63 0.66

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----

| CALIB |  
 | STANDHYD ( 0204) | Area (ha)= 0.24  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.18	0.06	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	40.00	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	88.28	154.67	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.55 (ii)	8.02 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.45	0.13	
PEAK FLOW (cms)=	0.02	0.02	0.043 (iii)
TIME TO PEAK (hrs)=	12.00	12.03	12.00
RUNOFF VOLUME (mm)=	78.96	50.97	61.59
TOTAL RAINFALL (mm)=	79.96	79.96	79.96
RUNOFF COEFFICIENT =	0.99	0.64	0.77

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

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

-----

| DUHYD ( 0009) |  
 | Inlet Cap.= 0.041 |  
 | #of Inlets= 1 |  
 | Total(cms)= 0.0 | AREA QPEAK TPEAK R.V.  
 (ha) (cms) (hrs) (mm)

TOTAL HYD. (ID= 1):	0.24	0.04	12.00	61.59
MAJOR SYS. (ID= 2):	0.00	0.00	12.00	61.59
MINOR SYS. (ID= 3):	0.24	0.04	11.97	61.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----

| CALIB |  
 | STANDHYD ( 0203) | Area (ha)= 2.45  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.59	0.86	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	127.80	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	88.28	138.39	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.11 (ii)	9.31 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.12	
PEAK FLOW (cms)=	0.15	0.25	0.390 (iii)
TIME TO PEAK (hrs)=	12.00	12.03	12.00
RUNOFF VOLUME (mm)=	78.96	49.34	57.04
TOTAL RAINFALL (mm)=	79.96	79.96	79.96
RUNOFF COEFFICIENT =	0.99	0.62	0.71

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----

| CALIB |  
 | STANDHYD ( 0202) | Area (ha)= 0.92  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	78.32	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	88.28	114.51
over (min)	5.00	10.00
Storage Coeff. (min)=	2.32 (ii)	9.04 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.38	0.12

\*TOTALS\*  
 PEAK FLOW (cms)= 0.09 0.07 0.159 (iii)  
 TIME TO PEAK (hrs)= 12.00 12.03 12.00  
 RUNOFF VOLUME (mm)= 78.96 46.55 59.83  
 TOTAL RAINFALL (mm)= 79.96 79.96 79.96  
 RUNOFF COEFFICIENT = 0.99 0.58 0.75

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 | DUHYD ( 0006) |  
 | Inlet Cap.= 0.147 |  
 | #of Inlets= 1 |  
 | Total(cms)= 0.1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	0.92	0.16	12.00	59.83
MAJOR SYS. (ID= 2):	0.00	0.01	12.00	59.83
MINOR SYS. (ID= 3):	0.92	0.15	11.97	59.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | ADD HYD ( 0007) |  
 | 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0203):	2.45	0.390	12.00	57.04
+ ID2= 2 ( 0006):	0.00	0.012	12.00	59.83

=====

ID = 3 ( 0007):	2.45	0.403	12.00	57.04
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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | ADD HYD ( 0007) |  
 | 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 ( 0007):	2.45	0.403	12.00	57.04
+ ID2= 2 ( 0009):	0.24	0.041	11.97	61.59
ID = 1 ( 0007):	2.69	0.444	12.00	57.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | RESERVOIR( 0008) | OVERFLOW IS OFF  
 | IN= 2---> OUT= 1 |  
 | DT= 2.0 min |

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1750	0.0640
	0.0060	0.0325	0.2000	0.0740
	0.1000	0.0390	0.2300	0.0830
	0.1250	0.0520	0.2750	0.0900

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0007)	2.693	0.444	12.00	57.45
OUTFLOW: ID= 1 ( 0008)	2.693	0.171	12.23	56.73

PEAK FLOW REDUCTION [Qout/Qin] (%)= 38.54  
 TIME SHIFT OF PEAK FLOW (min)= 14.00  
 MAXIMUM STORAGE USED (ha.m.)= 0.0631

-----  
 | ADD HYD ( 0003) |  
 | 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 ( 0205):	0.23	0.036	12.00	52.69
+ ID2= 2 ( 0008):	2.69	0.171	12.23	56.73
ID = 3 ( 0003):	2.92	0.188	12.17	56.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB |
| STANDHYD ( 0207) | Area (ha)= 0.65
| ID= 1 DT= 2.0 min | Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10

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IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.31 0.34
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 65.83 40.00
Mannings n = 0.013 0.250

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Max.Eff.Inten.(mm/hr)= 88.28 118.11
over (min) 5.00 10.00
Storage Coeff. (min)= 2.09 (ii) 8.69 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.40 0.12

```

```

*TOTALS*
PEAK FLOW (cms)= 0.00 0.09 0.086 (iii)
TIME TO PEAK (hrs)= 12.00 12.03 12.03
RUNOFF VOLUME (mm)= 78.96 47.00 47.03
TOTAL RAINFALL (mm)= 79.96 79.96 79.96
RUNOFF COEFFICIENT = 0.99 0.59 0.59

```

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

```

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

```

RUNOFF VOLUME (mm)= 78.96 49.04 56.52
TOTAL RAINFALL (mm)= 79.96 79.96 79.96
RUNOFF COEFFICIENT = 0.99 0.61 0.71

```

```

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

```

-----
| RESERVOIR ( 0010) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1400 0.0584
0.0050 0.0278 | 0.1700 0.0694
0.0700 0.0363 | 0.1900 0.0737
0.1000 0.0478 | 0.3000 0.0767

```

```

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0206) 2.390 0.376 12.00 56.52
OUTFLOW: ID= 1 ( 0010) 2.390 0.136 12.27 55.77

```

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 36.07
TIME SHIFT OF PEAK FLOW (min)= 16.00
MAXIMUM STORAGE USED (ha.m.)= 0.0573

```

```

| CALIB |
| STANDHYD ( 0206) | Area (ha)= 2.39
| ID= 1 DT= 2.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.53 0.86
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 126.23 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 88.28 135.63
over (min) 5.00 10.00
Storage Coeff. (min)= 3.09 (ii) 9.34 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.33 0.12

```

```

*TOTALS*
PEAK FLOW (cms)= 0.15 0.24 0.376 (iii)
TIME TO PEAK (hrs)= 12.00 12.03 12.00

```

```

| ADD HYD ( 0001) |
| 1 + 2 = 3 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0010): 2.39 0.136 12.27 55.77
+ ID2= 2 ( 0207): 0.65 0.086 12.03 47.03
=====
ID = 3 ( 0001): 3.04 0.203 12.10 53.90

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 0001) |
| 3 + 2 = 1 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 0001): 3.04 0.203 12.10 53.90
+ ID2= 2 ( 0009): 0.00 0.002 12.00 61.59

```

=====  
ID = 1 ( 0001): 3.04 0.203 12.10 53.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
-----  
| CALIB |  
| STANDHYD ( 0201) | Area (ha)= 2.70  
| ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00  
-----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.19	0.51
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	134.16	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	88.28	61.33
over (min)	5.00	8.00
Storage Coeff. (min)=	3.20 (ii)	7.44 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.32	0.15

			*TOTALS*
PEAK FLOW (cms)=	0.50	0.07	0.574 (iii)
TIME TO PEAK (hrs)=	12.00	12.03	12.00
RUNOFF VOLUME (mm)=	78.96	37.47	69.42
TOTAL RAINFALL (mm)=	79.96	79.96	79.96
RUNOFF COEFFICIENT =	0.99	0.47	0.87

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
-----  
| CALIB |  
| STANDHYD ( 0004) | Area (ha)= 0.55  
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00  
-----

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.36	0.19
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	60.55	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	88.28	45.14
over (min)	5.00	8.00
Storage Coeff. (min)=	1.99 (ii)	7.78 (ii)

Unit Hyd. Tpeak (min)= 4.00 8.00  
Unit Hyd. peak (cms)= 0.41 0.14

			*TOTALS*
PEAK FLOW (cms)=	0.09	0.02	0.106 (iii)
TIME TO PEAK (hrs)=	12.00	12.03	12.00
RUNOFF VOLUME (mm)=	78.96	33.27	62.96
TOTAL RAINFALL (mm)=	79.96	79.96	79.96
RUNOFF COEFFICIENT =	0.99	0.42	0.79

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
-----  
| ADD HYD ( 0005) |  
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.  
(ha) (cms) (hrs) (mm)  
ID1= 1 ( 0201): 2.70 0.574 12.00 69.42  
+ ID2= 2 ( 0004): 0.55 0.106 12.00 62.96  
=====

ID = 3 ( 0005): 3.25 0.680 12.00 68.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
-----  
| ADD HYD ( 0005) |  
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.  
(ha) (cms) (hrs) (mm)  
ID1= 3 ( 0005): 3.25 0.680 12.00 68.32  
+ ID2= 2 ( 0006): 0.92 0.147 11.97 59.83  
=====

ID = 1 ( 0005): 4.17 0.827 12.00 66.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
-----  
| RESERVOIR ( 0002) | OVERFLOW IS OFF  
| IN= 2--> OUT= 1 |  
DT= 2.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1350
0.0130	0.0746	0.3750	0.1510
0.1500	0.0900	0.4000	0.1610
0.2100	0.1200	0.4500	0.1725

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0005)	4.166	0.827	12.00	66.46
OUTFLOW: ID= 1 ( 0002)	4.166	0.290	12.13	65.27

PEAK FLOW REDUCTION [Qout/Qin] (%) = 35.10  
 TIME SHIFT OF PEAK FLOW (min) = 8.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.1335

\*\*\*\*\*  
 \*\* SIMULATION : 4 - 25yr 24hr SCS \*\*  
 \*\*\*\*\*

-----  
 | MASS STORM | Filename: C:\Users\mmacdonald\AppData  
 | | ata\Local\Temp\  
 | | 598fd74c-16a6-4267-a81e-  
 3ca80d03e1b2\da15e4b2  
 | Ptotal= 93.38 mm | Comments: SCS 24 HOUR TYPE II STORM DISTRIBUTION  
 1  
 -----  
 Duration of storm = 24.00 hrs  
 Mass curve time step = 15.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.68	0.25	1.05	6.25	0.00	12.25	13.45	18.25
1.68	0.50	1.01	6.50	0.00	12.50	13.45	18.50
1.68	0.75	1.05	6.75	0.00	12.75	6.91	18.75
1.68	1.00	1.01	7.00	0.00	13.00	6.91	19.00
1.68	1.25	1.05	7.25	3.74	13.25	1.31	19.25
1.68	1.50	1.01	7.50	3.74	13.50	1.31	19.50
1.68	1.75	1.05	7.75	3.74	13.75	7.66	19.75
1.68	2.00	1.01	8.00	3.74	14.00	7.66	20.00
1.12	2.25	1.23	8.25	0.00	14.25	2.80	20.25
1.12	2.50	1.20	8.50	0.00	14.50	2.80	20.50
1.12	2.75	1.23	8.75	5.04	14.75	2.80	20.75
1.12	3.00	1.20	9.00	5.04	15.00	2.80	21.00
1.12	3.25	1.23	9.25	2.99	15.25	2.80	21.25
1.12	3.50	1.20	9.50	2.99	15.50	2.80	21.50
1.12	3.75	1.23	9.75	3.36	15.75	2.80	21.75
1.12	4.00	1.20	10.00	3.36	16.00	2.80	22.00
1.12	4.25	1.49	10.25	4.30	16.25	1.68	22.25
1.12							

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 =====  
 =====  
 V V I SSSSS U U A L (v 6.0.2001)  
 V V I SS U U A A L  
 V V I SS U U A A A A L  
 V V I SS U U A A L  
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 OOO TTTTT TTTTT H H Y Y M M OOO TM  
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 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  
 6.0\VO2\voin.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\ca146336-669d-465a-9903-64ae48146ef6\s  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\ca146336-669d-465a-9903-64ae48146ef6\s

DATE: 02/25/2021 TIME: 12:17:59

USER:

COMMENTS: \_\_\_\_\_

1.12	4.50	1.49	10.50	4.30	16.50	1.68	22.50	1.68	0.300	1.01	6.300	0.00	12.300	13.45	18.30
1.12	4.75	1.49	10.75	5.79	16.75	1.68	22.75	1.68	0.333	1.01	6.333	0.00	12.333	13.45	18.33
1.12	5.00	1.49	11.00	5.79	17.00	1.68	23.00	1.68	0.367	1.01	6.367	0.00	12.367	13.45	18.37
1.12	5.25	1.49	11.25	8.96	17.25	1.68	23.25	1.68	0.400	1.01	6.400	0.00	12.400	13.45	18.40
1.12	5.50	1.49	11.50	8.96	17.50	1.68	23.50	1.68	0.433	1.01	6.433	0.00	12.433	13.45	18.43
1.12	5.75	1.49	11.75	38.85	17.75	1.68	23.75	1.68	0.467	1.01	6.467	0.00	12.467	13.45	18.47
1.12	6.00	1.49	12.00	103.09	18.00	1.68	24.00	1.68	0.500	1.01	6.500	0.00	12.500	13.44	18.50

-----  
-----

CALIB		Area (ha)= 0.23	
STANDHYD ( 0205)		Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00	
ID= 1 DT= 2.0 min			
-----		-----	
Surface Area	(ha)=	IMPERVIOUS	PERVIOUS (i)
Dep. Storage	(mm)=	0.14	0.09
Average Slope	(%)=	1.00	5.00
Length	(m)=	1.00	2.00
Mannings n	=	39.16	40.00
		0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----															
RAIN		TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
mm/hr		hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
1.68	1.68	0.033	1.05	6.033	0.00	12.033	13.45	18.03	1.68	1.68	0.300	1.01	6.300	0.00	12.300
1.68	1.68	0.067	1.05	6.067	0.00	12.067	13.45	18.07	1.68	1.68	0.333	1.01	6.333	0.00	12.333
1.68	1.68	0.100	1.05	6.100	0.00	12.100	13.45	18.10	1.68	1.68	0.367	1.01	6.367	0.00	12.367
1.68	1.68	0.133	1.05	6.133	0.00	12.133	13.45	18.13	1.68	1.68	0.400	1.01	6.400	0.00	12.400
1.68	1.68	0.167	1.05	6.167	0.00	12.167	13.45	18.17	1.68	1.68	0.433	1.01	6.433	0.00	12.433
1.68	1.68	0.200	1.05	6.200	0.00	12.200	13.45	18.20	1.68	1.68	0.467	1.01	6.467	0.00	12.467
1.68	1.68	0.233	1.05	6.233	0.00	12.233	13.45	18.23	1.68	1.68	0.500	1.01	6.500	0.00	12.500
1.68	1.68	0.267	1.03	6.267	0.00	12.267	13.45	18.27	1.68	1.68	0.533	1.05	6.533	0.00	12.533
1.68	1.68								1.68	1.68	0.567	1.05	6.567	0.00	12.567
1.68	1.68								1.68	1.68	0.600	1.05	6.600	0.00	12.600
1.68	1.68								1.68	1.68	0.633	1.05	6.633	0.00	12.633
1.68	1.68								1.68	1.68	0.667	1.05	6.667	0.00	12.667
1.68	1.68								1.68	1.68	0.700	1.05	6.700	0.00	12.700
1.68	1.68								1.68	1.68	0.733	1.05	6.733	0.00	12.733
1.68	1.68								1.68	1.68	0.767	1.03	6.767	0.00	12.767
1.68	1.68								1.68	1.68	0.800	1.01	6.800	0.00	12.800
1.68	1.68								1.68	1.68	0.833	1.01	6.833	0.00	12.833
1.68	1.68								1.68	1.68	0.867	1.01	6.867	0.00	12.867
1.68	1.68								1.68	1.68	0.900	1.01	6.900	0.00	12.900
1.68	1.68								1.68	1.68	0.933	1.01	6.933	0.00	12.933
1.68	1.68								1.68	1.68	0.967	1.01	6.967	0.00	12.967
1.68	1.68								1.68	1.68	1.000	1.01	7.000	0.00	13.000
1.68	1.68								1.68	1.68	1.033	1.05	7.033	3.73	13.033
1.68	1.68								1.68	1.68	1.067	1.05	7.067	3.74	13.067
1.68	1.68								1.68	1.68	1.100	1.05	7.100	3.74	13.100
1.68	1.68								1.68	1.68	1.133	1.05	7.133	3.74	13.133
1.68	1.68								1.68	1.68	1.167	1.05	7.167	3.74	13.167

1.68	1.200	1.05   7.200	3.74  13.200	1.31   19.20	1.12	2.100	1.23   8.100	0.00  14.100	2.80   20.10
1.68	1.233	1.05   7.233	3.74  13.233	1.31   19.23	1.12	2.133	1.23   8.133	0.00  14.133	2.80   20.13
1.68	1.267	1.03   7.267	3.74  13.267	1.31   19.27	1.12	2.167	1.23   8.167	0.00  14.167	2.80   20.17
1.68	1.300	1.01   7.300	3.74  13.300	1.31   19.30	1.12	2.200	1.23   8.200	0.00  14.200	2.80   20.20
1.68	1.333	1.01   7.333	3.74  13.333	1.31   19.33	1.12	2.233	1.23   8.233	0.00  14.233	2.80   20.23
1.68	1.367	1.01   7.367	3.74  13.367	1.31   19.37	1.12	2.267	1.21   8.267	0.00  14.267	2.80   20.27
1.68	1.400	1.01   7.400	3.74  13.400	1.31   19.40	1.12	2.300	1.20   8.300	0.00  14.300	2.80   20.30
1.68	1.433	1.01   7.433	3.74  13.433	1.31   19.43	1.12	2.333	1.20   8.333	0.00  14.333	2.80   20.33
1.68	1.467	1.01   7.467	3.74  13.467	1.31   19.47	1.12	2.367	1.20   8.367	0.00  14.367	2.80   20.37
1.68	1.500	1.01   7.500	3.74  13.500	1.32   19.50	1.12	2.400	1.20   8.400	0.00  14.400	2.80   20.40
1.68	1.533	1.05   7.533	3.74  13.533	7.66   19.53	1.12	2.433	1.20   8.433	0.00  14.433	2.80   20.43
1.68	1.567	1.05   7.567	3.74  13.567	7.66   19.57	1.12	2.467	1.20   8.467	0.00  14.467	2.80   20.47
1.68	1.600	1.05   7.600	3.74  13.600	7.66   19.60	1.12	2.500	1.20   8.500	0.00  14.500	2.80   20.50
1.68	1.633	1.05   7.633	3.74  13.633	7.66   19.63	1.12	2.533	1.23   8.533	5.04  14.533	2.80   20.53
1.68	1.667	1.05   7.667	3.74  13.667	7.66   19.67	1.12	2.567	1.23   8.567	5.04  14.567	2.80   20.57
1.68	1.700	1.05   7.700	3.74  13.700	7.66   19.70	1.12	2.600	1.23   8.600	5.04  14.600	2.80   20.60
1.68	1.733	1.05   7.733	3.74  13.733	7.66   19.73	1.12	2.633	1.23   8.633	5.04  14.633	2.80   20.63
1.68	1.767	1.03   7.767	3.74  13.767	7.66   19.77	1.12	2.667	1.23   8.667	5.04  14.667	2.80   20.67
1.68	1.800	1.01   7.800	3.74  13.800	7.66   19.80	1.12	2.700	1.23   8.700	5.04  14.700	2.80   20.70
1.68	1.833	1.01   7.833	3.74  13.833	7.66   19.83	1.12	2.733	1.23   8.733	5.04  14.733	2.80   20.73
1.68	1.867	1.01   7.867	3.74  13.867	7.66   19.87	1.12	2.767	1.21   8.767	5.04  14.767	2.80   20.77
1.68	1.900	1.01   7.900	3.74  13.900	7.66   19.90	1.12	2.800	1.20   8.800	5.04  14.800	2.80   20.80
1.68	1.933	1.01   7.933	3.74  13.933	7.66   19.93	1.12	2.833	1.20   8.833	5.04  14.833	2.80   20.83
1.68	1.967	1.01   7.967	3.74  13.967	7.66   19.97	1.12	2.867	1.20   8.867	5.04  14.867	2.80   20.87
1.68	2.000	1.01   8.000	3.74  14.000	7.65   20.00	1.12	2.900	1.20   8.900	5.04  14.900	2.80   20.90
1.12	2.033	1.23   8.033	0.00  14.033	2.80   20.03	1.12	2.933	1.20   8.933	5.04  14.933	2.80   20.93
1.12	2.067	1.23   8.067	0.00  14.067	2.80   20.07	1.12	2.967	1.20   8.967	5.04  14.967	2.80   20.97

1.12	3.000	1.20   9.000	5.04  15.000	2.80   21.00
1.12	3.033	1.23   9.033	2.99  15.033	2.80   21.03
1.12	3.067	1.23   9.067	2.99  15.067	2.80   21.07
1.12	3.100	1.23   9.100	2.99  15.100	2.80   21.10
1.12	3.133	1.23   9.133	2.99  15.133	2.80   21.13
1.12	3.167	1.23   9.167	2.99  15.167	2.80   21.17
1.12	3.200	1.23   9.200	2.99  15.200	2.80   21.20
1.12	3.233	1.23   9.233	2.99  15.233	2.80   21.23
1.12	3.267	1.21   9.267	2.99  15.267	2.80   21.27
1.12	3.300	1.20   9.300	2.99  15.300	2.80   21.30
1.12	3.333	1.20   9.333	2.99  15.333	2.80   21.33
1.12	3.367	1.20   9.367	2.99  15.367	2.80   21.37
1.12	3.400	1.20   9.400	2.99  15.400	2.80   21.40
1.12	3.433	1.20   9.433	2.99  15.433	2.80   21.43
1.12	3.467	1.20   9.467	2.99  15.467	2.80   21.47
1.12	3.500	1.20   9.500	2.99  15.500	2.80   21.50
1.12	3.533	1.23   9.533	3.36  15.533	2.80   21.53
1.12	3.567	1.23   9.567	3.36  15.567	2.80   21.57
1.12	3.600	1.23   9.600	3.36  15.600	2.80   21.60
1.12	3.633	1.23   9.633	3.36  15.633	2.80   21.63
1.12	3.667	1.23   9.667	3.36  15.667	2.80   21.67
1.12	3.700	1.23   9.700	3.36  15.700	2.80   21.70
1.12	3.733	1.23   9.733	3.36  15.733	2.80   21.73
1.12	3.767	1.21   9.767	3.36  15.767	2.80   21.77
1.12	3.800	1.20   9.800	3.36  15.800	2.80   21.80
1.12	3.833	1.20   9.833	3.36  15.833	2.80   21.83
1.12	3.867	1.20   9.867	3.36  15.867	2.80   21.87

1.12	3.900	1.20   9.900	3.36  15.900	2.80   21.90
1.12	3.933	1.20   9.933	3.36  15.933	2.80   21.93
1.12	3.967	1.20   9.967	3.36  15.967	2.80   21.97
1.12	4.000	1.20  10.000	3.36  16.000	2.80   22.00
1.12	4.033	1.49  10.033	4.30  16.033	1.68   22.03
1.12	4.067	1.49  10.067	4.30  16.067	1.68   22.07
1.12	4.100	1.49  10.100	4.30  16.100	1.68   22.10
1.12	4.133	1.49  10.133	4.30  16.133	1.68   22.13
1.12	4.167	1.49  10.167	4.30  16.167	1.68   22.17
1.12	4.200	1.49  10.200	4.30  16.200	1.68   22.20
1.12	4.233	1.49  10.233	4.30  16.233	1.68   22.23
1.12	4.267	1.49  10.267	4.30  16.267	1.68   22.27
1.12	4.300	1.49  10.300	4.30  16.300	1.68   22.30
1.12	4.333	1.49  10.333	4.30  16.333	1.68   22.33
1.12	4.367	1.49  10.367	4.30  16.367	1.68   22.37
1.12	4.400	1.49  10.400	4.30  16.400	1.68   22.40
1.12	4.433	1.49  10.433	4.30  16.433	1.68   22.43
1.12	4.467	1.49  10.467	4.30  16.467	1.68   22.47
1.12	4.500	1.49  10.500	4.30  16.500	1.68   22.50
1.12	4.533	1.49  10.533	5.79  16.533	1.68   22.53
1.12	4.567	1.49  10.567	5.79  16.567	1.68   22.57
1.12	4.600	1.49  10.600	5.79  16.600	1.68   22.60
1.12	4.633	1.49  10.633	5.79  16.633	1.68   22.63
1.12	4.667	1.49  10.667	5.79  16.667	1.68   22.67
1.12	4.700	1.49  10.700	5.79  16.700	1.68   22.70
1.12	4.733	1.49  10.733	5.79  16.733	1.68   22.73
1.12	4.767	1.49  10.767	5.79  16.767	1.68   22.77



1.12 4.800 1.49 |10.800 5.79 |16.800 1.68 | 22.80  
1.12 4.833 1.49 |10.833 5.79 |16.833 1.68 | 22.83  
1.12 4.867 1.49 |10.867 5.79 |16.867 1.68 | 22.87  
1.12 4.900 1.49 |10.900 5.79 |16.900 1.68 | 22.90  
1.12 4.933 1.49 |10.933 5.79 |16.933 1.68 | 22.93  
1.12 4.967 1.49 |10.967 5.79 |16.967 1.68 | 22.97  
1.12 5.000 1.49 |11.000 5.79 |17.000 1.68 | 23.00  
1.12 5.033 1.49 |11.033 8.96 |17.033 1.68 | 23.03  
1.12 5.067 1.49 |11.067 8.96 |17.067 1.68 | 23.07  
1.12 5.100 1.49 |11.100 8.96 |17.100 1.68 | 23.10  
1.12 5.133 1.49 |11.133 8.96 |17.133 1.68 | 23.13  
1.12 5.167 1.49 |11.167 8.96 |17.167 1.68 | 23.17  
1.12 5.200 1.49 |11.200 8.96 |17.200 1.68 | 23.20  
1.12 5.233 1.49 |11.233 8.96 |17.233 1.68 | 23.23  
1.12 5.267 1.49 |11.267 8.96 |17.267 1.68 | 23.27  
1.12 5.300 1.49 |11.300 8.96 |17.300 1.68 | 23.30  
1.12 5.333 1.49 |11.333 8.96 |17.333 1.68 | 23.33  
1.12 5.367 1.49 |11.367 8.96 |17.367 1.68 | 23.37  
1.12 5.400 1.49 |11.400 8.96 |17.400 1.68 | 23.40  
1.12 5.433 1.49 |11.433 8.96 |17.433 1.68 | 23.43  
1.12 5.467 1.49 |11.467 8.96 |17.467 1.68 | 23.47  
1.12 5.500 1.49 |11.500 9.00 |17.500 1.68 | 23.50  
1.12 5.533 1.49 |11.533 38.85 |17.533 1.68 | 23.53  
1.12 5.567 1.49 |11.567 38.85 |17.567 1.68 | 23.57  
1.12 5.600 1.49 |11.600 38.85 |17.600 1.68 | 23.60  
1.12 5.633 1.49 |11.633 38.85 |17.633 1.68 | 23.63  
1.12 5.667 1.49 |11.667 38.85 |17.667 1.68 | 23.67

1.12 5.700 1.49 |11.700 38.85 |17.700 1.68 | 23.70  
1.12 5.733 1.49 |11.733 38.85 |17.733 1.68 | 23.73  
1.12 5.767 1.49 |11.767 71.05 |17.767 1.68 | 23.77  
1.12 5.800 1.49 |11.800 103.09 |17.800 1.68 | 23.80  
1.12 5.833 1.49 |11.833 103.09 |17.833 1.68 | 23.83  
1.12 5.867 1.49 |11.867 103.09 |17.867 1.68 | 23.87  
1.12 5.900 1.49 |11.900 103.09 |17.900 1.68 | 23.90  
1.12 5.933 1.49 |11.933 103.09 |17.933 1.68 | 23.93  
1.12 5.967 1.49 |11.967 103.09 |17.967 1.68 | 23.97  
1.12 6.000 1.49 |12.000 102.97 |18.000 1.68 | 24.00

Max.Eff.Inten.(mm/hr)= 103.09 186.54  
over (min) 5.00 8.00  
Storage Coeff. (min)= 1.44 (ii) 6.94 (ii)  
Unit Hyd. Tpeak (min)= 4.00 8.00  
Unit Hyd. peak (cms)= 0.46 0.15

PEAK FLOW (cms)= 0.00 0.04 \*TOTALS\*  
TIME TO PEAK (hrs)= 11.97 12.03 0.045 (iii)  
RUNOFF VOLUME (mm)= 92.38 62.69 12.00  
TOTAL RAINFALL (mm)= 93.38 93.38 64.76  
RUNOFF COEFFICIENT = 0.99 0.67 93.38  
0.69

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
-----  
| CALIB |  
| STANDHYD ( 0204)| Area (ha)= 0.24  
|ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
-----

IMPERVIOUS PERVIOUS (i)  
Surface Area (ha)= 0.18 0.06  
Dep. Storage (mm)= 1.00 5.00  
Average Slope (%)= 1.00 2.00

Length (m) = 40.00 40.00  
 Mannings n = 0.013 0.250  
 Max.Eff.Inten.(mm/hr)= 103.09 189.52  
 over (min) = 5.00 8.00  
 Storage Coeff. (min)= 1.46 (ii) 7.54 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 8.00  
 Unit Hyd. peak (cms)= 0.46 0.15

\*TOTALS\*  
 PEAK FLOW (cms)= 0.03 0.03 0.054 (iii)  
 TIME TO PEAK (hrs)= 11.97 12.03 12.00  
 RUNOFF VOLUME (mm)= 92.38 62.96 74.12  
 TOTAL RAINFALL (mm)= 93.38 93.38 93.38  
 RUNOFF COEFFICIENT = 0.99 0.67 0.79

Storage Coeff. (min)= 2.92 (ii) 10.78 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 12.00  
 Unit Hyd. peak (cms)= 0.34 0.10  
 PEAK FLOW (cms)= 0.18 0.28 0.441 (iii)  
 TIME TO PEAK (hrs)= 12.00 12.07 12.00  
 RUNOFF VOLUME (mm)= 92.38 61.16 69.27  
 TOTAL RAINFALL (mm)= 93.38 93.38 93.38  
 RUNOFF COEFFICIENT = 0.99 0.65 0.74

\*TOTALS\*  
 0.441 (iii)

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 |
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	0.24	0.05	12.00	74.12
MAJOR SYS.(ID= 2):	0.01	0.01	12.00	74.12
MINOR SYS.(ID= 3):	0.23	0.04	11.87	74.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| STANDHYD ( 0203) |
| ID= 1 DT= 2.0 min |
-----

```

	Area (ha)	Total Imp(%)	Dir. Conn.(%)
	2.45	65.00	26.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.59	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	127.80	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	103.09	170.24
over (min)	5.00	12.00

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB
| STANDHYD ( 0202) |
| ID= 1 DT= 2.0 min |
-----

```

	Area (ha)	Total Imp(%)	Dir. Conn.(%)
	0.92	68.00	41.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.63	0.29
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	78.32	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	103.09	141.86
over (min)	5.00	10.00
Storage Coeff. (min)=	2.18 (ii)	8.49 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.39	0.13
PEAK FLOW (cms)=	0.11	0.09
TIME TO PEAK (hrs)=	12.00	12.03
RUNOFF VOLUME (mm)=	92.38	58.04
TOTAL RAINFALL (mm)=	93.38	93.38
RUNOFF COEFFICIENT =	0.99	0.62

\*TOTALS\*  
 0.194 (iii)  
 12.00  
 72.12  
 93.38  
 0.77

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0006) |
-----

```

```

| Inlet Cap.= 0.147|
| #of Inlets= 1|
| Total(cms)= 0.1|
-----
| AREA   QPEAK   TPEAK   R.V.
| (ha)   (cms)   (hrs)   (mm)
TOTAL HYD. (ID= 1):  0.92   0.19   12.00   72.12
=====
MAJOR SYS. (ID= 2):  0.03   0.05   12.00   72.12
MINOR SYS. (ID= 3):  0.89   0.15   11.87   72.12

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 0007)|
| 1 + 2 = 3 |
-----
| AREA   QPEAK   TPEAK   R.V.
| (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0203):  2.45   0.441  12.00   69.27
+ ID2= 2 ( 0006):  0.03   0.047  12.00   72.12
=====
ID = 3 ( 0007):  2.48   0.487  12.00   69.30

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 0007)|
| 3 + 2 = 1 |
-----
| AREA   QPEAK   TPEAK   R.V.
| (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 0007):  2.48   0.487  12.00   69.30
+ ID2= 2 ( 0009):  0.23   0.041  11.87   74.12
=====
ID = 1 ( 0007):  2.71   0.528  12.00   69.72

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| RESERVOIR( 0008)|
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
| OVERFLOW IS OFF
| OUTFLOW STORAGE | OUTFLOW STORAGE
| (cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1750 0.0640
0.0060 0.0325 | 0.2000 0.0740
0.1000 0.0390 | 0.2300 0.0830
0.1250 0.0520 | 0.2750 0.0900
-----
| AREA   QPEAK   TPEAK   R.V.
| (ha)   (cms)   (hrs)   (mm)
INFLOW : ID= 2 ( 0007)  2.709   0.528   12.00   69.72
OUTFLOW: ID= 1 ( 0008)  2.709   0.199   12.27   69.00

```

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 37.66
TIME SHIFT OF PEAK FLOW (min)= 16.00
MAXIMUM STORAGE USED (ha.m.)= 0.0736

```

```

| ADD HYD ( 0003)|
| 1 + 2 = 3 |
-----
| AREA   QPEAK   TPEAK   R.V.
| (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0205):  0.23   0.045  12.00   64.76
+ ID2= 2 ( 0008):  2.71   0.199  12.27   69.00
=====
ID = 3 ( 0003):  2.94   0.221  12.10   68.67

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| CALIB
| STANDHYD ( 0207)|
| ID= 1 DT= 2.0 min |
-----
| Area (ha)= 0.65
| Total Imp(%)= 47.00 Dir. Conn.(%)= 0.10

```

```

| IMPERVIOUS PERVIOUS (i)
| Surface Area (ha)= 0.31 0.34
| Dep. Storage (mm)= 1.00 5.00
| Average Slope (%)= 1.00 2.00
| Length (m)= 65.83 40.00
| Mannings n = 0.013 0.250
-----
| Max.Eff.Inten.(mm/hr)= 103.09 146.15
| over (min) = 5.00 10.00
| Storage Coeff. (min)= 1.96 (ii) 8.03 (ii)
| Unit Hyd. Tpeak (min)= 4.00 10.00
| Unit Hyd. peak (cms)= 0.41 0.13

```

```

| PEAK FLOW (cms)= 0.00 0.11
| TIME TO PEAK (hrs)= 12.00 12.03
| RUNOFF VOLUME (mm)= 92.38 58.56
| TOTAL RAINFALL (mm)= 93.38 93.38
| RUNOFF COEFFICIENT = 0.99 0.63
-----
| *TOTALS*
| PEAK FLOW (cms)= 0.110 (iii)
| TIME TO PEAK (hrs)= 12.03
| RUNOFF VOLUME (mm)= 58.58
| TOTAL RAINFALL (mm)= 93.38
| RUNOFF COEFFICIENT = 0.63

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0206) | Area (ha)= 2.39
| ID= 1 DT= 2.0 min | Total Imp(%)= 64.00 Dir. Conn.(%)= 25.00
-----

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.53 0.86
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 126.23 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 103.09 166.98
over (min) 5.00 10.00
Storage Coeff. (min)= 2.90 (ii) 8.65 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

```

```

*TOTALS*
PEAK FLOW (cms)= 0.17 0.31 0.465 (iii)
TIME TO PEAK (hrs)= 12.00 12.03 12.00
RUNOFF VOLUME (mm)= 92.38 60.83 68.71
TOTAL RAINFALL (mm)= 93.38 93.38 93.38
RUNOFF COEFFICIENT = 0.99 0.65 0.74

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| RESERVOIR( 0010) | OVERFLOW IS OFF
| IN= 2----> OUT= 1 |
| DT= 2.0 min |
-----

```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1400	0.0584
0.0050	0.0278	0.1700	0.0694
0.0700	0.0363	0.1900	0.0737
0.1000	0.0478	0.3000	0.0767

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0206)	2.390	0.465	12.00	68.71
OUTFLOW: ID= 1 ( 0010)	2.390	0.167	12.27	67.96

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 35.82
TIME SHIFT OF PEAK FLOW (min)= 16.00
MAXIMUM STORAGE USED (ha.m.)= 0.0682

```

```

-----
| ADD HYD ( 0001) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 1 ( 0010): 2.39 0.167 12.27 67.96
+ ID2= 2 ( 0207): 0.65 0.110 12.03 58.58
=====
ID = 3 ( 0001): 3.04 0.257 12.10 65.96

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0001) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 3 ( 0001): 3.04 0.257 12.10 65.96
+ ID2= 2 ( 0009): 0.01 0.013 12.00 74.12
=====
ID = 1 ( 0001): 3.05 0.257 12.10 65.98

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0201) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00
-----

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.19 0.51
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 134.16 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 103.09 77.81
over (min) 5.00 8.00
Storage Coeff. (min)= 3.01 (ii) 6.99 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.33 0.15

```

```

*TOTALS*
PEAK FLOW (cms)= 0.59 0.09 0.681 (iii)
TIME TO PEAK (hrs)= 12.00 12.03 12.00
RUNOFF VOLUME (mm)= 92.38 47.74 82.11
TOTAL RAINFALL (mm)= 93.38 93.38 93.38
RUNOFF COEFFICIENT = 0.99 0.51 0.88

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

- CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0004) | Area (ha)= 0.55
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00
-----

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.36	0.19
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	60.55	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	103.09	57.96
over (min)	5.00	8.00
Storage Coeff. (min)=	1.87 (ii)	7.31 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.42	0.15
*TOTALS*		
PEAK FLOW (cms)=	0.10	0.03
TIME TO PEAK (hrs)=	12.00	12.03
RUNOFF VOLUME (mm)=	92.38	42.84
TOTAL RAINFALL (mm)=	93.38	93.38
RUNOFF COEFFICIENT =	0.99	0.46

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
ID1= 1 ( 0201): 2.70 0.681 12.00 82.11
+ ID2= 2 ( 0004): 0.55 0.127 12.00 75.03
=====
ID = 3 ( 0005): 3.25 0.808 12.00 80.91
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
ID1= 3 ( 0005): 3.25 0.808 12.00 80.91
+ ID2= 2 ( 0006): 0.89 0.147 11.87 72.12
=====
ID = 1 ( 0005): 4.14 0.955 12.00 79.02
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0002) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min | OUTFLOW STORAGE | OUTFLOW STORAGE
|-----| (cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.3000 0.1350
0.0130 0.0746 | 0.3750 0.1510
0.1500 0.0900 | 0.4000 0.1610
0.2100 0.1200 | 0.4500 0.1725
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0005) 4.143 0.955 12.00 79.02
OUTFLOW: ID= 1 ( 0002) 4.143 0.372 12.10 77.78
-----
PEAK FLOW REDUCTION [Qout/Qin](%)= 38.97
TIME SHIFT OF PEAK FLOW (min)= 6.00
MAXIMUM STORAGE USED (ha.m.)= 0.1507
-----

```

```

-----
|-----|
|-----|
|-----|
V V I SSSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL
OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y M M O O
O O T T H H Y Y M M O O
OOO T T H H Y 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  
 6.0\VO2\voim.dat  
 Output filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\ddb74331-82d0-4d6c-b655-7aca77ff1910\  
 Summary filename:  
 C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
 0af8143f9a42\ddb74331-82d0-4d6c-b655-7aca77ff1910\  
 COMMENTS: \_\_\_\_\_

DATE: 02/25/2021 TIME: 12:18:00  
 USER:

COMMENTS: \_\_\_\_\_

\*\*\*\*\*  
 \*\* SIMULATION : 5 - 50yr 24hr SCS \*\*  
 \*\*\*\*\*

-----  
 | MASS STORM | Filename: C:\Users\mmacdonald\AppData  
 | | ata\Local\Temp\  
 | | 598fd74c-16a6-4267-a81e-  
 3ca80d03e1b2\0ad1c211  
 | Ptotal=100.95 mm | Comments: SCS 24 HOUR TYPE II STORM DISTRIBUTION  
 1

-----  
 Duration of storm = 24.00 hrs  
 Mass curve time step = 15.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.82	0.25	1.13	6.25	0.00	12.25	14.54	18.25
1.82	0.50	1.09	6.50	0.00	12.50	14.54	18.50
1.82	0.75	1.13	6.75	0.00	12.75	7.47	18.75
1.82	1.00	1.09	7.00	0.00	13.00	7.47	19.00
1.82	1.25	1.13	7.25	4.04	13.25	1.41	19.25
1.82	1.50	1.09	7.50	4.04	13.50	1.41	19.50

1.82	1.75	1.13	7.75	4.04	13.75	8.28	19.75
1.82	2.00	1.09	8.00	4.04	14.00	8.28	20.00
1.21	2.25	1.33	8.25	0.00	14.25	3.03	20.25
1.21	2.50	1.29	8.50	0.00	14.50	3.03	20.50
1.21	2.75	1.33	8.75	5.45	14.75	3.03	20.75
1.21	3.00	1.29	9.00	5.45	15.00	3.03	21.00
1.21	3.25	1.33	9.25	3.23	15.25	3.03	21.25
1.21	3.50	1.29	9.50	3.23	15.50	3.03	21.50
1.21	3.75	1.33	9.75	3.63	15.75	3.03	21.75
1.21	4.00	1.29	10.00	3.63	16.00	3.03	22.00
1.21	4.25	1.62	10.25	4.64	16.25	1.82	22.25
1.21	4.50	1.62	10.50	4.64	16.50	1.82	22.50
1.21	4.75	1.62	10.75	6.26	16.75	1.82	22.75
1.21	5.00	1.62	11.00	6.26	17.00	1.82	23.00
1.21	5.25	1.62	11.25	9.69	17.25	1.82	23.25
1.21	5.50	1.62	11.50	9.69	17.50	1.82	23.50
1.21	5.75	1.62	11.75	42.00	17.75	1.82	23.75
1.21	6.00	1.62	12.00	111.45	18.00	1.82	24.00

-----  
 | CALIB |  
 | STANDHYD ( 0205) | Area (ha)= 0.23  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00  
 -----  
 IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 0.14 0.09  
 Dep. Storage (mm)= 1.00 5.00  
 Average Slope (%)= 1.00 2.00  
 Length (m)= 39.16 40.00  
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.



1.82	1.733	1.13		7.733	4.04		13.733	8.28		19.73	1.21	2.633	1.33		8.633	5.45		14.633	3.03		20.63
1.82	1.767	1.11		7.767	4.04		13.767	8.28		19.77	1.21	2.667	1.33		8.667	5.45		14.667	3.03		20.67
1.82	1.800	1.09		7.800	4.04		13.800	8.28		19.80	1.21	2.700	1.33		8.700	5.45		14.700	3.03		20.70
1.82	1.833	1.09		7.833	4.04		13.833	8.28		19.83	1.21	2.733	1.33		8.733	5.45		14.733	3.03		20.73
1.82	1.867	1.09		7.867	4.04		13.867	8.28		19.87	1.21	2.767	1.31		8.767	5.45		14.767	3.03		20.77
1.82	1.900	1.09		7.900	4.04		13.900	8.28		19.90	1.21	2.800	1.29		8.800	5.45		14.800	3.03		20.80
1.82	1.933	1.09		7.933	4.04		13.933	8.28		19.93	1.21	2.833	1.29		8.833	5.45		14.833	3.03		20.83
1.82	1.967	1.09		7.967	4.04		13.967	8.28		19.97	1.21	2.867	1.29		8.867	5.45		14.867	3.03		20.87
1.82	2.000	1.09		8.000	4.04		14.000	8.27		20.00	1.21	2.900	1.29		8.900	5.45		14.900	3.03		20.90
1.21	2.033	1.33		8.033	0.00		14.033	3.03		20.03	1.21	2.933	1.29		8.933	5.45		14.933	3.03		20.93
1.21	2.067	1.33		8.067	0.00		14.067	3.03		20.07	1.21	2.967	1.29		8.967	5.45		14.967	3.03		20.97
1.21	2.100	1.33		8.100	0.00		14.100	3.03		20.10	1.21	3.000	1.29		9.000	5.45		15.000	3.03		21.00
1.21	2.133	1.33		8.133	0.00		14.133	3.03		20.13	1.21	3.033	1.33		9.033	3.23		15.033	3.03		21.03
1.21	2.167	1.33		8.167	0.00		14.167	3.03		20.17	1.21	3.067	1.33		9.067	3.23		15.067	3.03		21.07
1.21	2.200	1.33		8.200	0.00		14.200	3.03		20.20	1.21	3.100	1.33		9.100	3.23		15.100	3.03		21.10
1.21	2.233	1.33		8.233	0.00		14.233	3.03		20.23	1.21	3.133	1.33		9.133	3.23		15.133	3.03		21.13
1.21	2.267	1.31		8.267	0.00		14.267	3.03		20.27	1.21	3.167	1.33		9.167	3.23		15.167	3.03		21.17
1.21	2.300	1.29		8.300	0.00		14.300	3.03		20.30	1.21	3.200	1.33		9.200	3.23		15.200	3.03		21.20
1.21	2.333	1.29		8.333	0.00		14.333	3.03		20.33	1.21	3.233	1.33		9.233	3.23		15.233	3.03		21.23
1.21	2.367	1.29		8.367	0.00		14.367	3.03		20.37	1.21	3.267	1.31		9.267	3.23		15.267	3.03		21.27
1.21	2.400	1.29		8.400	0.00		14.400	3.03		20.40	1.21	3.300	1.29		9.300	3.23		15.300	3.03		21.30
1.21	2.433	1.29		8.433	0.00		14.433	3.03		20.43	1.21	3.333	1.29		9.333	3.23		15.333	3.03		21.33
1.21	2.467	1.29		8.467	0.00		14.467	3.03		20.47	1.21	3.367	1.29		9.367	3.23		15.367	3.03		21.37
1.21	2.500	1.29		8.500	0.00		14.500	3.03		20.50	1.21	3.400	1.29		9.400	3.23		15.400	3.03		21.40
1.21	2.533	1.33		8.533	5.45		14.533	3.03		20.53	1.21	3.433	1.29		9.433	3.23		15.433	3.03		21.43
1.21	2.567	1.33		8.567	5.45		14.567	3.03		20.57	1.21	3.467	1.29		9.467	3.23		15.467	3.03		21.47
1.21	2.600	1.33		8.600	5.45		14.600	3.03		20.60	1.21	3.500	1.29		9.500	3.23		15.500	3.03		21.50



1.21	3.533	1.33   9.533	3.63  15.533	3.03   21.53
1.21	3.567	1.33   9.567	3.63  15.567	3.03   21.57
1.21	3.600	1.33   9.600	3.63  15.600	3.03   21.60
1.21	3.633	1.33   9.633	3.63  15.633	3.03   21.63
1.21	3.667	1.33   9.667	3.63  15.667	3.03   21.67
1.21	3.700	1.33   9.700	3.63  15.700	3.03   21.70
1.21	3.733	1.33   9.733	3.63  15.733	3.03   21.73
1.21	3.767	1.31   9.767	3.63  15.767	3.03   21.77
1.21	3.800	1.29   9.800	3.63  15.800	3.03   21.80
1.21	3.833	1.29   9.833	3.63  15.833	3.03   21.83
1.21	3.867	1.29   9.867	3.63  15.867	3.03   21.87
1.21	3.900	1.29   9.900	3.63  15.900	3.03   21.90
1.21	3.933	1.29   9.933	3.63  15.933	3.03   21.93
1.21	3.967	1.29   9.967	3.63  15.967	3.03   21.97
1.21	4.000	1.29  10.000	3.63  16.000	3.02   22.00
1.21	4.033	1.62  10.033	4.64  16.033	1.82   22.03
1.21	4.067	1.62  10.067	4.64  16.067	1.82   22.07
1.21	4.100	1.62  10.100	4.64  16.100	1.82   22.10
1.21	4.133	1.62  10.133	4.64  16.133	1.82   22.13
1.21	4.167	1.62  10.167	4.64  16.167	1.82   22.17
1.21	4.200	1.62  10.200	4.64  16.200	1.82   22.20
1.21	4.233	1.62  10.233	4.64  16.233	1.82   22.23
1.21	4.267	1.62  10.267	4.64  16.267	1.82   22.27
1.21	4.300	1.62  10.300	4.64  16.300	1.82   22.30
1.21	4.333	1.62  10.333	4.64  16.333	1.82   22.33
1.21	4.367	1.62  10.367	4.64  16.367	1.82   22.37
1.21	4.400	1.62  10.400	4.64  16.400	1.82   22.40

1.21	4.433	1.62  10.433	4.64  16.433	1.82   22.43
1.21	4.467	1.62  10.467	4.64  16.467	1.82   22.47
1.21	4.500	1.62  10.500	4.65  16.500	1.82   22.50
1.21	4.533	1.62  10.533	6.26  16.533	1.82   22.53
1.21	4.567	1.62  10.567	6.26  16.567	1.82   22.57
1.21	4.600	1.62  10.600	6.26  16.600	1.82   22.60
1.21	4.633	1.62  10.633	6.26  16.633	1.82   22.63
1.21	4.667	1.62  10.667	6.26  16.667	1.82   22.67
1.21	4.700	1.62  10.700	6.26  16.700	1.82   22.70
1.21	4.733	1.62  10.733	6.26  16.733	1.82   22.73
1.21	4.767	1.62  10.767	6.26  16.767	1.82   22.77
1.21	4.800	1.62  10.800	6.26  16.800	1.82   22.80
1.21	4.833	1.62  10.833	6.26  16.833	1.82   22.83
1.21	4.867	1.62  10.867	6.26  16.867	1.82   22.87
1.21	4.900	1.62  10.900	6.26  16.900	1.82   22.90
1.21	4.933	1.62  10.933	6.26  16.933	1.82   22.93
1.21	4.967	1.62  10.967	6.26  16.967	1.82   22.97
1.21	5.000	1.62  11.000	6.26  17.000	1.82   23.00
1.21	5.033	1.62  11.033	9.69  17.033	1.82   23.03
1.21	5.067	1.62  11.067	9.69  17.067	1.82   23.07
1.21	5.100	1.62  11.100	9.69  17.100	1.82   23.10
1.21	5.133	1.62  11.133	9.69  17.133	1.82   23.13
1.21	5.167	1.62  11.167	9.69  17.167	1.82   23.17
1.21	5.200	1.62  11.200	9.69  17.200	1.82   23.20
1.21	5.233	1.62  11.233	9.69  17.233	1.82   23.23
1.21	5.267	1.62  11.267	9.69  17.267	1.82   23.27
1.21	5.300	1.62  11.300	9.69  17.300	1.82   23.30

1.21	5.333	1.62	11.333	9.69	17.333	1.82	23.33
1.21	5.367	1.62	11.367	9.69	17.367	1.82	23.37
1.21	5.400	1.62	11.400	9.69	17.400	1.82	23.40
1.21	5.433	1.62	11.433	9.69	17.433	1.82	23.43
1.21	5.467	1.62	11.467	9.69	17.467	1.82	23.47
1.21	5.500	1.62	11.500	9.73	17.500	1.82	23.50
1.21	5.533	1.62	11.533	42.00	17.533	1.82	23.53
1.21	5.567	1.62	11.567	42.00	17.567	1.82	23.57
1.21	5.600	1.62	11.600	42.00	17.600	1.82	23.60
1.21	5.633	1.62	11.633	42.00	17.633	1.82	23.63
1.21	5.667	1.62	11.667	42.00	17.667	1.82	23.67
1.21	5.700	1.62	11.700	42.00	17.700	1.82	23.70
1.21	5.733	1.62	11.733	42.00	17.733	1.82	23.73
1.21	5.767	1.62	11.767	76.81	17.767	1.82	23.77
1.21	5.800	1.62	11.800	111.45	17.800	1.82	23.80
1.21	5.833	1.62	11.833	111.45	17.833	1.82	23.83
1.21	5.867	1.62	11.867	111.45	17.867	1.82	23.87
1.21	5.900	1.62	11.900	111.45	17.900	1.82	23.90
1.21	5.933	1.62	11.933	111.45	17.933	1.82	23.93
1.21	5.967	1.62	11.967	111.45	17.967	1.82	23.97
1.21	6.000	1.62	12.000	111.31	18.000	1.82	24.00

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
-----
| CALIB |
| STANDHYD ( 0204) | Area (ha)= 0.24
| ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00
-----

```

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.18	0.06	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	40.00	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten. (mm/hr)=	111.45	209.32	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.41 (ii)	7.31 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.47	0.15	
			*TOTALS*
PEAK FLOW (cms)=	0.03	0.03	0.059 (iii)
TIME TO PEAK (hrs)=	11.97	12.03	12.00
RUNOFF VOLUME (mm)=	99.95	69.84	81.27
TOTAL RAINFALL (mm)=	100.95	100.95	100.95
RUNOFF COEFFICIENT =	0.99	0.69	0.81

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Max.Eff.Inten. (mm/hr)=	111.45	206.10	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.39 (ii)	6.68 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.47	0.16	
			*TOTALS*
PEAK FLOW (cms)=	0.00	0.05	0.051 (iii)
TIME TO PEAK (hrs)=	11.97	12.03	12.00
RUNOFF VOLUME (mm)=	99.95	69.57	71.68
TOTAL RAINFALL (mm)=	100.95	100.95	100.95
RUNOFF COEFFICIENT =	0.99	0.69	0.71

```

-----
-----
| DUHYD ( 0009) |
| Inlet Cap.= 0.041 |
| #of Inlets= 1 |
| Total(cms)= 0.0 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
TOTAL HYD. (ID= 1): 0.24 0.06 12.00 81.27

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=====
MAJOR SYS.(ID= 2):  0.01    0.02   12.00  81.27
MINOR SYS.(ID= 3):  0.23    0.04   11.83  81.27

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

over (min)          5.00    10.00
Storage Coeff. (min)= 2.11 (ii)  8.23 (ii)
Unit Hyd. Tpeak (min)= 4.00    10.00
Unit Hyd. peak (cms)= 0.40    0.13

PEAK FLOW (cms)= 0.12    0.10    0.213 (iii)
TIME TO PEAK (hrs)= 12.00  12.03    12.00
RUNOFF VOLUME (mm)= 99.95   64.68    79.14
TOTAL RAINFALL (mm)= 100.95  100.95   100.95
RUNOFF COEFFICIENT = 0.99    0.64    0.78

```

\*TOTALS\*

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-----
| CALIB |
| STANDHYD ( 0203) | Area (ha)= 2.45
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00
-----

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IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.59 0.86
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 127.80 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 111.45 188.39
over (min) 5.00 12.00
Storage Coeff. (min)= 2.83 (ii) 10.45 (ii)
Unit Hyd. Tpeak (min)= 4.00 12.00
Unit Hyd. peak (cms)= 0.34 0.10

PEAK FLOW (cms)= 0.20 0.32 0.488 (iii)
TIME TO PEAK (hrs)= 12.00 12.07 12.00
RUNOFF VOLUME (mm)= 99.95 67.95 76.27
TOTAL RAINFALL (mm)= 100.95 100.95 100.95
RUNOFF COEFFICIENT = 0.99 0.67 0.76

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
TOTAL HYD.(ID= 1): 0.92 0.21 12.00 79.14
=====
MAJOR SYS.(ID= 2): 0.04 0.07 12.00 79.14
MINOR SYS.(ID= 3): 0.88 0.15 11.87 79.14

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 1 ( 0203): 2.45 0.488 12.00 76.27
+ ID2= 2 ( 0006): 0.04 0.066 12.00 79.14
=====
ID = 3 ( 0007): 2.49 0.555 12.00 76.32

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0202) | Area (ha)= 0.92
| ID= 1 DT= 2.0 min | Total Imp(%)= 68.00 Dir. Conn.(%)= 41.00
-----

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.63 0.29
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 78.32 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 111.45 157.49

```

```

-----
| ADD HYD ( 0007) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 3 ( 0007): 2.49 0.555 12.00 76.32

```

```

+ ID2= 2 ( 0009):    0.23  0.041  11.83  81.27
=====
ID = 1 ( 0007):    2.72  0.596  12.00  76.73

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR ( 0008) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
| OUTFLOW STORAGE | OUTFLOW STORAGE
| (cms) (ha.m.) | (cms) (ha.m.)
| 0.0000 0.0000 | 0.1750 0.0640
| 0.0060 0.0325 | 0.2000 0.0740
| 0.1000 0.0390 | 0.2300 0.0830
| 0.1250 0.0520 | 0.2750 0.0900
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0007) 2.719 0.596 12.00 76.73
OUTFLOW: ID= 1 ( 0008) 2.719 0.222 12.27 76.02

```

```

PEAK FLOW REDUCTION [Qout/Qin] (%) = 37.23
TIME SHIFT OF PEAK FLOW (min) = 16.00
MAXIMUM STORAGE USED (ha.m.) = 0.0805

```

```

-----
| ADD HYD ( 0003) |
| 1 + 2 = 3 |
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 1 ( 0205):    0.23  0.051  12.00  71.68
+ ID2= 2 ( 0008):    2.72  0.222  12.27  76.02
=====
ID = 3 ( 0003):    2.95  0.242  12.10  75.68

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0207) | Area (ha) = 0.65
| ID= 1 DT= 2.0 min | Total Imp(%) = 47.00 Dir. Conn.(%) = 0.10
-----

```

```

| IMPERVIOUS PERVIOUS (i)
| Surface Area (ha) = 0.31 0.34
| Dep. Storage (mm) = 1.00 5.00
| Average Slope (%) = 1.00 2.00
| Length (m) = 65.83 40.00
| Mannings n = 0.013 0.250
| Max.Eff.Inten.(mm/hr) = 111.45 162.17

```

```

over (min) 5.00 8.00
Storage Coeff. (min) = 1.90 (ii) 7.72 (ii)
Unit Hyd. Tpeak (min) = 4.00 8.00
Unit Hyd. peak (cms) = 0.42 0.14

```

```

*TOTALS*
PEAK FLOW (cms) = 0.00 0.13 0.127 (iii)
TIME TO PEAK (hrs) = 12.00 12.03 12.03
RUNOFF VOLUME (mm) = 99.95 65.22 65.25
TOTAL RAINFALL (mm) = 100.95 100.95 100.95
RUNOFF COEFFICIENT = 0.99 0.65 0.65

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0206) | Area (ha) = 2.39
| ID= 1 DT= 2.0 min | Total Imp(%) = 64.00 Dir. Conn.(%) = 25.00
-----

```

```

| IMPERVIOUS PERVIOUS (i)
| Surface Area (ha) = 1.53 0.86
| Dep. Storage (mm) = 1.00 5.00
| Average Slope (%) = 1.00 2.00
| Length (m) = 126.23 40.00
| Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr) = 111.45 184.84
over (min) = 5.00 12.00
Storage Coeff. (min) = 2.81 (ii) 10.63 (ii)
Unit Hyd. Tpeak (min) = 4.00 12.00
Unit Hyd. peak (cms) = 0.34 0.10

```

```

*TOTALS*
PEAK FLOW (cms) = 0.18 0.31 0.469 (iii)
TIME TO PEAK (hrs) = 12.00 12.07 12.00
RUNOFF VOLUME (mm) = 99.95 67.61 75.69
TOTAL RAINFALL (mm) = 100.95 100.95 100.95
RUNOFF COEFFICIENT = 0.99 0.67 0.75

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| RESERVOIR( 0010)|
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
OVERFLOW IS OFF
-----
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1400 0.0584
0.0050 0.0278 | 0.1700 0.0694
0.0700 0.0363 | 0.1900 0.0737
0.1000 0.0478 | 0.3000 0.0767
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0206) 2.390 0.469 12.00 75.69
OUTFLOW: ID= 1 ( 0010) 2.390 0.182 12.30 74.94
-----
PEAK FLOW REDUCTION [Qout/Qin] (%) = 38.78
TIME SHIFT OF PEAK FLOW (min) = 18.00
MAXIMUM STORAGE USED (ha.m.) = 0.0720

```

```

-----
| ADD HYD ( 0001)|
| 1 + 2 = 3 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0010): 2.39 0.182 12.30 74.94
+ ID2= 2 ( 0207): 0.65 0.127 12.03 65.25
=====
ID = 3 ( 0001): 3.04 0.273 12.07 72.87

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0001)|
| 3 + 2 = 1 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 0001): 3.04 0.273 12.07 72.87
+ ID2= 2 ( 0009): 0.01 0.018 12.00 81.27
=====
ID = 1 ( 0001): 3.05 0.281 12.03 72.90

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0201)|
|ID= 1 DT= 2.0 min |
-----
Area (ha)= 2.70
Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00

```

```

-----
Surface Area (ha)= 2.19 IMPERVIOUS 0.51 PERVIOUS (i)
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 134.16 40.00
Mannings n = 0.013 0.250
-----
Max.Eff.Inten.(mm/hr)= 111.45 87.39
over (min) 5.00 8.00
Storage Coeff. (min)= 2.92 (ii) 6.78 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.34 0.16
-----
*TOTALS*
PEAK FLOW (cms)= 0.64 0.10 0.742 (iii)
TIME TO PEAK (hrs)= 12.00 12.03 12.00
RUNOFF VOLUME (mm)= 99.95 53.74 89.32
TOTAL RAINFALL (mm)= 100.95 100.95 100.95
RUNOFF COEFFICIENT = 0.99 0.53 0.88

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0004)|
|ID= 1 DT= 2.0 min |
-----
Area (ha)= 0.55
Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00

```

```

-----
Surface Area (ha)= 0.36 IMPERVIOUS 0.19 PERVIOUS (i)
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 60.55 40.00
Mannings n = 0.013 0.250
-----
Max.Eff.Inten.(mm/hr)= 111.45 65.47
over (min) 5.00 8.00
Storage Coeff. (min)= 1.81 (ii) 7.09 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.43 0.15
-----
*TOTALS*
PEAK FLOW (cms)= 0.11 0.03 0.139 (iii)
TIME TO PEAK (hrs)= 12.00 12.03 12.00
RUNOFF VOLUME (mm)= 99.95 48.48 81.93
TOTAL RAINFALL (mm)= 100.95 100.95 100.95
RUNOFF COEFFICIENT = 0.99 0.48 0.81

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0005)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
-----
ID1= 1 ( 0201):   2.70  0.742  12.00  89.32
+ ID2= 2 ( 0004):   0.55  0.139  12.00  81.93
=====
ID = 3 ( 0005):   3.25  0.881  12.00  88.07

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0005)|
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
-----
ID1= 3 ( 0005):   3.25  0.881  12.00  88.07
+ ID2= 2 ( 0006):   0.88  0.147  11.87  79.14
=====
ID = 1 ( 0005):   4.13  1.028  12.00  86.17

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0002)| OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
          OUTFLOW   STORAGE | OUTFLOW   STORAGE
          (cms)     (ha.m.) | (cms)     (ha.m.)
-----
          0.0000   0.0000 | 0.3000   0.1350
          0.0130   0.0746 | 0.3750   0.1510
          0.1500   0.0900 | 0.4000   0.1610
          0.2100   0.1200 | 0.4500   0.1725

```

```

          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
-----
INFLOW : ID= 2 ( 0005)   4.129   1.028   12.00   86.17
OUTFLOW: ID= 1 ( 0002)   4.129   0.398   12.13   84.91

```

PEAK FLOW REDUCTION [Qout/Qin] (%) = 38.69  
TIME SHIFT OF PEAK FLOW (min) = 8.00  
MAXIMUM STORAGE USED (ha.m.) = 0.1603

FINISH

```

V V I SSSSS U U A L (v 6.0.2001)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLL

OOO TTTT TTTT 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  
6.0\VO2\voin.dat  
Output filename:  
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
0af8143f9a42\dbca97a0-e6a6-4993-b023-2025ec99f322\s  
Summary filename:  
C:\Users\mmacdonald\AppData\Local\Civica\XH5\23646c50-1505-4d70-89df-  
0af8143f9a42\dbca97a0-e6a6-4993-b023-2025ec99f322\s

DATE: 02/25/2021 TIME: 12:18:00

USER:

COMMENTS:

```

*****
** SIMULATION : 6 - 100yr 24hr SCS **
*****

```

| MASS STORM | Filename: C:\Users\mmacdonald\AppData\Local\Temp\598fd74c-16a6-4267-a81e-3ca80d03e1b2\916a0673  
 | | |  
 | | | Ptotal=109.98 mm |  
 | 1 | Comments: SCS 24 HOUR TYPE II STORM DISTRIBUTION  
 -----

Duration of storm = 24.00 hrs  
 Mass curve time step = 15.00 min

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.98	0.25	1.23	6.25	0.00	12.25	15.84	18.25
1.98	0.50	1.19	6.50	0.00	12.50	15.84	18.50
1.98	0.75	1.23	6.75	0.00	12.75	8.14	18.75
1.98	1.00	1.19	7.00	0.00	13.00	8.14	19.00
1.98	1.25	1.23	7.25	4.40	13.25	1.54	19.25
1.98	1.50	1.19	7.50	4.40	13.50	1.54	19.50
1.98	1.75	1.23	7.75	4.40	13.75	9.02	19.75
1.98	2.00	1.19	8.00	4.40	14.00	9.02	20.00
1.32	2.25	1.45	8.25	0.00	14.25	3.30	20.25
1.32	2.50	1.41	8.50	0.00	14.50	3.30	20.50
1.32	2.75	1.45	8.75	5.94	14.75	3.30	20.75
1.32	3.00	1.41	9.00	5.94	15.00	3.30	21.00
1.32	3.25	1.45	9.25	3.52	15.25	3.30	21.25
1.32	3.50	1.41	9.50	3.52	15.50	3.30	21.50
1.32	3.75	1.45	9.75	3.96	15.75	3.30	21.75
1.32	4.00	1.41	10.00	3.96	16.00	3.30	22.00
1.32	4.25	1.76	10.25	5.06	16.25	1.98	22.25
1.32	4.50	1.76	10.50	5.06	16.50	1.98	22.50
1.32	4.75	1.76	10.75	6.82	16.75	1.98	22.75
1.32	5.00	1.76	11.00	6.82	17.00	1.98	23.00
1.32							

1.32	5.25	1.76	11.25	10.56	17.25	1.98	23.25
1.32	5.50	1.76	11.50	10.56	17.50	1.98	23.50
1.32	5.75	1.76	11.75	45.75	17.75	1.98	23.75
1.32	6.00	1.76	12.00	121.42	18.00	1.98	24.00

-----  
 | CALIB |  
 | STANDHYD ( 0205) | Area (ha)= 0.23  
 | ID= 1 DT= 2.0 min | Total Imp(%)= 59.00 Dir. Conn.(%)= 7.00  
 -----

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)= 0.14	0.09
Dep. Storage	(mm)= 1.00	5.00
Average Slope	(%)= 1.00	2.00
Length	(m)= 39.16	40.00
Mannings n	= 0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME
mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs
1.98	0.033	1.23	6.033	0.00	12.033	15.84	18.03
1.98	0.067	1.23	6.067	0.00	12.067	15.84	18.07
1.98	0.100	1.23	6.100	0.00	12.100	15.84	18.10
1.98	0.133	1.23	6.133	0.00	12.133	15.84	18.13
1.98	0.167	1.23	6.167	0.00	12.167	15.84	18.17
1.98	0.200	1.23	6.200	0.00	12.200	15.84	18.20
1.98	0.233	1.23	6.233	0.00	12.233	15.84	18.23
1.98	0.267	1.21	6.267	0.00	12.267	15.84	18.27
1.98	0.300	1.19	6.300	0.00	12.300	15.84	18.30
1.98	0.333	1.19	6.333	0.00	12.333	15.84	18.33
1.98	0.367	1.19	6.367	0.00	12.367	15.84	18.37

1.98	0.400	1.19   6.400	0.00  12.400	15.84   18.40	1.98	1.300	1.19   7.300	4.40  13.300	1.54   19.30
1.98	0.433	1.19   6.433	0.00  12.433	15.84   18.43	1.98	1.333	1.19   7.333	4.40  13.333	1.54   19.33
1.98	0.467	1.19   6.467	0.00  12.467	15.84   18.47	1.98	1.367	1.19   7.367	4.40  13.367	1.54   19.37
1.98	0.500	1.19   6.500	0.00  12.500	15.83   18.50	1.98	1.400	1.19   7.400	4.40  13.400	1.54   19.40
1.98	0.533	1.23   6.533	0.00  12.533	8.14   18.53	1.98	1.433	1.19   7.433	4.40  13.433	1.54   19.43
1.98	0.567	1.23   6.567	0.00  12.567	8.14   18.57	1.98	1.467	1.19   7.467	4.40  13.467	1.54   19.47
1.98	0.600	1.23   6.600	0.00  12.600	8.14   18.60	1.98	1.500	1.19   7.500	4.40  13.500	1.55   19.50
1.98	0.633	1.23   6.633	0.00  12.633	8.14   18.63	1.98	1.533	1.23   7.533	4.40  13.533	9.02   19.53
1.98	0.667	1.23   6.667	0.00  12.667	8.14   18.67	1.98	1.567	1.23   7.567	4.40  13.567	9.02   19.57
1.98	0.700	1.23   6.700	0.00  12.700	8.14   18.70	1.98	1.600	1.23   7.600	4.40  13.600	9.02   19.60
1.98	0.733	1.23   6.733	0.00  12.733	8.14   18.73	1.98	1.633	1.23   7.633	4.40  13.633	9.02   19.63
1.98	0.767	1.21   6.767	0.00  12.767	8.14   18.77	1.98	1.667	1.23   7.667	4.40  13.667	9.02   19.67
1.98	0.800	1.19   6.800	0.00  12.800	8.14   18.80	1.98	1.700	1.23   7.700	4.40  13.700	9.02   19.70
1.98	0.833	1.19   6.833	0.00  12.833	8.14   18.83	1.98	1.733	1.23   7.733	4.40  13.733	9.02   19.73
1.98	0.867	1.19   6.867	0.00  12.867	8.14   18.87	1.98	1.767	1.21   7.767	4.40  13.767	9.02   19.77
1.98	0.900	1.19   6.900	0.00  12.900	8.14   18.90	1.98	1.800	1.19   7.800	4.40  13.800	9.02   19.80
1.98	0.933	1.19   6.933	0.00  12.933	8.14   18.93	1.98	1.833	1.19   7.833	4.40  13.833	9.02   19.83
1.98	0.967	1.19   6.967	0.00  12.967	8.14   18.97	1.98	1.867	1.19   7.867	4.40  13.867	9.02   19.87
1.98	1.000	1.19   7.000	0.00  13.000	8.13   19.00	1.98	1.900	1.19   7.900	4.40  13.900	9.02   19.90
1.98	1.033	1.23   7.033	4.40  13.033	1.54   19.03	1.98	1.933	1.19   7.933	4.40  13.933	9.02   19.93
1.98	1.067	1.23   7.067	4.40  13.067	1.54   19.07	1.98	1.967	1.19   7.967	4.40  13.967	9.02   19.97
1.98	1.100	1.23   7.100	4.40  13.100	1.54   19.10	1.98	2.000	1.19   8.000	4.40  14.000	9.01   20.00
1.98	1.133	1.23   7.133	4.40  13.133	1.54   19.13	1.32	2.033	1.45   8.033	0.00  14.033	3.30   20.03
1.98	1.167	1.23   7.167	4.40  13.167	1.54   19.17	1.32	2.067	1.45   8.067	0.00  14.067	3.30   20.07
1.98	1.200	1.23   7.200	4.40  13.200	1.54   19.20	1.32	2.100	1.45   8.100	0.00  14.100	3.30   20.10
1.98	1.233	1.23   7.233	4.40  13.233	1.54   19.23	1.32	2.133	1.45   8.133	0.00  14.133	3.30   20.13
1.98	1.267	1.21   7.267	4.40  13.267	1.54   19.27	1.32	2.167	1.45   8.167	0.00  14.167	3.30   20.17



1.32 2.200 1.45 | 8.200 0.00 |14.200 3.30 | 20.20  
1.32 2.233 1.45 | 8.233 0.00 |14.233 3.30 | 20.23  
1.32 2.267 1.43 | 8.267 0.00 |14.267 3.30 | 20.27  
1.32 2.300 1.41 | 8.300 0.00 |14.300 3.30 | 20.30  
1.32 2.333 1.41 | 8.333 0.00 |14.333 3.30 | 20.33  
1.32 2.367 1.41 | 8.367 0.00 |14.367 3.30 | 20.37  
1.32 2.400 1.41 | 8.400 0.00 |14.400 3.30 | 20.40  
1.32 2.433 1.41 | 8.433 0.00 |14.433 3.30 | 20.43  
1.32 2.467 1.41 | 8.467 0.00 |14.467 3.30 | 20.47  
1.32 2.500 1.41 | 8.500 0.00 |14.500 3.30 | 20.50  
1.32 2.533 1.45 | 8.533 5.94 |14.533 3.30 | 20.53  
1.32 2.567 1.45 | 8.567 5.94 |14.567 3.30 | 20.57  
1.32 2.600 1.45 | 8.600 5.94 |14.600 3.30 | 20.60  
1.32 2.633 1.45 | 8.633 5.94 |14.633 3.30 | 20.63  
1.32 2.667 1.45 | 8.667 5.94 |14.667 3.30 | 20.67  
1.32 2.700 1.45 | 8.700 5.94 |14.700 3.30 | 20.70  
1.32 2.733 1.45 | 8.733 5.94 |14.733 3.30 | 20.73  
1.32 2.767 1.43 | 8.767 5.94 |14.767 3.30 | 20.77  
1.32 2.800 1.41 | 8.800 5.94 |14.800 3.30 | 20.80  
1.32 2.833 1.41 | 8.833 5.94 |14.833 3.30 | 20.83  
1.32 2.867 1.41 | 8.867 5.94 |14.867 3.30 | 20.87  
1.32 2.900 1.41 | 8.900 5.94 |14.900 3.30 | 20.90  
1.32 2.933 1.41 | 8.933 5.94 |14.933 3.30 | 20.93  
1.32 2.967 1.41 | 8.967 5.94 |14.967 3.30 | 20.97  
1.32 3.000 1.41 | 9.000 5.94 |15.000 3.30 | 21.00  
1.32 3.033 1.45 | 9.033 3.52 |15.033 3.30 | 21.03  
1.32 3.067 1.45 | 9.067 3.52 |15.067 3.30 | 21.07

1.32 3.100 1.45 | 9.100 3.52 |15.100 3.30 | 21.10  
1.32 3.133 1.45 | 9.133 3.52 |15.133 3.30 | 21.13  
1.32 3.167 1.45 | 9.167 3.52 |15.167 3.30 | 21.17  
1.32 3.200 1.45 | 9.200 3.52 |15.200 3.30 | 21.20  
1.32 3.233 1.45 | 9.233 3.52 |15.233 3.30 | 21.23  
1.32 3.267 1.43 | 9.267 3.52 |15.267 3.30 | 21.27  
1.32 3.300 1.41 | 9.300 3.52 |15.300 3.30 | 21.30  
1.32 3.333 1.41 | 9.333 3.52 |15.333 3.30 | 21.33  
1.32 3.367 1.41 | 9.367 3.52 |15.367 3.30 | 21.37  
1.32 3.400 1.41 | 9.400 3.52 |15.400 3.30 | 21.40  
1.32 3.433 1.41 | 9.433 3.52 |15.433 3.30 | 21.43  
1.32 3.467 1.41 | 9.467 3.52 |15.467 3.30 | 21.47  
1.32 3.500 1.41 | 9.500 3.52 |15.500 3.30 | 21.50  
1.32 3.533 1.45 | 9.533 3.96 |15.533 3.30 | 21.53  
1.32 3.567 1.45 | 9.567 3.96 |15.567 3.30 | 21.57  
1.32 3.600 1.45 | 9.600 3.96 |15.600 3.30 | 21.60  
1.32 3.633 1.45 | 9.633 3.96 |15.633 3.30 | 21.63  
1.32 3.667 1.45 | 9.667 3.96 |15.667 3.30 | 21.67  
1.32 3.700 1.45 | 9.700 3.96 |15.700 3.30 | 21.70  
1.32 3.733 1.45 | 9.733 3.96 |15.733 3.30 | 21.73  
1.32 3.767 1.43 | 9.767 3.96 |15.767 3.30 | 21.77  
1.32 3.800 1.41 | 9.800 3.96 |15.800 3.30 | 21.80  
1.32 3.833 1.41 | 9.833 3.96 |15.833 3.30 | 21.83  
1.32 3.867 1.41 | 9.867 3.96 |15.867 3.30 | 21.87  
1.32 3.900 1.41 | 9.900 3.96 |15.900 3.30 | 21.90  
1.32 3.933 1.41 | 9.933 3.96 |15.933 3.30 | 21.93  
1.32 3.967 1.41 | 9.967 3.96 |15.967 3.30 | 21.97

1.32	4.000	1.41	10.000	3.96	16.000	3.30	22.00
1.32	4.033	1.76	10.033	5.06	16.033	1.98	22.03
1.32	4.067	1.76	10.067	5.06	16.067	1.98	22.07
1.32	4.100	1.76	10.100	5.06	16.100	1.98	22.10
1.32	4.133	1.76	10.133	5.06	16.133	1.98	22.13
1.32	4.167	1.76	10.167	5.06	16.167	1.98	22.17
1.32	4.200	1.76	10.200	5.06	16.200	1.98	22.20
1.32	4.233	1.76	10.233	5.06	16.233	1.98	22.23
1.32	4.267	1.76	10.267	5.06	16.267	1.98	22.27
1.32	4.300	1.76	10.300	5.06	16.300	1.98	22.30
1.32	4.333	1.76	10.333	5.06	16.333	1.98	22.33
1.32	4.367	1.76	10.367	5.06	16.367	1.98	22.37
1.32	4.400	1.76	10.400	5.06	16.400	1.98	22.40
1.32	4.433	1.76	10.433	5.06	16.433	1.98	22.43
1.32	4.467	1.76	10.467	5.06	16.467	1.98	22.47
1.32	4.500	1.76	10.500	5.06	16.500	1.98	22.50
1.32	4.533	1.76	10.533	6.82	16.533	1.98	22.53
1.32	4.567	1.76	10.567	6.82	16.567	1.98	22.57
1.32	4.600	1.76	10.600	6.82	16.600	1.98	22.60
1.32	4.633	1.76	10.633	6.82	16.633	1.98	22.63
1.32	4.667	1.76	10.667	6.82	16.667	1.98	22.67
1.32	4.700	1.76	10.700	6.82	16.700	1.98	22.70
1.32	4.733	1.76	10.733	6.82	16.733	1.98	22.73
1.32	4.767	1.76	10.767	6.82	16.767	1.98	22.77
1.32	4.800	1.76	10.800	6.82	16.800	1.98	22.80
1.32	4.833	1.76	10.833	6.82	16.833	1.98	22.83
1.32	4.867	1.76	10.867	6.82	16.867	1.98	22.87

1.32	4.900	1.76	10.900	6.82	16.900	1.98	22.90
1.32	4.933	1.76	10.933	6.82	16.933	1.98	22.93
1.32	4.967	1.76	10.967	6.82	16.967	1.98	22.97
1.32	5.000	1.76	11.000	6.82	17.000	1.98	23.00
1.32	5.033	1.76	11.033	10.56	17.033	1.98	23.03
1.32	5.067	1.76	11.067	10.56	17.067	1.98	23.07
1.32	5.100	1.76	11.100	10.56	17.100	1.98	23.10
1.32	5.133	1.76	11.133	10.56	17.133	1.98	23.13
1.32	5.167	1.76	11.167	10.56	17.167	1.98	23.17
1.32	5.200	1.76	11.200	10.56	17.200	1.98	23.20
1.32	5.233	1.76	11.233	10.56	17.233	1.98	23.23
1.32	5.267	1.76	11.267	10.56	17.267	1.98	23.27
1.32	5.300	1.76	11.300	10.56	17.300	1.98	23.30
1.32	5.333	1.76	11.333	10.56	17.333	1.98	23.33
1.32	5.367	1.76	11.367	10.56	17.367	1.98	23.37
1.32	5.400	1.76	11.400	10.56	17.400	1.98	23.40
1.32	5.433	1.76	11.433	10.56	17.433	1.98	23.43
1.32	5.467	1.76	11.467	10.56	17.467	1.98	23.47
1.32	5.500	1.76	11.500	10.60	17.500	1.98	23.50
1.32	5.533	1.76	11.533	45.75	17.533	1.98	23.53
1.32	5.567	1.76	11.567	45.75	17.567	1.98	23.57
1.32	5.600	1.76	11.600	45.75	17.600	1.98	23.60
1.32	5.633	1.76	11.633	45.75	17.633	1.98	23.63
1.32	5.667	1.76	11.667	45.75	17.667	1.98	23.67
1.32	5.700	1.76	11.700	45.75	17.700	1.98	23.70
1.32	5.733	1.76	11.733	45.75	17.733	1.98	23.73
1.32	5.767	1.76	11.767	83.68	17.767	1.98	23.77

1.32 5.800 1.76 |11.800 121.42 |17.800 1.98 | 23.80  
 1.32 5.833 1.76 |11.833 121.42 |17.833 1.98 | 23.83  
 1.32 5.867 1.76 |11.867 121.42 |17.867 1.98 | 23.87  
 1.32 5.900 1.76 |11.900 121.42 |17.900 1.98 | 23.90  
 1.32 5.933 1.76 |11.933 121.42 |17.933 1.98 | 23.93  
 1.32 5.967 1.76 |11.967 121.42 |17.967 1.98 | 23.97  
 1.32 6.000 1.76 |12.000 121.27 |18.000 1.98 | 24.00

Max.Eff.Inten.(mm/hr)= 121.42 229.51  
 over (min) 5.00 8.00  
 Storage Coeff. (min)= 1.35 (ii) 6.41 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 8.00  
 Unit Hyd. peak (cms)= 0.47 0.16

PEAK FLOW (cms)= 0.01 0.05 0.057 (iii)  
 TIME TO PEAK (hrs)= 11.97 12.03 12.00  
 RUNOFF VOLUME (mm)= 108.98 77.85 80.02  
 TOTAL RAINFALL (mm)= 109.98 109.98 109.98  
 RUNOFF COEFFICIENT = 0.99 0.71 0.73

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 | CALIB |  
 | STANDHYD ( 0204) | Area (ha)= 0.24  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 73.00 Dir. Conn.(%)= 38.00  
 -----

IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 0.18 0.06  
 Dep. Storage (mm)= 1.00 5.00  
 Average Slope (%)= 1.00 2.00  
 Length (m)= 40.00 40.00  
 Mannings n = 0.013 0.250  
 Max.Eff.Inten.(mm/hr)= 121.42 233.04  
 over (min) 5.00 8.00  
 Storage Coeff. (min)= 1.36 (ii) 7.06 (ii)

Unit Hyd. Tpeak (min)= 4.00 8.00  
 Unit Hyd. peak (cms)= 0.47 0.15

PEAK FLOW (cms)= 0.03 0.04 0.066 (iii)  
 TIME TO PEAK (hrs)= 11.97 12.03 12.00  
 RUNOFF VOLUME (mm)= 108.98 78.14 89.84  
 TOTAL RAINFALL (mm)= 109.98 109.98 109.98  
 RUNOFF COEFFICIENT = 0.99 0.71 0.82

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 | DUHYD ( 0009) |  
 | Inlet Cap.= 0.041 |  
 | #of Inlets= 1 |  
 | Total(cms)= 0.0 | AREA QPEAK TPEAK R.V.  
 ----- (ha) (cms) (hrs) (mm)  
 TOTAL HYD. (ID= 1): 0.24 0.07 12.00 89.84  
 MAJOR SYS. (ID= 2): 0.02 0.02 12.00 89.84  
 MINOR SYS. (ID= 3): 0.22 0.04 11.83 89.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----  
 | CALIB |  
 | STANDHYD ( 0203) | Area (ha)= 2.45  
 |ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 26.00  
 -----

IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 1.59 0.86  
 Dep. Storage (mm)= 1.00 5.00  
 Average Slope (%)= 1.00 2.00  
 Length (m)= 127.80 40.00  
 Mannings n = 0.013 0.250  
 Max.Eff.Inten.(mm/hr)= 121.42 210.14  
 over (min) 5.00 12.00  
 Storage Coeff. (min)= 2.74 (ii) 10.09 (ii)  
 Unit Hyd. Tpeak (min)= 4.00 12.00  
 Unit Hyd. peak (cms)= 0.35 0.11

PEAK FLOW (cms)= 0.21 0.36 0.546 (iii)  
 TIME TO PEAK (hrs)= 12.00 12.07 12.00

\*\*\*\*\*

RUNOFF VOLUME (mm) = 108.98 76.16 84.70  
 TOTAL RAINFALL (mm) = 109.98 109.98 109.98  
 RUNOFF COEFFICIENT = 0.99 0.69 0.77

MAJOR SYS. (ID= 2): 0.06 0.10 12.00 87.58  
 MINOR SYS. (ID= 3): 0.86 0.15 11.83 87.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0007) |
| 1 + 2 = 3 |
-----
                AREA   QPEAK   TPEAK   R.V.
                (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0203):  2.45  0.546  12.00  84.70
+ ID2= 2 ( 0006):  0.06  0.095  12.00  87.58
=====
ID = 3 ( 0007):  2.51  0.642  12.00  84.77
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0007) |
| 3 + 2 = 1 |
-----
                AREA   QPEAK   TPEAK   R.V.
                (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 0007):  2.51  0.642  12.00  84.77
+ ID2= 2 ( 0009):  0.22  0.041  11.83  89.84
=====
ID = 1 ( 0007):  2.74  0.683  12.00  85.18
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 0008) |
| IN= 2--> OUT= 1 |
| DT= 2.0 min |
-----
OVERFLOW IS OFF
                OUTFLOW  STORAGE | OUTFLOW  STORAGE
                (cms)   (ha.m.) | (cms)   (ha.m.)
0.0000  0.0000 | 0.1750  0.0640
0.0060  0.0325 | 0.2000  0.0740
0.1000  0.0390 | 0.2300  0.0830
0.1250  0.0520 | 0.2750  0.0900
  
```

```

                AREA   QPEAK   TPEAK   R.V.
                (ha)   (cms)   (hrs)   (mm)
INFLOW : ID= 2 ( 0007)  2.739  0.683  12.00  85.18
OUTFLOW: ID= 1 ( 0008)  2.739  0.266  12.23  84.47
  
```

PEAK FLOW REDUCTION [Qout/Qin](%) = 38.89  
 TIME SHIFT OF PEAK FLOW (min) = 14.00  
 MAXIMUM STORAGE USED (ha.m.) = 0.0886

-----

```

-----
| CALIB |
| STANDHYD ( 0202) |
| ID= 1 DT= 2.0 min |
-----
                Area (ha) = 0.92
                Total Imp(%) = 68.00 Dir. Conn.(%) = 41.00
-----
                IMPERVIOUS   PERVIOUS (i)
Surface Area (ha) = 0.63 0.29
Dep. Storage (mm) = 1.00 5.00
Average Slope (%) = 1.00 2.00
Length (m) = 78.32 40.00
Mannings n = 0.013 0.250
-----
Max.Eff.Inten.(mm/hr) = 121.42 176.29
over (min) = 5.00 8.00
Storage Coeff. (min) = 2.04 (ii) 7.96 (ii)
Unit Hyd. Tpeak (min) = 4.00 8.00
Unit Hyd. peak (cms) = 0.40 0.14
-----
                *TOTALS*
PEAK FLOW (cms) = 0.13 0.12 0.242 (iii)
TIME TO PEAK (hrs) = 12.00 12.03 12.00
RUNOFF VOLUME (mm) = 108.98 72.72 87.58
TOTAL RAINFALL (mm) = 109.98 109.98 109.98
RUNOFF COEFFICIENT = 0.99 0.66 0.80
  
```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
 CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 0006) |
| Inlet Cap.= 0.147 |
| #of Inlets= 1 |
| Total(cms)= 0.1 |
-----
                AREA   QPEAK   TPEAK   R.V.
                (ha)   (cms)   (hrs)   (mm)
TOTAL HYD. (ID= 1):  0.92  0.24  12.00  87.58
=====
  
```

```

-----
| ADD HYD ( 0003) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0205):  0.23  0.057  12.00  80.02
+ ID2= 2 ( 0008):  2.74  0.266  12.23  84.47
-----
          ID = 3 ( 0003):  2.97  0.285  12.20  84.13
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0207) |
| ID= 1 DT= 2.0 min |
-----
          Area   (ha)=  0.65
          Total Imp(%)= 47.00   Dir. Conn.(%)=  0.10
-----

```

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.31	0.34	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	65.83	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten. (mm/hr)=	121.42	181.42	
over (min)	5.00	8.00	
Storage Coeff. (min)=	1.84 (ii)	7.40 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.42	0.15	
			*TOTALS*
PEAK FLOW (cms)=	0.00	0.14	0.144 (iii)
TIME TO PEAK (hrs)=	12.00	12.03	12.03
RUNOFF VOLUME (mm)=	108.98	73.29	73.32
TOTAL RAINFALL (mm)=	109.98	109.98	109.98
RUNOFF COEFFICIENT =	0.99	0.67	0.67

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0206) |
| ID= 1 DT= 2.0 min |
-----
          Area   (ha)=  2.39
          Total Imp(%)= 64.00   Dir. Conn.(%)= 25.00
-----

```

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.53	0.86	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	126.23	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten. (mm/hr)=	121.42	206.26	
over (min)	5.00	12.00	
Storage Coeff. (min)=	2.72 (ii)	10.27 (ii)	
Unit Hyd. Tpeak (min)=	4.00	12.00	
Unit Hyd. peak (cms)=	0.35	0.10	
			*TOTALS*
PEAK FLOW (cms)=	0.20	0.35	0.525 (iii)
TIME TO PEAK (hrs)=	12.00	12.07	12.00
RUNOFF VOLUME (mm)=	108.98	75.80	84.10
TOTAL RAINFALL (mm)=	109.98	109.98	109.98
RUNOFF COEFFICIENT =	0.99	0.69	0.76

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)  
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.  
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| RESERVOIR ( 0010) |
| IN= 2---> OUT= 1 |
| DT= 2.0 min |
-----
          OVERFLOW IS OFF
          OUTFLOW STORAGE | OUTFLOW STORAGE
          (cms) (ha.m.) | (cms) (ha.m.)
-----
          0.0000 0.0000 | 0.1400 0.0584
          0.0050 0.0278 | 0.1700 0.0694
          0.0700 0.0363 | 0.1900 0.0737
          0.1000 0.0478 | 0.3000 0.0767
-----

```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 ( 0206)	2.390	0.525	12.00	84.10
OUTFLOW: ID= 1 ( 0010)	2.390	0.275	12.20	83.34

PEAK FLOW REDUCTION [Qout/Qin](%)= 52.31  
TIME SHIFT OF PEAK FLOW (min)= 12.00  
MAXIMUM STORAGE USED (ha.m.)= 0.0761

```

-----
| ADD HYD ( 0001) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
-----

```

```

ID1= 1 ( 0010):    2.39  0.275  12.20  83.34
+ ID2= 2 ( 0207):    0.65  0.144  12.03  73.32
=====
ID = 3 ( 0001):    3.04  0.342  12.20  81.20

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0004) | Area (ha)= 0.55
| ID= 1 DT= 2.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 65.00
-----

```

```

-----
Surface Area (ha)= 0.36 IMPERVIOUS PERVIOUS (i)
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 60.55 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 121.42 74.66
over (min) 5.00 8.00
Storage Coeff. (min)= 1.75 (ii) 6.85 (iii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.43 0.16

```

```

*TOTALS*
PEAK FLOW (cms)= 0.12 0.03 0.153 (iii)
TIME TO PEAK (hrs)= 12.00 12.03 12.00
RUNOFF VOLUME (mm)= 108.98 55.40 90.22
TOTAL RAINFALL (mm)= 109.98 109.98 109.98
RUNOFF COEFFICIENT = 0.99 0.50 0.82

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| | (ha) (cms) (hrs) (mm)
ID1= 1 ( 0201): 2.70 0.815 12.00 97.96
+ ID2= 2 ( 0004): 0.55 0.153 12.00 90.22
=====
ID = 3 ( 0005): 3.25 0.968 12.00 96.65

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 0005) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
| | (ha) (cms) (hrs) (mm)
ID1= 3 ( 0005): 3.25 0.968 12.00 96.65
+ ID2= 2 ( 0006): 0.86 0.147 11.83 87.58

```

```

-----
| ADD HYD ( 0001) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
| | (ha) (cms) (hrs) (mm)
ID1= 3 ( 0001): 3.04 0.342 12.20 81.20
+ ID2= 2 ( 0009): 0.02 0.025 12.00 89.84
=====
ID = 1 ( 0001): 3.06 0.342 12.20 81.24

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0201) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 81.00 Dir. Conn.(%)= 77.00
-----

```

```

-----
Surface Area (ha)= 2.19 IMPERVIOUS PERVIOUS (i)
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 134.16 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 121.42 99.03
over (min) 5.00 8.00
Storage Coeff. (min)= 2.82 (ii) 6.55 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.34 0.16

```

```

*TOTALS*
PEAK FLOW (cms)= 0.70 0.12 0.815 (iii)
TIME TO PEAK (hrs)= 12.00 12.03 12.00
RUNOFF VOLUME (mm)= 108.98 61.07 97.96
TOTAL RAINFALL (mm)= 109.98 109.98 109.98
RUNOFF COEFFICIENT = 0.99 0.56 0.89

```

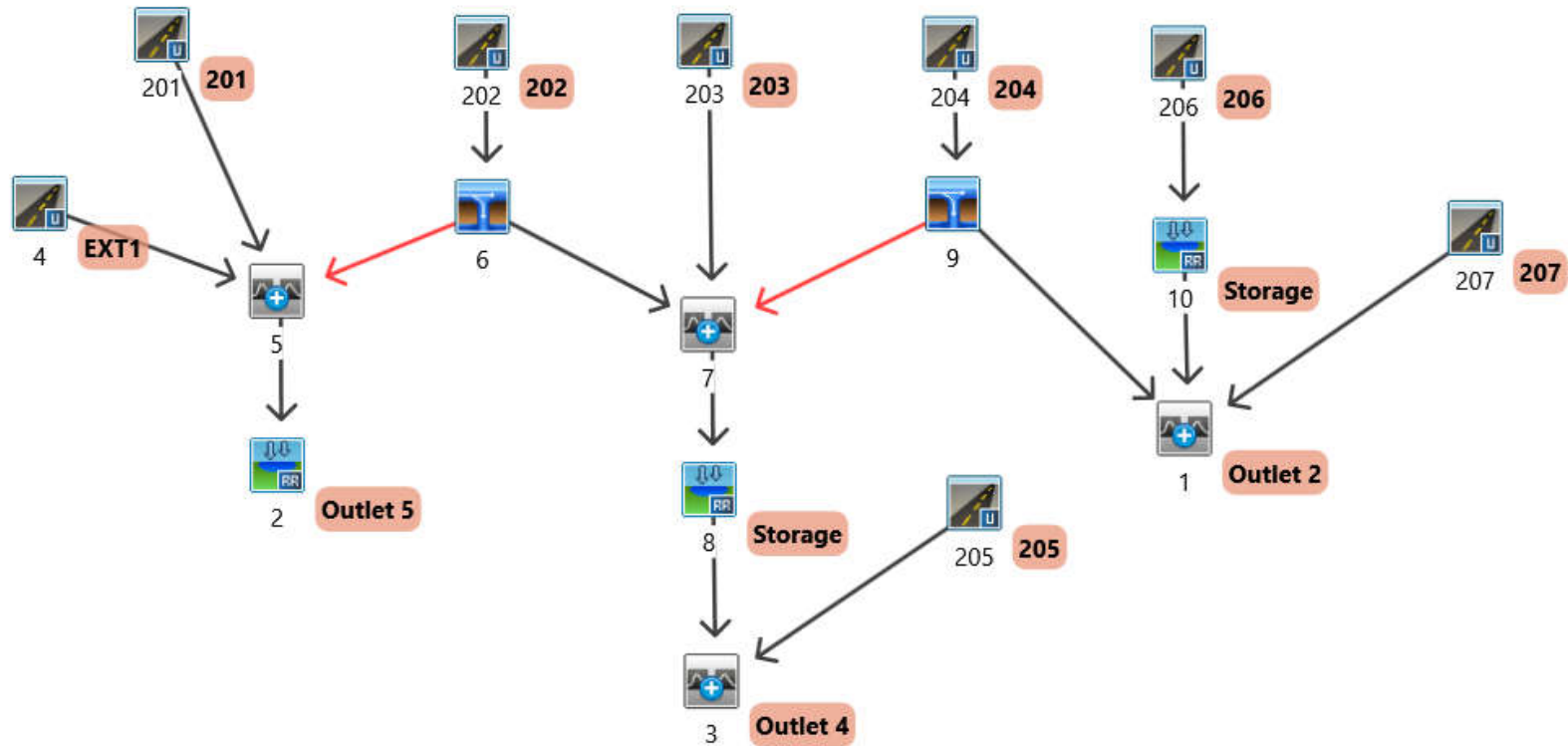
- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  
CN\* = 73.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

=====
ID = 1 ( 0005): 4.11 1.115 12.00 94.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR( 0002) OVERFLOW IS OFF
IN= 2--> OUT= 1
DT= 2.0 min
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.3000 0.1350
0.0130 0.0746 | 0.3750 0.1510
0.1500 0.0900 | 0.4000 0.1610
0.2100 0.1200 | 0.4500 0.1725
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 0005) 4.105 1.115 12.00 94.76
OUTFLOW: ID= 1 ( 0002) 4.105 0.444 12.10 93.50
PEAK FLOW REDUCTION [Qout/Qin](%)= 39.78
TIME SHIFT OF PEAK FLOW (min)= 6.00
MAXIMUM STORAGE USED (ha.m.)= 0.1713

Shining Hill Estates PH3 (Aurora)  
Proposed Hydrology Schematic  
February 2021





## Proposed Conditions VO2 Parameter Summary

**STANDHYD**

Number	201	202	203	204	205	206	207	EXT1
Description								
DT (min)	2	2	2	2	2	2	2	2
Area (ha)	2.7	0.92	2.45	0.24	0.23	2.39	0.65	0.55
XIMP <sup>1,2</sup>	0.77	0.41	0.26	0.38	0.07	0.25	0.00	0.65
TIMP <sup>2</sup>	0.81	0.68	0.65	0.73	0.59	0.64	0.47	0.65
CN*	73.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0
IA(mm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
SLPP(%)	2	2	2	2	2	2	2	2
LGP(m)	40	40	40	40	40	40	40	40
MNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
DPSI (mm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
SLPI(%)	1	1	1	1	1	1	1	1
LGI(m)	134.16	78.32	127.80	40.00	39.16	126.23	65.83	60.55
MNI	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013

<sup>1</sup>Note that where there is NO directly connected area (ie: roof runoff to grassed areas), the hydrology program does not accept XIMP=0%, therefore, XIMP = 1% has been used

<sup>2</sup>Note that where there is NO pervious area, the hydrology program does not accept TIMP and XIMP=100%, therefore, TIMP and XIMP = 99% has been used

**Total Area =** 10.1 ha

## Proposed Conditions CN Calculations

Site Soils: (per OMAFRA County Soils Mapping)

Soil Type

Schomberg Clay Loam

Hydrologic Soil Group

C

TABLE OF CURVE NUMBERS (CN's)**										
Land Use	Hydrologic Soil Type								Manning's 'n'	Source
	A	AB	B	BC	C	CD	D			
Meadow "Good"	30	44	58	64.5	71	74.5	78	0.40	MTO	
Woodlot "Fair"	36	48	60	66.5	73	76	79	0.40	MTO	
Gravel	76	80.5	85	87	89	90	91	0.30	USDA	
Lawns "Good"	39	50	61	67.5	74	77	80	0.25	USDA	
Pasture/Range	58	61.5	65	70.5	76	78.5	81	0.17	MTO	
Crop	66	70	74	78	82	84	86	0.13	MTO	
Fallow (Bare)	77	82	86	89	91	93	94	0.05	MTO	
Low Density Residences	57	64.5	72	76.5	81	83.5	86	0.25	USDA	
Streets, paved	98	98	98	98	98	98	98	0.01	USDA	

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers

2. USDA (1986), Urban Hydrology for Small Watersheds, Table 2.2-Runoff Curve Numbers for Urban Areas

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
201	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
202	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
203	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
204	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
205	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
206	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
207	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100
EXT1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100

HYDROLOGIC SOIL TYPE (%) - Proposed Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
201					100			100
202					100			100
203					100			100
204					100			100
205					100			100
206					100			100
207					100			100
EXT1					100			100

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
202	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
203	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
204	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
205	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
206	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
207	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
EXT1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture	Crop	Fallow	Low Density	Impervious	Total



## Proposed Conditions CN Calculations

Shining Hill Estates PH3 (Aurora)

Project Number: 2183

Date: February 2021

Designer Initials: M.E.C.M.

					Range		(Bare)	Residences	
201				100.0					100.0
202				100.0					100.0
203				100.0					100.0
204				100.0					100.0
205				100.0					100.0
206				100.0					100.0
207				100.0					100.0
EXT1				100.0					100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Weighted CN
201	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
202	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
203	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
204	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
205	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
206	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
207	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74
EXT1	0.0	0.0	0.0	74.0	0.0	0.0	0.0	0.0	0.0	74

\*\* AMC II assumed

## Proposed Conditions CN Calculations

Input Values			201	202	203	204	205	206	207	EXT1
Step 1	Subcatchment: CN (AMC II):		201 74	202 74	203 74	204 74	205 74	206 74	207 74	EXT1 74
2	CN (AMC III) =		88	88	88	88	88	88	88	88
3	100 Year Precipitation, P =	95.98 mm	95.98	95.98	95.98	95.98	95.98	95.98	95.98	95.98

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S} \quad S = \frac{(P - I_a)^2}{Q} - (P - I_a)$$

Q = rainfall excess or runoff, mm  
S = potential maximum retention or available storage, mm

$$CN = \frac{25400}{S + 254} \quad S = \frac{25400}{CN} - 254$$

CN\* = modified SCS curve # that better reflects Ia conditions in Ontario

Output Values			201	202	203	204	205	206	207	EXT1
4	Subcatchment: S <sub>III</sub> =	mm	34.64	34.64	34.64	34.64	34.64	34.64	34.64	34.64
	SCS Assumption of 0.2 S = Ia =	mm	6.93	6.93	6.93	6.93	6.93	6.93	6.93	6.93
	Q <sub>III</sub> =	mm	64.12	64.12	64.12	64.12	64.12	64.12	64.12	64.12
5	Preferred Initial Abstraction, Ia =	mm	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6	S* <sub>III</sub> =	mm	38.12	38.12	38.12	38.12	38.12	38.12	38.12	38.12
	CN* <sub>III</sub> =	mm	86.95	86.95	86.95	86.95	86.95	86.95	86.95	86.95
7	CN* <sub>III</sub> =	Rounded	87	87	87	87	87	87	87	87
	CN* <sub>II</sub> =	convert	73	73	73	73	73	73	73	73

### Explanation of Procedure

- 1 Determine CN based on typical AMC II conditions (attached)
- 2 Convert CN from AMC II to AMC III conditions (standard SCS tables)
- 3 Get precipitation depth P for 100 year storm
- 4 Using CN<sub>III</sub> with Ia = 0.2S, compute Q<sub>III</sub> for 100 year precipitation
- 5 For the same Q<sub>III</sub>, compute S\*<sub>III</sub> using Ia=1.5mm (or otherwise determined)
- 6 Compute CN\*<sub>III</sub> using S\*<sub>III</sub>
- 7 Calculate CN\*<sub>II</sub> using SCS conversion table



## Proposed Conditions CN Calculations

Shining Hill Estates PH3 (Aurora)  
Project Number: 2183  
Date: February 2021  
Designer Initials: M.E.C.M.

HYDROLOGIC SOIL TYPE (ha) - Proposed Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
201					2.70			2.70
202					0.92			0.92
203					2.45			2.45
204					0.24			0.24
205					0.23			0.23
206					2.39			2.39
207					0.65			0.65
EXT1					0.55			0.55

HYDROLOGIC SOIL TYPE (%) - Proposed Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
201	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0
202	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0
203	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0
204	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0
205	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0
206	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0
207	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0
EXT1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0

HYDROLOGIC SOIL TYPE (%) - Proposed Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
201					100.0			100.0
202					100.0			100.0
203					100.0			100.0
204					100.0			100.0
205					100.0			100.0
206					100.0			100.0
207					100.0			100.0
EXT1					100.0			100.0



## Proposed Conditions CN Calculations

Shining Hill Estates PH3 (Aurora)

Project Number: 2183

Date: February 2021

Designer Initials: M.E.C.M.

LAND USE (ha) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201				2.70						2.70
202				0.92						0.92
203				2.45						2.45
204				0.24						0.24
205				0.23						0.23
206				2.39						2.39
207				0.65						0.65
EXT1				0.55						0.55

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
202	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
203	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
204	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
205	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
206	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
207	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
EXT1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201				100.0						100.0
202				100.0						100.0
203				100.0						100.0
204				100.0						100.0
205				100.0						100.0
206				100.0						100.0
207				100.0						100.0
EXT1				100.0						100.0

## Proposed Conditions IA Calculations

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201				100.0						100.0
202				100.0						100.0
203				100.0						100.0
204				100.0						100.0
205				100.0						100.0
206				100.0						100.0
207				100.0						100.0
EXT1				100.0						100.0

IA VALUES (mm) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
IA (mm)	8	10	2	5	8	8	3	2	2	
201				5.0						5.0
202				5.0						5.0
203				5.0						5.0
204				5.0						5.0
205				5.0						5.0
206				5.0						5.0
207				5.0						5.0
EXT1				5.0						5.0

\* IA values based on LRSCA guidelines

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**APPENDIX D**

**PHOSPHORUS BUDGET**

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**Existing Phosphorus Budget**

Watershed **East Holland River**

Land Cover	TP Loading (kg/ha/yr)	Area (ha)	TP Loading (kg/yr)
Low Intensity Development	0.13	10.95	1.423
Forest	0.10	2.78	0.278
Wetland	0.10	0.13	0.013
<b>TOTAL</b>		13.86	1.714

Subwatershed	Phosphorus Export (kg/ha/yr)											
	Cropland	Hay-Pasture	Sod Farm/Golf Course	High Intensity Development		Low Intensity Development	Quarry	Unpaved Road	Forest	Transition	Wetland	Open Water
				Commercial /Industrial	Residential							
<b>Monitored Subwatersheds</b>												
Beaver River	0.22	0.04	0.01	1.82	1.32	0.19	0.06	0.83	0.02	0.04	0.02	0.26
Black River	0.23	0.08	0.02	1.82	1.32	0.17	0.15	0.83	0.05	0.06	0.04	0.26
<b>East Holland River</b>	<b>0.36</b>	<b>0.12</b>	<b>0.24</b>	<b>1.82</b>	<b>1.32</b>	<b>0.13</b>	<b>0.08</b>	<b>0.83</b>	<b>0.10</b>	<b>0.16</b>	<b>0.10</b>	<b>0.26</b>
Hawkestone Creek	0.19	0.10	0.06	1.82	1.32	0.09	0.10	0.83	0.03	0.04	0.03	0.26
Lovers Creek	0.16	0.07	0.17	1.82	1.32	0.07	0.06	0.83	0.06	0.06	0.05	0.26
Pefferlaw/Uxbridge Brook	0.11	0.06	0.02	1.82	1.32	0.13	0.04	0.83	0.03	0.04	0.04	0.26
Whites Creek	0.23	0.10	0.42	1.82	1.32	0.15	0.08	0.83	0.10	0.11	0.09	0.26
<b>Unmonitored Subwatersheds</b>												
Barrie Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Georgina Creeks	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Hewitts Creek	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Innisfil Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Maskinonge River	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Oro Creeks North	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Oro Creeks South	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Ramara Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Talbot/Upper Talbot River	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
West Holland River	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26

**Proposed Conditions Phosphorus Budget**

Watershed **East Holland River**

Description	Land Cover	TP Loading (kg/ha/yr)	Area (ha)	TP Loading (kg/yr)	BMP #1			BMP #2			Combined Removal Efficiency	Unmitigated P <sub>load</sub> (kg/year)	Mitigated P <sub>load</sub> (kg/year)
					BMP	TP Removal Rate (%)	TP Export (kg/yr)	BMP	TP Removal Rate (%)	TP Export (kg/yr)			
School Block	Low Intensity Development	0.13	3.74	0.486	On-Site Removal	100%	0.000	None	0%	0.000	100%	0.49	0.000
School Block	Low Intensity Development	0.13	0.55	0.071	Underground Storage	25%	0.053	On-Site Removal	100%	0.000	100%	0.07	0.000
Medium Density Block	High Industrial Dev. - Residential	1.32	0.87	1.148	Underground Storage	25%	0.861	On-Site Removal	100%	0.000	100%	1.15	0.000
Park Block	High Industrial Dev. - Residential	1.32	1.60	2.112	Underground Storage	25%	1.584	Perforated Pipe Infiltration / Exfiltration Systems	87%	0.206	90%	2.11	0.206
Catchbasin Infiltration and Underground Storage	High Industrial Dev. - Residential	1.32	1.19	1.575	Perforated Pipe Infiltration / Exfiltration Systems	87%	0.205	Underground Storage	25%	0.154	90%	1.58	0.154
Catchbasin Filtration and Underground Storage	High Industrial Dev. - Residential	1.32	3.41	4.507	Sand or Media Filters	45%	2.479	Underground Storage	25%	1.859	59%	4.51	1.859
Bioswale Infiltration and Underground Storage	High Industrial Dev. - Residential	1.32	0.42	0.560	Perforated Pipe Infiltration / Exfiltration Systems	87%	0.073	Underground Storage	25%	0.055	90%	0.56	0.055
Bioswale Filtration and Underground Storage	High Industrial Dev. - Residential	1.32	0.09	0.121	Sand or Media Filters	45%	0.067	Underground Storage	25%	0.050	59%	0.12	0.050
Rear Yard Infiltration and Underground Storage	High Industrial Dev. - Residential	1.32	1.09	1.440	Perforated Pipe Infiltration / Exfiltration Systems	87%	0.187	Underground Storage	25%	0.140	90%	1.44	0.140
Rear Yard Infiltration and Stream Buffer	High Industrial Dev. - Residential	1.32	0.44	0.587	Perforated Pipe Infiltration / Exfiltration Systems	87%	0.076	Vegetated Filter Strips / Stream Buffers	65%	0.027	95%	0.59	0.027
No BMP	High Industrial Dev. - Residential	1.32	0.45	0.588	None	0%	0.588	None	0%	0.588	0%	0.59	0.588
<b>Total</b>			<b>13.86</b>								<b>Total</b>	<b>13.19</b>	<b>3.079</b>
												<b>Removal Rate</b>	<b>77%</b>

Subwatershed	Phosphorus Export (kg/ha/yr)											
	Cropland	Hay-Pasture	Sod Farm/Golf Course	High Intensity Development		Low Intensity Development	Quarry	Unpaved Road	Forest	Transition	Wetland	Open Water
				Commercial /Industrial	Residential							
<b>Monitored Subwatersheds</b>												
Beaver River	0.22	0.04	0.01	1.82	1.32	0.19	0.06	0.83	0.02	0.04	0.02	0.26
Black River	0.23	0.08	0.02	1.82	1.32	0.17	0.15	0.83	0.05	0.06	0.04	0.26
<b>East Holland River</b>	<b>0.36</b>	<b>0.12</b>	<b>0.24</b>	<b>1.82</b>	<b>1.32</b>	<b>0.13</b>	<b>0.08</b>	<b>0.83</b>	<b>0.10</b>	<b>0.16</b>	<b>0.10</b>	<b>0.26</b>
Hawkestone Creek	0.19	0.10	0.06	1.82	1.32	0.09	0.10	0.83	0.03	0.04	0.03	0.26
Lovers Creek	0.16	0.07	0.17	1.82	1.32	0.07	0.06	0.83	0.06	0.06	0.05	0.26
Pefferlaw/Uxbridge Brook	0.11	0.06	0.02	1.82	1.32	0.13	0.04	0.83	0.03	0.04	0.04	0.26
Whites Creek	0.23	0.10	0.42	1.82	1.32	0.15	0.08	0.83	0.10	0.11	0.09	0.26
<b>Unmonitored Subwatersheds</b>												
Barrie Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Georgina Creeks	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Hewitts Creek	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Innisfil Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Maskinonge River	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Oro Creeks North	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26
Oro Creeks South	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Ramara Creeks	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
Talbot/Upper Talbot River	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26
West Holland River	0.36	0.12	0.24	1.82	1.32	0.13	0.08	0.83	0.10	0.16	0.10	0.26

## Lake Simcoe Phosphorous Offsetting Policy Calculation

Phosphorus Export = 3.08 kg/yr  
Offset Ratio = 2.5 :1  
Offsetting Value = \$ 35,000.00 /kg/year  
Offsetting Cost = \$ 269,373.01

Administration Fee = 15%  
\$ 40,405.95

**TOTAL PHOSPHORUS OFFSETTING FEE = \$ 309,778.96**

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**APPENDIX E**

**LID PRELIMINARY DESIGN**

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### Individual Infiltration Trench Sizing - Maximum Trench Depth

	Units	House Product Line			Notes
		12.2m	13.7m	15.24m	
Roof Area to Infiltration Trench	m <sup>2</sup>	82.4	92.5	102.9	Estimated per zoning (45% coverage, 1/2 of roof)
Runoff Depth to Infiltration Trench	mm	25.0	25.0	25.0	Rainfall event to capture less evaporation (initial abstraction)
Runoff Volume to Infiltration Trench	m <sup>3</sup>	2.06	2.31	2.57	
P - Percolation Rate	mm/h	12	12	12	per Hydrogeological Assessment
SF - Safety Factor		1.00	1.00	1.00	(included in P)
n - Media Porosity		0.40	0.40	0.40	
t - Detention Time	h	48	48	48	
D - Maximum Infiltration Trench Depth	m	1.44	1.44	1.44	$D = \frac{P * t}{SF * n * 1000}$

### Individual Infiltration Trench Design - Provided

	Units	House Product Line			Notes
		12.2m	13.7m	15.24m	
D - Depth	m	0.60	0.60	0.60	
W - Width	m	1.0	1.0	1.0	
L - Length	m	9.00	10.00	11.00	
A - Bottom Area	m <sup>2</sup>	9.0	10.0	11.0	
Total Volume of the Infiltration Trench	m <sup>3</sup>	5.4	6.0	6.6	
n - Media Porosity		0.40	0.40	0.40	
Total Runoff Storage Volume of the Infiltration Trench	m <sup>3</sup>	2.16	2.40	2.64	

### Summary Table

	Units	House Product Line			Notes
		12.2m	13.7m	15.24m	
Maximum Depth Required	m	1.44	1.44	1.44	
Depth Provided	m	0.6	0.6	0.6	
Volume Required	m <sup>3</sup>	2.06	2.31	2.57	(per Runoff Volume to Infiltration Trench above)
Volume Provided	m <sup>3</sup>	2.16	2.40	2.64	

Estimate imperviousness of drainage area from road area draining to bioswale

Total Area (assume 1 m sample section, crown of road to ROW limit)	5.5 x 1 =	5.50 m <sup>2</sup>
Imp Area (Roof)		0.00 m <sup>2</sup>
Imp Area (Driveway)		0 m <sup>2</sup>
Imp Area (Sidewalk/Trail)		0 m <sup>2</sup>
Imp Area (Pavement+Curb)	4 + 0.5	4.5 m <sup>2</sup>
Total Imp. Area		4.50 m <sup>2</sup>

**Imperviousness 81.8%**

Sample Drainage Area 5.5 m<sup>2</sup>/m-road 0.00055 ha/m-road

**Required Volume per Hectare (Water Quality Requirements)**

(as per Table 3.2, MOE, 2003) 38.9 m<sup>3</sup>/ha  
 Required Water Quality Infiltration Volume **0.021 m<sup>3</sup>/m-road**

**Required Volume per Hectare (25 mm Storm Requirements)**

as per 25 mm Storm Event 204.5 m<sup>3</sup>/ha  
 Required 25 mm Storm Event Volume **0.113 m<sup>3</sup>/m-road**

Required Trench Volume	<b>0.113 m<sup>3</sup>/m-road</b>
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**TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS  
 (FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)**

Protection Level	SWMP Type	Storage Volume (m <sup>3</sup> /ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (ContinuousFlow)	90	150	200	240

**Bioswale Design - Provided**

	Units	Total to Bioswale
D - Depth	m	0.60
W - Width	m	0.5
L - Length	m	1.00
A - Bottom Area	m <sup>2</sup>	0.5
Total Volume of the Bioswale (i.e. media volume)	m <sup>3</sup>	0.3
n - Media Porosity		0.40
Total Runoff Storage Volume of the Bioswale	m <sup>3</sup>	0.12
Total Runoff Storage Volume of the Bioswale	mm	26.7

Estimate imperviousness of drainage area from roofs, driveway, and road areas draining to filtration trench. Assume a section of road with a 12.2 m frontage lot with a split draining lot

Total Area	12.2 x 24 =	292.80 m <sup>2</sup>
Imp Area (Roof)	(165 x 1/2) =	82.50 m <sup>2</sup>
Imp Area (Driveway, including boulevard driveway)	(6 x 6) + (5.5 x 6) =	69 m <sup>2</sup>
Imp Area (Sidewalk, less driveway overlap)	(1.5 x 12.2) - (6 x 1.5) =	9.3 m <sup>2</sup>
Imp Area (Pavement+Curb)	(4 + 0.5) x 12.2 =	54.9 m <sup>2</sup>
Total Imp. Area		215.70 m <sup>2</sup>

**Imperviousness 73.7%**

Sample Drainage Area 24 m<sup>2</sup>/m-road 0.0024 ha/m-road

**Required Volume per Hectare (Water Quality Requirements)**

(as per Table 3.2, MOE, 2003) 36.2 m<sup>3</sup>/ha  
Required Water Quality Infiltration Volume **0.087 m<sup>3</sup>/m-road**

**Required Volume per Hectare (25 mm Storm Requirements)**

as per 25 mm Storm Event 184.2 m<sup>3</sup>/ha  
Required 25 mm Storm Event Volume **0.442 m<sup>3</sup>/m-road**

Required Trench Volume	<b>0.442 m<sup>3</sup>/m-road</b>
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**TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS  
(FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)**

Protection Level	SWMP Type	Storage Volume (m <sup>3</sup> /ha) for Impervious Level			
		35%	55%	70%	85%
<b>Enhanced (Level 1)</b>	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
<b>Normal (Level 2)</b>	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
<b>Basic (Level 3)</b>	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (ContinuousFlow)	90	150	200	240

**Filtration Trench Design - Provided**

	Units	Total to Filtration Trench
D - Depth	m	0.80
W - Width	m	1.25
L - Length	m	1.00
A - Bottom Area	m <sup>2</sup>	1.3
Total Volume of the Filtration Trench (i.e. stone volume)	m <sup>3</sup>	1.0
n - Media Porosity		0.40
Total Runoff Storage Volume of the Filtration Trench	m <sup>3</sup>	0.40
Total Runoff Storage Volume of the Filtration Trench	mm	22.6

Based on the maximum dimensions of the filtration trench to avoid conflicts with service laterals and utilities in the boulevard, the filtration trench provides 22.6 mm/impervious area of storage.

Estimate imperviousness of drainage area from roofs, driveway, and road areas draining to filtration trench. Assume a section of road with a 13.7 m frontage lot with a split draining lot on one side and front draining lot on the other.

Total Area	13.7 x 68 =	931.60 m <sup>2</sup>
Imp Area (Roof)	(185 x 1/2) + (185) =	277.50 m <sup>2</sup>
Imp Area (Driveway, including boulevard driveway)	(6 x 6 x 2) + (5 x 6 x 2) =	132 m <sup>2</sup>
Imp Area (Sidewalk, less driveway overlap)	(1.5 x 13.7) - (6 x 1.5) =	11.55 m <sup>2</sup>
Imp Area (Pavement+Curb)	(8 + 0.5 + 0.5) x 13.7 =	123.3 m <sup>2</sup>
Total Imp. Area		544.35 m <sup>2</sup>

**Imperviousness 58.4%**

Sample Drainage Area 68 m<sup>2</sup>/m-road 0.0068 ha/m-road

**Required Volume per Hectare (Water Quality Requirements)**

(as per Table 3.2, MOE, 2003) 31.1 m<sup>3</sup>/ha  
Required Water Quality Infiltration Volume **0.212 m<sup>3</sup>/m-road**

**Required Volume per Hectare (25 mm Storm Requirements)**

as per 25 mm Storm Event 146.1 m<sup>3</sup>/ha  
Required 25 mm Storm Event Volume **0.993 m<sup>3</sup>/m-road**

Required Trench Volume	<b>0.993 m<sup>3</sup>/m-road</b>
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**TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS  
(FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)**

Protection Level	SWMP Type	Storage Volume (m <sup>3</sup> /ha) for Impervious Level			
		35%	55%	70%	85%
<b>Enhanced (Level 1)</b>	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
<b>Normal (Level 2)</b>	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
<b>Basic (Level 3)</b>	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (ContinuousFlow)	90	150	200	240

**Filtration Trench Design - Provided**

	Units	Total to Filtration Trench
D - Depth	m	0.80
W - Width	m	1.25
L - Length	m	1.00
A - Bottom Area	m <sup>2</sup>	1.3
Total Volume of the Filtration Trench (i.e. stone volume)	m <sup>3</sup>	1.0
n - Media Porosity		0.40
Total Runoff Storage Volume of the Filtration Trench	m <sup>3</sup>	0.40
Total Runoff Storage Volume of the Filtration Trench	mm	10.1

Based on the maximum dimensions of the filtration trench to avoid conflicts with service laterals and utilities in the boulevard, the filtration trench provides 10.1 mm/impervious area of storage.



Estimate imperviousness of drainage area from road area draining to bioswale

Total Area (assume 1 m sample section, crown of road to ROW limit)	11 x 1 =	11.00 m <sup>2</sup>
Imp Area (Roof)		0.00 m <sup>2</sup>
Imp Area (Driveway)		0 m <sup>2</sup>
Imp Area (Sidewalk/Trail/Multi-Use Pathway)		3 m <sup>2</sup>
Imp Area (Pavement+Curb)	4 + 0.2	4.2 m <sup>2</sup>
Total Imp. Area		7.20 m <sup>2</sup>

**Imperviousness 65.5%**

Sample Drainage Area 11 m<sup>2</sup>/m-road 0.0011 ha/m-road

**Required Volume per Hectare (Water Quality Requirements)**

(as per Table 3.2, MOE, 2003) 33.5 m<sup>3</sup>/ha  
 Required Water Quality Infiltration Volume **0.037 m<sup>3</sup>/m-road**

**Required Volume per Hectare (25 mm Storm Requirements)**

as per 25 mm Storm Event 163.6 m<sup>3</sup>/ha  
 Required 25 mm Storm Event Volume **0.180 m<sup>3</sup>/m-road**

Required Trench Volume	<b>0.180 m<sup>3</sup>/m-road</b>
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**TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS  
 (FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)**

Protection Level	SWMP Type	Storage Volume (m <sup>3</sup> /ha) for Impervious Level			
		35%	55%	70%	85%
<b>Enhanced (Level 1)</b>	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
<b>Normal (Level 2)</b>	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
<b>Basic (Level 3)</b>	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (ContinuousFlow)	90	150	200	240

**Bioswale Design - Provided**

	Units	Total to Bioswale
D - Depth	m	0.60
W - Width	m	1.0
L - Length	m	1.00
A - Bottom Area	m <sup>2</sup>	1.0
Total Volume of the Bioswale (i.e. media volume)	m <sup>3</sup>	0.6
n - Media Porosity		0.40
Total Runoff Storage Volume of the Bioswale	m <sup>3</sup>	0.24
Total Runoff Storage Volume of the Bioswale	mm	33.3

Estimate imperviousness of drainage area from road area draining to filtration trench.

Total Area	12.0 x 1 =	12.00 m <sup>2</sup>
Imp Area (Roof)		0.00 m <sup>2</sup>
Imp Area (Driveway, including boulevard driveway)		0 m <sup>2</sup>
Imp Area (Sidewalk, less driveway overlap)	(1.5 x 1) =	1.5 m <sup>2</sup>
Imp Area (Pavement)	6.7 x 1 =	6.7 m <sup>2</sup>
Total Imp. Area		8.20 m <sup>2</sup>

**Imperviousness 68.3%**

Sample Drainage Area 12 m<sup>2</sup>/m-road 0.0012 ha/m-road

**Required Volume per Hectare (Water Quality Requirements)**

(as per Table 3.2, MOE, 2003) 34.4 m<sup>3</sup>/ha  
Required Water Quality Infiltration Volume **0.041 m<sup>3</sup>/m-road**

**Required Volume per Hectare (25 mm Storm Requirements)**

as per 25 mm Storm Event 170.8 m<sup>3</sup>/ha  
Required 25 mm Storm Event Volume **0.205 m<sup>3</sup>/m-road**

Required Trench Volume	<b>0.205 m<sup>3</sup>/m-road</b>
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**TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS  
(FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)**

Protection Level	SWMP Type	Storage Volume (m <sup>3</sup> /ha) for Impervious Level			
		35%	55%	70%	85%
<b>Enhanced (Level 1)</b>	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
<b>Normal (Level 2)</b>	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
<b>Basic (Level 3)</b>	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (ContinuousFlow)	90	150	200	240

**Infiltration Trench Design - Provided**

	Units	Total to Infiltration Trench
D - Depth	m	0.80
W - Width	m	0.70
L - Length	m	1.00
A - Bottom Area	m <sup>2</sup>	0.7
Total Volume of the Infiltration Trench (i.e. stone volume)	m <sup>3</sup>	0.6
n - Media Porosity		0.40
Total Runoff Storage Volume of the Infiltration Trench	m <sup>3</sup>	0.22
Total Runoff Storage Volume of the Infiltration Trench	mm	27.3

Estimate imperviousness of drainage area from roofs, driveway, and road areas draining to filtration trench. Assume a section of road with a 15.2 m frontage lot with a split draining lot on one side and front draining lot on the other.

Total Area	15.2 x 68 =	1033.60 m <sup>2</sup>
Imp Area (Roof)	(208 x 1/2) + (208 ) =	312.00 m <sup>2</sup>
Imp Area (Driveway, including boulevard driveway)	(6 x 6 x 2) + (5.5 x 6) + (7 x 6) =	147 m <sup>2</sup>
Imp Area (Sidewalk, less driveway overlap)	(3 x 15.2) + (1.5 x 15.2) - (6 x 1.5) - (6 x 3) =	41.4 m <sup>2</sup>
Imp Area (Pavement)	10.5 x 15.2=	159.6 m <sup>2</sup>
Total Imp. Area		660.00 m <sup>2</sup>

**Imperviousness 63.9%**

Sample Drainage Area 68 m<sup>2</sup>/m-road 0.0068 ha/m-road

**Required Volume per Hectare (Water Quality Requirements)**

(as per Table 3.2, MOE, 2003) 33.0 m<sup>3</sup>/ha  
Required Water Quality Infiltration Volume **0.224 m<sup>3</sup>/m-road**

**Required Volume per Hectare (25 mm Storm Requirements)**

as per 25 mm Storm Event 159.6 m<sup>3</sup>/ha  
Required 25 mm Storm Event Volume **1.086 m<sup>3</sup>/m-road**

Required Trench Volume	<b>1.086 m<sup>3</sup>/m-road</b>
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**TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS  
(FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)**

Protection Level	SWMP Type	Storage Volume (m <sup>3</sup> /ha) for Impervious Level			
		35%	55%	70%	85%
<b>Enhanced (Level 1)</b>	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
<b>Normal (Level 2)</b>	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
<b>Basic (Level 3)</b>	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (ContinuousFlow)	90	150	200	240

**Filtration Trench Design - Provided**

	Units	Total to Filtration Trench
D - Depth	m	0.80
W - Width	m	1.25
L - Length	m	1.00
A - Bottom Area	m <sup>2</sup>	1.3
Total Volume of the Filtration Trench (i.e. stone volume)	m <sup>3</sup>	1.0
n - Media Porosity		0.40
Total Runoff Storage Volume of the Infiltration/Filtration Trench	m <sup>3</sup>	0.40
Total Runoff Storage Volume of the Infiltration/Filtration Trench	mm	9.2

Based on the maximum dimensions of the filtration trench to avoid conflicts with service laterals and utilities in the boulevard, the filtration trench provides 9.2 mm/impervious area of storage.



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**APPENDIX F**

**DETENTION STORAGE PRELIMINARY DESIGN**

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## Permanent Pool and Extended Detention Sizing - Outlet 2

Shining Hill PH3 (Aurora)  
Project Number: 2183  
Date: February 2021  
Designer Initials: ETCK

### Weighted Impervious Calculation

Catchment ID	Total Area (ha)	Imperviousness (%)	Impervious Area (ha)
206	2.39	64	1.53
<b>Total</b>	<b>2.39</b>	<b>64</b>	<b>1.53</b>

## Water Quality and Extended Detention Sizing - Outlet 2

**EXTENDED DETENTION**

Using the 25mm - 4 hour Chicago Storm

$$\text{Erosion Control Volume (V)} = \text{Runoff Depth (mm)} \times \text{Drainage Area (ha)} \times 10 \text{ (m}^3\text{)} / \text{(mm)(ha)}$$

$$\text{Erosion Control Volume (V)} = 11.65 \text{ mm} \times 2.39 \text{ ha} \times 10 \text{ m}^3 / \text{mm} \cdot \text{ha}$$

$$\text{Erosion Control Volume (V)} = 278 \text{ m}^3$$

$$\text{Peak Flowrate (Q}_p\text{)} = \text{Extended Detention Volume (m}^3\text{)} / \text{Detention Time (hr)} \times 1 \text{ (hr)} / 3600 \text{ (s)} \times 1.5 \text{ (peaking factor)}$$

$$\text{Peak Flowrate (Q}_p\text{)} = 278 \text{ m}^3 / 24 \text{ hr} \times 1 \text{ (hr)} / 3600 \text{ (s)} \times 1.5 \text{ (peaking factor)}$$

$\text{Peak Flowrate (Q}_p\text{)} = 0.005 \text{ m}^3/\text{s}$
--

## Permanent Pool and Extended Detention Sizing - Outlet 4

Shining Hill PH3 (Aurora)  
Project Number: 2183  
Date: February 2021  
Designer Initials: ETCK

### Weighted Impervious Calculation

Catchment ID	Total Area (ha)	Imperviousness (%)	Impervious Area (ha)
203	2.45	65	1.59
204	0.24	73	0.18
<b>Total</b>	<b>2.69</b>	<b>66</b>	<b>1.77</b>



## Water Quality and Extended Detention Sizing - Outlet 4

**EXTENDED DETENTION**

Using the 25mm - 4 hour Chicago Storm

$$\text{Erosion Control Volume (V)} = \text{Runoff Depth (mm)} \times \text{Drainage Area (ha)} \times 10 \text{ (m}^3\text{)} / \text{(mm)(ha)}$$

$$\text{Erosion Control Volume (V)} = 12.09 \text{ mm} \times 2.69 \text{ ha} \times 10 \text{ m}^3 / \text{mm} \cdot \text{ha}$$

$$\text{Erosion Control Volume (V)} = 325 \text{ m}^3$$

$$\text{Peak Flowrate (Q}_p\text{)} = \text{Extended Detention Volume (m}^3\text{)} / \text{Detention Time (hr)} \times 1 \text{ (hr)} / 3600 \text{ (s)} \times 1.5 \text{ (peaking factor)}$$

$$\text{Peak Flowrate (Q}_p\text{)} = 325 \text{ m}^3 / 24 \text{ hr} \times 1 \text{ (hr)} / 3600 \text{ (s)} \times 1.5 \text{ (peaking factor)}$$

<b>Peak Flowrate (Q<sub>p</sub>) = 0.006 m<sup>3</sup>/s</b>
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## Permanent Pool and Extended Detention Sizing - Outlet 5

Shining Hill PH3 (Aurora)  
Project Number: 2183  
Date: February 2021  
Designer Initials: ETCK

### Weighted Impervious Calculation

Catchment ID	Total Area (ha)	Imperviousness (%)	Impervious Area (ha)
201	2.70	81	2.19
202	0.92	68	0.63
EXT1	0.55	65	0.36
<b>Total</b>	<b>4.17</b>	<b>76</b>	<b>3.17</b>



## Water Quality and Extended Detention Sizing - Outlet 5

Shining Hill PH3 (Aurora)  
Project Number: 2183  
Date: February 2021  
Designer Initials: ETCK

### EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

$$\text{Erosion Control Volume (V)} = \text{Runoff Depth (mm)} \times \text{Drainage Area (ha)} \times 10 \text{ (m}^3\text{)} / \text{(mm)(ha)}$$

$$\text{Erosion Control Volume (V)} = 17.89 \text{ mm} \times 4.17 \text{ ha} \times 10 \text{ m}^3 / \text{mm} \cdot \text{ha}$$

$$\text{Erosion Control Volume (V)} = 746 \text{ m}^3$$

$$\text{Peak Flowrate (Q}_p\text{)} = \text{Extended Detention Volume (m}^3\text{)} / \text{Detention Time (hr)} \times 1 \text{ (hr)} / 3600 \text{ (s)} \times 1.5 \text{ (peaking factor)}$$

$$\text{Peak Flowrate (Q}_p\text{)} = 746 \text{ m}^3 / 24 \text{ hr} \times 1 \text{ (hr)} / 3600 \text{ (s)} \times 1.5 \text{ (peaking factor)}$$

$\text{Peak Flowrate (Q}_p\text{)} = 0.013 \text{ m}^3/\text{s}$
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**APPENDIX G**

**SANITARY FLOW CALCULATIONS**

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**Existing Sanitary Design Sheet  
Shining Hill Estates  
Phase 3 (Aurora) - FSSR  
Aurora, York Region**

Project: Shining Hill Estates  
Project No. 2183  
Date: 18-Feb-21  
Designed By: B.B.O.  
Reviewed By: E.T.C.K.

Minimum Sewer Diameter (mm) = 200      Avg. Domestic Flow (l/cap/day) = 400  
Mannings n = 0.013      Infiltration Rate (l/s/ha) = 0.26  
Minimum Velocity (m/s) = 0.60      Max. Harmon Peaking Factor = 4.0  
Maximum Velocity (m/s) = 3      Min. Harmon Peaking Factor = 2.0  
Minimum Pipe Slope (%) = 1.00      **NOMINAL PIPE SIZE USED**

P:\2183 Shining Hill Estates\Design\Pipe Design\Sanitary\FSSR Phase 3\2183 St Johns SR Sanitary HGL-aurora.xlsm\Design

LOCATION			RESIDENTIAL							FLOW CALCULATIONS							PIPE DATA					
STREET	MANHOLE		AREA (ha)	ACCUM. AREA (ha)	UNITS (#)	DENSITY		RESIDENTIAL POPULATION	ACCUM. RESIDENTIAL POPULATION	INFILTRATION  (L/s)	TOTAL ACCUM. POPULATION	AVG. DOMESTIC FLOW  (L/s)	ACCUM. AVG. DOMESTIC FLOW  (L/s)	PEAKING FACTOR	PEAKED RESIDENTIAL FLOW  (L/s)	ICI FLOW  (L/s)	TOTAL FLOW  (L/s)	LENGTH  (m)	PIPE DIAMETER  (mm)	SLOPE  (%)	FULL FLOW CAPACITY  (L/s)	FULL FLOW VELOCITY  (m/s)
	FROM	TO				PER UNIT (p/unit)	PER HA (p/ha)															
EXT (North of SJSR)	MH3	MH99	12	12	750	1		750	750	3.1	750	3.5	3.5	3.88	13.5	0.0	16.6	100.0	200	1.00	32.8	1.04
Phase 3 Connection	MH99	MH69A	0	12	0			0	750	3.1	750	0.0	3.5	3.88	13.5	0.0	16.6	100.0	200	1.90	45.2	1.44
Phase 2 External	ext3	MH69A	9.32	9.32	92	3.8		350	350	2.4	350	1.6	1.6	4.00	6.5	0.0	8.9	46.8	200	2.04	46.8	1.49
Willow Farm Lane	MH69A	MH68A	0	21.32	0			0	1100	5.5	1100	0.0	5.1	3.77	19.2	0.0	24.8	46.8	200	2.04	46.8	1.49
External to Willow Farm	ext4	MH63A	53.93	53.93	302	3.8		1148	1148	14.0	1148	5.3	5.3	3.76	20.0	0.0	34.0	100.0	250	1.00	59.4	1.21
Willow Farm Lane (south)	MH63A	MH64A	0.54	54.47	12	1		12	1160	14.2	1160	0.1	5.4	3.76	20.2	0.0	34.3	100.0	250	0.40	37.6	0.77
Willow Farm Lane	MH68A	MH64A	1.95	23.27	19	1		19	1119	6.1	1119	0.1	5.2	3.77	19.5	0.0	25.6	48.2	200	4.95	72.9	2.32
Heatherfield Lane	MH64A	MH65A	0.11	77.85	0			0	2278	20.2	2278	0.0	10.5	3.54	37.3	0.0	57.6	76.3	300	0.40	61.1	0.86
Heatherfield Lane	MH65A	MH66A	0.64	78.49	15	1		15	2293	20.4	2293	0.1	10.6	3.54	37.6	0.0	58.0	73.5	300	0.40	61.1	0.86
Heatherfield Lane	MH66A	MH67A	1.04	79.53	15	1		15	2308	20.7	2308	0.1	10.7	3.54	37.8	0.0	58.5	29.6	300	0.48	67.0	0.95
Easement	MH67A	MH74A	0	79.53	0			0	2308	20.7	2308	0.0	10.7	3.54	37.8	0.0	58.5	49.7	300	0.47	66.3	0.94
Easement	MH74A	MH73A	0	79.53	0			0	2308	20.7	2308	0.0	10.7	3.54	37.8	0.0	58.5	55.2	300	1.00	96.7	1.37
Easement	MH73A	MH72A	0	79.53	0			0	2308	20.7	2308	0.0	10.7	3.54	37.8	0.0	58.5	27.1	300	2.03	137.7	1.95
St. John's Sideroad	MH72A	MH71A	0.8	80.33	1	3.8		4	2312	20.9	2312	0.0	10.7	3.54	37.8	0.0	58.7	102.7	300	0.42	62.6	0.89
St. John's Sideroad	MH71A	MH70A	3.63	83.96	1	3.8		4	2316	21.8	2316	0.0	10.7	3.54	37.9	0.0	59.7	89.9	300	0.46	65.6	0.93
St. John's Sideroad	MH70A	MH70C	0	83.96	0			0	2316	21.8	2316	0.0	10.7	3.54	37.9	0.0	59.7	7.0	300	0.46	65.6	0.93
Yonge Street	MH70C	MH70B	0.08	84.04	0			0	2316	21.9	2316	0.0	10.7	3.54	37.9	0.0	59.8	43.0	300	0.44	64.1	0.91



**Sanitary Design Sheet - Downstream Analysis (with Aurora flows only)**  
**Shining Hill Estates**  
**Phase 3 (Aurora) - FSSR**  
**Aurora, York Region**

Minimum Sewer Diameter (mm) = 200      Avg. Domestic Flow (l/cap/day) = 400  
Mannings n = 0.013      Infiltration Rate (l/s/ha) = 0.26  
Minimum Velocity (m/s) = 0.60      Max. Harmon Peaking Factor = 4.0  
Maximum Velocity (m/s) = 3      Min. Harmon Peaking Factor = 2.0  
Minimum Pipe Slope (%) = 1.00      **NOMINAL PIPE SIZE USED**

Project: Shining Hill Estates  
Project No. 2183  
Date: 18-Feb-21  
Designed By: B.B.O.  
Reviewed By: E.T.C.K.

P:\2183 Shining Hill Estates\Design\Pipe Design\Sanitary\FSSR Phase 3\2183 St Johns SR Sanitary HGL-aurora.xlsm\Design

LOCATION			RESIDENTIAL							FLOW CALCULATIONS							PIPE DATA					
STREET	MANHOLE		AREA (ha)	ACCUM. AREA (ha)	UNITS (#)	DENSITY		RESIDENTIAL POPULATION	ACCUM. RESIDENTIAL POPULATION	INFILTRATION  (L/s)	TOTAL ACCUM. POPULATION	AVG. DOMESTIC FLOW  (L/s)	ACCUM. AVG. DOMESTIC FLOW  (L/s)	PEAKING FACTOR	PEAKED RESIDENTIAL FLOW  (L/s)	ICI FLOW  (L/s)	TOTAL FLOW  (L/s)	LENGTH  (m)	PIPE DIAMETER  (mm)	SLOPE  (%)	FULL FLOW CAPACITY  (L/s)	FULL FLOW VELOCITY  (m/s)
	FROM	TO				PER UNIT (p/unit)	PER HA (p/ha)															
Newmarket Residential	ext1	MH99	0	0	0			0	0	0.0	0	0.0	0.0	4.00	0.0	0.0	0.0	100.0	200	1.00	32.8	1.04
Newmarket Medium Density	ext2	MH99	0	0	0			0	0	0.0	0	0.0	0.0	4.00	0.0	0.0	0.0	100.0	200	1.00	32.8	1.04
Medium Density Block	MH1	MH99	0.87	0.87	200	2.5		500	500	0.2	500	2.3	2.3	3.97	9.2	0.0	9.4	100.0	200	1.00	32.8	1.04
Neighbourhood Park	MH2	MH99	1.6	1.6	0		50	80	80	0.4	80	0.4	0.4	4.00	1.5	0.0	1.9	100.0	200	1.00	32.8	1.04
Residential	MH3	MH99	7.1	7.1	88	3.8		334	334	1.8	334	1.5	1.5	4.00	6.2	0.0	8.0	100.0	200	1.00	32.8	1.04
St. Anne's School	MH4	MH99	4.28	4.28	650	0.3		195	195	1.1	195	0.9	0.9	4.00	3.6	0.0	4.7	100.0	200	1.00	32.8	1.04
Phase 3 Connection	MH99	MH69A	0	13.85	0			0	1109	3.6	1109	0.0	5.1	3.77	19.4	0.0	23.0	100.0	200	1.90	45.2	1.44
Phase 2 External	ext3	MH69A	9.32	9.32	92	3.8		350	350	2.4	350	1.6	1.6	4.00	6.5	0.0	8.9	46.8	200	2.04	46.8	1.49
Willow Farm Lane	MH69A	MH68A	0	23.17	0			0	1459	6.0	1459	0.0	6.8	3.69	24.9	0.0	30.9	46.8	200	2.04	46.8	1.49
External to Willow Farm	ext4	MH63A	53.93	53.93	302	3.8		1148	1148	14.0	1148	5.3	5.3	3.76	20.0	0.0	34.0	100.0	250	1.00	59.4	1.21
Willow Farm Lane (south)	MH63A	MH64A	0.54	54.47	12	1		12	1160	14.2	1160	0.1	5.4	3.76	20.2	0.0	34.3	100.0	250	0.40	37.6	0.77
Willow Farm Lane	MH68A	MH64A	1.95	25.12	19	1		19	1478	6.5	1478	0.1	6.8	3.68	25.2	0.0	31.7	48.2	200	4.95	72.9	2.32
Heatherfield Lane	MH64A	MH65A	0.11	79.7	0			0	2638	20.7	2638	0.0	12.2	3.49	42.6	0.0	63.3	76.3	300	0.40	61.1	0.86
Heatherfield Lane	MH65A	MH66A	0.64	80.34	15	1		15	2653	20.9	2653	0.1	12.3	3.49	42.8	0.0	63.7	73.5	300	0.40	61.1	0.86
Heatherfield Lane	MH66A	MH67A	1.04	81.38	15	1		15	2668	21.2	2668	0.1	12.4	3.49	43.0	0.0	64.2	29.6	300	0.48	67.0	0.95
Easement	MH67A	MH74A	0	81.38	0			0	2668	21.2	2668	0.0	12.4	3.49	43.0	0.0	64.2	49.7	300	0.47	66.3	0.94
Easement	MH74A	MH73A	0	81.38	0			0	2668	21.2	2668	0.0	12.4	3.49	43.0	0.0	64.2	55.2	300	1.00	96.7	1.37
Easement	MH73A	MH72A	0	81.38	0			0	2668	21.2	2668	0.0	12.4	3.49	43.0	0.0	64.2	27.1	300	2.03	137.7	1.95
St. John's Sideroad	MH72A	MH71A	0.8	82.18	1	3.8		4	2671	21.4	2671	0.0	12.4	3.48	43.1	0.0	64.5	102.7	300	0.42	62.6	0.89
St. John's Sideroad	MH71A	MH70A	3.63	85.81	1	3.8		4	2675	22.3	2675	0.0	12.4	3.48	43.2	0.0	65.5	89.9	300	0.46	65.6	0.93
St. John's Sideroad	MH70A	MH70C	0	85.81	0			0	2675	22.3	2675	0.0	12.4	3.48	43.2	0.0	65.5	7.0	300	0.46	65.6	0.93
Yonge Street	MH70C	MH70B	0.08	85.89	0			0	2675	22.3	2675	0.0	12.4	3.48	43.2	0.0	65.5	43.0	300	0.44	64.1	0.91



**Sanitary Design Sheet - Proposed  
Shining Hill Estates  
Phase 3 (Aurora) - FSSR  
Aurora, York Region**

Project: Shining Hill Estates  
Project No. 2183  
Date: 18-Feb-21  
Designed By: B.B.O.  
Reviewed By: E.T.C.K.

Minimum Sewer Diameter (mm) = 200      Avg. Domestic Flow (l/cap/day) = 400  
Mannings n = 0.013      Infiltration Rate (l/s/ha) = 0.26  
Minimum Velocity (m/s) = 0.60      Max. Harmon Peaking Factor = 4.0  
Maximum Velocity (m/s) = 3      Min. Harmon Peaking Factor = 2.0  
Minimum Pipe Slope (%) = 1.00      **NOMINAL PIPE SIZE USED**

P:\2183 Shining Hill Estates\Design\Pipe Design\Sanitary\FSSR Phase 3\2183 St Johns SR Sanitary HGL-aurora.xlsm\Design

LOCATION			RESIDENTIAL							FLOW CALCULATIONS								PIPE DATA				
STREET	MANHOLE		AREA (ha)	ACCUM. AREA (ha)	UNITS (#)	DENSITY		RESIDENTIAL POPULATION	ACCUM. RESIDENTIAL POPULATION	INFILTRATION  (L/s)	TOTAL ACCUM. POPULATION	AVG. DOMESTIC FLOW  (L/s)	ACCUM. AVG. DOMESTIC FLOW  (L/s)	PEAKING FACTOR	PEAKED RESIDENTIAL FLOW  (L/s)	ICI FLOW  (L/s)	TOTAL FLOW  (L/s)	LENGTH  (m)	PIPE DIAMETER  (mm)	SLOPE  (%)	FULL FLOW CAPACITY  (L/s)	FULL FLOW VELOCITY  (m/s)
	FROM	TO				PER UNIT (p/unit)	PER HA (p/ha)															
Medium Density Block	MH1	MH99	0.87	0.87	200	2.5		500	500	0.2	500	2.3	2.3	3.97	9.2	0.0	9.4	100.0	200	1.00	32.8	1.04
Neighbourhood Park	MH2	MH99	1.6	1.6	0		50	80	80	0.4	80	0.4	0.4	4.00	1.5	0.0	1.9	100.0	200	1.00	32.8	1.04
Residential	MH3	MH99	7.1	7.1	88	3.8		334	334	1.8	334	1.5	1.5	4.00	6.2	0.0	8.0	100.0	200	1.00	32.8	1.04
St. Anne's School	MH4	MH99	4.28	4.28	650	0.3		195	195	1.1	195	0.9	0.9	4.00	3.6	0.0	4.7	100.0	200	1.00	32.8	1.04
Phase 3 Connection	MH99	MH72A	0	13.85	0			0	1109	3.6	1109	0.0	5.1	3.77	19.4	0.0	23.0	100.0	200	1.90	45.2	1.44
Phase 2 External	ext3	MH69A	9.32	9.32	92	3.8		350	350	2.4	350	1.6	1.6	4.00	6.5	0.0	8.9	46.8	200	2.04	46.8	1.49
Willow Farm Lane	MH69A	MH68A	0	9.32	0			0	350	2.4	350	0.0	1.6	4.00	6.5	0.0	8.9	46.8	200	2.04	46.8	1.49
External to Willow Farm	ext4	MH63A	53.93	53.93	302	3.8		1148	1148	14.0	1148	5.3	5.3	3.76	20.0	0.0	34.0	100.0	250	1.00	59.4	1.21
Willow Farm Lane (south)	MH63A	MH64A	0.54	54.47	12	1		12	1160	14.2	1160	0.1	5.4	3.76	20.2	0.0	34.3	100.0	250	0.40	37.6	0.77
Willow Farm Lane	MH68A	MH64A	1.95	11.27	19	1		19	369	2.9	369	0.1	1.7	4.00	6.8	0.0	9.8	48.2	200	4.95	72.9	2.32
Heatherfield Lane	MH64A	MH65A	0.11	65.85	0			0	1528	17.1	1528	0.0	7.1	3.67	26.0	0.0	43.1	76.3	300	0.40	61.1	0.86
Heatherfield Lane	MH65A	MH66A	0.64	66.49	15	1		15	1543	17.3	1543	0.1	7.1	3.67	26.2	0.0	43.5	73.5	300	0.40	61.1	0.86
Heatherfield Lane	MH66A	MH67A	1.04	67.53	15	1		15	1558	17.6	1558	0.1	7.2	3.67	26.5	0.0	44.0	29.6	300	0.48	67.0	0.95
Easement	MH67A	MH74A	0	67.53	0			0	1558	17.6	1558	0.0	7.2	3.67	26.5	0.0	44.0	49.7	300	0.47	66.3	0.94
Easement	MH74A	MH73A	0	67.53	0			0	1558	17.6	1558	0.0	7.2	3.67	26.5	0.0	44.0	55.2	300	1.00	96.7	1.37
Easement	MH73A	MH72A	0	67.53	0			0	1558	17.6	1558	0.0	7.2	3.67	26.5	0.0	44.0	27.1	300	2.03	137.7	1.95
St. John's Sideroad	MH72A	MH71A	0.8	82.18	1	3.8		4	2671	21.4	2671	0.0	12.4	3.48	43.1	0.0	64.5	102.7	300	0.42	62.6	0.89
St. John's Sideroad	MH71A	MH70A	3.63	85.81	1	3.8		4	2675	22.3	2675	0.0	12.4	3.48	43.2	0.0	65.5	89.9	300	0.46	65.6	0.93
St. John's Sideroad	MH70A	MH70C	0	85.81	0			0	2675	22.3	2675	0.0	12.4	3.48	43.2	0.0	65.5	7.0	300	0.46	65.6	0.93
Yonge Street	MH70C	MH70B	0.08	85.89	0			0	2675	22.3	2675	0.0	12.4	3.48	43.2	0.0	65.5	43.0	300	0.44	64.1	0.91



**Sanitary Sewer Hydraulic Grade Line Analysis**  
**Shining Hill Estates**  
**Phase 3 (Aurora) - FSSR**  
**Aurora, York Region**

Project: Shining Hill Estates  
 Project No. 2183  
 Date: 25-Feb-21  
 Designed By: ETCK  
 Reviewed By: SEK

P:\2183 Shining Hill Estates\Design\Pipe Design\Sanitary\FSSR Phase 3\2183 St Johns SR Sanitary HGL-aurora.xlsm\Design

LOCATION			INVERTS		FLOW	PIPE DATA								PIPE LOSS CALCULATIONS				MH LOSS CALCULATIONS		TOTAL LOSS	HYDRAULIC GRADE LINE				
STREET	FROM (U/S)	TO (D/S)	U/S (m)	D/S (m)	TOTAL PIPE FLOW (Qdes) (L/s)	PIPE DIAMETER (mm)	LENGTH (m)	MANNING'S 'n'	PIPE AREA (m <sup>2</sup> )	HYD. RAD <sup>2/3</sup>	SLOPE (%)	Qcap. (L/s)	Qdes/Qcap (%)	L/D	f	Vf	V <sup>2</sup> /2g	TOTAL PIPE LOSS (m)	MH LOSS (m)	PIPE BEND LOSS (m)	TOTAL LOSS (m)	HGL (U/S) (m)	HGL SURCHARGE ABOVE U/S OBV. (m)	HGL (D/S) (m)	MH TOP (U/S) (m)
St. John's Sideroad	MH72A	MH71A	246.889	246.458	65.5	300	102.7	0.013	0.071	0.178	0.42	62.6	1.05	342.333	0.031	0.927	0.044	0.471	0.03	0.00	0.50	247.258	0.068	246.758	248.79
St. John's Sideroad	MH71A	MH70A	246.454	246.041	65.5	300	89.9	0.013	0.071	0.178	0.46	65.6	1.00	299.500	0.031	0.927	0.044	0.412	0.00	0.00	0.41	246.755	0.001	246.341	249.31
St. John's Sideroad	MH70A	MH70C	246.030	245.998	65.5	300	7.0	0.013	0.071	0.178	0.46	65.6	1.00	23.333	0.031	0.927	0.044	0.032	0.00	0.00	0.03	246.332	0.002	246.298	248.20
Yonge Street	MH70C	MH70B	245.969	245.780	65.5	300	43.0	0.013	0.071	0.178	0.44	64.1	1.02	143.333	0.031	0.927	0.044	0.197	0.01	0.00	0.21	246.288	0.019	246.080	249.00



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**APPENDIX H**

**WATER DISTRIBUTION ANALYSIS LETTER**

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March 9, 2021

Project No. 17002-102

Shining Hill Estate Collection Inc.  
2235 Sheppard Avenue East, Suite 903  
Attn: Mr. Paul Bailey  
c/o SCS Consulting Group

**Subject: Shining Hill Phase 3 Development  
Water Demand Calculations  
Town of Aurora, Region of York**

Dear Mr. Bailey,

We are pleased to submit the water demand calculations for the Shining Hill Phase 3 Development, located north of St. John’s Sideroad and west of Yonge Street in the Town of Aurora, Region of York.

The proposed development is entirely residential, and will also service a future school located in an existing building just west of the proposed development. The development consists of 88 single family homes as well as a medium density residential block consisting of 200 apartment units.

### Domestic Water Usage

To calculate the equivalent population and water design factors for this development MES used Town of Aurora standard residential population densities as noted in the Town of Aurora Design Criteria Manual for Engineering Plans (November 2020). The ultimate population of the school is estimated to be 800 people. **Table 1** summarizes the residential population densities and **Table 2** summarizes the average daily demand and peaking factors used for the calculations.

**Table 1 – Equivalent Population Density**

Type of Development	Equivalent Population (Persons/Unit)
Single Family Homes	3.8
Apartments	2.5

Source: Design Criteria Manual for Engineering Plans, November 2020

**Table 2 - Water Design Factors**

Type of Development	Average Daily Demand	Minimum Hourly Demand Peaking Factor	Maximum Daily Demand Peaking Factor	Peak Hourly Demand Peaking Factor
Residential	400 L/capita/day	0.65	2.00	3.00

Source: Design Criteria Manual for Engineering Plans, November 2020

Utilizing the equivalent population data from Table 1 and the corresponding Maximum Day and Peak Hour data from Table 2 the water demands for this development were calculated. The residential demand rate was also used for the school population because it will be a boarding school. The calculated demands for the development are summarized in **Table 3**. Detailed water demand calculations are attached.

**Table 3 – Water Demand for the Shining Hill Phase 3 Development**

	Average Day Demand (L/S)	Maximum Day Demand (L/S)	Peak Hour Demand (L/S)	Minimum Hour Demand (L/S)
<b>Water Demands</b>	<b>7.56</b>	<b>15.13</b>	<b>22.69</b>	<b>4.92</b>

## Fire Flow Demands

The fire flow demand for the residential portions of this development are assumed to be 117 L/s for the single family homes and 150 L/s for the apartments as specified in the Town of Aurora Design Criteria. The fire flow for the school has yet to be determined. Typically, the fire flow required for a school is 250 L/s or higher as per the Town's criteria.

**Table 4 – Minimum Fire Flow Requirements**

Type of Development	Fire Flow (L/S)
Single Family Homes	117
Apartments	150
School	To be determined

Source: Design Criteria Manual for Engineering Plans, November 2020

The fire flow requirements for this development are currently based on the Town's minimum requirements. The fire flow requirements must be reviewed with the Town and confirmed with the appropriate designer (architect or mechanical designer) to determine the appropriate level of protection (i.e. fire flows) required for this development. A greater fire flow than currently noted within the Town's standards may be required or the required fire flows may need to be calculated using the Fire Underwriters Survey.

## Proposed Watermain Connection

The proposed water supply for the development is from two connections to the existing 300 mm/200mm diameter watermain on St. John's Sideroad. The development is located in Aurora Central (Zone 1) Pressure District. Elevations within the development range from 262.1 to 270.0 m which is within the service range for Aurora Central.

A Hydrant Flow Test will be completed once weather permits to confirm the available flows and pressures from the St. John's Sideroad watermain at this location. Detailed modelling is required to determine if the existing water supply on St. John's Sideroad is adequate to service this development. The proposed development is located in an area that was previously entirely residential, and will now include both residential and school use.

At the north extent of the development, the watermain will be connected in the future to the Newmarket System (Newmarket Central or Newmarket West Pressure Zone). The future connection will need to have a Water Meter and either a Pressure Reducing Valve (PRV) or a normally closed zone boundary valve. The direction of the PRV and meter will depend on which Newmarket pressure zone the watermain is connected to.

The purpose of this report is to address domestic water demand calculations only and does not address or comment on the adequacy of the water supply to the proposed development. Detailed modelling will need to be completed to ensure that both domestic and fire flows are available at the required pressures. Detailed modelling and coordination with the Town of Newmarket will also be required to address the proposed connection between the Aurora and Newmarket systems at the north end of the proposed development.

We trust you find this report satisfactory. Should you have any questions or require further clarification, please call.

Yours truly,

**Municipal Engineering Solutions**



Kristin St-Jean, P.Eng.

/KS

File Location: C:\Users\krist\Documents\Projects\17002-102 Shining Hill, Aurora\5.0 Report\17002-102 Shining Hill Aurora Phase 3\_20210309.docx

**Attachments:**

Design Criteria

Domestic Water Usage Calculations

## Town of Aurora

Design Criteria Manual of Engineering Plans, November 2020 (unless otherwise stated)

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### Equivalent Population by Unit

Type of Development	Equivalent Population Density
	<i>(Person/Unit)</i>
Single Family Homes/Semi-Detached	3.8
Townhouses	3.5
Apartments	2.5

### Water Design Factors

Average Daily Demand (litres/capita/day)	400
Maximum Daily Demand P.F.	2.00
Peak Hourly Demand P.F.	3.00
Minimum Hourly Demand P.F.	0.65 *

\* From previous Town Design Criteria Manual, 2019

### Fire Flow Demands

Type of Development	Fire Demand (L/s)
Single Family/Semi-Detached	117
Townhouse/Row House	125
Apartment	150
Commercial	200
Institutional/Industrial	250

**Water Demands**  
**Shining Hill Phase 3 Development, Aurora**  
**March 2021**



Type of Development			Equivalent Population		Demands			
Detached <i>(units)</i>	Apartment <i>(units)</i>	Institutional <i>(people)</i>	Total Population <i>(Residential)</i>	Total Population <i>(ICI)</i>	Avg Day <i>(L/s)</i>	Max Day <i>(L/s)</i>	Peak Hour <i>(L/s)</i>	Min Hour <i>(L/s)</i>
88			334	0	1.55	3.10	4.65	1.01
	200		500	0	2.31	4.62	6.93	1.50
		800	0	800	3.70	7.41	11.11	2.41
<b>88</b>	<b>200</b>	<b>800</b>	<b>834</b>	<b>800</b>	<b>7.56</b>	<b>15.13</b>	<b>22.69</b>	<b>4.92</b>

**SCS Consulting Group Ltd**  
**30 Centurian Drive, Suite 100**  
**Markham, ON, L3R 8B8**  
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