

# 961 St. David Street North

# Functional Servicing and Stormwater Management Report

**Project Location:** 961 St. David Street North, Fergus, ON

Prepared for: 2687734 Ontario Inc. 766 Hespeler Road Cambridge, ON N3H 5L8

**Prepared by:** MTE Consultants Inc. 520 Bingemans Centre Drive Kitchener, ON N2B 3X9

July 15, 2022 **Revised:** November 10, 2023

MTE File No.: 48650-100

Engineers, Scientists, Surveyors.



# Contents

1.0	Introduction 1	I
1.1	Site Description1	I
1.2	Proposed Development 1	I
2.0	Existing Conditions	3
2.1	Topography	3
2.2	Existing Servicing	3
2.2	2.1 Water	3
2.2	2.2 Sanitary	1
2.2	2.3 Storm	1
2.3	Existing Soils Information	1
2.4	Reviewing Agencies	1
2.4	4.1 Township of Centre Wellington	1
2.4	4.2 Ministry of Transportation	1
2.4	4.3 Grand River Conservation Authority	5
3.0	Proposed Grading and Servicing Strategy	5
3.1	Proposed Grading	5
3.2	Proposed Servicing	5
3.2	2.1 Water	5
3.2	2.2 Sanitary	7
3.2	2.3 Storm	7
4.0	Preliminary Storm Water Management Design	7
4.1	SWM Criteria	7
4.2	Water Quantity Control	3
4.3	Water Quality Control	2
4.4	Water Balance	2
4.5	Erosion and Sedimentation Control15	5
5.0	Conclusions	3

# Figures

Figure 1.0 – Site Location Plan	2
Figure 2.0 – Pre-Development Catchment Areas	9
Figure 3.0 – Post-Development Catchment Areas	.10
Figure 4.0 – Post-Development Water Balance Catchment Areas	.13

# Tables

Table 2.1 – Results of Flow Tests	. 3
Table 3.1 – Required Fire Flow	. 6
Table 4.1 – Catchment Parameters	. 8
Table 4.2 – Summary of Flows (MIDUSS Modelling)	11
Table 4.3 – Yearly Water Balance Summary	14

# Appendices

Appendix A	Design Sheets
Appendix B	MIDUSS Output
Appendix C	Stormceptor Sizing
Appendix D	Water Balance

# Drawings

Existing Conditions Plan	
MTE Drawing No. C1.1	Appended Seperately
Functional Site Grading Plan MTE Drawing No. C2.1	Appended Seperately
Functional Site Servicing Plan MTE Drawing No. C2.2	Appended Seperately

# **1.0 INTRODUCTION**

MTE Consultants Inc. was retained by 2687734 Ontario Inc. to complete a Functional Servicing and Stormwater Management (FSSWM) Report in support of the Zoning By-Law Amendment and Vacant Lot Condominium applications for the proposed residential development to be constructed at 961 St. David Street North/Highway 6 (herein referred to as 'the Site') in the Township of Centre Wellington.

The purpose of this study is to support the Zoning By-Law Amendment and Vacant Land Condominium applications. This will be accomplished by reviewing the opportunities and constraints for the subject property with respect to servicing, grading, and stormwater management; reviewing the requirements of the reviewing agencies; describing the development concept; and demonstrating the functional serviceability of the property. Pending approval of the applications, detailed design of the Site will commence and be submitted to the Township of Centre Wellington and other governing agencies in support of the applications and Site Plan Approval.

## 1.1 Site Description

The Site encompasses an area of 1.402ha, and is currently comprised of a single detached dwelling, several accessory buildings, and an asphalt driveway off 961 St. David Street North/Highway 6. The property is bounded to the west, south, and east by existing residential development, and to the northeast by St. David Street North/Highway 6. For the exact location of the Site refer to Figure 1.0.

The current zoning of the Site is Residential R1a Zone. A Zoning By-Law Amendment will be required to re-zone the Site to Residential R3 Zone to permit the proposed Vacant Land Condominium development.

# 1.2 Proposed Development

The proposed development for the Site is a Vacant Land Condominium, consisting of 12 single-detached houses, and 37 townhouse units, complete with a common element roadway and driveway entrance off St. David Street North/Highway 6.

SIDE ROAD 18

# 961 ST. DAVID STREET NORTH



ST. DAVID STREET

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961 ST.DAVID STREET NORTH

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# 2.0 EXISTING CONDITIONS

# 2.1 Topography

Existing topographic information for the Site was obtained from a detailed survey completed by MTE in February 2021. The Site's frontage along St. David Street North/Highway 6 has an approximate slope of 2% from west to east. There is an existing ditch along the south side of the highway along the Site's frontage, with an approximate slope of 1% from west to east. The road elevation is approximately 0.8m to 1.0m above the property line elevation along the Site's frontage. The northeast end of the Site is sloped towards St. David Street North/Highway 6, with high point elevations of 424.5mASL around the existing buildings, and a low point elevation of approximately 422.4mASL at the northeast corner of the Site. The southwest portion of the Site is sloped towards the southwest property line, with a high point elevation of 424.5mASL near the approximate center of the property, and a low point elevation of 422.6mASL along the southwest property line.

# 2.2 Existing Servicing

Existing servicing information within the surrounding right-of-way was obtained from the topographic survey, from plan and profile information provided by the Township of Centre Wellington, and from MTE plan and profile drawings.

## 2.2.1 Water

There is currently an existing 300mm diameter watermain on the far (north) side of St. David Street North/Highway 6. There is an existing 150mm diameter water service from this watermain that is extended underneath St. David Street North/Highway 6 to the property line near the northern corner of the Site.

There are two existing municipal fire hydrants located on the north side of St. David Street North/Highway 6 near the Site. One is located approximately 94m to the north of the existing driveway entrance, and one is located approximately 69m to the south of the existing driveway entrance. A flow test was performed at the aforementioned hydrants by Classic Fire and Life Safety on June 21, 2022. Refer to Table 2.1 below for a summary of the flow test results.

Results of Flow Tests Completed June 21, 2022 by Classic Fire & Life Safety								
Test #	Test #Outlet Inside Diameter (in.)Number of OutletsPitot Pressure (PSI)Residual Pressure (PSI)Flow @ Residual (gal/min)							
1	n/a	n/a	n/a	46	0			
2	2.5	1	20	40	751			
3	2.5	2	12 + 14	38	1,209			

Table 2.	1 –	Results	of	Flow	Tests
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Refer to Appendix A for further details.

## 2.2.2 Sanitary

There is an existing 300mm diameter municipal sanitary sewer along the far (north) side of St. David Street North/Highway 6 which drains southeast, at a depth of approximately 5.7m to 6.6m below the centreline elevation of the road. There is an existing 150mm diameter sanitary service from the Site to the 300mm diameter sewer, extended to an existing manhole near the northern corner of the Site. The depth of the 150mm diameter service at the manhole is approximately 4.8m.

#### 2.2.3 Storm

There is an existing 500mm diameter Corrugated Metal Pipe (CMP) culvert underneath the existing driveway entrance, draining southeast in the ditch along the Site's frontage with St. David Street North/Highway 6. The culvert obvert is at a depth of approximately 1m below the existing grade of the driveway.

# 2.3 Existing Soils Information

A Geotechnical Investigation was completed for the Site by MTE in June 2023. Four boreholes were advanced to depths between 5.0 and 6.7m below grade. The investigation revealed the subsurface soil conditions as being generally comprised of surficial topsoil underlain by native silt and sand deposits.

Monitoring wells were installed in three of the boreholes to facilitate monitoring and measurement of groundwater elevations. Groundwater elevations measured in August 2023 were found to be between 1.7m-2.7mm below grade, at elevations of 421.2 to 421.8 meters above sea level (masl). Ongoing monitoring of the groundwater levels is being completed as part of a Hydrogeological Investigation for the Site, also being completed by MTE.

The complete Geotechnical Investigation and Hydrogeological Investigations are included in the resubmission package under separate cover.

The Tile Drainage layer on OMAFRA Ag-Maps GIS mapping indicates that systematic tile drainage may be present on the southwestern half of the Site.

# 2.4 Reviewing Agencies

## 2.4.1 Township of Centre Wellington

Functional grading, servicing and stormwater management designs as well as this Functional Servicing and Stormwater Management Report will be required for submission to the Township of Centre Wellington in support of the Zoning By-Law Amendment and Vacant Land Condominium applications. The Township will also be responsible for the review and approval of site plans, site grading, servicing, stormwater management, lighting and landscape design and ultimately issuing building permits.

## 2.4.2 Ministry of Transportation

St. David Street North is a part of Highway 6, a provincially maintained highway. As such, the Ministry of Transportation (MTO) will be circulated on the Zoning By-Law Amendment and Site Plan Applications and will need to approve the site grading, servicing and stormwater management designs. An entrance permit will need to be obtained from the MTO for the new entrance off St. David Street North/Highway 6.

## 2.4.3 Grand River Conservation Authority

The Site also falls within the area regulated by the Grand River Conservation Authority (GRCA). As such, the site engineering design will also be submitted to the GRCA for review and approval.

# 3.0 PROPOSED GRADING AND SERVICING STRATEGY

Preliminary grading and servicing strategies have been developed based on the topographic survey, plan and profile information, and the Concept Plan provided by MHBC, dated October 2, 2023. Refer to the enclosed MTE Drawings C2.1 and C2.2 for details. These grading and servicing strategies will be further refined during detailed design during the Site Plan Approval process.

## 3.1 Proposed Grading

The proposed vacant land condominium development consists of 12 single-detached houses and 37 townhouse units, complete with a common element roadway and driveway entrance from St. David Street North/Highway 6. The proposed grading strategy will respect the existing grades along St. David Street North/Highway 6, and all other property boundaries. The majority of the grading internal to the Site will involve directing stormwater runoff to the existing ditch along the south side of St. David Street North/Highway 6. Stormwater runoff will be conveyed to the existing ditch via an on-site storm sewer system, and via a rear-yard swale along the southeast property line. For the units along the south end of the Site, runoff from the rear of the units will continue to drain to the southwest property line. Refer to MTE Drawing C2.1 for an illustration of the functional grading design.

## 3.2 Proposed Servicing

The following sections provide details regarding the preliminary proposed water, sanitary and storm servicing for the proposed development. Refer to MTE Drawing C2.2 for an illustration of the functional servicing design.

#### 3.2.1 Water

The existing 150mm diameter water service currently extended to the northern corner of the Site will service the proposed development. At the property line, the 150mm diameter watermain will be upsized to 250mm diameter, and will be extended in the common element roadway to service each unit. Each unit will be serviced off the proposed watermain with a 25mm diameter domestic water service connection. It is anticipated that two on-site fire hydrants will also be required for the proposed development, as shown on the enclosed MTE Drawing C2.2.

#### Water Demand

Various guidelines and references exist for calculating the required water supply for firefighting purposes. In Ontario, there are two standards/guidelines that are most often referenced:

- Ontario Building Code (OBC) provincial codes and guidelines published by the Ministry of Municipal Affairs and Housing for the Province of Ontario; and
- The Fire Underwriters Survey (FUS) an insurance industry guideline.

Many municipalities in Ontario use both the OBC and the FUS fire flow requirements for assessing firefighting water supply requirements. Ideally, fire flow demands for new developments are calculated based on the FUS criteria; however, it is not always reasonable to expect that the local existing municipal infrastructure has the operational capacity to supply water at the rates prescribed in the FUS guidelines. As a result, at no time shall the available fire flow be less than that required by the Ontario Building Code.

The pressures and flows at the proposed private hydrant must be sufficient for firefighting conditions as established by the Ontario Building Code (2012). The minimum residual pressure permitted under firefighting conditions is 140.0kPa (20.3psi) per OBC 2012 A-3.2.5.7 3(b).

The buildings are proposed to be of wood frame construction (combustible construction). For the purposes of this analysis, the worst-case scenario was determined to be the future townhouse building located on Units 28-32. This building has the largest allowable footprint, and in a firefighting scenario the hydrant furthest from the connection the municipal main will be utilized. The OBC and FUS requirements were calculated for this worst-case scenario for reference and are shown in Table 3.1. Refer to Appendix A for detailed calculations.

Building	OBC (L/s)	FUS (L/s)
Proposed Building*	4,500	17,000

#### Table 3.1 – Required Fire Flow

• A detailed analysis will need to be completed once the final building design has been completed Additional fire walls may be required once the final plans are developed.

For this design, pressure and flow information for the existing 300mm diameter municipal watermain in the St. David Street North/Highway 6 right-of-way was taken from the hydrant flow testing results as detailed in Section 2.2.1.

The minimum water supply flow rate for the proposed development is 283.0L/s (17,000L/min) based on the calculation method specified in the FUS. The residual pressures at the proposed hydrants are less than the minimum allowable pressure of 140kPa based on the FUS calculation method.

The minimum water supply flow rate for the proposed development is 75.0L/s (4,500L/min) based on the calculation method specified by the OBC. The residual pressure at the proposed hydrant was calculated to be 184kPa at a flow rate of 75.0L/s (4,500L/min), which is greater than the minimum allowable pressure of 140kPa per OBC 2012. Therefore, the proposed watermain configuration is expected to be sufficient. Based on a maximum day domestic demand of 0.44L/s and the fire flow demand of 75.0L/s, the total water demand for the Site is expected to be 75.4L/s.

The fire flow demand calculations completed in this report assume that the proposed buildings will have two above grade stories. Should the buildings increase to a height of 3-storeys as

design progresses, fire walls may be required to meet previously described pressure and flow requirements set forth by the OBC.

#### 3.2.2 Sanitary

A sanitary flow design sheet has been prepared to determine the flows anticipated to be generated by the proposed development. With the 12 units proposed for detached homes and 37 units proposed for townhouses, the resulting peak flow rate from the Site is expected to be 2.42L/s. Refer to Appendix A for the Sanitary Flow Design Sheet.

A 150mm diameter private sanitary sewer will be connected to the existing sanitary manhole near the northern corner of the Site, and will be extended throughout the common element area of the Site, servicing each of the proposed units.

The proposed 150mm diameter sanitary sewer has a minimum design slope of slope of 1.00%, corresponding to a full flow pipe capacity of 15.22L/s. Therefore, the proposed 150mm diameter sanitary sewer has sufficient capacity for this development.

#### 3.2.3 Storm

A private storm sewer system is proposed along the common element roadways within the proposed development. The storm sewer system, which will include several catchbasins, manholes, and catchbasin manholes, will convey runoff from the roadways, driveways, landscaped areas, and several of the building roofs through an oil and grit separator unit (OGS) before discharging to the existing ditch along the south side of St. David Street North/Highway 6. A storm sewer design sheet for the last pipe run from the Site is included in Appendix A. The major overland flow route for the Site will be to the existing ditch along St. David Street North/Highway 6.

Specifications and details of these proposed servicing strategies will be further refined during detailed design.

# 4.0 PRELIMINARY STORM WATER MANAGEMENT DESIGN

## 4.1 SWM Criteria

In the existing condition, stormwater runoff from the northeastern end of the Site is directed to the existing ditch along St. David Street North/Highway 6. Stormwater runoff from the southwestern end of the Site is directed to the southwest property line, where it subsequently sheet flows across the adjacent property before reaching a GRCA regulated wetland, and ultimately Municipal Drain No. 1.

The stormwater management design criteria for the Site, as established by the MTO, the GRCA, and the Township of Centre Wellington, are as follows:

- i) Attenuation of the post-development peak flows for the 2-, 5-, 10-, 25-, 50-, and 100-year storm events to the pre-development (existing) peak flows;
- ii) Implementation of Enhanced (Level 1) water quality controls;
- iii) Implementation of Erosion and Sediment Control Measures; and
- iv) Provide an infiltration water balance for the entire Site area, and a surface runoff water balance for the portion of the Site draining to the wetland.

# 4.2 Water Quantity Control

In order to successfully complete the preliminary stormwater management design for the Site, the following specific tasks were undertaken:

- i) Calculate the allowable runoff rates using MIDUSS NET;
- ii) Determine the percent impervious of the Site and catchment parameters for inclusion in MIDUSS NET modelling; and
- iii) Calculate post-development runoff hydrographs using MIDUSS NET.

The following table summarizes the catchments used in modelling the Site. The pre-development condition was separated into two catchments areas: the southwestern portion of the Site that drains to the southwest property line and ultimately to the wetland, and the northeastern portion of the Site that drains to St. David Street North/Highway 6. The post-development condition was separated into three catchment areas: the uncontrolled area directed to the southwest property line, the controlled area directed to St. David Street North/Highway 6, and the uncontrolled area directed to St. David Street North/Highway 6. Figure 2.0 illustrates the limits of the pre-development catchment areas. Figure 3.0 illustrates the limits of the post-development catchment areas.

#	Catchment	Area (ha)	% Impervious	Pervious CN	Impervious CN	Slope (%)	Flow Length (m)
Pre-D	evelopment Catchment A	reas					
101	Area to southwest property line, ultimately to wetland	0.804	0%	75	98	2.0	100
102	Area to Highway 6	0.598	9%	75	98	5.0	90
Post-	Development Catchment A	Areas					
201	Uncontrolled Area to Southwest Property Line	0.136	46%	75	98	2.0	15
202	Controlled Area to Highway 6	0.962	70%	75	98	2.0	15
203	Uncontrolled Area to Highway 6	0.304	23%	75	98	2.0	120

#### Table 4.1 – Catchment Parameters

As previously described, a geotechnical investigation was completed for the Site by MTE. Based on the underlaying sand and silt soils, a pervious CN of 75 for grassed areas is appropriate.





In order to achieve the stormwater requirements for the Site, runoff generated from Catchment's 201, and 203 and from the rear roofs of Catchment 202 will be directed to a 0.45m deep layer of amended topsoil in the landscaped areas of the units. The amended topsoil will allow for increased infiltration and runoff volume reduction in these catchments. Runoff generated from Catchment 202 will be conveyed to catchbasin manhole CBMH16, wherein the flow will be controlled with a 75mm orifice tube, and a 6.0m wide weir in the common element drive aisle Storage volume will be provided by an underground storage tank the storm sewers and structures, and by surface ponding on the surface of the common element driveway. The following table summarizes the flows generated by the Site for each storm event. The post-development flow rates are subject to change during detailed design.

	Pre-Developm	ent (m³/s)	Post-Development (m <sup>3</sup> /s)		
Modeling Condition	Area to Southwest Property Line	Area to Highway 6	Area to Southwest Property Line	Area to Highway 6	
2-Year Storm Event	0.005	0.011	0.001	0.014	
5-Year Storm Event	0.012	0.017	0.005	0.019	
10-Year Storm Event	0.019	0.022	0.009	0.023	
25-Year Storm Event	0.032	0.031	0.016	0.031	
50-Year Storm Event	0.041	0.040	0.022	0.038	
100-Year Storm Event	0.057	0.052	0.029	0.048	

Table 4.2 – Summary of Flows (MIDUSS Modelling)

With the installation of the orifice tube, the post-development runoff from the controlled portion of the Site for the 2-, 10-, 25-, 50- and 100-year storm events is controlled to 0.012m<sup>3</sup>/s, 0.015m<sup>3</sup>/s, 0.017m<sup>3</sup>/s, 0.022m<sup>3</sup>/s, 0.022m<sup>3</sup>/s, and 0.037m<sup>3</sup>/s, respectively.

The total post-development peak flows to St. David Street North/Highway 6 exceed pre-development levels for the 2-, 5-, and 10-year storm events; however, a 75mm orifice tube is considered to be the minimum acceptable diameter, therefore additional reduction of the post-development peak flows is not considered to be feasible and the increased runoff is minimal.

The maximum ponding depth in the common element driveway is 0.17m for the 100-year storm event. As above, the ponding values are subject to change at detailed design. Please refer to Appendix B for the MIDUSS outputs.

# 4.3 Water Quality Control

A Stormceptor Model EFO4 will be installed on the storm sewer system to provide water quality control for the Site. The chosen unit is expected to provide Enhanced (Level 1) water quality control. Refer to Appendix C for the sizing output from the Stormceptor Expert program. The Stormceptor will require regular annual maintenance to ensure it is operating properly. The owner may be required to enter into a maintenance agreement with a suitable contractor to complete this work. In addition, all the storm structures will have a 600mm sump.

# 4.4 Water Balance

The GRCA requires that the Site's existing hydrologic patterns related to infiltration and the wetland be maintained. As previously discussed, in the pre-development condition runoff from Catchment 101 is conveyed overland southwest across the adjacent property to a GRCA regulated wetland. Runoff from the remainder of the Site (Catchment 102) is conveyed northeast to the existing ditch on St. David Street North/Highway 6. Based on feedback from the GRCA, it is understood that infiltration inputs across the whole Site, and surface runoff inputs to the wetland are required be maintained post-development.

As previously noted, the Tile Drainage layer on OMAFRA Ag-Maps GIS mapping indicates that systematic tile drainage may be present on the southwestern half of the Site. Mapping of any tile drainage on the Site was not available at the time of publishing this report. Based on the surrounding topography and extent of the Tile Drainage layer, should any tile drainage exist on the Site, it is expected to outlet to the wetland area southwest of the Site. Although tile drainage may decrease surface runoff, it is expected that the total water yield to the wetland (lateral groundwater flow + surface runoff + tile flow) from the Site in the existing condition is not expected to be significantly different than if the Site were not systematically tiled. Therefore for the purposes of the water balance, the existing runoff, infiltration, and evapotranspiration components will be calculated based on the soil type, land cover, and topography of the Site. As groundwater monitoring continues as part of the MTE hydrogeological investigation, the impact of any existing tile drainage on groundwater levels will be assessed, particularly in relation to proposed building basements and footings.

The pre-development water balance catchment areas for the Site are as per Table 4.1 and Figure 2.0. The post-development condition water balance was separated into four catchment areas: the rear roofs and yards of townhouse units along the southwest property line where runoff is conveyed to the wetland (Catchment 401); the front roofs and yards of these units, and the common element area (Catchment 402-1); the townhouse units where runoff is conveyed to Highway 6 (Catchment 402-2); and the single detached units (Catchment 403). Figure 4.0 illustrates the limits of the post-development catchment areas.



Canadian Climate Normal data provides an annual precipitation estimate of 945.7mm/year for the Fergus Shand Dam, which was rounded to 946mm/year for the purposes of the water balance.

To achieve the water balance requirements for the Site, a 0.45m thick layer of amended topsoil will be placed in the landscaped areas of Catchments 401, 402, and 403. Runoff from rooftop areas in these catchments will be conveyed to the amended topsoil, increasing infiltration and decreasing runoff. The following table summarizes the pre- and post-development annual surface runoff and infiltration volumes from the Site. Refer to Appendix D for detailed calculations.

		Pre- Development	Post- Development	Volume Change	Percentage Change
Runoff Volume (m³/year)	Directed to Wetland	571	494	-77	-14%
	Directed to St. David Steet North/Highway 6	819	5,621	+4,802	-
Infiltration Volume (m³/year)	Total Site	3,869	3,961	+91	+2%

#### Table 4.3 – Yearly Water Balance Summary

In the existing condition the annual surface runoff volume to the wetland is 571m<sup>3</sup>/year. In the post-development condition, the annual surface runoff volume decreases slightly to 494m<sup>3</sup>/year, representing a decrease of 14%. Given the relatively small pre-development runoff volume, and the grading constraints of the proposed development that limit what drainage can be directed to the southwest property line while maintaining an overland flow route to the right-of-way, the 14% decrease is considered to be within the acceptable range of a balanced condition.

The post-development surface runoff volume to St. David Street North/Highway 6 represents an increase of 4,802m<sup>3</sup>/year from the pre-development condition. An increase in runoff volume is to be expected when development occurs. As discussed in Section 4.2, there is only a minor increase in post development peak flow rates to St. David Street North/Highway 6 in the post-development condition during the 2-, 5-, and 10-year storm events. Therefore, the increase in runoff volume to the St. David Street North/Highway 6 ditch is considered to be acceptable.

In the existing condition, the annual infiltration volume from the Site is 3,869m<sup>3</sup>/year. In the postdevelopment condition, the annual infiltration volume is 3,961m<sup>3</sup>/year, representing an increase of 2%, which is considered to be negligible.

# 4.5 Erosion and Sedimentation Control

Precautions will need to be taken during construction to limit erosion and sedimentation. Typically, the following measures are recommended during construction for erosion and sedimentation control:

- Erosion and sedimentation facilities are to be installed prior to any area grading operations;
- ii) All erosion control measures are to be inspected and monitored by the contractor and repairs are to be completed as required;
- iii) All materials and equipment used for the purpose of site preparation and project completion should be operated and stored in a manner that prevents any deleterious substance from leaving the site; and
- iv) To minimize the amount of mud being tracked onto the roadway, a mud mat should be installed at the primary construction entrance.

# 5.0 CONCLUSIONS

Based on the foregoing, it is concluded that:

- i) Municipal infrastructure for water and sanitary services is available along St. David Street North/Highway 6;
- ii) A fire flow analysis has been completed and demonstrates that adequate flow and pressure is available from the proposed on-site hydrants;
- iii) The water supply needs of the proposed development will not exceed what is available in the existing municipal water distribution system;
- iv) The proposed grading design will respect the natural topography of the Site to achieve a reasonable cut/fill balance where possible and match into existing grades along all property boundaries; and
- v) The SWM criteria can be satisfied with the implementation of on-site controls for water quantity and water quality.

Detailed grading and servicing designs and a detailed stormwater management design will be provided during detailed design in support of Site Plan Approval and Building Permits.

All of which is respectfully submitted,

#### **MTE Consultants Inc.**

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# **Design Sheets**





FIRE + LIFE SAFETY

# FLOW TEST REPORT Form SD-003B RevDate: Nov 29, 2021

	PROJECT INFORMATION											
Project Name:	Fergus Flow Test	Const. Project #:	22-CAM-690-0568									
Site Address:	961 St. David Street/Highway 6 Fergus	Design Project #:	2022-CFLS-359									
City Contact:	Mike Mullen	Phone #:	519-501-7252									
CFLS Contact:	Dean Wanders	Phone #:	905-514-7417									
Technical Contact:	Andy Coghlin	Phone #:	519-476-0761									





# FLOW TEST REPORT Form SD-003B RevDate: Nov 29, 2021

				TES	ST INFO	DRMA	TIC	N				
Minimur	m Required F	-low:	NA							Min Ports:	2	
CFLS P	ersonnel Pre	sent:	Dean \	Wanders						Test Date:	2022-06-21	
City / Ex	kternal Comp	any:	Infrast	ructure Serv	ices					Test Time:	1:00pm	
				Т	EST EQ	UIPME	NT					
🗌 Hose	e Monsters w	ith bui	lt in Pite	ot		Hose	len	igth used:				
Hand	□ Hand held pitot gauge											
Othe	r:											
				•	TEST R	ESULT	S					
Number of Ports	Outlet Size (IN)	Disc Coel	harge fficient		Pitot F (F	Reading SI)			-	Total Flow (GPM)	Static / Residual Pressure (PSI)	
0 Ports					STATIC						46	
1 Port	2.5	0.9			2	:0				751	40	
2 Ports	2.5	0.9		12			1	4		1,209	38	
3 Ports	2.5	0.9				•				0		
4 Ports	2.5	0.9			·					0		
0 Ports				STAT	IC RE-C	HECK					46	
	TEST NOTES											

HYDRAULIC ADJUSTMENTS (FOR OFFICE USE ONLY)											
ADJUSTMENTS FOR HYDRAULIC GRADE LINE (HGL)											
Reservoir HGL (m): Site Elevation (m):											
Theoretical Static Head (PSI):	0	PSI to subtract from test pressures:	46								
ОТ	HER HYDRAUL	IC ADJUSTMENTS									
Other adjustment as required by the City / AHJ:											



## 961 St. David Street

FIRE FLOW DEMANDS

Kitchener, Ontario Project #: 48650-100 Date: Revised: 2023-10-10 Date Printed: 10/10/2023 By: NGK

								Fire Flow <sup>2,3</sup>									Dome	stic Flov	N <sup>4,5,6</sup>									
		Developm	ent Info	rmation <sup>1,2</sup>					Ont	tario B	uilding (	Code					Fire Under	writers Su	urvey									
Node ID / Area ID / Building #	F.F.E. (m.a.s.l.)	Description	# of Units	Population	Bldg Area (1 <sup>st</sup> Floor)	Total Bldg Area	Building Volume	к	V	S <sub>tot</sub>	Q	F	F	с	A	F	<b>(2)</b> Occupancy Reduction	<b>(3)</b> Sprinkler Protection	<b>(4)</b> Building Exposure	F	F	Fire Flow (Max OBC/FUS)	MOE Guidelines	Average Day	Max Day	Peak Hour	Minimum Hour	Max Day + Fire Flow
				# of people	m²	m²	m³		m°		L	L/min	L/s		m²	L/min				L/min	L/s	L/s	L/s	L/s	L/s	L/s	L/s	L/s
Units 1-12		Detached Houses	12	39	135	270	1,316	23	1,316	2.00	60,548	2,700	45	1.50	270	5,422	-15%	0%	75%	8,000	133	133	0.102	0.102	0.134	0.419	0.041	134
Units 13-18		Townhouses	6	15	504	1,008	3,024	23	3,024	2.00	139,104	4,500	75	1.50	1,008	10,477	-15%	0%	75%	16,000	267	267	0.038	0.038	0.050	0.157	0.015	267
Units 19-22		Townhouses	4	10	336	672	2,016	23	2,016	2.00	92,736	2,700	45	1.50	672	8,555	-15%	0%	75%	13,000	217	217	0.025	0.025	0.034	0.105	0.010	217
Units 23-27		Townhouses	5	12	423	846	2,538	23	2,538	2.00	116,748	3,600	60	1.50	846	9,598	-15%	0%	75%	14,000	233	233	0.032	0.032	0.042	0.131	0.013	234
Units 28-32		Townhouses	5	12	580	1,160	3,480	23	3,480	2.00	160,080	4,500	75	1.50	1,160	11,239	-15%	0%	75%	17,000	283	283	0.032	0.032	0.042	0.131	0.013	284
Units 33-38		Townhouses	6	15	486	972	2,916	23	2,916	2.00	134,136	3,600	60	1.50	972	10,288	-15%	0%	75%	15,000	250	250	0.038	0.038	0.050	0.157	0.015	250
Units 39-43		Townhouses	5	12	400	800	2,400	23	2,400	2.00	110,400	3,600	60	1.50	800	9,334	-15%	0%	75%	14,000	233	233	0.032	0.032	0.042	0.131	0.013	234
Units 44-49		Townhouses	6	15	480	960	2,880	23	2,880	2.00	132,480	3,600	60	1.50	960	10,225	-15%	0%	75%	15,000	250	250	0.038	0.038	0.050	0.157	0.015	250
	· · · · ·	TOTALS FOR SITE	49	129							Max Fire	Flow =	75						Max Fir	e Flow =	283	283	0.34	0.34	0.44	1.39	0.13	284
																					5	Sum of Ma	aximum Da	y Flows +	Largest	Fire Flo	ow (L/s) =	284

#### Assumptions:

1 Number of units are based on the Conceptual Plan by MHBC Ltd., dated March 23, 2022

2 Residential population is calculated using a Persons Per Unit (PPU) count taken from "Region of Waterloo Water and Wastewater Monitoring Report" (WWWMR) (Region of Waterloo, June 2021) Residential = 3.25 PPU for Single and Semi-Detached houses

Residential = 2.44 PPU for Townhouses

3 All buildings are classified as occupancy group C (Residential Occupancy)

4 Average Daily Demands for each building are based on "Tri City Water Distribution Master Plan Final Report" by AECOM, Dated May 2009:

Residential = 225 L/cap/day

5 Peaking Factors based on "Design Guidelines for Drinking-Water Systems" (MOE, 2008):

Average Day = 1 Maximum Day = 2.75 Peak Hour = 4.13 Minimum Hour = 0.4

6 Maximum Day Demand is based on "Centre Wellington Reserve Capacity Calculations (RCC) (2021)

Maximum Day = 297 L/capita/day



## 961 St. David Street

FIRE FLOW ANALYSIS

Fergus, Ontario Project Number: 48650-100

Date: Revised October 26, 2023

Design By: NGK

P2 - Residual Pressure

## File: Q:\48650\100\Water\48650-100\_Site Fire Flow Analysis with test results.xlsx

1. Boundary Conditions (Based on Fire Flow Test Results):												
	Metric	Imperial										
P0 - Starting Pressure	32.35 <i>m</i>	46.0 psi										
P1 - Pressure at Q1	26.72 m	38.0 psi										
Q1 - From Fire Flow Test	4577 L/min	1209 U.S. gal/min	From: Hydrant Flow Tes Results									
Q2 - Required Flow	4500 L/min	1189 U.S. gal/min	From: Water Demand calculations by MTE									
P-loss 1	5.63 m	8 psi										
P-loss 2	5 45 m	8 psi										

26.90 m

2. Friction Losses Through Water Service:

2. Thetion Losses Through Wat	er Service. Motrio	Imporial	
	Wethe	Imperial	
C <sub>hw</sub> = Pipe Friction Factor	150	150	
k = conversion factor	10.675	4.727	
n = constant	1.852	1.852	
m = constant	4.8704	4.8704	
Q = Flow	4500 L/min		
Q = Flow	0.075 m <sup>3</sup> /s	1189 U.S. gal/min	
d = Pipe Diameter (1)	150 mm	5.91 in	
	0.15 m		
d = Pipe Diameter (2)	250 mm	9.84 in	
	0.25 m		
p = Loss/Length (1)	0.0846 m/m	0.0367 psi/ft	
p = Loss/Length (2)	0.0070 m/m	0.0030 psi/ft	
Length (1)	36 m	118 ft	Service under road & hydrant lead
Length (2)	132 m	433 ft	
Loss	3.98 m	5.7 psi	
	39 kPa	-	

38 psi

3. Friction Losses Through Apurten	ances:					
Apurtenances	Number	K	Velocity	Head Loss	Tota	Loss
			m/s	m	т	psi
Site						
Valve - 150mm dia.	2	0.120	4.244	0.110	0.220	0.313
Expander - 150mm to 250mm dia.	1	2.127	4.244	1.953	1.953	2.777
45° Bend - 150mm dia.	1	0.240	4.244	0.220	0.220	0.313
45° Bend - 250mm dia.	3	0.224	1.528	0.027	0.080	0.114
250mm dia. Tee (through)	1	0.280	1.528	0.033	0.033	0.047
150mm dia. Tee (branch)	2	0.900	4.244	0.826	1.653	2.350
Total Minor Losses					4.159	5.914
4. Elevation - Elevational differences	from exist	ting hydra	ant to prop	oosed hydrar	nt	
			М	etric	Imp	erial
Elevation at Boundary (i.e. Residual Hy	/drant):		424.00	m	1391	ft
Elevation at Site Hydrant:			424.00	m	1391	ft
Elevation Diff	erence = L	oss/Gain	0	m	0.0	psi
ANALYSIS SUMMARY						
Total Losses		8.135	m			
		79.80	kPa	11.6	psi	
Residual Pressure after Losses		18.76	m			
		184	kPa	26.7	psi	PASS
Allowable Residual Pressure		140	kPa	20.3	psi	

961	St. David Stree	t															De	sign P	aramete	rs										
Ferg	gus, Ontario				:	SANITA	RY SEV	VER DE	ESIGN	SHEET		Averag	e Daily Fl	ow				Mannin	ıgs " <i>n"</i>	0.013	3									
том	NSHIP OF CENTRE W	ELLING	TON		-							Reside	ntial	350.00	) L/capita	a/day		Min. Ve	locity	0.6	6 m/sec									
Proje	oct Numbor:	48650	100			ENGINE	EERING	AND PU	BLIC W	URKS		Comme	ercial	1.16	5 L/s/ha			Max. Ve	elocity	3.( an Daaking	) m/sec	F = 4 + 44	// D <sup>0.5</sup>							
Date	:	Octobe	r 28, 202	23	Drainage A	rea Plan No:				n/a		Inst. / S	School	0.25	5 L/s/ha			Comme	ercial Peak	ing Factor	= 2.5	F = I + I4	/(4 + P)							
Desi	gn By:	NGK																Reside	ntial Areas	Infiltration	<sup>1</sup> 0.15	L/s/ha								
Cheo File	cked By:	JPL 0:\48650	\100\Sanit:	an\\48650-1	00 Sanitary Sev	ver Desian Shee	et Waterloo (SS	MS) Rev7 vis																						
	LOCA	TION	100104114			RESIDE		EAS ANI	POPUL	ATION		INS	SCHOO STITUTIC	L, DNAL	co	OMMERC	IAL	I	NDUSTR	RIAL		IN	FILTRAT	ION			D	ESIGN		
			MAN	HOLE		No.	No.			PEAK	PEAK			HECT	ARES AN	ND FLOW	OF EACH	ZONIN	G		TOTALS-				TOTAL					
	STREET	AREA NO.	FROM	TO TO	AREA	UNITS @ 3.25	UNITS @ 2.44	POPUL.	POPUL.	FACTOR	RES.		0.25 CUMUL	L/s/ha PEAK		1.16 CUMUL	L/s/ha PEAK		0.5 CUMUL	0 <i>L/s/ha</i> . PEAK	C-I	AREA	AREA	FLOW	VOLUME	LENGTH	SLOPE	PIPE SIZE	CAPACITY	VELOCITY
			MH	MH		PPU	PPU			"+"	FLOW	AREA	AREA	FLOW	AREA	AREA	FLOW	AREA	AREA	FLOW	FLOW				FLOW					
					ha			1000s	1000s		L/sec	ha	ha	L/sec	ha	ha	L/sec	ha	ha	L/sec	L/sec	ha	ha	L/sec	L/sec	т	%	mm	L/sec.	m/s
Prop	osed development				1.402	12.00	37.00	0.129	0.129	4.211337	2.2055											1.402	2 1.40	2 0.2103	3 2.4158	3 50.0	) 1.00	150	15.2217	0.862

961 St. David St	treet									Des	sign Parame	eters					
Fergus, Ontario	(alliantan			STO	RM SEV	VER DE	SIGN SH	IEET	5 YEAR ST	ORM							
Project Number: Date: Design By: Checked By: File:	48650-100 November 1 NGK JPL Q:\48650\100\S	0, 2023 torm\Storm Sewe	er Design Sheet I	ENGI	NEERING ea Plan No: .xlsx	g and pi	JBLIC W	ORKS	Q=kAIC, k=( Intensity (I) : a = b = c =	0.00278 = a/(tc+b) <sup>c</sup> 500 0.24 0.6877	Manning's "n" Min. Velocity Max. Velocity	0.013 0.800 6.000	m/s m/s		51		Έ
	LOCATION	1					STORMW	ATER FLO	w					DE	SIGN		
STREET	AREA NUMBER	MANHOLE FROM MH	LOCATION TO MH	AREA (A)	RUNOFF COEFF. (C)	AxC	CUMUL. A x C	CONCEN TI TOTAL	ITRATION ME IN PIPE	RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	PIPE FULL
				ha		ha	ha	min	min	mm/hr	L/s	mm	m	%	L/s	m/s	%



# **MIDUSS** Output



## Q:\48650\100\SWM\2yr pre.Out Printed at 08:37 on 30 Oct 2023

1	"			MIDUSS Output				>"
2	"			MIDUSS version		Ve	ersion 2.25	rev. 473"
3	"			MIDUSS created		Sund	lay, Februa	ry 7, 2010"
4	"		10	Units used:				ie METRIC"
5	"			Job folder:			Q:\486	50\100\SWM"
6	"			Output filename:			2	yr pre.Out"
7	"			Licensee name:				A''
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9	"			Date & Time last u	ised:	10/2	27/2023 at 2	2:02:20 PM"
10	"	31	TI	IME PARAMETERS"				
11	"		5.000	Time Step"				
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54			T.	lme to Centroid	181.077	97.331	181.077	minutes"
55			Ra	aintall depth	31.396	31.396	31.396	mm''
56			Ra	aintall volume	252.42	0.00	252.42	c.m"
5/			Ra	aintall losses	26.511	5.151	26.511	mm''
58			Ru	inoff depth	4.885	26.245	4.885	mm''
59			Rı	inoff volume	39.28	0.00	39.28	c.m"
60			Rı	nott coefficient	0.156	0.000	0.156	··· /
61			Ma	aximum flow	0.005	0.000	0.005	c.m/sec"
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66			1	"Irlangular SCS"				
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68			1	SCS method"				

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7	"			Licensee name:				A"
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9	"			Date & Time last us	ed:	10/2	27/2023 at 2	2:01:23 PM"
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27	"		1	Equal length"				
28	"		1	SCS method"				
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31	"		0.804	Total Area"				
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33	"		2.000	Overland Slope"				
34	"		0.804	Pervious Area"				
35	"		100.000	Pervious length"				
36	"		2.000	Pervious slope"				
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41	"		75.000	Pervious SCS Curve	No."			
42	"		0.227	Pervious Runoff coe	fficient"			
43	"		0.100	Pervious Ia/S coeff	icient"			
44	"		8.467	Pervious Initial ab	straction"			
45			0.015	Impervious Manning	'n'"			
46			98.000	Impervious SCS Curv	e No."			
47			0.000	Impervious Runoff c	oefficient"			
48			0.100	Impervious la/S coe	fficient"			
49			0.518	Impervious Initial	abstraction <sup>.</sup>		~ ~ / ~ ~ ~ "	
50			Co	$\begin{array}{ccc} 0.012 & 0.00 \\ tabmant 101 \end{array}$	0 0.000		Total Aroa	
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54			יד ד עייי	me to Centroid	160 316	95 565	160 316	minutes"
55	"		Ra	infall denth	42 145	42 145	42 145	mm"
56	"		Ra	infall volume	338 84	0 00	338 84	c m"
57	"		Ra	infall losses	32 561	5 881	32 561	mm"
58	"		Rui	noff depth	9.583	36.263	9.583	mm"
59	"		Rui	noff volume	77.05	0.00	77.05	c.m"
60	"		Rui	noff coefficient	0.227	0.000	0.227	"
61	"		Ma	ximum flow	0.012	0.000	0.012	c.m/sec"
62	"	40	HY	DROGRAPH Start - New	Tributarv"			_
63	"		2	Start - New Tributa	ry"			
64	"			0.012 0.00	0.000	0.000"		
65	"	33	CA	TCHMENT 102"				
66	"		1	Triangular SCS"				
67	"		1	Equal length"				
68	"		1	SCS method"				

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Page	2	of	2
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69 70 71	" "	102 9.000 0.598	Area to Highway 6" % Impervious" Total Area"						
72	"	90.000	Flow length"						
73	"	5 000	Overland Slope"						
74	"	0 544	Pervious Area"						
75	"	90 000	Pervious length"						
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82	"	0.227	Pervious Runoff coe	fficient"					
83	"	0.100	Pervious Ia/S coeff:	icient"					
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86	"	98.000	Impervious SCS Curve	e No."					
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91	"	Cat	tchment 102	Pervious	Imperviou	ıs	Total A	Area	
92	"	Sui	rface Area	0.544	0.054		0.598		hectare"
93	"	Tir	me of concentration	28.284	2.762		21.277		minutes"
94	"	Tir	me to Centroid	144.474	93.560		130.497	7	minutes"
95	"	Rat	infall depth	42.145	42.145		42.145		mm"
96	"	Rat	infall volume	229.34	22.68		252.02		c.m"
97	"	Rat	infall losses	32.570	5.508		30.134		mm"
98	"	Rur	noff depth	9.575	36.636		12.011		mm"
99	"	Rur	noff volume	52.11	19.72		71.82		c.m"
100	"	Rur	noff coefficient	0.227	0.869		0.285		
101	"	Max	ximum flow	0.011	0.015		0.017		c.m/sec"
102	"	38 STA	ART/RE-START TOTALS	11					
103	"	3	Runoff Totals on EX	IT"					
104	"	Tot	tal Catchment area			0.	000	hect	tare"
105		Tot	tal Impervious area			0.	000	hect	care"
106		Tot	tal % impervious			0.	000"		
107		19 EXI	IT"						

## Q:\48650\100\SWM\10yr pre.Out Printed at 08:37 on 30 Oct 2023

1	"			MIDUSS Output				>"
2	"			MIDUSS version		Ve	ersion 2.25	rev. 473"
3	"			MIDUSS created		Sunc	lay, Februai	ry 7, 2010"
4	"		10	Units used:				ie METRIC"
5	"			Job folder:			Q:\4865	50\100\SWM"
6	"			Output filename:			105	yr pre.Out"
7	"			Licensee name:				A"
8	"			Company				"
9	"			Date & Time last use	ed:	10/2	27/2023 at 2	2:00:18 PM"
10	"	31	TII	ME PARAMETERS"				
11	"		5.000	Time Step"				
12	"		180.000	Max. Storm length"				
13	"		1500.000	Max. Hydrograph"				
14	"	32	STO	ORM Chicago storm"				
15			1	Chicago storm"				
16			595.000	Coefficient A"				
17			0.360	Constant B"				
18			0.691	Exponent C"				
19			0.400	Fraction R"				
20			180.000	Duration"				
21			1.000	Time step multiplie:	r"	o1 () •		
22			Mai	ximum intensity	186.4	31 mm/hr'	•	
23			10.	tal depth	49.22	26 mm''	c'	
24		~ ~	6	UlUhyd Hydrograph	extension (	used in this	s file"	
25		33	CA	TCHMENT IOI"				
26			1	Triangular SCS"				
27			1	Equal length"				
28			101	SCS method"				
29			101	Area to southwest p	roperty line	e, ultimatel	ly to Mun. I	Jrain #1"
30			0.000	% Impervious"				
31			0.804	Total Area"				
3Z			100.000	Flow length"				
33 24			2.000	Overland Slope"				
24			100 000	Pervious Area				
30			100.000	Pervious length"				
30 27			2.000	Fervious stope				
37 20			100.000	Impervious Area				
20			2 000	Impervious length				
10			2.000	Porvious Manning 'n				
40 // 1			75 000	Pervious SCS Curve 1	No "			
41			13.000	Pervious Bupoff coe	fficient"			
42			0.209	Pervious Ta/S cooff	iciont"			
4 J 1 A			8 467	Pervious Initial ab	straction"			
45			0.407	Impervious Manning	'n'"			
46			98 000	Impervious SCS Curve	> No "			
47	"		0 000	Impervious Bunoff C	pefficient"			
48	"		0.100	Impervious Ia/S coe	fficient"			
49	"		0.518	Impervious Initial	abstraction'			
50	"		0.010	0.019 0.00	0.000	0.000 0	.m/sec"	
51	"		Ca	tchment 101	Pervious	Impervious	Total Area	"
52	"		Su	rface Area	0.804	0.000	0.804	hectare"
53	"		Tin	me of concentration	34.073	3.625	34.073	minutes"
54	"		Tin	me to Centroid	151.986	94.644	151.986	minutes"
55	"		Ra	infall depth	49.226	49.226	49.226	mm"
56	"		Ra	infall volume	395.78	0.00	395.78	c.m"
57	"		Ra	infall losses	35.986	6.385	35.986	mm"
58	"		Rui	noff depth	13.240	42.841	13.240	mm"
59	"		Rui	noff volume	106.45	0.00	106.45	c.m"
60	"		Rui	noff coefficient	0.269	0.000	0.269	"
61	"		Ma	ximum flow	0.019	0.000	0.019	c.m/sec"
62	"	40	HY	DROGRAPH Start - New	Tributary"			
63	"		2	Start - New Tributa:	ry"			
64	"			0.019 0.00	0.000	0.000"		
65	"	33	CA	TCHMENT 102"				
66	"		1	Triangular SCS"				
67	"		1	Equal length"				
68	"		1	SCS method"				

## Q:\48650\100\SWM\10yr pre.Out Printed at 08:37 on 30 Oct 2023

69 70	" "		102 9.000	Area to Highway 6" % Impervious"						
71	"		0.598	Total Area"						
72	"		90.000	Flow length"						
73	"		5.000	Overland Slope"						
74	"		0 544	Pervious Area"						
75	"		90 000	Pervious length"						
76	"		5 000	Pervious slope"						
77	"		0 054	Impervious Area"						
78	"		90 000	Impervious length"						
79	"		5 000	Impervious slope"						
80	"		0 250	Pervious Manning 'n						
81	"		75 000	Pervious SCS Curve I	No "					
82	"		0 269	Pervious Bunoff coe	fficient"					
83	"		0.100	Pervious Ia/S coeff	icient"					
84	"		8.467	Pervious Initial ab	straction"					
85	"		0.015	Impervious Manning	'n'"					
86	"		98.000	Impervious SCS Curv	e No."					
87	"		0.886	Impervious Runoff c	oefficient"					
88	"		0.100	Impervious Ia/S coe	fficient"					
89	"		0.518	Impervious Initial	abstraction'					
90	"			0.022 0.00	0.000	0.000	) (	c.m/sec'	•	
91	"		Са	tchment 102	Pervious	Imperviou	IS	Total A	Area	"
92	"		Su	Irface Area	0.544	0.054		0.598		hectare"
93	"		Ti	me of concentration	24.298	2.585		18.962		minutes"
94	"		Ti	me to Centroid	138.081	92.658		126.910	5	minutes"
95	"		Ra	infall depth	49.226	49.226		49.226		mm"
96	"		Ra	infall volume	267.88	26.49		294.37		c.m"
97	"		Ra	infall losses	35.985	5.594		33.249		mm"
98	"		Ru	noff depth	13.241	43.632		15.977		mm"
99	"		Ru	noff volume	72.06	23.48		95.54		c.m"
100	"		Ru	noff coefficient	0.269	0.886		0.325		
101	"		Ма	ximum flow	0.018	0.018		0.022		c.m/sec"
102	"	38	SI	ART/RE-START TOTALS						
103	"		3	Runoff Totals on EX	IT"					
104	"		Tc	tal Catchment area			0.	.000	hect	tare"
105	"		Tc	tal Impervious area			0.	.000	hect	tare"
106	"		Tc	tal % impervious			0.	.000"		
107	"	19	EX	IT"						

## Q:\48650\100\SWM\25yr pre.Out Printed at 08:37 on 30 Oct 2023

1	"			MIDUSS Output					>"
2	"			MIDUSS version			Ve	ersion 2.25	rev. 473"
3	"			MIDUSS created			Sunc	lay, Februai	ry 7, 2010"
4	"		10	Units used:					ie METRIC"
5	"			Job folder:				Q:\4865	50\100\SWM"
6	"			Output filename:				255	r pre.Out"
7	"			Licensee name:					A"
8	"			Company					"
9	"			Date & Time last	used:		10/2	27/2023 at 1	L:58:22 PM"
10		31	TI	ME PARAMETERS"					
11			5.000	Time Step"					
12			180.000	Max. Storm lengt	:h"				
11		2.2	1500.000	Max. Hydrograph'	. 11				
14 15		52	51	Chicago storm"	L				
16			702 000	Coefficient A"					
17	"		0 350	Constant B"					
18	"		0.690	Exponent C"					
19	"		0.400	Fraction R"					
20	"		180.000	Duration"					
21	"		1.000	Time step multip	lier"				
22	"		Ma	ximum intensity		220.57	4 mm/hr"	1	
23	"		То	tal depth		58.35	53 mm"		
24	"		6	025hyd Hydrogr	aph exte	ension u	used in this	s file"	
25	"	33	CA	TCHMENT 101"					
26			1	Triangular SCS"					
27			1	Equal length"					
28			101	SCS method"					
29				Area to southwes	st propei	rty line	e, ultimatel	y to Mun. I	Drain #1"
3U 21			0.000	<pre>% Impervious"</pre>					
30 7			100 000	IOLAI AIEA Elow longth"					
32 33			2 000	Overland Slope"					
34	"		0.804	Pervious Area"					
35	"		100.000	Pervious length'	,				
36	"		2.000	Pervious slope"					
37	"		0.000	Impervious Area'	ı				
38	"		100.000	Impervious lengt	:h"				
39	"		2.000	Impervious slope	<sup>2</sup> "				
40	"		0.250	Pervious Manning	g 'n'"				
41			75.000	Pervious SCS Cur	ve No."				
42			0.317	Pervious Runoff	coeffici	lent"			
43			0.100	Pervious Ia/S co	pefficier	nt"			
44			8.46/	Pervious Initial	abstrac	ction"			
45			0.015	Impervious Manni	Ing In				
40			90.000	Impervious Bunof	f coeffi	cient"			
48	"		0.100	Impervious Ta/S	coeffici	ent"			
49	"		0.518	Impervious Initi	al absti	action"	ı		
50	"			0.032 0	.000	0.000	0.000 c	c.m/sec"	
51	"		Ca	tchment 101	Perv	rious	Impervious	Total Area	"
52	"		Su	rface Area	0.80	)4	0.000	0.804	hectare"
53	"		Ti	me of concentrati	on 29.2	275	3.375	29.275	minutes"
54	"		Ti	me to Centroid	144.	.683	93.660	144.683	minutes"
55			Ra	infall depth	58.3	353	58.353	58.353	mm"
56			Ra	infall volume	469.	.16	0.00	469.16	c.m"
J/ 50			Ka	INIALL LOSSES	39.8	009 197	0.300 51 066	39.009 10 101	IIIIII."
50 50			KU:	norr depth	1 / 0 1 / 0	±04 61	0 00	10.404 1/8 61	
53			KU. Dur	noff coefficient	140. N 21	. U I 1 7	0.000	140.01 0 317	U.III 11
61			Ma Ma	ximum flow	0.01	32	0.000	0.032	c.m/sec"
62		40	HV.	DROGRAPH Start -	New Trib	outarv"			C • m, DCC
63	"	- •	2	Start - New Trik	outarv"	<u>y</u>			
64	"		_	0.032	0.000	0.000	0.000"		
65	"	33	CA	TCHMENT 102"					
66	"		1	Triangular SCS"					
67	"		1	Equal length"					
68	"		1	SCS method"					

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Page 2	2 of	2
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72       "90.000       Flow length"         73       "5.000       Overland Slope"         74       "0.544       Pervious Area"         75       "90.000       Pervious Area"         76       "5.000       Pervious Area"         77       "0.554       Impervious Area"         78       "90.000       Impervious length"         78       "90.000       Impervious Slope"         78       "90.000       Impervious Slope"         79       5.000       Pervious Manning 'n'"         81       "75.000       Pervious Manning 'n'"         82       0.317       Pervious Nanning 'n'"         83       0.100       Pervious Nanning 'n'"         84       "8.467       Pervious Nanning 'n'"         85       0.015       Impervious SCS Curve No."         87       0.902       Impervious Runoff coefficient"         88       0.100       Impervious SCS Curve No."         87       0.101       Impervious Runoff coefficient"         88       0.102       Impervious Runoff coefficient"         89       0.518       Impervious Scs Curve No."         91       Catchment 102       Pervious Impervious Total Area "         <	69 70 71	" "	102 9.000 0.598	Area to Highway 6" % Impervious" Total Area"				
73       " 5.000       Overland Slope"         74       0.544       Pervious Area"         75       " 90.000       Pervious length"         76       " 5.000       Pervious length"         77       " 0.541       Impervious length"         78       " 90.000       Impervious length"         79       " 5.000       Impervious Slope"         80       0.250       Pervious Score No."         81       " 0.100       Pervious Scoreficient"         83       " 0.100       Pervious Manning 'n'"         84       " 8.467       Pervious Scoreficient"         85       0.015       Impervious Manning 'n'"         86       " 0.016       Impervious Scoreficient"         87       0.010       Pervious Ia/S coefficient"         88       0.100       Impervious Scoreficient"         89       0.051       Impervious Ia/S coefficient"         89       0.518       Impervious Scoreficient"         91       Catchment 102       Pervious       Impervious Total Area "         92       Surface Area       0.544       0.054       0.598       hectare"         93       Time of concentration 20.876       2.407       f6.818       mi	72	"	90.000	Flow length"				
74 "       0.544       Pervious Area"         75 "       90.000       Pervious length"         76 "       5.000       Pervious slope"         77 "       0.054       Impervious Area"         78 "       90.000       Impervious length"         79 "       5.000       Impervious length"         79 "       5.000       Impervious Score         78 "       90.000       Impervious Score         79 "       5.000       Pervious Score         81 "       75.000       Pervious Score         82 "       0.317       Pervious Manning 'n'"         83 "       0.100       Pervious Score         84 "       8.467       Pervious Manning 'n'"         85 "       0.015       Impervious Score         87 "       0.902       Impervious Score         87 "       0.902       Impervious Initial abstraction"         90 "       0.131       0.000       0.000       0.000 c.m/sec"         91 "       Catchment 102       Pervious Impervious Total Area "         92 "       Surface Area       0.544       0.054       0.598       hectare"         93 "       Time of concentration 20.876       2.407       16.818       minutes" </td <td>73</td> <td>"</td> <td>5 000</td> <td>Overland Slope"</td> <td></td> <td></td> <td></td> <td></td>	73	"	5 000	Overland Slope"				
75       90.000       Pervious Aleat         76       5.000       Pervious slope"         77       0.054       Impervious Areat         78       90.000       Impervious length"         79       5.000       Impervious slope"         80       0.250       Pervious Manning 'n'"         81       75.000       Pervious SCS Curve No."         82       0.317       Pervious Indication"         84       8.467       Pervious Manning 'n'"         85       0.015       Impervious SCS Curve No."         87       0.902       Impervious SCS Curve No."         87       0.902       Impervious SCS Curve No."         87       0.902       Impervious Indication"         98       0.100       Impervious SCS Curve No."         87       0.902       Impervious Indication"         98       0.101       Impervious Indication"         90       0.518       Impervious Indication"         91       Catchment 102       Pervious       Impervious Total Area         92       Surface Area       0.544       0.054       0.598       hectare"         93       Time of concentration       2.875       58.353       58.353       58	71	"	0 544	Pervious Area"				
76       S.100       Pervious Slope"         77       0.054       Impervious Area"         78       90.000       Impervious length"         79       S.000       Pervious slope"         80       0.250       Pervious SCS Curve No."         81       75.000       Pervious SCS Curve No."         82       0.317       Pervious Supe"         83       0.100       Pervious Ia/S coefficient"         84       8.467       Pervious Manning 'n'"         85       0.015       Impervious SCS Curve No."         87       0.902       Impervious Coefficient"         88       0.100       Impervious Geofficient"         87       0.902       Impervious Initial abstraction"         90       0.518       Impervious Impervious Impervious Total Area "         91       Catchment 102       Pervious Impervious Total Area "         92       Surface Area       0.544       0.054       0.598       hectare"         93       Time of concentration 20.876       2.407       16.818       minutes"         94       Time to Centroid       132.461       91.887       123.546       minutes"         95       Rainfall depth       58.353       58.353	75	"	90 000	Pervious length"				
77       0.054       Impervious Area"         78       90.000       Impervious length"         79       5.000       Impervious slope"         80       0.250       Pervious Manning 'n"         81       75.000       Pervious SCS Curve No."         82       0.317       Pervious Runoff coefficient"         83       0.100       Pervious IA/S coefficient"         84       8.467       Pervious Manning 'n'"         85       0.015       Impervious Manning 'n'"         86       98.000       Impervious SCS Curve No."         87       0.902       Impervious SCS Curve No."         87       0.901       Impervious SCS Curve No."         87       0.902       Impervious SCS Curve No."         87       0.902       Impervious SCS Curve No."         88       0.100       Impervious SCS Curve No."         87       0.902       Impervious SCS Curve No."         88       0.100       Impervious SCS Curve No."         87       0.902       Impervious SCS Curve No."         87       0.902       Impervious Suff coefficient"         98       0.518       Impervious Suff coefficient"         90       Surface Area       0.544	76	"	5 000	Pervious slope"				
78       90.000       Impervious length"         79       5.000       Impervious slope"         80       0.250       Pervious Manning 'n'"         81       75.000       Pervious SCS Curve No."         82       0.317       Pervious Runoff coefficient"         83       0.100       Pervious Initial abstraction"         84       8.467       Pervious Initial abstraction"         85       0.015       Impervious Runoff coefficient"         86       98.000       Impervious Runoff coefficient"         87       0.100       Impervious Runoff coefficient"         88       0.100       Impervious SCS Curve No."         87       0.301       0.000       0.000 c.m/sec"         91       Catchment 102       Pervious Impervious Total Area "         92       Surface Area       0.544       0.598       hectare"         93       Time of concentration 20.876       2.407       16.818       minutes"         94       Time to Centroid       132.461       91.887       123.546       minutes"         95       Rainfall depth       58.353       58.353       58.353       mm"         96       Rainfall losses       39.869       5.725       mm"	70	"	0 054	Impervious Area"				
79       50.000       Impervious slope"         80       0.250       Pervious Manning 'n'"         81       75.000       Pervious SCS Curve No."         82       0.317       Pervious Runoff coefficient"         83       0.100       Pervious Ia/S coefficient"         84       8.467       Pervious Initial abstraction"         85       0.015       Impervious Manning 'n'"         86       98.000       Impervious SCS Curve No."         87       0.902       Impervious Runoff coefficient"         88       0.100       Impervious SCS Curve No."         87       0.902       Impervious SCS Curve No."         88       0.100       Impervious SCS Curve No."         90       0.001       Impervious Total Area         91       0.518       Impervious Intital abstraction"         92       Surface Area       0.544       0.554       0.598       hectare"	78	"	90 000	Impervious length"				
0         0.250         Pervious Manning 'n'"           81         "         75.000         Pervious SCS Curve No."           82         0.317         Pervious Runoff coefficient"           83         "         0.100         Pervious Initial abstraction"           84         8.467         Pervious Initial abstraction"           85         0.015         Impervious Runoff coefficient"           86         "         98.000         Impervious Runoff coefficient"           87         0.010         Impervious Runoff coefficient"           88         0.100         Impervious Initial abstraction"           90         "         0.031         0.000         0.000 c.m/sec"           91         Catchment 102         Pervious         Impervious Total Area "           92         "         Surface Area         0.544         0.054         0.598         hectare"           93         "         Time of concentration 20.876         2.407         16.818         minutes"           94         "         Time to Centroid         132.461         91.887         123.546         minutes"           95         Rainfall depth         58.353         58.353         58.353         m"           96 <td>79</td> <td>"</td> <td>5 000</td> <td>Impervious slope"</td> <td></td> <td></td> <td></td> <td></td>	79	"	5 000	Impervious slope"				
00       75.000       Pervious SCS Curve No."         82       0.317       Pervious Runoff coefficient"         83       0.100       Pervious Ia/S coefficient"         84       8.467       Pervious Initial abstraction"         85       0.015       Impervious Manning 'n'"         86       '98.000       Impervious SCS Curve No."         87       0.902       Impervious Runoff coefficient"         88       0.100       Impervious Ia/S coefficient"         89       0.518       Impervious Ia/S coefficient"         89       0.518       Impervious Ia/S coefficient"         90       0.021       Dervious Ia/S coefficient"         91       Catchment 102       Pervious Impervious Total Area "         92       Surface Area       0.544       0.054       0.598       hectare"         93       Time of concentration 20.876       2.407       16.818       minutes"         94       Time of concentration 21.876       2.407       16.818       minutes"         94       Time of concentration 21.876       2.407       16.818       minutes"         94       Time of concentration 21.876       2.407       16.818       minutes"         94       Rainfall depth 58.353	80	"	0 250	Pervious Manning 'n				
0.1       0.100       Pervious Runoff coefficient"         82       0.100       Pervious Runoff coefficient"         84       8.467       Pervious Initial abstraction"         85       0.015       Impervious Manning 'n'"         86       '98.000       Impervious SCS Curve No."         87       0.902       Impervious SCS Curve No."         87       0.902       Impervious Runoff coefficient"         88       0.100       Impervious Initial abstraction"         90       0.518       Impervious Initial abstraction"         90       0.031       0.000       0.000 c.m/sec"         91       Catchment 102       Pervious       Impervious Total Area "         92       Surface Area       0.544       0.054       0.598       hectare"         93       Time of concentration 20.876       2.407       16.818       minutes"         94       Time of concentration 20.876       2.407       16.818       minutes"         95       Rainfall depth       58.353       58.353       58.353       mm"         96       Rainfall losses       39.869       5.725       36.796       mm"         97       Runoff depth       18.484       52.628       21.557	81	"	75 000	Pervious SCS Curve	No "			
3"       0.100       Pervious Ta/S coefficient"         84 "       8.467       Pervious Initial abstraction"         85 "       0.015       Impervious Manning 'n'"         86 "       98.000       Impervious SCS Curve No."         87 "       0.902       Impervious Runoff coefficient"         88 "       0.100       Impervious Ia/S coefficient"         89 "       0.518       Impervious Initial abstraction"         90 "       0.031       0.000       0.000 c.m/sec"         91 "       Catchment 102       Pervious Impervious Total Area "         92 "       Surface Area       0.544       0.054       0.598       hectare"         93 "       Time of concentration 20.876       2.407       16.818       minutes"         94 "       Time to Centroid       132.461       91.887       123.546       minutes"         94 "       Time to Centroid       132.461       91.887       123.546       minutes"         95 "       Rainfall depth       58.353       58.353       mm"         96 "       Rainfall losses       39.869       5.725       36.796       mm"         97 "       Rainfall opth       18.484       52.628       21.557       mm"	82	"	0 317	Pervious Bunoff coe	fficient"			
84 "       8.467 Pervious Initial abstraction"         85 "       0.015 Impervious SCS Curve No."         87 "       0.902 Impervious SCS Curve No."         87 "       0.902 Impervious SCS Corve No."         88 "       0.100 Impervious Ia/S coefficient"         89 "       0.518 Impervious Initial abstraction"         90 "       0.031 0.000 0.000 0.000 c.m/sec"         91 "       Catchment 102 Pervious Impervious Total Area "         92 "       Surface Area 0.544 0.054 0.598 hectare"         93 "       Time of concentration 20.876 2.407 16.818 minutes"         94 "       Time to Centroid 132.461 91.887 123.546 minutes"         95 "       Rainfall depth 58.353 58.353 mm"         96 "       Rainfall volume 317.54 31.41 348.95 c.m"         97 "       Rainfall losses 39.869 5.725 36.796 mm"         98 "       Runoff depth 18.484 52.628 21.557 mm"         99 "       Runoff coefficient 0.317 0.902 0.369 "         100 "       Runoff coefficient 0.317 0.902 0.369 "         101 "       Maximum flow 0.028 0.022 0.001 c.m/sec"         102 " 38 START/RE-START TOTALS "         103 "       3 Runoff Totals on EXIT"         104 "       Total Catchment area 0.000 hectare"         105 "       Total Impervious area 0.000 hectare"         106 "	83	"	0.100	Pervious Ja/S coeff	icient"			
85       0.015       Impervious Manning 'n'"         86       '''       98.000       Impervious SCS Curve No."         87       0.902       Impervious Runoff coefficient"         88       0.100       Impervious Ia/S coefficient"         89       0.518       Impervious Initial abstraction"         90       0.031       0.000       0.000 c.m/sec"         91       Catchment 102       Pervious Impervious Total Area "         92       Surface Area       0.544       0.054       0.598       hectare"         93       Time of concentration 20.876       2.407       16.818       minutes"         94       Time to Centroid       132.461       91.887       123.546       minutes"         94       Time to Centroid       132.461       91.887       123.546       minutes"         95       Rainfall depth       58.353       58.353       58.353       mm"         96       Rainfall losses       39.869       5.725       36.796       mm"         97       Runoff depth       18.484       52.628       21.557       mm"         98       Runoff coefficient       0.317       0.902       0.369       "         101       Maximum flow	84	"	8.467	Pervious Initial ab	straction"			
86 "98.000       Impervious SCS Curve No."         87 "0.902       Impervious Runoff coefficient"         88 "0.100       Impervious Ia/S coefficient"         89 "0.518       Impervious Initial abstraction"         90 "0.031       0.000       0.000 c.m/sec"         91 "Catchment 102       Pervious Impervious Total Area "         92 "Surface Area       0.544       0.054       0.598         94 "Time of concentration 20.876       2.407       16.818       minutes"         94 "Time to Centroid       132.461       91.887       123.546       minutes"         95 "Rainfall depth       58.353       58.353       58.353       mm"         96 "Rainfall volume       317.54       31.41       348.95       c.m"         97 "Rainfall losses       39.869       5.725       36.796       mm"         98 "Runoff depth       18.484       52.628       21.557       mm"         99 "Runoff volume       100.58       28.32       128.91       c.m"         100 "Runoff coefficient       0.317       0.902       0.369       "         101 "Maximum flow       0.028       0.022       0.031       c.m/sec"         102 "38       START/RE-START TOTALS "       0.000       hectare" <td>85</td> <td>"</td> <td>0.015</td> <td>Impervious Manning</td> <td>'n'"</td> <td></td> <td></td> <td></td>	85	"	0.015	Impervious Manning	'n'"			
87 "       0.902       Impervious Runoff coefficient"         88 "       0.100       Impervious Ia/S coefficient"         99 "       0.518       Impervious Initial abstraction"         90 "       0.031       0.000       0.000       c.m/sec"         91 "       Catchment 102       Pervious       Impervious Total Area "         92 "       Surface Area       0.544       0.054       0.598       hectare"         93 "       Time of concentration       20.876       2.407       16.818       minutes"         94 "       Time to Centroid       132.461       91.887       123.546       minutes"         95 "       Rainfall depth       58.353       58.353       58.353       mm"         95 "       Rainfall volume       317.54       31.41       348.95       c.m"         96 "       Rainfall losses       39.869       5.725       36.796       mm"         97 "       Runoff coefficient       0.317       0.902       0.369       "         91 "       Runoff coefficient       0.317       0.902       0.369       "         90 "       Runoff Totals on EXIT"       Total Catchment area       0.000       hectare"         100 "       3	86	"	98.000	Impervious SCS Curv	e No."			
88 "       0.100 Impervious Ia/S coefficient"         89 "       0.518 Impervious Initial abstraction"         90 "       0.031 0.000 0.000 0.000 c.m/sec"         91 "       Catchment 102 Pervious Impervious Total Area "         92 "       Surface Area 0.544 0.054 0.598 hectare"         93 "       Time of concentration 20.876 2.407 16.818 minutes"         94 "       Time to Centroid 132.461 91.887 123.546 minutes"         95 "       Rainfall depth 58.353 58.353 mm"         96 "       Rainfall volume 317.54 31.41 348.95 c.m"         97 "       Rainfall losses 39.869 5.725 36.796 mm"         98 "       Runoff depth 18.484 52.628 21.557 mm"         99 "       Runoff coefficient 0.317 0.902 0.369 "         100 "       Maximum flow 0.028 0.022 0.031 c.m/sec"         101 "       Maximum flow 0.028 0.022 0.031 c.m/sec"         102 " 38       START/RE-START TOTALS "         103 "       3 Runoff Totals on EXIT"         104 "       Total Catchment area 0.000 hectare"         105 "       Total Impervious area 0.000"         106 "       Total % impervious area 0.000"	87	"	0.902	Impervious Runoff c	pefficient"			
89       0.518       Impervious Initial abstraction"         90       0.031       0.000       0.000       0.000 c.m/sec"         91       Catchment 102       Pervious       Impervious Total Area "         92       Surface Area       0.544       0.054       0.598       hectare"         93       Time of concentration 20.876       2.407       16.818       minutes"         94       Time to Centroid       132.461       91.887       123.546       minutes"         95       Rainfall depth       58.353       58.353       58.353       sm"         96       Rainfall volume       317.54       31.41       348.95       c.m"         97       Rainfall losses       39.869       5.725       36.796       mm"         98       Runoff depth       18.484       52.628       21.557       mm"         98       Runoff coefficient       0.317       0.902       0.369       "         100       Maximum flow       0.028       0.022       0.031       c.m/sec"         102       38       START/RE-START TOTALS "       "       0.000       hectare"         103       3       Runoff Totals on EXIT"       0.000       hectare"	88	"	0.100	Impervious Ia/S coe	fficient"			
90 "       0.031       0.000       0.000       0.000 c.m/sec"         91 "       Catchment 102       Pervious       Impervious Total Area "         92 "       Surface Area       0.544       0.054       0.598       hectare"         93 "       Time of concentration       20.876       2.407       16.818       minutes"         94 "       Time to Centroid       132.461       91.887       123.546       minutes"         95 "       Rainfall depth       58.353       58.353       58.353       mm"         96 "       Rainfall volume       317.54       31.41       348.95       c.m"         97 "       Rainfall losses       39.869       5.725       36.796       mm"         98 "       Runoff depth       18.484       52.628       21.557       mm"         99 "       Runoff coefficient       0.317       0.902       0.369       "         100 "       Maximum flow       0.028       0.022       0.031       c.m/sec"         102 "       38       START/RE-START TOTALS "       "       "       0.000       hectare"         103 "       3       Runoff Totals on EXIT"       0.000       hectare"       0.000       hectare"      <	89	"	0.518	Impervious Initial	abstraction'			
91       Catchment 102       Pervious       Impervious Total Area       "         92       Surface Area       0.544       0.054       0.598       hectare"         93       Time of concentration       20.876       2.407       16.818       minutes"         94       Time to Centroid       132.461       91.887       123.546       minutes"         95       Rainfall depth       58.353       58.353       58.353       mm"         96       Rainfall volume       317.54       31.41       348.95       c.m"         97       Rainfall losses       39.869       5.725       36.796       mm"         98       Runoff depth       18.484       52.628       21.557       mm"         99       Runoff coefficient       0.317       0.902       0.369       "         100       Maximum flow       0.028       0.022       0.031       c.m/sec"         102       38       START/RE-START TOTALS "       "       0.000       hectare"         103       "       3       Runoff Totals on EXIT"       0.000       hectare"         104       "       Total Catchment area       0.000       hectare"         106       "	90	"		0.031 0.00	0.000	0.00	0 c.m/sec	"
92 "       Surface Area       0.544       0.054       0.598       hectare"         93 "       Time of concentration       20.876       2.407       16.818       minutes"         94 "       Time to Centroid       132.461       91.887       123.546       minutes"         95 "       Rainfall depth       58.353       58.353       58.353       mm"         96 "       Rainfall volume       317.54       31.41       348.95       c.m"         97 "       Rainfall losses       39.869       5.725       36.796       mm"         98 "       Runoff depth       18.484       52.628       21.557       mm"         99 "       Runoff coefficient       0.317       0.902       0.369       "         100 "       Maximum flow       0.028       0.022       0.031       c.m/sec"         102 "       38       START/RE-START TOTALS "       "       0.000       hectare"         103 "       3       Runoff Totals on EXIT"       0.000       hectare"         104 "       Total Catchment area       0.000       hectare"         105 "       Total % impervious       0.000"       100"         107 "       19       EXIT"       0.000"	91	"	Ca	atchment 102	Pervious	Impervio	us Total	Area "
93 "       Time of concentration 20.876       2.407       16.818       minutes"         94 "       Time to Centroid       132.461       91.887       123.546       minutes"         95 "       Rainfall depth       58.353       58.353       58.353       mm"         96 "       Rainfall volume       317.54       31.41       348.95       c.m"         97 "       Rainfall losses       39.869       5.725       36.796       mm"         98 "       Runoff depth       18.484       52.628       21.557       mm"         99 "       Runoff coefficient       0.317       0.902       0.369       "         100 "       Runoff coefficient       0.317       0.902       0.369       "         101 "       Maximum flow       0.028       0.022       0.031       c.m/sec"         102 "       38       START/RE-START TOTALS "       "       "       0.000       hectare"         103 "       3       Runoff Totals on EXIT"       "       0.000       hectare"         104 "       Total Impervious area       0.000       hectare"       0.000"         107 "       19       EXIT"       0.000"       hectare"	92	"	Su	irface Area	0.544	0.054	0.598	hectare"
94 "       Time to Centroid       132.461       91.887       123.546       minutes"         95 "       Rainfall depth       58.353       58.353       58.353       mm"         96 "       Rainfall volume       317.54       31.41       348.95       c.m"         97 "       Rainfall losses       39.869       5.725       36.796       mm"         98 "       Runoff depth       18.484       52.628       21.557       mm"         99 "       Runoff coefficient       0.317       0.902       0.369       "         100 "       Runoff coefficient       0.317       0.902       0.031       c.m/sec"         102 "       38       START/RE-START TOTALS "       "       0.0031       c.m/sec"         103 "       3       Runoff Totals on EXIT"       0.000       hectare"         104 "       Total Catchment area       0.000       hectare"         105 "       Total % impervious area       0.000       hectare"         106 "       Total % impervious       0.000"       1.00"	93	"	Ti	Ime of concentration	20.876	2.407	16.818	minutes"
95 "       Rainfall depth       58.353       58.353       58.353       mm"         96 "       Rainfall volume       317.54       31.41       348.95       c.m"         97 "       Rainfall losses       39.869       5.725       36.796       mm"         98 "       Runoff depth       18.484       52.628       21.557       mm"         99 "       Runoff coefficient       0.317       0.902       0.369       "         100 "       Runoff coefficient       0.317       0.902       0.369       "         101 "       Maximum flow       0.028       0.022       0.031       c.m/sec"         102 " 38       START/RE-START TOTALS "       "       0.000       hectare"         103 "       3       Runoff Totals on EXIT"       0.000       hectare"         104 "       Total Catchment area       0.000       hectare"         105 "       Total Impervious area       0.000       hectare"         106 "       Total % impervious       0.000"       0.000"	94	"	Ti	lme to Centroid	132.461	91.887	123.54	6 minutes"
96 "       Rainfall volume       317.54       31.41       348.95       c.m"         97 "       Rainfall losses       39.869       5.725       36.796       mm"         98 "       Runoff depth       18.484       52.628       21.557       mm"         99 "       Runoff volume       100.58       28.32       128.91       c.m"         100 "       Runoff coefficient       0.317       0.902       0.369       "         101 "       Maximum flow       0.028       0.022       0.031       c.m/sec"         102 " 38       START/RE-START TOTALS "       3       Runoff Totals on EXIT"       0.000       hectare"         104 "       Total Catchment area       0.000       hectare"       0.000       hectare"         105 "       Total Impervious area       0.000       hectare"       0.000"       hectare"         106 "       Total % impervious       0.000"       hectare"       0.000"       hectare"	95	"	Ra	ainfall depth	58.353	58.353	58.353	mm"
97 "       Rainfall losses       39.869       5.725       36.796       mm"         98 "       Runoff depth       18.484       52.628       21.557       mm"         99 "       Runoff volume       100.58       28.32       128.91       c.m"         100 "       Runoff coefficient       0.317       0.902       0.369       "         101 "       Maximum flow       0.028       0.022       0.031       c.m/sec"         102 " 38       START/RE-START TOTALS "       0.000       hectare"         103 "       3       Runoff Totals on EXIT"       0.000       hectare"         104 "       Total Catchment area       0.000       hectare"         105 "       Total Impervious area       0.000       hectare"         106 "       Total % impervious       0.000"       1000"	96	"	Ra	ainfall volume	317.54	31.41	348.95	c.m"
98 "       Runoff depth       18.484       52.628       21.557       mm"         99 "       Runoff volume       100.58       28.32       128.91       c.m"         100 "       Runoff coefficient       0.317       0.902       0.369       "         101 "       Maximum flow       0.028       0.022       0.031       c.m/sec"         102 " 38       START/RE-START TOTALS "       0.000       hectare"         103 "       3       Runoff Totals on EXIT"       0.000       hectare"         104 "       Total Catchment area       0.000       hectare"         105 "       Total Impervious area       0.000       hectare"         106 "       Total % impervious       0.000"         107 " 19       EXIT"       0.000"	97	"	Ra	ainfall losses	39.869	5.725	36.796	mm"
99 "       Runoff volume       100.58       28.32       128.91       c.m"         100 "       Runoff coefficient       0.317       0.902       0.369       "         101 "       Maximum flow       0.028       0.022       0.031       c.m/sec"         102 " 38       START/RE-START TOTALS "       0.000       hectare"         103 "       3       Runoff Totals on EXIT"       0.000       hectare"         104 "       Total Catchment area       0.000       hectare"         105 "       Total Impervious area       0.000       hectare"         106 "       Total % impervious       0.000"         107 " 19       EXIT"       0.000"	98	"	Ru	unoff depth	18.484	52.628	21.557	mm"
100 "       Runoff coefficient       0.317       0.902       0.369       "         101 "       Maximum flow       0.028       0.022       0.031       c.m/sec"         102 " 38       START/RE-START TOTALS "       0.002       0.031       c.m/sec"         103 "       3       Runoff Totals on EXIT"       0.000       hectare"         104 "       Total Catchment area       0.000       hectare"         105 "       Total Impervious area       0.000       hectare"         106 "       Total % impervious       0.000"         107 " 19       EXIT"       0.000"	99	"	Ru	unoff volume	100.58	28.32	128.91	c.m"
101 "       Maximum flow       0.028       0.022       0.031       c.m/sec"         102 " 38       START/RE-START TOTALS "	100	"	Ru	unoff coefficient	0.317	0.902	0.369	"
102 "38START/RE-START TOTALS "103 "3 Runoff Totals on EXIT"104 "Total Catchment area105 "Total Impervious area106 "Total % impervious107 "19EXIT"	101	"	Ma	aximum flow	0.028	0.022	0.031	c.m/sec"
103 "3 Runoff Totals on EXIT"104 "Total Catchment area0.000 hectare"105 "Total Impervious area0.000 hectare"106 "Total % impervious0.000"107 " 19EXIT"0.000"	102	"	38 SI	TART/RE-START TOTALS	"			
104 "Total Catchment area0.000hectare"105 "Total Impervious area0.000hectare"106 "Total % impervious0.000"107 " 19EXIT"0.000"	103	"	3	Runoff Totals on EX	IT"			
105 "         Total Impervious area         0.000 hectare"           106 "         Total % impervious         0.000"           107 " 19         EXIT"         0.000"	104	"	Тс	otal Catchment area			0.000	hectare"
106 "         Total % impervious         0.000"           107 " 19         EXIT"	105	"	Τc	otal Impervious area			0.000	hectare"
107 " 19 EXIT"	106	"	Тс	otal % impervious			0.000"	
	107	"	19 EX	KIT"				

## Q:\48650\100\SWM\50yr pre.Out Printed at 08:37 on 30 Oct 2023

1	"			MIDUSS Output				>"		
2	"			MIDUSS version		Ve	ersion 2.25	rev. 473"		
3	"			MIDUSS created		Sunc	day, Februar	ry 7, 2010"		
4	"		10	Units used:				ie METRIC"		
5	"			Job folder:			Q:\486	50\100\SWM"		
6	"			Output filename:			50	yr pre.Out"		
7	"			Licensee name:				A"		
8	"			Company				"		
9	"			Date & Time last us	ed:	10/2	27/2023 at 1	1:59:30 PM"		
10		31	TII	ME PARAMETERS"						
11			5.000	Time Step"						
12			180.000	Max. Storm length"						
13		~ ~	1500.000	Max. Hydrograph"						
14		32	STO	ORM Chicago storm"						
15			1	Chicago storm"						
10 17			/80.000	Coefficient A"						
1 /			0.360	Constant B"						
10			0.690	Exponent C						
19			10.400	Fraction R"						
20			1 000	Duración Timo stop multiplio	~ "					
22			1.000 Mo:	vimum intonsity	211 0-	72 mm/hr <b>!</b>	,			
22			Ма. То:	tal depth	65 0(	72 IIIII/III 73 mm"				
20			6	050byd Hydrograph	evtension 1	Jo nun Jead in this	filo"			
25		22	ں د ۲	TCHMENT 101"	excension (		, TTTC			
26		55	1	Triangular SCS"						
27	"		1	Equal length"						
28	"		1	SCS method"						
29	"		101	Area to southwest p	roperty line	e. ultimatel	ly to Mun. I	Drain #1"		
30	"		0.000	% Impervious"		o, u101		J 4411 #1		
31	"		0.804	Total Area"						
32	"		100.000	Flow length"						
33	"		2.000	Overland Slope"						
34	"		0.804	Pervious Area"						
35	"		100.000	Pervious length"						
36	"		2.000	Pervious slope"						
37	"		0.000	Impervious Area"						
38	"		100.000	Impervious length"						
39	"		2.000	Impervious slope"						
40	"		0.250	Pervious Manning 'n						
41	"		75.000	Pervious SCS Curve	No."					
42	"		0.348	Pervious Runoff coe	fficient"					
43	"		0.100	Pervious Ia/S coeff.	icient"					
44	"		8.467	Pervious Initial ab	straction"					
45			0.015	Impervious Manning	'n'"					
46			98.000	Impervious SCS Curv	e No."					
4 /			0.000	Impervious Runoff C	oefficient"					
48			0.100	Impervious la/S coe	fficient"					
49			0.518	Impervious Initial	abstraction.	0 000 4	~ ~ / ~ ~ ~ "			
50			Co	0.041 $0.001$			Total Area			
52			Ca	rface Area	0 804		10tal Area	hostaro"		
52 53			ວນ. ຫຼີງ	me of concentration	26 777	3 229	26 777	minutes"		
54			יד ד עייי	me to Centroid	140 702	93 078	140 702	minutes"		
55	"		Ra	infall depth	65 003	65 003	65 003	mm"		
56	"		Ra	infall volume	522 62	0 00	522 62	c m"		
57	"		Ra	infall losses	42 373	6 372	42 373	mm"		
58	"		Rui	noff depth	22.629	58.631	22.629	mm"		
59	"		Rui	noff volume	181.94	0.00	181.94	c.m"		
60	"		Rui	noff coefficient	0.348	0.000	0.348			
61	"		Ma	ximum flow	0.041	0.000	0.041	c.m/sec"		
62	"	40	HY	DROGRAPH Start - New	Tributarv"			_		
63	"		2	Start - New Tributa	ry"					
64	"			0.041 0.00	0.000	0.000"				
65	"	33	CA	TCHMENT 102"						
66	"		1	Triangular SCS"						
67	"		1	Equal length"						
68	"		1	SCS method"						
69 70 71	" "		102 9.000	Area to Highway 6" % Impervious"						
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71			0.598	Total Area						
12			90.000	Flow length"						
73			5.000	Overland Slope						
74			0.544	Pervious Area"						
15			90.000	Pervious length"						
76			5.000	Pervious slope"						
77			0.054	Impervious Area"						
78			90.000	Impervious length"						
/9			5.000	Impervious slope"						
80			0.250	Pervious Manning 'n						
81			75.000	Pervious SCS Curve I	No."					
82			0.347	Pervious Runoff coe	fficient"					
83			0.100	Pervious Ia/S coeff:	icient"					
84			8.467	Pervious Initial ab	straction"					
85			0.015	Impervious Manning	'n'"					
86			98.000	Impervious SCS Curve	e No."					
87			0.910	Impervious Runoff co	pefficient"					
88			0.100	Impervious Ia/S coe	fficient"	_				
89			0.518	Impervious Initial	abstraction'			, .	_	
90				0.040 0.00	0.000	0.000	) (	c.m/sec'	•	
91	"		Cat	tchment 102	Pervious	Imperviou	lS	Total A	Area	"
92			Su	rface Area	0.544	0.054		0.598		hectare"
93	"		Tir	me of concentration	19.095	2.302		15.639		minutes"
94	"		Tir	me to Centroid	129.423	91.468		121.612	2	minutes"
95	"		Ra	infall depth	65.003	65.003		65.003		mm"
96	"		Ra	infall volume	353.73	34.98		388.72		c.m"
97	"		Ra	infall losses	42.415	5.826		39.122		mm"
98	"		Rui	noff depth	22.587	59.176		25.880		mm"
99	"		Rui	noff volume	122.92	31.85		154.76		c.m"
100	"		Rui	noff coefficient	0.347	0.910		0.398		
101	"		Max	ximum flow	0.036	0.025		0.040		c.m/sec"
102	"	38	STA	ART/RE-START TOTALS						
103	"		3	Runoff Totals on EX	IT"					
104	"		Tot	tal Catchment area			0.	000	hect	care"
105	"		Tot	tal Impervious area			0.	000	hect	care"
106	"		Tot	tal % impervious			0.	000"		
107	"	19	EXI	IT"						

1	"			MIDUSS Output				>"
2	"			MIDUSS version		Ve	ersion 2.25	rev. 473"
3	"			MIDUSS created		Sund	day, Februa:	ry 7, 2010"
4	"		10	Units used:				ie METRIC"
5	"			Job folder:			Q:\486	50\100\SWM"
6	"			Output filename:			100	yr pre.Out"
7	"			Licensee name:				A''
8	"			Company				
9	"			Date & Time last u	sed:	10/2	27/2023 at 🛛	3:55:18 PM"
10	"	31	TI	ME PARAMETERS"				
11	"		5.000	Time Step"				
12	"		180.000	Max. Storm length"				
13	"		1500.000	Max. Hydrograph"				
14	"	32	ST	'ORM Chicago storm"				
15	"		1	Chicago storm"				
16	"		851.000	Coefficient A"				
17	"		0.290	Constant B"				
18	"		0.687	Exponent C"				
19	"		0.400	Fraction R"				
20	"		180 000	Duration"				
21	"		1 000	Time step multipli	er"			
22	"		L.000 Ma	vimum intensity	270 7	86 mm/hr	T	
23	"		та То	tal depth	71 8	28 mm"		
20			6	100byd Hydrograp	h ovtonsion	usod in this	a filo"	
24		33	0 C 7	TOURYO HYDEOGLAP	II EXCENSION	used in this	s iite	
20		55	1	Triangular SCS"				
20			1	Faul longth"				
21			1	Equal Tength				
20			101	Area to conthroat	nnonontu lin	a ultimata	let to Mun	Ducin #1
29				Area to southwest	broberry IIU	e, uitimate.	iy to Mun.	DIAIN #1
30			0.000	<pre>% Impervious"</pre>				
31			0.804	Total Area"				
32			100.000	Flow length"				
33			2.000	Overland Slope"				
34			0.804	Pervious Area"				
35			100.000	Pervious length"				
36			2.000	Pervious slope"				
37			0.000	Impervious Area"				
38			100.000	Impervious length"				
39			2.000	Impervious slope"				
40			0.250	Pervious Manning '	n'"			
41			75.000	Pervious SCS Curve	No."			
42			0.377	Pervious Runoff co	efficient"			
43			0.100	Pervious Ia/S coef	ficient"			
44			8.467	Pervious Initial a	bstraction"			
45			0.015	Impervious Manning	'n'"			
46			98.000	Impervious SCS Cur	ve No."			
47			0.000	Impervious Runoff	coefficient"			
48			0.100	Impervious Ia/S co	efficient"			
49			0.518	Impervious Initial	abstraction	"	<i>,</i>	
50				0.056 0.0	00 0.000	0.000 0	c.m/sec"	_
51			Ca	tchment 101	Pervious	Impervious	Total Area	
52			Su	rface Area	0.804	0.000	0.804	hectare"
53			Ti	me of concentration	24.716	3.096	24.715	minutes"
54	"		Ti	me to Centroid	137.449	92.639	137.449	minutes"
55	"		Ra	infall depth	71.828	71.828	71.828	mm"
56	"		Ra	infall volume	577.50	0.00	577.50	c.m"
57	"		Ra	infall losses	44.722	6.351	44.722	mm"
58	"		Ru	noff depth	27.106	65.478	27.106	mm"
59	"		Ru	noff volume	217.93	0.00	217.93	c.m"
60	"		Ru	noff coefficient	0.377	0.000	0.377	"
61	"		Ma	ximum flow	0.056	0.000	0.056	c.m/sec"
62	"	40	HY	DROGRAPH Start - Ne	w Tributary"			
63	"		2	Start - New Tribut	ary"			
64	"			0.056 0.0	00 0.000	0.000"		
65	"	33	CA	TCHMENT 102"				
66	"		1	Triangular SCS"				
67	"		1	Equal length"				
68	"		1	SCS method"				

69 70 71	" "	102 9.000 0.598	Area to Highway 6" % Impervious" Total Area"				
72		90.000	Flow length"				
/3		5.000	Overland Slope"				
/4		0.544	Pervious Area"				
/5		90.000	Pervious length"				
/6		5.000	Pervious slope"				
//		0.054	Impervious Area"				
/8		90.000	Impervious length"				
/9		5.000	Impervious slope"				
80		0.250	Pervious Manning 'n				
81		75.000	Pervious SCS Curve I	No."			
82		0.377	Pervious Runoff coe	fficient"			
83		0.100	Pervious la/S coeff:	icient"			
84		8.46/	Pervious Initial ab	straction"			
85		0.015	Impervious Manning	'n'"			
86		98.000	Impervious SCS Curve	e No."			
8 /		0.917	Impervious Runoff Co	pefficient"			
88		0.100	Impervious la/S coe	fficient"			
89		0.518	Impervious Initial a	abstraction'		<b>^</b> /	
90		~	0.052 0.00	0.000	- 0.000	0 c.m/sec	
91		Ca	tchment 102	Pervious	Impervio	us Total	Area "
92		Su	riace Area	0.544	0.054	0.598	hectare"
93		Ti	me of concentration	17.625	2.208	14.639	minutes"
94		Ti	me to Centroid	126.8/4	91.122	119.94	9 minutes"
95		Ra	infall depth	/1.828	/1.828	/1.828	mm
96		Ra	infall volume	390.88	38.66	429.53	C.m.
97		Ra Du	InIall losses	44./10 07.110	5.9// CE 0E1	41.230	mm "
98		Ru			05.851	30.599	пшп <sup></sup>
100		Ru	norr volume	147.54	35.44	182.98	C.m.
100		Ku	noll coefficient	0.377	0.917	0.420	
101		20 Ma	XIMUM IIOW	0.045	0.028	0.052	c.m/sec
102 102		38 ST	ART/RE-START TOTALS	т m II			
101		По	tal Catabrant anas	11		0 000	ho at a wall
104 105		10	tal Catchinent area			0.000	hectare
10C		10	tal simporvious area			0.000	neclare
107		10 57	TUDETATOUS			0.000	
T0 /		L9 EX	± ±				

1				MEDIAG OFFICE					<b>N</b> 11
T				MIDUSS Output					>"
2	"			MIDUSS versio	n			Version 2.25	rev. 473"
З	"			MIDUSS create	h		Suu	ndav. Februa	rv 7. 2010"
1			1.0	Inita wood.			0 4.	naay, rebraa	i MEEDIC"
4			ΤŪ	Units used:					IE METRIC"
5	"			Job folder:				Q:\486	50\100\SWM"
6	"			Output filena	me:			2vr p	ost r4.out"
7								291 P	٦ DOC 11.040
/				Licensee name	:				A.,
8	"			Company					"
9	"			Date & Time 1	ast use	d•	10	/27/2023 at	4.01.22 PM"
10		21				u.	10	/2//2025 at	4.01.22 IN
ΤU		31		LIME PARAMETERS'					
11	"		5.000	Time Step"					
12			180 000	Max Storm lo	nath"				
12			100.000	Max. Storm re	ing ch				
13			1500.000	Max. Hydrogra	aph"				
14	"	32	5	STORM Chicago st	.orm"				
15	"		1	Chiqago storm					
TJ				Chicago Storn					
16			375.000	Coefficient A					
17	"		0.240	Constant B"					
1 0			0 (00						
ΤO			0.009	Exponent C					
19	"		0.400	Fraction R"					
20	"		180 000	Duration"					
20			1 000						
Ζ⊥			1.000	Time step mul	tipiler				
22	"		1	Maximum intensit	.y	119.78	38 mm/h:	r"	
23	"		r	Total depth	-	31 30	36 mm"		
23					,				
24			6	002hyd Hydi	ograph (	extension u	ised in th	ıs file"	
25	"	81	2	ADD COMMENT====	=======				====="
26	"		2 -	lines of comment	. 11				
20			<u>ک</u> _		-		~		
27				IA increased to	20mm to	account ic	or root and	d landscape	area "
28	"			runoff reductior	due to	amended to	"lioza		
20		33	(				<u> </u>		
29		55	(	CAICHMENI 201					
30			1	Triangular SC	S"				
31	"		1	Equal length'	•				
20			- 1	CCC mothod"					
32			T	SCS method					
33	"		201	Area to south	west pr	operty line	e, ultimate	ely to Mun D	rain #1"
34	"		46.000	% Impervious'					
25			0 126						
35			0.136	Total Area					
36	"		15.000	Flow length"					
37	"		2 000	Overland Slor					
20			2.000	Beeriana Brop					
38			0.0/3	Pervious Area	1				
39	"		15.000	Pervious lend	gth"				
40	"		2 000	Pervious slor					
11			0.000						
4 I			0.063	Impervious Ar	ea				
42	"		15.000	Impervious le	ength"				
43	"		2 000	Impervious sl	one"				
10			2.000	Impervious si					
44			0.250	Pervious Manr	iing 'n'				
45	"		75.000	Pervious SCS	Curve N	0."			
46	"		0 043	Pervious Runc	off coef	ficient"			
10			0.010						
4 /			0.236	Pervious la/s	coerri	cient"			
48	"		19.981	Pervious Init	ial abs	traction"			
49	"		0 015	Impervious Ma	nning '	n'"			
E 0			00.000			No II			
50			98.000	impervious so	s curve	NO."			
51	"		0.248	Impervious Ru	unoff co	efficient"			
52	"		3 858	Impervious Ia	/S coef	ficient"			
52			10.000						
53			19.999	Impervious ir	nitial a	pstraction.	•		
54	"			0.001	0.000	0.000	0.000	c.m/sec"	
55	"		(	Catchment 201		Pervious	Imperviou	s Total Area	"
							pcrvrou	0 10C	h
36				Suriace Area		0.0/3	0.063	U.136	nectare"
57	"		r	Time of concentr	ation	52.330	4.179	12.363	minutes"
5 Q	"		r	Time to Centroia	1	172 1/0	128 0.91	135 570	minutos"
50			-			1 1 2 • 1 7 V	1 20C	1 200	
59			]	kainiali depth		31.396	31.396	31.396	ınm
60	"		]	Rainfall volume		23.06	19.64	42.70	c.m"
61	"		1	Rainfall lossos		30 040	23 621	27 089	mm"
0 T			1				20.024	21.009	
62	"		]	Runoii depth		1.356	7.771	4.307	mm''
63	"		1	Runoff volume		1.00	4.86	5.86	c.m"
61				Dupoff coofficie	n+	0 043	0 210	0 1 2 7	
04			1	COELICIE	511 L	0.045	0.240	0.13/	/
65	"		I	Maxımum flow		0.000	0.001	0.001	c.m/sec"
66	"	40	1	HYDROGRAPH Start	: - New '	Tributarv"			
67	"	-	ົ່	Start - Nour	'rihutər	τ,			
07			Z	JUALU - NEW J		У			
c ~				0 001	0 000	$\alpha  \alpha  \alpha  \alpha  \alpha  \alpha  \alpha  \alpha  \alpha  \alpha $	0 000		

69	"	81		ADD COMMENT=======	===========		-=========	====="
70	"		2	Lines of comment"				
71	"			IA increased to 20mm t	o account f	for roof and	landscape	area "
72	"			runoff reduction due t	o amended t	copsoil"		
73	"	33		CATCHMENT 202"				
74	"		1	. Triangular SCS"				
7.5	"		1	Equal length"				
76	"		1	SCS method"				
70			202	Controlled area to	Highway 6"			
70		70	202	» Importional	nignway o			
70		/0	.000					
19		1 5	.962	. Total Area				
80		15	.000	) Flow length"				
81		2	.000	) Overland Slope"				
82	"	0	.289	) Pervious Area"				
83	"	15	.000	) Pervious length"				
84	"	2	.000	) Pervious slope"				
85	"	0	.673	3 Impervious Area"				
86	"	15	.000	) Impervious length"				
87	"	2	.000	) Impervious slope"				
88	"	0	.250	) Pervious Manning 'n				
89	"	7.5	.000	) Pervious SCS Curve	No."			
90	"	0	043	Pervious Bunoff coe	fficient"			
91	"	0	236	Pervious Ja/S coeff	icient"			
0.2		10	.230	Porvious Initial ab	atraation"			
92		19	. 901	. Pervious inicial ap	Straction			
93		0	.015	impervious Manning	· n · ··			
94		98	.000	Impervious SCS Curv	e No."			
95		0	.825	) Impervious Runoff c	oefficient"	•		
96	"	0	.100	) Impervious Ia/S coe	fficient"			
97	"	0	.518	3 Impervious Initial	abstractior	י"		
98	"			0.159 0.00	0 0.000	0.000 0	c.m/sec"	
99	"			Catchment 202	Pervious	Impervious	Total Area	
100	"			Surface Area	0.289	0.673	0.962	hectare"
101	"			Time of concentration	52.330	1.412	2.530	minutes"
102	"			Time to Centroid	172.140	92.372	94.123	minutes"
103	"			Rainfall depth	31 396	31 396	31 396	mm"
104	"			Rainfall volume	90 61	211 42	302 03	c m"
105				Rainfall loggog	20.010	5 505	12 966	~~
100				Rainiali losses	1 250	J.JUJ 25 001	10 520	
100				Ruhoff depth	1.350	23.891 174 of	170.00	
107				Runoff volume	3.91	1/4.35	1/8.26	c.m"
108				Runoff coefficient	0.043	0.825	0.590	
109	"			Maximum flow	0.001	0.159	0.159	c.m/sec"
110	"	40		HYDROGRAPH Add Runoff				
111	"		4	Add Runoff "				
112	"			0.159 0.15	9 0.000	0.000"		
113	"	54		POND DESIGN"				
114	"	0	.159	) Current peak flow	c.m/sec"			
115	"	0	.207	/ Target outflow c	.m/sec"			
116	"	1	78 3	} Hydrograph volume	c m"			
117	"	-	9	Number of stages"	0.11			
11Q	"	121	90	) Minimum water level	mot ro"			
110		421	. 990	Marimum vatar level	metre"			
100		424	.030	Maximum water rever	lieure	•		
120		421	.990	Starting water leve	1 metre"			
121			0	) Keep Design Data: I	= True; 0	= False"		
122	"			Level Discharge	Volume"			
123	"			421.990 0.000	0.000"			
124	"			422.200 0.00642	1.01E-05"			
125	"			422.600 0.01201	85.000"			
126	"			423.000 0.01572	170.000"			
127	"			423.500 0.01939	211.987"			
128	"			423.830 0.02147	221.426"			
129	"			423 930 0 02206	239 726"			
120	"			123,330 0.02200	270 251"			
101	"			424 020 0.02222	2/U.ZJI 225 201 "			
1 2 2			1	424.USU U.U648U	323.2UI"			
132			⊥.	WEIKS"	a i	T C:	D	
133				Crest Weir	Crest	Leit	Kight"	
134				elevation coefficie	preadth si	Laes⊥ope side	es⊥ope"	
135	"			423.980 0.900	0.600	50.000 5	50.000"	
136	"		1.	ORIFICES"				

137	"		Orifice Orifice	Orifice N	umber of"		
138	"		invert coefficie	diameter	orifices"		
139	"		421.990 0.820	0.0750	1.000"		
140			Peak outflow	0.	012 c.m/se	ec"	
141			Maximum level	422.	646 metre'	•	
142			Maximum storage	94.	/34 c.m"		
143			Centroidal lag	J.	033 nours"	/ ~ ~ ~ "	
144		10	U.159 U.159	1	0.000 C.m/	sec	
140		40	AIDROGRAPH COMDINE	Ţ			
140			1 Node #"				
148	"		Total to Highway #	6"			
149	"		Maximum flow	0.	012 c.m/se	°	
150	"		Hydrograph volume	178.	968 c.m"		
151	"		0.159 0.1	59 0.01	2 0.012"		
152	"	40	HYDROGRAPH Start - Ne	w Tributary			
153	"		2 Start - New Tribut	ary"			
154	"		0.159 0.0	00 0.01	2 0.012"		
155	"	81	ADD COMMENT=======		================		====="
156	"		2 Lines of comment"				
157	"		IA increased to 20mm	to account	for roof and	landscape a	area "
158	"		runoff reduction due	to amended	topsoil"		
159	"	33	CATCHMENT 203"				
160			1 Triangular SCS"				
161			1 Equal length"				
162			1 SCS method"				
163			203 Uncontrolled to Hi	ghway 6"			
164			23.000  % Impervious"				
165			120 000 Flow longth"				
167			2 000 Overland Slope"				
168	"		0 234 Pervious Area"				
169	"		120.000 Pervious length"				
170	"		2.000 Pervious slope"				
171	"		0.070 Impervious Area"				
172	"		120.000 Impervious length"				
173	"		2.000 Impervious slope"				
174	"		0.250 Pervious Manning '	n'"			
175			75.000 Pervious SCS Curve	No."			
176			0.043 Pervious Runoff co	efficient"			
170			0.236 Pervious Ia/S coef	ficient"			
170			19.981 Pervious Initial a	DStraction"			
180			0.015 Impervious Manning	vo No "			
181	"		0 249 Impervious Bunoff	coefficient			
182	"		3 858 Impervious Ia/S co	efficient"			
183	"		19.999 Impervious Initial	abstractio	n"		
184	"		0.001 0.0	00 0.01	2 0.012 0	c.m/sec"	
185	"		Catchment 203	Pervious	Impervious	Total Area	"
186	"		Surface Area	0.234	0.070	0.304	hectare"
187	"		Time of concentration	182.223	14.553	76.159	minutes"
188	"		Time to Centroid	271.867	137.008	186.559	minutes"
189			Rainfall depth	31.396	31.396	31.396	mm"
190			Rainfall volume	/3.49	21.95	95.44	C.M"
191			Rainfall losses	30.040	23.580	28.554	mm''
102			Runoii depth Dupoff Holumo	L.336 2 17	7.810 5.46	2.842	mm"
193 101			Runoff coofficient	J.17 0.043	0 240	0.04	C.m "
194	"		Maximum flow	0.045	0.249	0.091	c m/sec"
196	"	40	HYDROGRAPH Add Runoff	"	0.001	0.001	C.m/ 560
197	"		4 Add Runoff "				
198	"		0.001 0.0	01 0.01	2 0.012"		
199	"	40	HYDROGRAPH Copy to Ou	tflow"	0.012		
200	"	-	8 Copy to Outflow"	-			
201	"		0.001 0.0	01 0.00	1 0.012"		
202	"	40	HYDROGRAPH Combine	1"			
203	"		6 Combine "				
204	"		1 Node #"				

205	"		Total to Highway #6"			
206	"		Maximum flow	0.014	c.m/sec"	
207	"		Hydrograph volume	187.607	c.m"	
208	"		0.001 0.001	0.001	0.014"	
209	"	38	START/RE-START TOTALS 203"			
210	"		3 Runoff Totals on EXIT"			
211	"		Total Catchment area		1.266	hectare"
212	"		Total Impervious area		0.743	hectare"
213	"		Total % impervious		58.714"	
214	"	19	EXIT"			

1	"			MIDUCC Output				<b>N</b> 11
T				MIDOSS Output				
2				MIDUSS version		Ve	ersion 2.25	rev. 473"
3	"			MIDUSS created		Sunc	lay, Februa:	ry 7, 2010"
4	"		10	Units used:				ie METRIC"
5	"			Job folder.			0.\486	50\100\SWM"
ć				Outrut fileneme.			Q. (100.	
6				output illename:			byr bo	ost r4.out"
7				Licensee name:				A''
8	"			Company				"
9	"			Date & Time last us	sed•	10/2	7/2023 at 4	4.00.16 PM"
10		21	т	THE DADAMEMEDCU	Jeu.	10/2	.,,2025 ac	1.00.10 111
10		ST		IME PARAMEIERS				
11			5.000	Time Step"				
12	"		180.000	Max. Storm length"				
13	"		1500 000	Max Hydrograph"				
1 /		20	1000.0000	TOPM Chicago storm"				
1 5		52	1					
15			T	Chicago storm"				
16	"		500.000	Coefficient A"				
17	"		0.240	Constant B"				
18	"		0 688	Exponent C"				
10			0.000					
19			0.400	Fraction R"				
20			180.000	Duration"				
21	"		1.000	Time step multiplie	er"			
22	"		М	aximum intensity	160 0	61 mm/hr"	ı	
22			m	atal danth	40.0	45 mm."		
23			1		42.14	40		
24			6	005hyd Hydrograph	n extension 1	used in this	s file"	
25	"	81	A	DD COMMENT=======		==============		====="
26	"		2 L	ines of comment"				
27	"		т	A increased to 20mm t	- account f	or roof and	landecane	aroa "
27			1	A INCLEASED CO ZOMM (			Tanuscape d	area
28			r	unorr reduction due t	to amended to	opsoll"		
29		33	C	ATCHMENT 201"				
30	"		1	Triangular SCS"				
31	"		1	Equal length"				
22			1	CCC method"				
32				SCS MELIIOU				
33			201	Area to southwest p	property line	e, ultimatel	y to Mun D:	raın #1"
34	"		46.000	% Impervious"				
35	"		0.136	Total Area"				
36	"		15 000	Flow longth"				
20			13.000					
37			2.000	Overland Slope"				
38	"		0.073	Pervious Area"				
39	"		15.000	Pervious length"				
40	"		2 000	Pervious slope"				
<u>л</u> 1			0.063					
41			0.003	Impervious Area				
42			15.000	Impervious length"				
43	"		2.000	Impervious slope"				
44	"		0.250	Pervious Manning 'r	ר <b>י</b> י			
45	"		75 000	Pervious SCS Curve	No "			
10			/3.000					
40			0.109	Pervious Runori Coe	erricient"			
47			0.236	Pervious Ia/S coeff	ticient"			
48	"		19.981	Pervious Initial at				
49				10111040 11110141 44	ostraction"			
50			0.015	Impervious Manning	ostraction" 'n'"			
50			0.015	Impervious Manning	ostraction" 'n'"			
	"		0.015 98.000	Impervious Manning Impervious SCS Curv	ostraction" 'n'" ve No."			
ЪТ	יי יי		0.015 98.000 0.417	Impervious Manning Impervious SCS Curv Impervious Runoff (	ostraction" 'n'" ve No." coefficient"			
э⊥ 52	" "		0.015 98.000 0.417 3.858	Impervious Manning Impervious SCS Curv Impervious Runoff o Impervious Ia/S coe	ostraction" 'n'" ve No." coefficient" efficient"			
51 52 53	"" "		0.015 98.000 0.417 3.858 19.999	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial	ostraction" 'n'" ve No." coefficient" efficient" abstraction	"		
51 52 53 54	" " "		0.015 98.000 0.417 3.858 19.999	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial	ostraction" 'n'" ve No." coefficient" efficient" abstraction	" 0.000 c	m/sec"	
<ul> <li>⊃⊥</li> <li>52</li> <li>53</li> <li>54</li> <li>55</li> </ul>			0.015 98.000 0.417 3.858 19.999	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00	ostraction" 'n'" ve No." coefficient" efficient" abstraction 00 0.000	" 0.000 c	c.m/sec"	"
51 52 53 54 55			0.015 98.000 0.417 3.858 19.999	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201	ostraction" 'n'" ve No." coefficient" efficient" abstraction 00 0.000 Pervious	" 0.000 c Impervious	c.m/sec" Total Area	"
51 52 53 54 55 56			0.015 98.000 0.417 3.858 19.999 C S	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area	ostraction" 'n'" ve No." coefficient" abstraction 00 0.000 Pervious 0.073	" 0.000 c Impervious 0.063	.m/sec" Total Area 0.136	" hectare"
51 52 53 54 55 56 57			0.015 98.000 0.417 3.858 19.999 C S T	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration	ostraction" 'n'" ve No." coefficient" abstraction 00 0.000 Pervious 0.073 26.171	" 0.000 c Impervious 0.063 2.385	c.m/sec" Total Area 0.136 7.965	" hectare" minutes"
51 52 53 54 55 56 57 58			0.015 98.000 0.417 3.858 19.999 C S T	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid	ostraction" 'n'" ve No." coefficient" abstraction 00 0.000 Pervious 0.073 26.171 143.656	0.000 c Impervious 0.063 2.385 111.673	c.m/sec" Total Area 0.136 7.965 119.176	" hectare" minutes" minutes"
51 52 53 54 55 57 57 58 59			0.015 98.000 0.417 3.858 19.999 C S T T	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth	ostraction" 'n'" ve No." coefficient" abstraction 00 0.000 Pervious 0.073 26.171 143.656 42 145	" 0.000 c Impervious 0.063 2.385 111.673 42 145	c.m/sec" Total Area 0.136 7.965 119.176 42 145	" hectare" minutes" mm"
51 52 53 54 55 57 59 59 59			0.015 98.000 0.417 3.858 19.999 C S T T R	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth	<pre>ostraction" 'n'" ve No." coefficient" abstraction 0 0.000 Pervious 0.073 26.171 143.656 42.145 20 05</pre>	" 0.000 c Impervious 0.063 2.385 111.673 42.145 26.27	c.m/sec" Total Area 0.136 7.965 119.176 42.145 57.22	" hectare" minutes" mm" a m"
51 52 53 55 55 57 59 60			0.015 98.000 0.417 3.858 19.999 C S T T R R	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume	<pre>&gt;straction" 'n'" ve No." coefficient" abstraction 0 0.000 Pervious 0.073 26.171 143.656 42.145 30.95 </pre>	" 0.000 c Impervious 0.063 2.385 111.673 42.145 26.37	c.m/sec" Total Area 0.136 7.965 119.176 42.145 57.32	" hectare" minutes" mm" c.m"
51 52 53 55 55 57 59 61			0.015 98.000 0.417 3.858 19.999 C S T T R R R	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses	Distraction" 'n'" Ve No." coefficient" abstraction 00 0.000 Pervious 0.073 26.171 143.656 42.145 30.95 37.551	" 0.000 c Impervious 0.063 2.385 111.673 42.145 26.37 24.551	c.m/sec" Total Area 0.136 7.965 119.176 42.145 57.32 31.571	" hectare" minutes" mm" c.m" mm"
51 52 53 55 55 55 50 61 62			0.015 98.000 0.417 3.858 19.999 C S T T R R R R R	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses unoff depth	Distraction" 'n'" Ve No." Coefficient" abstraction 00 0.000 Pervious 0.073 26.171 143.656 42.145 30.95 37.551 4.593	" 0.000 c Impervious 0.063 2.385 111.673 42.145 26.37 24.551 17.594	c.m/sec" Total Area 0.136 7.965 119.176 42.145 57.32 31.571 10.574	" hectare" minutes" mm" c.m" mm" mm"
51234567890123			0.015 98.000 0.417 3.858 19.999 C S T T R R R R R	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses unoff depth unoff volume	<pre>&gt;straction" 'n'" ve No." coefficient" efficient" abstraction 0 0.000 Pervious 0.073 26.171 143.656 42.145 30.95 37.551 4.593 3.37</pre>	" 0.000 c Impervious 0.063 2.385 111.673 42.145 26.37 24.551 17.594 11.01	c.m/sec" Total Area 0.136 7.965 119.176 42.145 57.32 31.571 10.574 14.38	" hectare" minutes" mm" c.m" mm" mm" c.m"
512 534 555 557 550 612 601 623			0.015 98.000 0.417 3.858 19.999 C S T T R R R R R R	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses unoff depth unoff coefficient	<pre>&gt;straction" 'n'" ve No." coefficient" efficient" abstraction 0 0.000 Pervious 0.073 26.171 143.656 42.145 30.95 37.551 4.593 3.37 0.109</pre>	" 0.000 c Impervious 0.063 2.385 111.673 42.145 26.37 24.551 17.594 11.01 0.417	c.m/sec" Total Area 0.136 7.965 119.176 42.145 57.32 31.571 10.574 14.38 0.251	" hectare" minutes" mm" c.m" mm" c.m" "
5123455555556612345555566123666566656665666666666666666666			0.015 98.000 0.417 3.858 19.999 C S T R R R R R R R R R	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses unoff depth unoff volume	<pre>&gt;straction" 'n'" ve No." coefficient" abstraction" 0 0.000 Pervious 0.073 26.171 143.656 42.145 30.95 37.551 4.593 3.37 0.109 0.001</pre>	" 0.000 c Impervious 0.063 2.385 111.673 42.145 26.37 24.551 17.594 11.01 0.417 0.005	c.m/sec" Total Area 0.136 7.965 119.176 42.145 57.32 31.571 10.574 14.38 0.251	" hectare" minutes" minutes" mm" c.m" mm" c.m" "
5123455555555666236455			0.015 98.000 0.417 3.858 19.999 C S T R R R R R R R R R R R R	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses unoff depth unoff volume unoff coefficient aximum flow	<pre>&gt;straction" 'n'" ve No." coefficient" abstraction 0 0.000 Pervious 0.073 26.171 143.656 42.145 30.95 37.551 4.593 3.37 0.109 0.001</pre>	" 0.000 c Impervious 0.063 2.385 111.673 42.145 26.37 24.551 17.594 11.01 0.417 0.005	c.m/sec" Total Area 0.136 7.965 119.176 42.145 57.32 31.571 10.574 14.38 0.251 0.005	" hectare" minutes" mm" c.m" mm" c.m" " c.m/sec"
5 1 2 3 4 5 5 5 5 5 5 5 6 6 6 6 6 6 6 6 6 6 6 6		40	0.015 98.000 0.417 3.858 19.999 C S T T R R R R R R R R R R R H	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses unoff depth unoff volume unoff coefficient aximum flow YDROGRAPH Start - New	<pre>&gt;straction" 'n'" ve No." coefficient" abstraction 00 0.000 Pervious 0.073 26.171 143.656 42.145 30.95 37.551 4.593 3.37 0.109 0.001 w Tributary"</pre>	" 0.000 c Impervious 0.063 2.385 111.673 42.145 26.37 24.551 17.594 11.01 0.417 0.005	c.m/sec" Total Area 0.136 7.965 119.176 42.145 57.32 31.571 10.574 14.38 0.251 0.005	" hectare" minutes" mm" c.m" mm" c.m" " c.m/sec"
5 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		40	0.015 98.000 0.417 3.858 19.999 C S T T R R R R R R R R R R 2	Impervious Manning Impervious SCS Curv Impervious Runoff of Impervious Ia/S coe Impervious Initial 0.005 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses unoff depth unoff volume unoff coefficient aximum flow YDROGRAPH Start - New Start - New Tributa	<pre>&gt;straction" 'n'" &gt;ve No." coefficient" abstraction 00 0.000 Pervious 0.073 26.171 143.656 42.145 30.95 37.551 4.593 3.37 0.109 0.001 w Tributary"</pre>	" 0.000 c Impervious 0.063 2.385 111.673 42.145 26.37 24.551 17.594 11.01 0.417 0.005	c.m/sec" Total Area 0.136 7.965 119.176 42.145 57.32 31.571 10.574 14.38 0.251 0.005	" hectare" minutes" mm" c.m" mm" c.m" " c.m/sec"

69	"	81	ADD COMMENT===================================
70	"		2 Lines of comment"
71	"		IA increased to 20mm to account for roof and landscape area "
72	"		runoff reduction due to amended topsoil"
73	"	33	CATCHMENT 202"
74	"		1 Triangular SCS"
75	"		1 Equal length"
76	"		1 SCS method"
77	"		202 Controlled area to Highway 6"
78	"		70 000 % Impervious"
79	"		0.962 Total Area"
80	"		15.000 Flow length"
Q 1	"		2 000 Overland Slope"
82	"		2.000 Overland Stope
02			15.000 Dervicus lead
00			
04			2.000 Pervious stope
80			0.6/3 Impervious Area
86			15.000 Impervious length"
8.7			2.000 Impervious slope"
88			0.250 Pervious Manning 'n'"
89	"		75.000 Pervious SCS Curve No."
90	"		0.109 Pervious Runoff coefficient"
91	"		0.236 Pervious Ia/S coefficient"
92	"		19.981 Pervious Initial abstraction"
93	"		0.015 Impervious Manning 'n'"
94	"		98.000 Impervious SCS Curve No."
95	"		0.855 Impervious Runoff coefficient"
96	"		0.100 Impervious Ia/S coefficient"
97	"		0.518 Impervious Initial abstraction"
98	"		0.226 0.000 0.000 0.000 c.m/sec"
99	"		Catchment 202 Pervious Impervious Total Area "
100	"		Surface Area 0.289 0.673 0.962 bectare"
101	"		Time of concentration 26.171 1.241 2.533 minutes"
102	"		Time to Centroid 143 656 91 016 93 743 minutes"
103	"		Rainfall depth 42 145 42 145 42 145 mm"
100	"		Rainfall volume 121.63 283.80 405.43 c m"
105	"		Painfall locade 37,551 6,117 15,549 mm"
105			$\begin{array}{cccccccccccccccccccccccccccccccccccc$
107			$\begin{array}{cccccccccccccccccccccccccccccccccccc$
100			Runoli Volume 13.20 242.01 233.00 C.m
100			
1109		4.0	Maximum IIOW 0.002 0.226 0.226 C.m/sec*
		40	HIDROGRAPH AGE RUNDII
			4 Add Runoll "
112			0.226 0.226 0.000 0.000"
113		54	POND DESIGN"
114			0.226 Current peak flow c.m/sec"
115			0.207 Target outflow c.m/sec"
116			255.9 Hydrograph volume c.m"
117	"		9. Number of stages"
118	"		421.990 Minimum water level metre"
119	"		424.030 Maximum water level metre"
120	"		421.990 Starting water level metre"
121	"		0 Keep Design Data: 1 = True; 0 = False"
122	"		Level Discharge Volume"
123	"		421.990 0.000 0.000"
124	"		422.200 0.00642 1.01E-05"
125	"		422.600 0.01201 85.000"
126	"		423.000 0.01572 170.000"
127	"		423.500 0.01939 211.987"
128	"		423.830 0.02147 221.426"
129	"		423 930 0 02206 239 726"
120	"		423 980 0 02235 270 251 <b>"</b>
121			424 030 0 06480 325 201 <b>"</b>
エンエ 1 つつ			ЧАЧ.000 0.00900 020.201 1 метро <b>!!</b>
エン乙 1 つつ			L. WELLAD
121			Crest werr crest Lert Kight"
134 125			erevation coefficie preadin sidesiope sidesiope"
135			423.980 0.900 0.600 50.000 50.000"
136			I. ORIFICES"

137	"		Orifice Orifice	Orifice Nu	mber of"		
138	"		invert coefficie	diameter c	rifices"		
139			421.990 0.820	0.0750	1.000"		
140			Peak outflow	0.0	15 c.m/se	ec"	
141			Maximum level	422.8	94 metre'	•	
142			Maximum storage	147.5	62 C.M"		
143			Centroidal lag	3.4 0.015	/8 hours"	/ ~ ~ ~ "	
144		10	0.226 $0.226$	0.015	0.000 c.m/	sec"	
145		40	HIDROGRAPH Combine	Τ			
140			1 Nodo #"				
1/Q			I NOULE #	6"			
140			Maximum flow	0 0	15 cm/se		
150	"		Hydrograph volume	254 8	89 cm"		
151	"		0.226 0.2	26 0.015	0.015"		
152	"	40	HYDROGRAPH Start - Ne	w Tributary"			
153	"		2 Start - New Tribut	ary"			
154	"		0.226 0.0	00 0.015	0.015"		
155	"	81	ADD COMMENT=======				====="
156	"		2 Lines of comment"				
157	"		IA increased to 20mm	to account f	or roof and	landscape a	area "
158	"		runoff reduction due	to amended t	opsoil"		
159	"	33	CATCHMENT 203"				
160	"		1 Triangular SCS"				
161	"		1 Equal length"				
162			1 SCS method"				
163			203 Uncontrolled to Hi	ghway 6"			
164			23.000 % Impervious"				
165			120,000 Elemente "				
100			120.000 Flow length"				
160			2.000 Overland Slope"				
169			120 000 Pervious length"				
170	"		2 000 Pervious slope"				
171	"		0 070 Impervious Area"				
172	"		120.000 Impervious length"				
173	"		2.000 Impervious slope"				
174	"		0.250 Pervious Manning '	n'"			
175	"		75.000 Pervious SCS Curve	No."			
176	"		0.109 Pervious Runoff co	efficient"			
177	"		0.236 Pervious Ia/S coef	ficient"			
178	"		19.981 Pervious Initial a	bstraction"			
179	"		0.015 Impervious Manning	'n'"			
180			98.000 Impervious SCS Cur	ve No."			
181			0.424 Impervious Runoff	coefficient"			
182			3.858 Impervious Ia/S co	efficient"			
101			19.999 Impervious Initial	abstraction	0 015	~ ~ / ~ ~ ~ "	
104			0.005 $0.0$	Dorrigue		Total Area	
186			Surface Area	0 234	0 070	0 304	hectare"
187	"		Time of concentration	91 133	8 304	46 625	minutes"
188	"		Time to Centroid	205.843	118.191	158.743	minutes"
189	"		Rainfall depth	42.145	42.145	42.145	mm"
190	"		Rainfall volume	98.65	29.47	128.12	c.m"
191	"		Rainfall losses	37.547	24.268	34.493	mm"
192	"		Runoff depth	4.598	17.877	7.652	mm"
193	"		Runoff volume	10.76	12.50	23.26	c.m"
194	"		Runoff coefficient	0.109	0.424	0.182	"
195	"		Maximum flow	0.001	0.005	0.005	c.m/sec"
196	"	40	HYDROGRAPH Add Runoff	"			
197	"		4 Add Runoff "				
198	"	4.0	0.005 0.0	0.015	0.015"		
199		40	HYDROGRAPH Copy to Ou	tílow"			
200			8 Copy to Outflow"	0.5 0.005	0.015		
∠U⊥ 202		⁄1 ∩	U.UU5 U.U HVDDOCDADU Combine	0.005 1"	0.015"		
∠∪∠ 203	"	чU	6 Combine "	Ŧ			
203	"		1 Node #"				

205	"		Total to Highway #6"			
206	"		Maximum flow	0.019	c.m/sec"	
207	"		Hydrograph volume	278.150	c.m"	
208	"		0.005 0.005	0.005	0.019"	
209	"	38	START/RE-START TOTALS 203"			
210	"		3 Runoff Totals on EXIT"			
211	"		Total Catchment area		1.266	hectare"
212	"		Total Impervious area		0.743	hectare"
213	"		Total % impervious		58.714"	
214	"	19	EXIT"			

1				MIDUSS Output				>"
2	"			MIDUSS version		Ve	rsion 2 25	rev 473"
2				MIDUQQ averated		0		200104
3				MIDUSS created		Sund	ay, reprua	ry /, 2010"
4	"		10	Units used:				ie METRIC"
5	"			Job folder.			0.\486	50\100\SWM"
2							2. (1000	50 (100 (DWII
6				Output filename:			10yr po	ost r4.out"
7	"			Licensee name:				A"
Q				Company				"
0					,	10/0		0 50 10 50
9				Date & Time last us	ed:	10/2	27/2023 at s	3:59:18 PM"
10	"	31	T	IME PARAMETERS"				
11	"		5 000	Time Step"				
1 I I			5.000	IIIIe Scep				
12			180.000	Max. Storm length"				
13	"		1500.000	Max. Hvdrograph"				
1 /		30	C.	POPM Chicago storm"				
1 -		52	, D.					
15			$\perp$	Chicago storm"				
16	"		595.000	Coefficient A"				
17	"		0 360	Constant B"				
10			0.000					
Τ8			0.691	Exponent C"				
19	"		0.400	Fraction R"				
20	"		180 000	Duration"				
20			1 000					
Ζ⊥			1.000	Time step multiplie	r"			
22	"		Ma	aximum intensity	186.43	31 mm/hr"		
23	"		ጥረ	stal depth	49 22	26 mm <b>"</b>		
20					19.22		e : 1 - 11	
24			6	Ulunya Hyarograph	extension (	ised in this	s ille"	
25	"	81	AI	DD COMMENT========	=============		=============	====="
26	"		2 T	ines of comment"				
20			2 11-				1 1	
27			$\perp I$	A increased to 20mm t	o account io	or root and	landscape a	area "
28	"		rı	unoff reduction due t	o amended to	opsoil"		
29	"	33	CI	ATCHMENT 201"		-		
20		55	1					
30			T	Triangular SCS				
31	"		1	Equal length"				
32	"		1	SCS method"				
22			201					
33			201	Area to southwest p	ropercy rine	e, uitimatei	y to Mun Di	rain #1"
34	"		46.000	% Impervious"				
			0 126	Total Area"				
35	"		1 1 1 1 1 1					
35	"		15 000	Flour longth				
35 36	" "		15.000	Flow length"				
35 36 37	" " "		15.000	Flow length" Overland Slope"				
35 36 37 38	"" " "		15.000 2.000 0.073	Flow length" Overland Slope" Pervious Area"				
35 36 37 38	"" "		15.000 2.000 0.073	Flow length" Overland Slope" Pervious Area"				
35 36 37 38 39	" " "		15.000 2.000 0.073 15.000	Flow length" Overland Slope" Pervious Area" Pervious length"				
35 36 37 38 39 40	" " "		15.000 2.000 0.073 15.000 2.000	Flow length" Overland Slope" Pervious Area" Pervious length" Pervious slope"				
35 36 37 38 39 40 41	" " " "		15.000 2.000 0.073 15.000 2.000 0.063	Flow length" Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area"				
35 36 37 38 39 40 41 42			15.000 2.000 0.073 15.000 2.000 0.063	Flow length" Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area"				
35 36 37 38 39 40 41 42			15.000 2.000 0.073 15.000 2.000 0.063 15.000	Flow length" Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area"				
35 36 37 38 39 40 41 42 43			15.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000	Flow length" Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope"				
35 36 37 38 39 40 41 42 43 44			15.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250	Flow length" Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n				
35 36 37 38 39 40 41 42 43 44 45			$\begin{array}{c} 15.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\end{array}$	Flow length" Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve	' " No "			
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69	"	81	ADD COMMENT=========	========			====="
70	"	2	Lines of comment"				
71	"		IA increased to 20mm to a	.ccount f	for roof and	landscape (	area "
72	"		runoff reduction due to an	mended t	topsoil"		
73	"	33	CATCHMENT 202"				
74	"	1	1 Triangular SCS"				
7.5	"	1	1 Equal length"				
76	"	- 1	1 SCS method"				
77	"	202	2 Controlled area to Hig	hway 6"			
70	"		0 <sup>§</sup> Importuious"	nway o			
70		/0.000					
00		15 000	2 IOLAI AIEA 0 Elemente "				
80		15.000	U Flow length"				
81		2.000	0 Overland Slope"				
82		0.289	9 Pervious Area"				
83		15.000	0 Pervious length"				
84	"	2.000	0 Pervious slope"				
85	"	0.673	3 Impervious Area"				
86	"	15.000	0 Impervious length"				
87	"	2.000	0 Impervious slope"				
88	"	0.250	0 Pervious Manning 'n'"				
89	"	75.000	0 Pervious SCS Curve No.	"			
90	"	0.152	2 Pervious Runoff coeffi	cient"			
91	"	0 236	6 Pervious Ja/S coeffici	ent"			
92	"	19.29	1 Pervious Initial abstr	action"			
92		19.901	5 Importious Manning In!				
93		0.01					
94		98.000	0 Impervious SCS Curve N				
95		0.86	/ Impervious Runoff coef	ficient'			
96		0.100	0 Impervious Ia/S coeffi	cient"			
97		0.518	8 Impervious Initial abs <sup>-</sup>	traction	n"		
98	"		0.270 0.000	0.000	0.000 c	c.m/sec"	
99	"		Catchment 202 Pe	rvious	Impervious	Total Area	"
100	"		Surface Area 0.1	289	0.673	0.962	hectare"
101	"		Time of concentration 19	.542	1.162	2.448	minutes"
102	"		Time to Centroid 13	4.145	90.250	93.321	minutes"
103	"		Rainfall depth 49	.226	49.226	49.226	mm"
104	"		Rainfall volume 14	2 07	331 49	473 55	c m"
105	"		Rainfall losses 41	729	6 525	17 086	mm"
105	"		Rainiali 103365 41 Pupoff dopth 7	107	12 701	32 140	mm
107			Runoff Holymo 21	497	42.701 207 55	200 10	
107			Runoll Volume 21	1 5 0 4	207.00	309.10	C.m
108			Runoii coefficient U.	152	0.867	0.653	,
109			Maximum flow 0.	005	0.270	0.270	c.m/sec"
110	"	40	HYDROGRAPH Add Runoff "				
111	"	4	4 Add Runoff "				
112	"		0.270 0.270	0.000	0.000"		
113	"	54	POND DESIGN"				
114	"	0.270	0 Current peak flow c	.m/sec"			
115	"	0.207	7 Target outflow c.m/	sec"			
116	"	309.2	2 Hydrograph volume c	.m"			
117	"	9	Number of stages"				
118	"	421 990	0 Minimum water level	mot ro"			
110		424 030	0 Mawimum water level	metre"			
120		424.030	0 Maximum water rever	metre			
101		421.990	0 Starting water level	Песте	<b>T</b> - 1 <b>U</b>		
		l	U Keep Design Data: I = '	True; 0	= False"		
122			Level Discharge V	olume"			
123	"		421.990 0.000	0.000"			
124	"		422.200 0.00642 1.0	1E-05"			
125	"		422.600 0.01201 8	5.000"			
126	"		423.000 0.01572 17	0.000"			
127	"		423.500 0.01939 21	1.987"			
128	"		423.830 0.02147 22	1.426"			
129	"		423.930 0.02206 23	9.726"			
120	"		423 980 0 02235 27	0 251"			
1 2 1			121 030 0 06400 22	5 201 <b>"</b>			
1 2 C		1	424.UJU U.U048U 32. Metro!!	J.ZUI			
122		1.	. WEIKS"	~ ·	- C·		
133			crest Weir	urest	Leit	kight"	
134			elevation coefficie br	eadth si	ideslope side	eslope"	
135	"		423.980 0.900	0.600	50.000 5	50.000"	
136	"	1.	. ORIFICES"				

137	"		Orifice Orifice Orifi	ce Ni	umber of"		
138	"		invert coefficie diamet	er (	orifices"		
139	"		421.990 0.820 0.07	50	1.000"		
140	"		Peak outflow	0.0	017 c.m/se	ec"	
141	"		Maximum level	423.3	185 metre"	1	
142	"		Maximum storage	185.5	514 c.m"		
143	"		Centroidal lag	3.	733 hours"		
144	"		0.270 0.270 0.0	17	0.000 c.m/	'sec"	
145	"	40	HYDROGRAPH Combine 1"				
146	"		6 Combine "				
147	"		1 Node #"				
148	"		Total to Highway #6"				
149	"		Maximum flow	0.0	017 c.m/se	ec"	
150	"		Hydrograph volume	309.4	496 c.m"		
151	"		0.270 0.270	0.01	7 0.017"		
152	"	40	HYDROGRAPH Start - New Tribu	tary'	"		
153	"		2 Start - New Tributary"	-			
154	"		0.270 0.000	0.01	7 0.017"		
155	"	81	ADD COMMENT============	====:	=======================================	:===========	"
156	"		2 Lines of comment"				
157	"		IA increased to 20mm to acco	unt :	for roof and	landscape a	area "
158	"		runoff reduction due to amen	ded +	topsoil"		
159	"	33	CATCHMENT 203"		0010011		
160	"	00	1 Triangular SCS"				
161	"		1 Equal length"				
162	"		1 SCS method"				
163	"		203 Uncontrolled to Highway 6	"			
164	"		23 000 % Impervious"				
165	"		0 304 Total Area"				
166	"		120.000 Flow length"				
167	"		2 000 Overland Slope"				
168	"		0 234 Pervious Area"				
169	"		120 000 Pervious length"				
170	"		2.000 Pervious slope"				
171	"		0.070 Impervious Area"				
172	"		120.000 Impervious length"				
173	"		2 000 Impervious slope"				
174	"		0 250 Pervious Manning 'n'"				
175	"		75.000 Pervious SCS Curve No."				
176	"		0.153 Pervious Runoff coefficie	nt"			
177	"		0.236 Pervious Ia/S coefficient	"			
178	"		19.981 Pervious Initial abstract	ion"			
179	"		0.015 Impervious Manning 'n'"				
180	"		98.000 Impervious SCS Curve No."				
181	"		0.501 Impervious Runoff coeffic	ient'	"		
182	"		3.858 Impervious Ia/S coefficie	nt."			
183	"		19.999 Impervious Initial abstra	ctio	n"		
184	"		0.008 0.000	0.01	7 0.017 c	.m/sec"	
185	"		Catchment 203 Pervi	ous	Impervious	Total Area	"
186	"		Surface Area 0.234		0.070	0.304	hectare"
187	"		Time of concentration 68.04	9	5.923	37.281	minutes"
188	"		Time to Centroid 184.4	89	112.215	148.695	minutes"
189	"		Rainfall depth 49.22	6	49.226	49.226	mm"
190	"		Rainfall volume 115.2	3	34.42	149.65	c.m"
191	"		Rainfall losses 41.71	9	24.566	37.773	mm"
192	"		Runoff depth 7.507		24.660	11.453	mm"
193	"		Runoff volume 17.57		17.24	34.82	c.m"
194	"		Runoff coefficient 0.153		0.501	0.233	"
195	"		Maximum flow 0.002		0.008	0.008	c.m/sec"
196	"	40	HYDROGRAPH Add Runoff "				
197	"		4 Add Runoff "				
198	"		0.008 0.008	0.01	7 0.017"		
199	"	40	HYDROGRAPH Copy to Outflow"		`		
200	"	-	8 Copy to Outflow"				
201	"		0.008 0.008	0.008	8 0.017"		
202	"	40	HYDROGRAPH Combine 1"				
203	"		6 Combine "				
204	"		1 Node #"				

205	"		Total to Highway #6"			
206	"		Maximum flow	0.023	c.m/sec"	
207	"		Hydrograph volume	344.312	c.m"	
208	"		0.008 0.008	0.008	0.023"	
209	"	38	START/RE-START TOTALS 203"			
210	"		3 Runoff Totals on EXIT"			
211	"		Total Catchment area		1.266	hectare"
212	"		Total Impervious area		0.743	hectare"
213	"		Total % impervious		58.714"	
214	"	19	EXIT"			

-				MEDICO					
T				MIDUSS	Output				>"
2	"			MIDUSS	version		Ve	ersion 2.25	rev. 473"
3	"			MIDUSS	created		Sund	dav. Februai	rv 7. 2010"
1			1 0	III			Duit	aay, repraa	- MEEDICH
4			ΤU	UNILS	usea:				IE METRIC"
5				Job fol	lder:			Q:\4865	50\100\SWM"
6	"			Output	filename:			25vr pc	ost r4.out"
7								zoji po	סטטייי ביסטע איז
/				License	e name:				A.,
8	"			Company	Y .				"
9	"			Date &	Time last use	-d•	10/	27/2023 at 3	8.58.24 PM"
10		21		Date a			10/2	2772025 at 1	
ΤU		31		LIME LAKU	METERS"				
11	"		5.000	Time St	tep"				
12			180 000	May St	torm length"				
12			100.000	Max. S					
13			1500.000	Max. Hy	ydrograph"				
14	"	32		STORM Chid	cago storm"				
15			1	Chicad	o storm"				
TJ				Chicago					
16			702.000	Coeffic	cient A"				
17	"		0.350	Constar	nt. B"				
10			0 600	Europoo	$rac{1}{r}$				
ΤO			0.090	Exponer					
19			0.400	Fractio	on R"				
20	"		180 000	Duratio	on"				
20			1 000	Duruci		. 11			
Ζ⊥			1.000	Time si	cep multiplier	<u> </u>			
22	"		I	Maximum in	ntensity	220.57	74 mm/hr'		
23	"		r	Total dent	th -	58 3F	53 mm "		
23								<u> </u>	
24			6	025hyd	Hydrograph	extension u	ised in this	s file"	
25	"	81		ADD COMMEN	NT==========				====="
26			2 .	Lines of (	comment"				
20							с ,		
27				IA increas	sed to 20mm to	o account ic	or roof and	landscape a	area "
28	"			runoff red	duction due to	o amended to	"lioza		
20		22			201"		-T		
29		55		CAICHMENI	201				
30			1	Triangu	ular SCS"				
31	"		1	Equal	length"				
22			- 1		+bod"				
32			1	SCS Me	LIIOU				
33			201	Area to	o southwest pr	roperty line	e, ultimate	ly to Mun Di	rain #1"
34	"		46.000	% Imper	rvious"				
25			0 126	© ±…po: ∏otol i					
35			0.136	TOTAL A	Area				
36			15.000	Flow le	ength"				
37	"		2 000	Overla	nd Slope"				
20			2.000	Dennia					
38			0.0/3	Pervio	is Area"				
39	"		15.000	Perviou	us length"				
40	"		2 000	Pervio	us slope"				
11			0.000	Two a ward					
4 I			0.063	Impervi	lous Area				
42			15.000	Impervi	ious length"				
43	"		2 000	Imperv	ious slope"				
10				Demois	Louis Stope				
44			0.250	Pervio	us Manning 'n'				
45			75.000	Perviou	as SCS Curve N	No."			
46	"		0.205	Pervio	us Runoff coef	fficient"			
17			0 226	Dorrio	$T_{2}/S$	i ai ant"			
-1 /			0.230	LetATO	La Ia/S CUEIII				
48			19.981	Pervio	us Initial abs	straction"			
49	"		0.015	Imperv	ious Manning '	'n'"			
50			00 000	Tmport		No "			
50			90.000	Imperv.	LOUS SCS CULVE	E NO.			
51			0.564	Imperv:	ious Runoff co	pefficient"			
52	"		3.858	Imperv	ious Ta/S coef	fficient"			
52			10 000	Tmport	$i_{\alpha}$	hat waat i an!	,		
55			19.999	Tuber .	IOUS INICIAL a	abstraction		,	
54				0	.016 0.000	0.000	0.000 (	c.m/sec"	
55	"		(	Catchment	201	Pervious	Impervious	Total Area	"
50						0 072	0 062	0 126	heaters"
30				surrace A	Lea	0.0/3	0.003	U.130	nectare"
57	"		r	Time of co	oncentration	13.765	1.331	5.044	minutes"
58	"		r	Time to Ca	entroid	126.673	102.749	109,891	minutes"
50					donth				
59			l	Kainfall (	Jepth	08.333	08.333	00.303	111111
60	"		]	Rainfall v	volume	42.85	36.51	79.36	c.m"
61	"		1	Rainfall	losses	46 415	25 428	36 761	mm"
~~ ~~	,,		-			11 020	20.120	0.0.701	
юZ			1	kunori dep	beu	TT. 238	32.924	21.392	um
63	"		]	Runoff vol	lume	8.77	20.60	29.36	c.m"
64	"		1	Runoff cod	efficient	0 205	0 564	0 370	"
			-			0.000	0.015	0.010	a m / a 11
65			I	Maximum İ.	TOM	0.002	0.013	0.010	C.m/sec"
66	"	40	]	HYDROGRAPI	H Start - New	Tributary"			
67	"		2	Start -	- New Tributar	rv"			
<u> </u>			2	o cur c			0 000"		
oх				()		J U_UUU	0.000"		

69	"	81	ADD COMMENT=====		================		====="
70	"		2 Lines of comment	JT			
71	"		IA increased to	20mm to account	for roof and	landscape	area "
72	"		runoff reduction	due to amended	topsoil"	-	
73	"	33	CATCHMENT 202"		1		
74	"	00	1 Triangular SC	2 "			
75	"		1 Equal longth"	2			
76			1 SCS mothod"				
70			1 SCS method				
77			202 Controlled an	a to Highway 6			
/8			/0.000 % Impervious"				
/9			0.962 Total Area"				
80			15.000 Flow length"				
81			2.000 Overland Slop	э"			
82	"		0.289 Pervious Area	T			
83	"		15.000 Pervious leng	ch"			
84	"		2.000 Pervious slop	э"			
85	"		0.673 Impervious Ar	ea"			
86	"		15.000 Impervious le	ngth"			
87	"		2.000 Impervious sl	ope"			
88	"		0.250 Pervious Mann	ing 'n'"			
89	"		75.000 Pervious SCS	Curve No."			
90	"		0.205 Pervious Runo	ff coefficient"			
91	"		0 236 Pervious Ta/S	coefficient"			
92	"		19 981 Pervious Init	ial abstraction'	11		
92	"		0 015 Impervious Ma	ning 'n'"			
01			0.015 Impervious Ma				
94	"		98.000 Impervious Sc	S CULVE NO.	L 11		
90			0.879 Impervious Ru	IOII COEIIICIEIN	L		
90			0.100 Impervious la	'S coefficient"	U		
97			0.518 Impervious In	Itial abstractio	on"	/ <b></b>	
98			0.328	0.000 0.00	0.000 0	c.m/sec"	
99			Catchment 202	Pervious	Impervious	Total Area	
100			Surface Area	0.289	0.673	0.962	hectare"
101	"		Time of concentr	ation 13.765	1.081	2.232	minutes"
102	"		Time to Centroid	126.673	89.548	92.917	minutes"
103	"		Rainfall depth	58.353	58.353	58.353	mm"
104	"		Rainfall volume	168.41	392.95	561.35	c.m"
105	"		Rainfall losses	46.415	7.077	18.879	mm"
106	"		Runoff depth	11.938	51.276	39.474	mm"
107	"		Runoff volume	34.45	345.29	379.74	c.m"
108	"		Runoff coefficie	nt. 0.205	0.879	0.676	
109	"		Maximum flow	0.010	0.326	0.328	c.m/sec"
110	"	40	HYDROGRAPH Add R	unoff "	0.020	0.020	0.111, 0000
111	"	10	A Add Bupoff "	111011			
112	"			0 3 2 8 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
112		51	DOND DESIGN	0.520 0.00	0.000		
	"	54	0 229 Current noch	florr a m/aaal			
115			0.320 Current peak	LIOW C.III/Sec			
110			0.207 Target outrio	v c.m/sec			
110			3/9./ Hydrograph Vo	Lume C.m.			
			9. Number of sta	jes"			
118			421.990 Minimum water	level metre			
119			424.030 Maximum water	level metre'			
120			421.990 Starting wate	r level metre	e"		
121	"		0 Keep Design D	ata: 1 = True; (	0 = False"		
122	"		Level Disch	arge Volume"			
123	"		421.990 0	.000 0.000"			
124	"		422.200 0.0	)642 1.01E-05"			
125	"		422.600 0.0	1201 85.000"			
126	"		423.000 0.0	1572 170.000"			
127	"		423.500 0.0	1939 211.987"			
128	"		423.830 0.0	2147 221.426"			
129	"		423.930 0.0	2206 239.726"			
130	"		423.980 0.0	2235 270.251"			
131	"			6480 325 201"			
132	"		1 WEIRS"				
122	"		T. MILINO Creet	Neir Creet	T.⇔f+	Right"	
121	"		olowation coaff	icia broodth i	eideelone sid	night alono"	
エン4 1 2 5				TOTE DIEGOUIS	20 000 i PTOEPTORE 2106	20 000 <b>n</b> 2970be	
100			423.980 U	.900 0.000	50.000	50.000"	
тзр			I. ORIFICES"				

137	"		Orifice Orifice	Orifice Nur	mber of"		
138	"		invert coefficie d	iameter o	rifices"		
139	"		421.990 0.820	0.0750	1.000"		
140	"		Peak outflow	0.02	22 c.m/se	≥C"	
141	"		Maximum level	423.88	32 metre'	•	
142	"		Maximum storage	230.85	50 c.m"		
143	"		Centroidal lag	3.84	19 hours"		
144			0.328 0.328	0.022	0.000 c.m/	/sec"	
145		40	HYDROGRAPH Combine	1"			
146			6 Combine "				
14/			I Node #"				
148			Total to Highway #6"	0.07	22	II	
149			Maximum Ilow	270.02	ZZ C.III/SE	30.	
151				5/9.43			
152	"	40	HYDROGRAPH Start - New	Tributary"	0.022		
153	"	10	2 Start - New Tributar	v"			
154	"			y 0 022	0 022"		
155	"	81	ADD COMMENT==========	============	=============	:	"
156	"	01	2 Lines of comment"				
157	"		IA increased to 20mm to	account fo	or roof and	landscape a	area "
158	"		runoff reduction due to	amended to	opsoil"		
159	"	33	CATCHMENT 203"		-1		
160	"		1 Triangular SCS"				
161	"		1 Equal length"				
162	"		1 SCS method"				
163	"		203 Uncontrolled to High	way 6"			
164	"		23.000 % Impervious"				
165	"		0.304 Total Area"				
166	"		120.000 Flow length"				
167	"		2.000 Overland Slope"				
168			0.234 Pervious Area"				
169			120.000 Pervious length"				
170			2.000 Pervious slope"				
170			0.070 Impervious Area"				
172			120.000 Impervious length"				
171			2.000 Impervious Slope"				
175			75 000 Pervious SCS Curve N	~ <b>"</b>			
176	"		0 205 Pervious Runoff coef	U. ficient"			
177	"		0 236 Pervious Ia/S coeffi	cient"			
178	"		19.981 Pervious Initial abs	traction"			
179	"		0.015 Impervious Manning '	n'"			
180	"		98.000 Impervious SCS Curve	No."			
181	"		0.574 Impervious Runoff co	efficient"			
182	"		3.858 Impervious Ia/S coef	ficient"			
183	"		19.999 Impervious Initial a	bstraction'	T		
184	"		0.015 0.000	0.022	0.022 0	c.m/sec"	
185	"		Catchment 203	Pervious	Impervious	Total Area	"
186			Surface Area	0.234	0.070	0.304	hectare"
187			Time of concentration	47.934	4.636	28.216	minutes"
188			Time to Centroid	167.633	107.838	140.402	minutes"
189			Rainfall depth	58.353 196 ED	58.353	58.353	mm''
101			Rainiali Volume	130.39	40.80	1//.39 11 127	C.III."
102			Rainiaii 1055e5	40.309	24.039	41.437	mm <b>"</b>
192 193	"		Runoff volume	28 01	23.424	±0.9±0 51 43	 c m <b>"</b>
194	"		Runoff coefficient	0 205	0 574	0 290	"
195	"		Maximum flow	0.004	0.015	0.015	c.m/sec"
196	"	40	HYDROGRAPH Add Runoff "				, 500
197	"	-	4 Add Runoff "				
198	"		0.015 0.015	0.022	0.022"		
199	"	40	HYDROGRAPH Copy to Outf	low"			
200	"		8 Copy to Outflow"				
201	"		0.015 0.015	0.015	0.022"		
202	"	40	HYDROGRAPH Combine	1"			
203	"		6 Combine "				
204	"		l Node #"				

205	"		Total to Highway #6"			
206	"		Maximum flow	0.031	c.m/sec"	
207	"		Hydrograph volume	430.861	c.m"	
208	"		0.015 0.015	0.015	0.031"	
209	"	38	START/RE-START TOTALS 203"			
210	"		3 Runoff Totals on EXIT"			
211	"		Total Catchment area		1.266	hectare"
212	"		Total Impervious area		0.743	hectare"
213	"		Total % impervious		58.714"	
214	"	19	EXIT"			

1				MIDUSS Output				>"
2	"			MIDUSS version		Ve	rsion 2 25	rev 473"
2				MIDUQQ averated		0		7 0010
3				MIDUSS created		Sund	ay, reprua	ry /, 2010"
4	"		10	Units used:				ie METRIC"
5	"			Job folder.			0.\486	50\100\SWM"
2							Q• (1000	50 (100 (DWII
6				Output filename:			50yr po	ost r4.out"
7	"			Licensee name:				A"
Q	"			Company				"
0					,	10/0		
9				Date & Time last us	ed:	10/2	27/2023 at 3	3:57:05 PM"
10	"	31	T	IME PARAMETERS"				
11	"	-	5 000	Time Stop"				
1 I			5.000	IIMe Step				
12	"		180.000	Max. Storm length"				
13	"		1500.000	Max. Hydrograph"				
1 /		22	2000.000	DODM Chicago atorm"				
14		32	р.	IORM CHICago Storm				
15			1	Chicago storm"				
16	"		780.000	Coefficient A"				
17			0 260	Constant P"				
1 /			0.300	CONStant B				
18	"		0.690	Exponent C"				
19	"		0.400	Fraction R"				
20			100 000					
20			180.000	Duration				
21			1.000	Time step multiplie	r"			
2.2	"		Ma	aximum intensity	244.9	72. mm/hr"	1	
22			т. П.	atal donth		)2 mm <b>!!</b>		
23			1.0	otal depth	65.00	J3 mm		
24	"		6	050hyd Hydrograph	extension u	used in this	s file"	
25	"	81	AI	OD COMMENT========				"
20		01	2 T.					
20			ـل ک	Lnes of comment"				
27	"		IA	A increased to 20mm t	o account fo	or roof and	landscape a	area "
28	"		rı	unoff reduction due t	o amended to	unsoil"	-	
20		2.2	10		o ameriaca co	opoorr		
29		33	CA	ATCHMENT ZUI"				
30	"		1	Triangular SCS"				
31	"		1	Equal length"				
) T			1					
32			$\perp$	SCS method"				
33	"		201	Area to southwest p	roperty line	e, ultimatel	y to Mun Di	rain #1"
34	"		46 000	% Impervious"	1 1	,	-	
21			-0.000					
35			0.136	Total Area"				
36			15 000	Flow length"				
50			13.000	I I OW I CHIQCH				
30			2 000	Overland Slope"				
37	"		2.000	Overland Slope"				
37 38	" "		2.000	Overland Slope" Pervious Area"				
37 38 39	"" "		2.000 0.073 15.000	Overland Slope" Pervious Area" Pervious length"				
37 38 39 40	"" "		2.000 0.073 15.000 2.000	Overland Slope" Pervious Area" Pervious length" Pervious slope"				
37 38 39 40			2.000 0.073 15.000 2.000	Overland Slope" Pervious Area" Pervious length" Pervious slope"				
37 38 39 40 41	" " "		2.000 0.073 15.000 2.000 0.063	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area"				
37 38 39 40 41 42			2.000 0.073 15.000 2.000 0.063 15.000	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length"				
37 38 39 40 41 42 43			2.000 0.073 15.000 2.000 0.063 15.000 2.000	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length"				
37 38 39 40 41 42 43			2.000 0.073 15.000 2.000 0.063 15.000 2.000	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope"				
37 38 39 40 41 42 43 44			2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n	1.11			
37 38 39 40 41 42 43 44 45			$\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\end{array}$	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve	'" No."			
37 38 39 40 41 42 43 44 45 46			$\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\\ 0.240\end{array}$	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe	'" No." fficient"			
37 38 39 40 41 42 43 44 45 46			$\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\\ 0.240\\ 0.236\end{array}$	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe	'" No." fficient" icient"			
37 38 39 40 41 42 44 45 46 47			$\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\\ 0.240\\ 0.230\\ 0.231\end{array}$	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff	'" No." fficient" icient"			
37 38 39 40 41 42 44 45 46 47 48			$\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\\ 0.240\\ 0.236\\ 19.981 \end{array}$	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab	'" No." fficient" icient" straction"			
37 38 39 40 42 43 44 45 46 47 49			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning	'" No." fficient" icient" straction" 'n'"			
37 38 39 40 41 42 44 45 46 47 48 90			$\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\\ 0.240\\ 0.236\\ 19.981\\ 0.015\\ 98.000\end{array}$	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious SCS Curve	"" No." fficient" icient" straction" 'n'" e No "			
37 38 30 40 42 43 44 45 46 48 90			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv	'" fficient" icient" straction" 'n'" e No."			
37         38         40         41         42         43         445         45         50         50         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70         70 <td></td> <td></td> <td><math display="block">\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\\ 0.240\\ 0.236\\ 19.981\\ 0.015\\ 98.000\\ 0.601 \end{array}</math></td> <td>Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious Runoff c</td> <td>'" fficient" icient" straction" 'n'" e No." oefficient"</td> <td></td> <td></td> <td></td>			$\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\\ 0.240\\ 0.236\\ 19.981\\ 0.015\\ 98.000\\ 0.601 \end{array}$	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious Runoff c	'" fficient" icient" straction" 'n'" e No." oefficient"			
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37 339 41 42 44 44 44 44 40 55 52 55 55 55			$\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\\ 0.240\\ 0.236\\ 19.981\\ 0.015\\ 98.000\\ 0.601\\ 3.858\\ 19.989\end{array}$	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious Runoff c Impervious Ia/S coe Impervious Ia/S coe	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction</pre>	1		
37 38 40 42 44 44 44 40 55 52 55 55 55			$\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\\ 0.240\\ 0.236\\ 19.981\\ 0.015\\ 98.000\\ 0.601\\ 3.858\\ 19.999\end{array}$	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious SCS Curv Impervious Runoff c Impervious Ia/S coe Impervious Initial	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction'</pre>	"		
37 38 40 42 44 44 44 40 55 53 55 53 55			$\begin{array}{c} 13.000\\ 2.000\\ 0.073\\ 15.000\\ 2.000\\ 0.063\\ 15.000\\ 2.000\\ 0.250\\ 75.000\\ 0.240\\ 0.236\\ 19.981\\ 0.015\\ 98.000\\ 0.601\\ 3.858\\ 19.999\end{array}$	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious Runoff c Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000</pre>	" 0.000 c	c.m/sec"	
33390123445678901234555555555555555555555555555555555555			13.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious Runoff c Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000 Pervious</pre>	" 0.000 c Impervious	c.m/sec" Total Area	1
33334423445678901234555555555555555555555555555555555555			13.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious CS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious Runoff c Impervious Ia/S coe Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 urface Area	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000 Pervious 0 073</pre>	" 0.000 c Impervious 0.063	c.m/sec" Total Area 0 136	" hectare"
333901234444444555555555555555555555555555555			13.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Case	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious Manning Impervious Anning Impervious CS Curv Impervious Initial ab Impervious Initial 0.022 0.00 atchment 201 urface Area	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000 Pervious 0.073 11 f 40</pre>	" 0.000 c Impervious 0.063	c.m/sec" Total Area 0.136	" hectare"
3339012345678901234555555555555555555555555555555555555			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Cast	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious length" Impervious Slope" Pervious Manning 'n Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious Runoff c Impervious Runoff c Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000 Pervious 0.073 11.548</pre>	" 0.000 c Impervious 0.063 1.182	c.m/sec" Total Area 0.136 4.491	" hectare" minutes"
333901234456789012345678			13.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Case The second	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious SCS Curv Impervious SCS Curv Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851</pre>	" 0.000 c Impervious 0.063 1.182 101.068	c.m/sec" Total Area 0.136 4.491 108.021	" hectare" minutes" minutes"
33344444444455555555555555555555555555			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious SCS Curv Impervious Runoff c Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003</pre>	" 0.000 c Impervious 0.063 1.182 101.068 65.003	c.m/sec" Total Area 0.136 4.491 108.021 65.003	" hectare" minutes" minutes" mm"
33334442444444444         3390123445678901234567890			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Starrist Tarrian R	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious SCS Curv Impervious Initial ab Impervious Runoff c Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74</pre>	" 0.000 c Impervious 0.063 1.182 101.068 65.003	c.m/sec" Total Area 0.136 4.491 108.021 65.003	" hectare" minutes" mm"
333344424444678901234567890			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Su Ta Ra Ra Ra	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious Runoff c Impervious Runoff c Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74</pre>	" 0.000 c Impervious 0.063 1.182 101.068 65.003 40.67	c.m/sec" Total Area 0.136 4.491 108.021 65.003 88.40	" hectare" minutes" minutes" mm" c.m"
3334444444445555555555666			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Sta Ta Ra Ra Ra Ra	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious SCS Curv Impervious SCS Curv Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74 49.392</pre>	" 0.000 c Impervious 0.063 1.182 101.068 65.003 40.67 25.916	c.m/sec" Total Area 0.136 4.491 108.021 65.003 88.40 38.593	" hectare" minutes" minutes" mm" c.m" mm"
33344444444455555555556666			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Star Tr Ra Ra Ra	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious SCS Curv Impervious SCS Curv Impervious SCS Curv Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses unoff depth	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74 49.392 15.610</pre>	" 0.000 c Impervious 0.063 1.182 101.068 65.003 40.67 25.916 39.086	c.m/sec" Total Area 0.136 4.491 108.021 65.003 88.40 38.593 26 409	" hectare" minutes" minutes" mm" c.m" mm"
33334442444444444         33390123445678901234567890123			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Sta Ta Ra Ra Ra Ra	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious area" Impervious length" Impervious slope" Pervious SCS Curve Pervious Runoff coe Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious SCS Curv Impervious Ia/S coeff Pervious Initial ab Impervious Runoff c Impervious Runoff c Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall losses unoff depth	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74 49.392 15.610 11 46</pre>	0.000 c Impervious 0.063 1.182 101.068 65.003 40.67 25.916 39.086	c.m/sec" Total Area 0.136 4.491 108.021 65.003 88.40 38.593 26.409	" hectare" minutes" mm" c.m" mm" mm"
33344424444445555555555666666			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Su T: Ra Ra Ra Ra Ra Ra Ra Ra Ra Ra	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious length" Impervious Slope" Pervious Manning 'n Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curve Impervious SCS Curve Impervious SCS Curve Impervious Initial ab Impervious Runoff c Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses unoff depth unoff volume	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74 49.392 15.610 11.46</pre>	" 0.000 c Impervious 0.063 1.182 101.068 65.003 40.67 25.916 39.086 24.45	c.m/sec" Total Area 0.136 4.491 108.021 65.003 88.40 38.593 26.409 35.92	" hectare" minutes" minutes" mm" c.m" mm" c.m"
3334444444444555555555556666666			13.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Sta Ta Ra Ra Ra Ra Ra Ra Ra Ra Ra R	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious length" Impervious Slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious SCS Curv Impervious SCS Curv Impervious Ia/S coe Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall losses unoff depth unoff volume unoff coefficient	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74 49.392 15.610 11.46 0.240</pre>	" 0.000 c Impervious 0.063 1.182 101.068 65.003 40.67 25.916 39.086 24.45 0.601	c.m/sec" Total Area 0.136 4.491 108.021 65.003 88.40 38.593 26.409 35.92 0.406	" hectare" minutes" mm" c.m" mm" mm" c.m" "
333444444444455555555555666666666666666			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Su To Ra Ra Ra Ra Ra Ra Ra Ra	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious Manning Impervious SCS Curv Impervious SCS Curv Impervious Runoff c Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses unoff coefficient aximum flow	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74 49.392 15.610 11.46 0.240 0 0.04</pre>	" 0.000 c Impervious 0.063 1.182 101.068 65.003 40.67 25.916 39.086 24.45 0.601 0.021	c.m/sec" Total Area 0.136 4.491 108.021 65.003 88.40 38.593 26.409 35.92 0.406 0.022	" hectare" minutes" mm" c.m" mm" c.m" " c.m"
333444444444555555555566666666666666666			2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Su Ta Ra Ra Ra Ra Ra Ra Ra Ra Ra R	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious area" Impervious length" Impervious alope" Pervious ScS Curve Pervious Runoff coe Pervious Ta/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious SCS Curv Impervious SCS Curv Impervious Initial ab Impervious Runoff c Impervious Runoff c Impervious Runoff c Impervious Initial 0.022 0.00 atchment 201 urface Area ime of concentration ime to Centroid ainfall depth ainfall volume ainfall losses uoff depth uoff coefficient aximum flow	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" fficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74 49.392 15.610 11.46 0.240 0.004 </pre>	" 0.000 c Impervious 0.063 1.182 101.068 65.003 40.67 25.916 39.086 24.45 0.601 0.021	c.m/sec" Total Area 0.136 4.491 108.021 65.003 88.40 38.593 26.409 35.92 0.406 0.022	" hectare" minutes" mm" c.m" mm" c.m" " c.m/sec"
333444444444455555555555666666666666666		40	2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Su T: Ra Ra Ra Ra Ra Ra Ra Ra Ra Ra	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious length" Impervious length" Impervious length" Impervious Slope" Pervious Manning 'n Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious Manning Impervious SCS Curve Marrial ab Impervious Runoff co Impervious Runoff co Impervious Runoff co Impervious Ia/S coe Impervious Ia/S coe Impervious Initial 0.022 0.00 atchment 201 arface Area ime of concentration ime to Centroid ainfall depth ainfall losses unoff depth unoff volume unoff coefficient aximum flow VDROGRAPH Start - New	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74 49.392 15.610 11.46 0.240 0.004 Tributary"</pre>	0.000 c Impervious 0.063 1.182 101.068 65.003 40.67 25.916 39.086 24.45 0.601 0.021	c.m/sec" Total Area 0.136 4.491 108.021 65.003 88.40 38.593 26.409 35.92 0.406 0.022	" hectare" minutes" mm" c.m" mm" c.m" " c.m/sec"
333444444444455555555556666666666666666		40	2.000 2.000 0.073 15.000 2.000 0.063 15.000 2.000 0.250 75.000 0.240 0.236 19.981 0.015 98.000 0.601 3.858 19.999 Ca Sta Ta Ra Ra Ra Ra Ra Ra Ra Ra Ra R	Overland Slope" Pervious Area" Pervious length" Pervious slope" Impervious Area" Impervious length" Impervious length" Impervious Slope" Pervious Manning 'n Pervious SCS Curve Pervious Runoff coe Pervious Ia/S coeff Pervious Initial ab Impervious Manning Impervious SCS Curv Impervious Runoff c Impervious Runoff c Impervious Runoff c Impervious Ia/S coe Impervious Initial 0.022 0.00 Atchment 201 urface Area ime of concentration ime to Centroid Ainfall depth Ainfall volume ainfall losses unoff depth unoff volume unoff coefficient Aximum flow VDROGRAPH Start - New Start - New Tributa	<pre>'" No." fficient" icient" straction" 'n'" e No." oefficient" abstraction' 0 0.000 Pervious 0.073 11.548 122.851 65.003 47.74 49.392 15.610 11.46 0.240 0.004 Tributary" ry"</pre>	0.000 c Impervious 0.063 1.182 101.068 65.003 40.67 25.916 39.086 24.45 0.601 0.021	c.m/sec" Total Area 0.136 4.491 108.021 65.003 88.40 38.593 26.409 35.92 0.406 0.022	" hectare" minutes" mm" c.m" mm" c.m" " c.m/sec"

69	"	81	ADD COMMENT======	================			"
70	"		2 Lines of comment"				
71	"		IA increased to 20m	m to account	for roof and	landscape	area "
72	"		runoff reduction du	e to amended	topsoil"		
73	"	33	CATCHMENT 202"				
74	"		1 Triangular SCS"				
75	"		1 Equal length"				
76	"		1 SCS method"				
77	"		202 Controlled area	to Highway 6'	,		
78	"		70 000 % Impervious"	oo migimag o			
79	"		0 962 Total Area"				
80	"		15 000 Flow length"				
81	"		2 000 Overland Slope"				
82	"		0.289 Pervious Area"				
02			15 000 Peruious longth"				
0.0			2 000 Pervious clope"				
04			2.000 Fervious stope				
00			15 000 Impervious Area	1- 11			
86			15.000 Impervious lengt	n			
8 /			2.000 Impervious slope				
88			0.250 Pervious Manning	'n'"			
89			75.000 Pervious SCS Cur	ve No."			
90			0.240 Pervious Runoff	coefficient"			
91	"		0.236 Pervious Ia/S co	efficient"			
92	"		19.981 Pervious Initial	abstraction'	1		
93	"		0.015 Impervious Manni	ng 'n'"			
94	"		98.000 Impervious SCS C	urve No."			
95	"		0.885 Impervious Runof	f coefficient	_ ''		
96	"		0.100 Impervious Ia/S	coefficient"			
97	"		0.518 Impervious Initi	al abstractio	on"		
98	"		0.370 0	.000 0.00	0.000	c.m/sec"	
99	"		Catchment 202	Pervious	Impervious	Total Area	. "
100	"		Surface Area	0.289	0.673	0.962	hectare"
101	"		Time of concentrati	on 11.548	1.034	2.130	minutes"
102	"		Time to Centroid	122.851	89.143	92.655	minutes"
103	"		Rainfall depth	65.003	65.003	65.003	mm"
104	"		Rainfall volume	187.60	437.73	625.32	c.m"
105	"		Rainfall losses	49 392	7 474	20 050	mm"
106	"		Runoff depth	15 610	57 528	44 953	mm"
107	"		Runoff volume	15.010	387 39	132 15	
100	"		Runoff coofficient	- 240	0 885	152.15	"
100	"		Maximum flow	0.240	0.005	0.052	a m/soa"
110	"	10	UVDDOCDADU Add Duno	ff "	0.300	0.370	C.III/ SEC
111		40	A Add Dunoff "				
			4 Add RUNOIL "	270 0.00			
				.370 0.00	0.000**		
111		54	POND DESIGN"	/			
114			0.370 Current peak IIo	w c.m/sec'			
115			0.20/ Target outilow	c.m/sec"			
116			432.4 Hydrograph volum	e c.m"			
117			9. Number of stages		-		
118			421.990 Minimum water le	vel metre'			
119			424.030 Maximum water le	vel metre'	· 		
120			421.990 Starting water 1	evel metre	<u> </u>		
121	"		0 Keep Design Data	: 1 = True; (	) = False"		
122	"		Level Discharg	e Volume"			
123	"		421.990 0.00	0 0.000"			
124	"		422.200 0.0064	2 1.01E-05"			
125	"		422.600 0.0120	1 85.000"			
126	"		423.000 0.0157	2 170.000"			
127	"		423.500 0.0193	9 211.987"			
128	"		423.830 0.0214	7 221.426"			
129	"		423.930 0.0220	6 239.726"			
130	"		423.980 0.0223	5 270.251"			
131	"		424.030 0.0648	0 325.201"			
132	"		1. WEIRS"				
133	"		Crest. Wei	r Crest	Left.	Right"	
134	"		elevation coeffici	e breadth s	sideslope side	eslope"	
135	"		423.980 0.90	0 0.600	50.000	50,000"	
136	"		1. ORIFICES"				
1.00							

137	"		Orifice Orifice	Orifice :	Number of"		
138	"		invert coefficie	diameter	orifices"		
139			421.990 0.820	0.0750	1.000"		
140			Peak outflow	0	.022 c.m/s	ec"	
141			Maximum level	423	.980 metre		
142			Maximum storage	270	.403 c.m"		
143			Centroidal lag	4	.044 hours"	/ ~ ~ ~ "	
144		10	0.370 $0.370$	1.	0.000 C.m	/sec	
145		40	AIDROGRAPH COMDINE	T			
1/7			1 Node #"				
148			Total to Highway	6"			
149	"		Maximum flow	0	.022 c.m/s	ec"	
150	"		Hydrograph volume	432	.895 c.m"	00	
151	"		0.370 0.3	370 0.0	22 0.022"		
152	"	40	HYDROGRAPH Start - Ne	w Tributar	у"		
153	"		2 Start - New Tribut	ary"	-		
154	"		0.370 0.0	0.0	22 0.022"		
155	"	81	ADD COMMENT=======			================	====="
156	"		2 Lines of comment"				
157	"		IA increased to 20mm	to account	for roof and	landscape a	area "
158			runoff reduction due	to amended	topsoil"		
159		33	CATCHMENT 203"				
160			1 Triangular SCS"				
161			l Equal length"				
162			I SUS method"	alara ("			
164			203 Uncontrolled to Hi	Ignway 6"			
165			0.304 Total Area"				
166	"		120 000 Flow length"				
167	"		2.000 Overland Slope"				
168	"		0.234 Pervious Area"				
169	"		120.000 Pervious length"				
170	"		2.000 Pervious slope"				
171	"		0.070 Impervious Area"				
172	"		120.000 Impervious length"	1			
173			2.000 Impervious slope"				
174			0.250 Pervious Manning '	n'"			
175			75.000 Pervious SCS Curve	e No."			
177			0.240 Pervious Runoli CC	ficiont"			
178			19 981 Pervious Initial a	hetraction	"		
179	"		0 015 Impervious Manning				
180	"		98.000 Impervious SCS Cur	ve No."			
181	"		0.612 Impervious Runoff	coefficien	t"		
182	"		3.858 Impervious Ia/S co	efficient"			
183	"		19.999 Impervious Initial	abstracti	on"		
184	"		0.021 0.0	0.0	22 0.022	c.m/sec"	
185			Catchment 203	Pervious	Impervious	Total Area	
186			Surface Area	0.234	0.0/0	0.304	hectare"
100			Time of concentration	1 40.214	4.110 105 022	24.626 126 107	minutes"
100 100			Painfall dopth	159.250	105.032	130.107	mm"
190	"		Rainfall volume	152 16	45 45	197 61	
191	"		Rainfall losses	49.377	25.243	43.826	mm"
192	"		Runoff depth	15.626	39.760	21.177	mm"
193	"		Runoff volume	36.58	27.80	64.38	c.m"
194	"		Runoff coefficient	0.240	0.612	0.326	"
195	"		Maximum flow	0.005	0.020	0.021	c.m/sec"
196	"	40	HYDROGRAPH Add Runoff				
197	"		4 Add Runoff "				
198	"		0.021 0.0	0.0	22 0.022"		
199	"	40	HYDROGRAPH Copy to Ou	utflow"			
200			8 Copy to Outflow"	01 0 -	0.1 0 0.00		
201		4.0		1"	0.022"		
202		40	HIDRUGRAPH Combine	⊥			
∠U3 201			1 Node #"				
ムマコ							

205	"		Total to Highway #6"			
206	"		Maximum flow	0.038	c.m/sec"	
207	"		Hydrograph volume	497.272	c.m"	
208	"		0.021 0.021	0.021	0.038"	
209	"	38	START/RE-START TOTALS 203"			
210	"		3 Runoff Totals on EXIT"			
211	"		Total Catchment area		1.266	hectare"
212	"		Total Impervious area		0.743	hectare"
213	"		Total % impervious		58.714"	
214	"	19	EXIT"			

-								
T				MIDUSS Output				>"
2	"			MIDUSS version		Ve	rsion 2.25	rev. 473"
2				MIDUCC amaginal		C		2010
3				MIDUSS created		Sunc	ay, reprua	ry /, 2010"
4	"		10	Units used:				ie METRIC"
5	"			Joh folder:			0.1865	50\100\gwm"
5				JUD IOIUEI.			Q. (900.	
6				Output filename:			100yr po	ost r4.out"
7	"			Licensee name.				Δ "
,								л
8				Company				"
9	"			Date & Time last used	1.	10/2	7/2023 at 3	R•48•01 PM"
		~ 1	_			10/2	1/2025 at .	0.40.01 IM
10		31	Т	IME PARAMETERS"				
11	"		5 000	Time Step"				
1 0			100.000					
12			180.000	Max. Storm length"				
13	"		1500 000	Max Hydrograph"				
1 0		~ ~	1000.000					
⊥4		32	S	TORM Chicago storm"				
15	"		1	Chicago storm"				
1 0			0 5 1 0 0 0					
ТΟ			001.000	COEFFICIENT A				
17	"		0.290	Constant B"				
10			0 607	Europont CU				
ΤO			0.00/	Exponent C				
19	"		0.400	Fraction R"				
20			100 000	Duration"				
20			100.000	Duración				
21			1.000	Time step multiplier"				
22	"		М	avimum intensity	270 78	6 mm/hr"		
~ ~			11	aximum incensicy	270.70			
23	"		Т	otal depth	71.82	28 mm"		
21	"		6	100hvd Uvdrograph o	vtoncion u	and in this	filo"	
24			0	ioonya nyarograph e	xcension u	iseu in chiis	TTTE	
25		81	A	.DD COMMENT==========			===========	=====""
26	"		2 т.	ines of comment"				
20						c 1		
27			T	A increased to 20mm to	account to	or root and	landscape a	area "
28	"		r	unoff reduction due to	amended to	nsoil"		
20		2.2	1		amenaca co	POOTT		
29		33	C	ATCHMENT 201"				
30	"		1	Triangular SCS"				
21			- 1					
31			T	Equal length"				
32	"		1	SCS method"				
22			201	Area to couthreat area	nontre line		to Mup D	aain #1.
55			201	Area to southwest pro	ретсу ттпе	e, uitimatei	y to Mun Di	alli #1
34	"		46.000	% Impervious"				
35	"		0 136	Total Aroa"				
55			0.130	IOLAI AIEA				
36	"		15.000	Flow length"				
27			2 000	Overland clane"				
51			2.000	Overland Slope				
38	"		0.073	Pervious Area"				
20			15 000	Dorrigue longth"				
59			13.000	reivious iengun				
40			2.000	Pervious slope"				
41	"		0 063	Impervious Area"				
- T			1 - 000					
42			15.000	Impervious length"				
43	"		2 000	Impervious slope"				
1.0			2.000	Impervious brope				
44			0.250	Pervious Manning 'n'"				
45	"		75.000	Demailance CCC Comme Ne				
ΛG				Pervious SUS Curve No				
40			0 272	Pervious SCS Curve No	· "			
47			0.272	Pervious SCS Curve No Pervious Runoff coeff	." Sicient"			
18	"		0.272 0.236	Pervious SCS curve No Pervious Runoff coeff Pervious Ia/S coeffic	o." Ticient" Sient"			
10	"		0.272 0.236	Pervious SCS curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst	icient" cient"			
ΛQ			0.272 0.236 19.981	Pervious SCS Curve NC Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst	." icient" ient" raction"			
コン	" " "		0.272 0.236 19.981 0.015	Pervious SCS curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n	icient" ient" raction"			
マック 50	"" "		0.272 0.236 19.981 0.015	Pervious SCS Curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n	." ficient" fient" fraction"			
-1 9 50	"" "" "		0.272 0.236 19.981 0.015 98.000	Pervious SCS Curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve	o." icient" iraction" '" No."			
9 50 51	"" "" "		0.272 0.236 19.981 0.015 98.000 0.631	Pervious SCS Curve NC Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe	o." Sicient" Sient" Straction" No." Sfficient"			
9 50 51 52	" " " "		0.272 0.236 19.981 0.015 98.000 0.631 3.858	Pervious SCS Curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff	." ficient" raction" "" No." efficient"			
50 51 52			0.272 0.236 19.981 0.015 98.000 0.631 3.858	Pervious SCS Curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff	." icient" raction" '" No." efficient" icient"			
- 9 50 51 52 53			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999	Pervious SCS Curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab	." Sicient" Staction" " No." Efficient" Sicient" Sstraction"			
- 9 50 51 52 53 54			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999	Pervious SCS Curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000	o." Sicient" Staction" "" No." Efficient" Sicient" ostraction" 0.000	, 0.000 c	.m/sec"	
			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999	Pervious SCS curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000	o." Sicient" Straction" "" No." Sificient" Sicient" Ostraction" 0.000	0.000 c	.m/sec"	"
50 51 52 53 54 55			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999	Pervious ScS curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P	C." Sicient" craction" "" No." Efficient" Straction" 0.000 Pervious	0.000 c Impervious	.m/sec" Total Area	п
50 51 52 53 54 55 56			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999	Pervious ScS curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0	cicient" cient" craction" "" No." efficient" cicient" ostraction" 0.000 Pervious 0.073	0.000 c Impervious 0.063	.m/sec" Total Area 0.136	" hectare"
<sup>1</sup> 50 51 52 53 55 55 55 55 57			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999	Pervious SCS curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1	cicient" cient" craction" "" No." efficient" cicient" ostraction" 0.000 Pervious 0.073 0.001	0.000 c Impervious 0.063 1 074	.m/sec" Total Area 0.136 4 076	" hectare" minutes"
<sup>1</sup> 50 51 52 53 54 55 57 57			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1	C." Sicient" craction" "" No." officient" Sicient" ostraction" 0.000 Pervious 0.073 0.001	0.000 c Impervious 0.063 1.074	.m/sec" Total Area 0.136 4.076	" hectare" minutes"
<sup>1</sup> 50 51 52 53 55 55 55 57 58			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T	Pervious ScS curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1	cicient" cient" craction" craction" cricient" cicient" costraction" costraction" costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costraction costrac	0.000 c Impervious 0.063 1.074 99.883	.m/sec" Total Area 0.136 4.076 106.671	" hectare" minutes" minutes"
<sup>1</sup> 50 51 52 53 55 55 55 55 55 55 55 55 55 55 55 55			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T	Pervious ScS curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7	cicient" cient" craction" "" No." efficient" cicient" ostraction" 0.000 Pervious 0.073 0.001 20.070 1.828	0.000 c Impervious 0.063 1.074 99.883 71.828	.m/sec" Total Area 0.136 4.076 106.671 71.828	" hectare" minutes" mm"
<sup>1</sup> 50 51 52 55 55 55 55 55 55 55 55 55 55 55 55			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T T R	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7	<pre>." icient" ient" iraction" '" No." officient" officient" o.000 ervious 0.073 0.001 20.070 1.828</pre>	0.000 c Impervious 0.063 1.074 99.883 71.828	.m/sec" Total Area 0.136 4.076 106.671 71.828	" hectare" minutes" mmutes" mm"
<sup>1</sup> 501 523 5555 5555 557 559 60			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R	Pervious ScS curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5	<pre>." icient" ient" .raction" ." fficient" icient" ostraction"</pre>	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69	" hectare" minutes" minutes" mm" c.m"
<sup>1</sup> 55123455678901			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5 ainfall losses 5	." icient" raction" '" No." efficient" ostraction" 0.000 Pervious 0.073 0.001 20.070 1.828 2.75 2.256	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94 26.477	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69 40.398	" hectare" minutes" mm" c.m" mm"
<sup>1</sup> 5555555555666			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5 ainfall losses 5	." icient" raction" No." efficient" icient" ostraction" 0.000 Pervious 0.073 0.001 20.070 1.828 2.75 2.256 0.72	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94 26.477	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69 40.398	" hectare" minutes" mm" c.m" mm"
<sup>+</sup> 50123455555556012			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R R R	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5 ainfall losses 5 unoff depth 1	C." Sicient" raction" "" No." efficient" ostraction" 0.000 Pervious 0.073 0.001 20.070 1.828 52.75 52.256 9.572	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94 26.477 45.352	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69 40.398 31.431	" hectare" minutes" minutes" mm" c.m" mm"
1       5       5       5       5       5       5       5       5       5       5       5       5       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R R R R	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5 ainfall losses 5 unoff depth 1 unoff volume 1	<pre>."</pre>	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94 26.477 45.352 28.37	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69 40.398 31.431 42.75	" hectare" minutes" mm" c.m" mm" mm" c.m"
1       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R R R R	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Ia/S coeff Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5 ainfall losses 5 unoff depth 1 unoff volume 1	<pre>."</pre>	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94 26.477 45.352 28.37 0.621	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69 40.398 31.431 42.75 0.422	" hectare" minutes" mm" c.m" mm" c.m" "
<sup>1</sup> 5555555555555666234			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R R R R R R R R R R R R	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5 ainfall losses 5 unoff depth 1 unoff coefficient 0	C: C: C: C: C: C: C: C: C: C:	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94 26.477 45.352 28.37 0.631	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69 40.398 31.431 42.75 0.438	" hectare" minutes" mm" c.m" mm" c.m" "
<sup>1</sup> 555555555556666666			0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R R R R R R R R R R R R R	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5 ainfall losses 5 unoff depth 1 unoff volume 1 unoff coefficient 0 aximum flow 0	<pre>." icient" ient" .raction" ." fficient" icient" ostraction"</pre>	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94 26.477 45.352 28.37 0.631 0.028	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69 40.398 31.431 42.75 0.438 0.029	" hectare" minutes" mm" c.m" mm" c.m" " c.m/sec"
1       5       5       5       5       5       5       5       5       5       5       5       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6		4.0	0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R R R R R R	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5 ainfall losses 5 unoff depth 1 unoff volume 1 unoff coefficient 0 aximum flow 0	<pre>."</pre>	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94 26.477 45.352 28.37 0.631 0.028	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69 40.398 31.431 42.75 0.438 0.029	" hectare" minutes" mm" c.m" mm" c.m" " c.m/sec"
1       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       5       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6       6		40	0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R R R R R R R R R R	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5 ainfall losses 5 unoff depth 1 unoff volume 1 unoff coefficient 0 aximum flow 0 YDROGRAPH Start - New T	<pre> Sicient" sient" raction"  Pficient" Straction" 0.000 Pervious 0.073 0.001 20.070 1.828 52.256 9.572 4.37 0.272 0.005 Sributary"</pre>	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94 26.477 45.352 28.37 0.631 0.028	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69 40.398 31.431 42.75 0.438 0.029	<pre>" hectare" minutes" mm" c.m" mm" c.m" " c.m/sec"</pre>
<sup>1</sup> 55555555555555556666666666666		40	0.272 0.236 19.981 0.015 98.000 0.631 3.858 19.999 C S T T R R R R R R R R R R R R R R 2	Pervious Scs curve No Pervious Runoff coeff Pervious Ia/S coeffic Pervious Initial abst Impervious Manning 'n Impervious SCS Curve Impervious Runoff coe Impervious Initial ab 0.029 0.000 atchment 201 P urface Area 0 ime of concentration 1 ime to Centroid 1 ainfall depth 7 ainfall volume 5 ainfall losses 5 unoff depth 1 unoff volume 1 unoff coefficient 0 aximum flow 0 YDROGRAPH Start - New T	C: C: C: C: C: C: C: C: C: C:	0.000 c Impervious 0.063 1.074 99.883 71.828 44.94 26.477 45.352 28.37 0.631 0.028	.m/sec" Total Area 0.136 4.076 106.671 71.828 97.69 40.398 31.431 42.75 0.438 0.029	" hectare" minutes" mm" c.m" mm" c.m" " c.m/sec"

69	"	81	ADD COMMENT===================================
70	"		2 Lines of comment"
71	"		IA increased to 20mm to account for roof and landscape area "
72	"		runoff reduction due to amended topsoil"
73	"	33	CATCHMENT 202"
74	"		1 Triangular SCS"
75	"		1 Equal length"
76	"		1 SCS method"
77	"		202 Controlled area to Highway 6"
78	"		70.000 % Impervious"
79	"		0.962 Total Area"
80	"		15.000 Flow length"
Q 1	"		2.000 Overland Slene"
82	"		0.280 Deruiala Stope
02			15.000 Pervious Alea
00			2.000 Pervious length
04			2.000 Pervious stope
85			0.6/3 Impervious Area.
86			15.000 Impervious length"
87			2.000 Impervious slope"
88	"		0.250 Pervious Manning 'n'"
89	"		75.000 Pervious SCS Curve No."
90	"		0.272 Pervious Runoff coefficient"
91	"		0.236 Pervious Ia/S coefficient"
92	"		19.981 Pervious Initial abstraction"
93	"		0.015 Impervious Manning 'n'"
94	"		98.000 Impervious SCS Curve No."
95	"		0.890 Impervious Runoff coefficient"
96	"		0.100 Impervious Ia/S coefficient"
97	"		0.518 Impervious Initial abstraction"
98	"		0.010 imperior and in the about 0.000 0.000 c m/sec"
aa			Catchment 202 Parvious Impervious Total Area "
100	"		Surface Area 0,280,0,673,0,962, bestar
101			Time of concentration 10.001 0.002 2.027 minute
101			Time of concentration 10.001 0.992 2.037 minute
102			Time to Centrola 120.070 88.820 92.444 minute
103			Rainfall depth /1.828 /1.828 mm"
104			Rainfall volume 207.30 483.69 690.99 c.m"
105			Rainfall losses 52.256 7.885 21.197 mm"
106	"		Runoff depth 19.572 63.943 50.632 mm"
107	"		Runoff volume 56.49 430.59 487.08 c.m"
108	"		Runoff coefficient 0.272 0.890 0.705 "
109	"		Maximum flow 0.020 0.409 0.414 c.m/se
110	"	40	HYDROGRAPH Add Runoff "
111	"		4 Add Runoff "
112	"		0.414 0.414 0.000 0.000"
113	"	54	POND DESIGN"
114	"		0.414 Current peak flow c.m/sec"
115	"		0.207 Target outflow c.m/sec"
116	"		487.1 Hydrograph volume c.m"
117	"		9 Number of stages"
118			121 900 Minimum water level metre"
110	"		121.030 Maximum water level metro"
120	"		121.000 Starting water level metro"
101			Very Design Date: 1 - There - False
121			0 Keep Design Data: I = True; 0 = Faise
102			
123			421.990 0.000 0.000*
124			422.200 0.00642 1.01E-05"
125			422.600 0.01201 85.000"
126	"		423.000 0.01572 170.000"
127	"		423.500 0.01939 211.987"
128	"		423.830 0.02147 221.426"
129	"		423.930 0.02206 239.726"
130	"		423.980 0.02235 270.251"
131	"		424.030 0.06480 325.201"
132	"		1. WEIRS"
133	"		Crest Weir Crest Left Right"
134	"		elevation coefficie breadth sideslope sideslope"
135	"		423,980 0,900 0,600 50 000 50 000"
136	"		1 ORIFICES"
- J U			

137	"		Orifice Orifice Orifice Number of"	
138	"		invert coefficie diameter orifices"	
139	"		421.990 0.820 0.0750 1.000"	
140	"		Peak outflow 0.037 c.m/sec'	•
141	"		Maximum level 423.998 metre"	
142	"		Maximum storage 289.708 c.m"	
143	"		Centroidal lag 3.888 hours"	
144	"		0.414 0.414 0.037 0.000 c.m/se	∋c"
145	"	40	HYDROGRAPH Combine 1"	
146	"		6 Combine "	
147	"		1 Node #"	
148	"		Total to Highway #6"	
149	"		Maximum flow 0.037 c.m/sec'	•
150	"		Hydrograph volume 486.912 c.m"	
151			0.414 0.414 0.037 0.037"	
152		40	HYDROGRAPH Start - New Tributary"	
153			2 Start - New Tributary"	
154			0.414 0.000 0.037 0.037"	
155		81	ADD COMMENT===================================	"
156			2 Lines of comment"	
157			IA increased to 20mm to account for roof and la	andscape area "
158			runoff reduction due to amended topsoil"	
159		33	CATCHMENT 203"	
160	"		1 Triangular SCS"	
161			1 Equal length"	
162			1 SCS method"	
163			203 Uncontrolled to Highway 6"	
164			23.000 % Impervious"	
165			0.304 Total Area"	
166			120.000 Flow length"	
16/			2.000 Overland Slope"	
168			0.234 Pervious Area"	
169			120.000 Pervious length"	
170 171			2.000 Pervious slope" 0.070 Impervious Amer"	
172			120.000 Impervious Area"	
172			2 000 Impervious alene"	
171			2.000 Impervious Stope	
175			75 000 Pervious SCS Curve No "	
176	"		0.274 Porvious Bunoff coofficient"	
177	"		0.236 Pervious Ta/S coefficient"	
178	"		19 981 Pervious Initial abstraction"	
170	"		0 015 Imporvious Manning In!"	
180	"		98 000 Impervious SCS Curve No "	
181	"		0.639 Impervious Bunoff coefficient"	
182	"		3 858 Impervious Ia/S coefficient"	
183	"		19 999 Impervious Initial abstraction"	
184	"		0.026 $0.000$ $0.037$ $0.037$ c.m	n/sec"
185	"		Catchment 203 Pervious Impervious To	otal Area "
186	"		Surface Area 0.234 0.070 0.	.304 hectare"
187	"		Time of concentration 34.827 3.740 22	2.058 minutes"
188	"		Time to Centroid 152.796 104.435 13	32.933 minutes"
189	"		Rainfall depth 71.828 71.828 71	1.828 mm"
190	"		Rainfall volume 168.14 50.22 21	18.36 c.m"
191	"		Rainfall losses 52.152 25.915 46	5.118 mm"
192	"		Runoff depth 19.676 45.913 25	5.711 mm"
193	"		Runoff volume 46.06 32.10 78	3.16 c.m"
194	"		Runoff coefficient 0.274 0.639 0.	.358 "
195	"		Maximum flow 0.008 0.024 0.	.026 c.m/sec"
196	"	40	HYDROGRAPH Add Runoff "	
197	"		4 Add Runoff "	
198	"		0.026 0.026 0.037 0.037"	
199	"	40	HYDROGRAPH Copy to Outflow"	
200	"		8 Copy to Outflow"	
201	"		0.026 0.026 0.026 0.037"	
202	"	40	HYDROGRAPH Combine 1"	
203	"		6 Combine "	
204	"		1 Node #"	

205	"		Total to Highway #6"			
206	"		Maximum flow	0.048	c.m/sec"	
207	"		Hydrograph volume	565.072	c.m"	
208	"		0.026 0.026	0.026	0.048"	
209	"	38	START/RE-START TOTALS 203"			
210	"		3 Runoff Totals on EXIT"			
211	"		Total Catchment area		1.266	hectare"
212	"		Total Impervious area		0.743	hectare"
213	"		Total % impervious		58.714"	
214	"	19	EXIT"			



# **Stormceptor Sizing**





Province:	Ontario		Project Name:	961 St. David Stree	et North
City:	Fergus		Project Number:	48650-100	
Nearest Rainfall Station:	WATERLOO WELLINGTON A	AP	Designer Name:	Nathan Katerberg	
Climate Station Id:	6149387		Designer Company:	MTE Consultants I	nc
Years of Bainfall Data	34		Designer Email:	nkaterberg@mte8	5.com
	- · ·		Designer Phone:	519-743-6500	
Site Name:	961 St. David Street North		EOR Name:		
Drainage Area (ha):	0.77		EOR Company:		
% Imperviousness:	75.00		EOR Email:		
Runoff Co	efficient 'c': 0.75		EOR Phone:		
Target TSS Removal (%): Required Water Quality Runc	80.0 ff Volume Capture (%):	90.00		(TSS) Load Sizing S	Reduction Summary
Estimated Water Quality Flov	v Rate (L/s):	21.88		Stormceptor Model	TSS Removal Provided (%)
Oil / Fuel Spill Risk Site?		Yes		EFO4	80
Upstream Flow Control?		Yes		EFO6	89
Upstream Orifice Control Flow	v Rate to Stormceptor (L/s):	22.00		EFO8	95
Peak Conveyance (maximum)	Flow Rate (L/s):			EFO10	97
Site Sediment Transport Pate	(ka/ba/yr)			FEO12	99
	Estimate	ed Net Ai V	Recommended S nnual Sediment (T /ater Quality Run	itormceptor EFO SS) Load Reduct off Volume Capt	) Model: E tion (%): ture (%): >



Forterra



## THIRD-PARTY TESTING AND VERIFICATION

► Stormceptor® EF and Stormceptor® EFO are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators and performance has been third-party verified in accordance with the ISO 14034 Environmental Technology Verification (ETV) protocol.

#### PERFORMANCE

► Stormceptor® EF and EFO remove stormwater pollutants through gravity separation and floatation, and feature a patentpending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including highintensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

# PARTICLE SIZE DISTRIBUTION (PSD)

► The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle	Percent Less	Particle Size	Dercent	
Size (µm)	Than	Fraction (µm)	Percent	
1000	100	500-1000	5	
500	95	250-500	5	
250	90	150-250	15	
150	75	100-150	15	
100	60	75-100	10	
75	50	50-75	5	
50	45	20-50	10	
20	35	8-20	15	
8	20	5-8	10	
5	10	2-5	5	
2	5	<2	5	





Upstream Flow Controlled Results									
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)	
0.5	8.5	8.5	0.80	48.0	40.0	100	8.5	8.5	
1	18.3	26.8	1.61	96.0	80.0	98	18.0	26.5	
2	14.4	41.3	3.21	193.0	161.0	88	12.7	39.3	
3	10.2	51.5	4.82	289.0	241.0	81	8.3	47.6	
4	8.0	59.5	6.42	385.0	321.0	78	6.2	53.8	
5	6.9	66.4	8.03	482.0	401.0	74	5.1	58.9	
6	5.9	72.3	9.63	578.0	482.0	70	4.1	63.0	
7	3.8	76.1	11.24	674.0	562.0	66	2.5	65.5	
8	2.6	78.7	12.84	771.0	642.0	64	1.7	67.2	
9	2.5	81.1	14.45	867.0	722.0	64	1.6	68.8	
10	2.2	83.3	16.05	963.0	803.0	63	1.4	70.1	
11	2.5	85.8	17.66	1060.0	883.0	62	1.6	71.7	
12	2.0	87.8	19.27	1156.0	963.0	62	1.2	72.9	
13	12.2	100.0	20.87	1252.0	1044.0	61	7.4	80.3	
14	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
15	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
16	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
17	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
18	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
19	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
20	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
21	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
22	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
23	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
24	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
25	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
30	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
35	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
40	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
45	0.0	100.0	22.00	1320.0	1100.0	59	0.0	80.3	
	•	-	Es	timated Ne	t Annual Sedim	ent (TSS) Loa	d Reduction =	80 %	

Climate Station ID: 6149387 Years of Rainfall Data: 34









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Maximum Pipe Diameter / Peak Conveyance										
Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate		
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)	
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15	
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35	
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60	
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100	
EF12 / EF012	3.6	12	90	1828	72	1828	72	2830	100	

## SCOUR PREVENTION AND ONLINE CONFIGURATION

► Stormceptor® EF and EFO feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

#### **DESIGN FLEXIBILITY**

► Stormceptor<sup>®</sup> EF and EFO offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

## **OIL CAPTURE AND RETENTION**

► While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid reentrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.











# 45\*-90\* 0\*-45\* 0\*-45\* 45\*-90\*

#### **INLET-TO-OUTLET DROP**

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

#### HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

	-				Pollu	utant C	apacity					
Stormceptor Model EF / EFO Diameter		Depth Pipe In Sump	(Outlet vert to Floor)	itlet t to Oil Volume or)		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **		
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

\*Increased sump depth may be added to increase sediment storage capacity

\*\* Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft<sup>3</sup>)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture	Proven performance for fuel/oil hotspot	Regulator, Specifying & Design Engineer,
and retention for EFO version	locations	Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection	Easy maintenance access from grade	Maintenance Contractor & Site Owner

#### STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef





#### STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

#### PART 1 – GENERAL

#### 1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

#### 1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators** 

#### 1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

#### PART 2 – PRODUCTS

#### 2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1 4 ft (1219 mm) Diameter OGS Units:
6 ft (1829 mm) Diameter OGS Units:
8 ft (2438 mm) Diameter OGS Units:
10 ft (3048 mm) Diameter OGS Units:
12 ft (3657 mm) Diameter OGS Units:

 $\begin{array}{l} 1.19 \ m^3 \ sediment \ / \ 265 \ L \ oil \\ 3.48 \ m^3 \ sediment \ / \ 609 \ L \ oil \\ 8.78 \ m^3 \ sediment \ / \ 1,071 \ L \ oil \\ 17.78 \ m^3 \ sediment \ / \ 1,673 \ L \ oil \\ 31.23 \ m^3 \ sediment \ / \ 2,476 \ L \ oil \\ \end{array}$ 

#### PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall







remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

#### 3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m<sup>2</sup> to 1400 L/min/m<sup>2</sup>, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m<sup>2</sup> and 1400 L/min/m<sup>2</sup> shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40  $L/min/m^2$  shall be assumed to be identical to the sediment removal efficiency at 40  $L/min/m^2$ . No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40  $L/min/m^2$ .

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m<sup>2</sup> shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m<sup>2</sup>, and shall be calculated using a simple proportioning formula, with 1400 L/min/m<sup>2</sup> in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m<sup>2</sup>.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

#### 3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** 

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m<sup>2</sup>.

#### 3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This reentrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to




## Stormceptor<sup>®</sup> EF Sizing Report

assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m<sup>2</sup> to 2600 L/min/m<sup>2</sup>) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.





# Water Balance



#### 961 ST. DAVID STREET WATER BALANCE (SURFACE RUNOFF AND INFILTRATION) ANALYSIS Fergus, Ontario

Weather Station	Fergus Shand Dam, 1981-2010 Canada Climate Normals
File:	Q:\48650\100\SWM\Water Balance\2023-09-28_Yearly Water
Design By:	NGK
Date:	October 28, 2023
Project No.	48650-100

Total Precipitation

Fergus Shand Dam, 1981-2010 Canada Climate Normals 946 mm/year

	Annual Water Balance Parameters & Hydrologic Cycle Components												
Condition	Topography	Coverage	Soil Type	ET (mr	n/yr)	Runoff (mm/yr)	Infiltratior (mm/yr)	ı	Notes				
Pre-Development pervious areas	Flat Lands	Pasture/ Shrubs	A/B - Sand, Sandy Silt		588		71	287					
Impervious areas (Pre- and Post Development)					142		804	0	Evapotranspiration rate of 15% assumed for impervious areas				
Post-Development pervious areas	Flat Lands	Urban Lawns	A/B - Sand, Sandy Silt		572		112	262					
Townhouse Lots with Amended Topsoil					288		363	295	Based on GAWSER modelling completed for typical townhouse lot coverage and grading, with runoff from roof and rear-yard areas draining to an amended topsoil reservoir in the rear yards. These rates are representative of the entire lot area.				
Single Detached Lots with Amended Topsoil					341		85	520	Based on GAWSER modelling completed for typical single detached lot coverage and split drainage grading, with runoff from roof and rear-yard areas draining to an amended topsoil reservoir in the side and rear yards. These rates are representative of the entire lot area.				

#### RUNOFF

Pre-Development Runoff											
				Pervious Area			Impervious Area				
Catchment <sup>1</sup>	Area	% Impervious	Area Runoff Rate <sup>2</sup>		Runoff Volume	Area	Runoff Rate	Runoff Volume	Total Runoff Volume	Comments	
	ha		ha	mm/yr/m <sup>2</sup>	m³/yr	ha	mm/yr/m <sup>2</sup>	m³/yr	m³/yr		
301	0.804	0	0.804	71	571				571	To Wetland	
302	0.598	9	0.544	71	386	0.054	804	433	819	To St. David Street North/Highway 6	
<b>b</b>						Sum c	of Pre-Developmen	Runoff	1,390		

Post-Development Runoff											
				Pervious Area	bus Area		Impervious Area				
Catchment <sup>1</sup>	Area	% Impervious	Area	Runoff Rate <sup>2</sup>	Runoff Volume	Runoff Area		Runoff Volume	Volume	Comments	
	ha		ha	mm/yr/m <sup>2</sup>	m³/yr	ha	mm/yr/m <sup>2</sup>	m³/yr	m³/yr		
401	0.136	46	0.073	363	267	0.063	363	227	494	Townhouse Lots w/Amended Topsoil	
	_					Post-D	Development Runo	494			
402-1	0.485	69	0 150	112	168	0 335	804	2 601	2 850	Common element, front roofs and yards of	
402-1	0.400	03	0.150	112	100	0.000	004	2,031	2,000	Catchment 401 townhouse lots	
402-2	0.399	60	0.160	363	580	0.239	363	870	1,449	Townhouse Lots w/Amended Topsoil	
403	0.382	43	0.218	85	185	0.164	85	140	325	Single Detached Lots w/Amended Topsoil	
				Post-Development Runoff, to St. David Street North/Highway 6							

#### INFILTRATION

	Pre-Development Infiltration											
			Pervious Area			Impervious Area			Total			
Catchment <sup>1</sup>	Area	% Impervious	Area	Infiltration Rate	Infiltration	Area	Infiltration Rate	Infiltration	Infiltration Volume	Comments		
	ha		ha	mm/vr/m <sup>2</sup>	m <sup>3</sup> /vr	ha	mm/vr/m <sup>2</sup>	m <sup>3</sup> /vr	m <sup>3</sup> /vr			
301	0.804	0	0.804	287	2,307		····· <b>·</b>		2,307	To Wetland		
302	0.598	9	0.544	287	1,562	0.054	0	0	1,562	To St. David Street North/Highway 6		
						Sum	of Pre-Developn	nent Infiltration	3,869			

Post-Development Infiltration											
				Pervious Area		Impervious Area			Total		
Catchment <sup>1</sup>	Area	% Impervious	Area	Infiltration Rate <sup>2</sup>	Infiltration Volume	Area	Infiltration Rate <sup>2</sup>	Infiltration Volume	Infiltration Volume	Comments	
	ha		ha	mm/yr/m <sup>2</sup>	m³/yr	ha	mm/yr/m <sup>2</sup>	m³/yr	m³/yr		
401	0.136	46	0.073	295	217	0.063	295	185	401	Townhouse Lots w/Amended Topsoil	
402-1	0.485	69	0.150	262	394				394	Common element, front roofs and yards of Catchment 401 townhouse lots	
402-2	0.399	60	0.160	295	471	0.239	295	707	1,178	Townhouse Lots w/Amended Topsoil	
403	0.382	43	0.218	520	1,133	0.164	520	855	1,988	Single Detached Lots w/Amended Topsoil	
Sum of Post-Development Infiltration							3,961				

### SUMMARY

		Pre-Development	Post-Development	Volume Change	Percentage Change	
$\mathbf{D}_{ij} = \mathbf{a}_{ij} \mathbf{b}_{ij} $	To Wetland	571	494	-77 m3 increase	-14%	
Runom volume ( <i>m<sup>-</sup>/yr</i> )	To St. David Street/Highway 6	819	5,621	4,802 m3 increase	-	
Infiltration Volume ( <i>m<sup>3</sup>/yr</i> )		3,869	3,961	91 m3 increase	2%	

#### NOTES

1 Refer to Figures 2.0 and 4.0 for Pre- and Post-Development Water Balance Catchment Areas.

2 Infiltration and runoff rates for Catchments 402-2 and 403 are based on GAWSER modelling of typical lot coverages and grading design for both townhouse lots and single detached split drainage lots, with runoff from the roof and rear yard areas draining to an amended topsoil reservoir. The GAWSER modelling routed runoff from the impervious roof areas through the amended topsoil reservoir, and determined infiltration and runoff rates representative of the entire lot. Therefore in the Infiltration and Runoff tables, the whole-lot rate is applied to both the Impervious and Pervious portions of Catchments 402-2 and 403