SERVICING AND STORMWATER MANAGEMENT REPORT

ENVEST CORP.

SOUTHGATE RENEWABLES RECYCLING PROJECT Project No.: 2021-0713-10

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ENVEST CORP.

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Southgate Renewables Recycling Project

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1.0 INTRODUCTION

WalterFedy was retained by Envest Corp. (Envest) to prepare a Servicing and Stormwater Management Report in support of the Site Plan Development for a biofuel and renewables recycling facility located in Dundalk, ON, in the Township of Southgate. The site will be used as an anaerobic digestion facility and is expected to receive and process organic waste and convert it into biogas and digestate. The biogas produced will be further upgraded to Renewable Natural Gas (RNG) for injection into the natural gas pipeline network through the injection station provided by Enbridge.

The purpose of this report is to identify how the site will be serviced, including water and sanitary connections to the municipal infrastructure, as well the storm sewer outlet to the neighbouring ditch. The report will discuss the existing boundary servicing conditions and the availability in the municipal system to accommodate the development. Stormwater management design has been presented, demonstrating consistency with the Township of Southgate and Grand River Conservation Authority design criteria.

1.1 Background

The proposed development is located on the southern side of Eco Parkway, approximately 600 m east of the intersection with Ida Street. Eco Parkway is a gravel road. The site is approximately 4.04 ha and is surrounded by future development lots to the west and north, a wetland and municipal sewage treatment lagoons to the south, and to the east by a developed industrial lot. A ditch separates the site from the property to the west. This ditch drains from the northern side of Eco Parkway, beneath the road through a culvert, and southerly towards the sanitary lagoon side of the subject property. The ditch is also regulated by the Grand River Conservation Authority (GRCA).

The site is zoned Holding General Industrial Exception 553 (M1-SS3-H) pursuant to a zoning amendment dated February 21, 2024, allowing for the intended use. The development itself will consist of a ventilated organics receiving building with below-grade organic waste storage areas, for a total building footprint of approximately 2,800 m², as well as an office and maintenance shop with a total building footprint of 570 m². The site will also include a tank containment area that includes partially below-grade pasteurizer tanks, hydrolyzer tanks, anaerobic digester tanks, a digestate storage tank, and pump shelter.

1.2 Reference Reports and Drawings

In preparation of this report, the following background information was referenced:

- 1. <u>Geotechnical Investigation Dundalk EcoPark 100 Eco Parkway, Township of Southgate, Ontario</u>, V.A. Wood (Guelph) Incorporated, July 2019, prepared for Petawawa Biofuel LP
- 2. <u>Draft Supplemental Geotechnical Investigation Southgate Renewables Facility 100 Eco Parkway,</u> <u>Township of Southgate, Ontario</u>, JLP Services Inc., January 13, 2023, prepared for Envest Corp.
- 3. <u>Draft Hydrogeological Investigation Report 100 Eco Park Way, Southgate, Ontario</u>, JLP Services Inc., May 31, 2023, prepared for Envest Corp.
- 4. <u>Eco-Parkway Plan and Profile Drawings</u>, Triton Engineering Services Limited, July 2012

The following guidance documents were also referenced in preparation of this report:

- 1. <u>Municipal Servicing Standards</u>, Township of Southgate, June 2016.
- 2. Design Guidelines for Sewage Works, Ministry of the Environment and Climate Change, March 2019.
- 3. <u>Design Guidelines for Drinking Water Systems</u>, Ministry of the Environment and Climate Change, May 2019.

- 4. <u>OFM-TG-03-1999 Fire Protection Water Supply Guideline for Part 3 in the Ontario Building Code</u> October 1999.
- 5. Ontario Building Code (OBC)- current version.

2.0 EXISTING INFORMATION

2.1 Existing Topography

The site is an open field which was recently cleared of all trees within the northern portion of the site. A 1- to 1.5-m-tall berm was also removed along the eastern site limits, which was originally constructed by the neighbouring owner and consisted of topsoil removed from the property to the east. The ditch immediately outside the property boundary to the west conveys stormwater from the north of Eco Parkway south towards the Foley Drain. This ditch is located within a GRCA regulated area, with the estimated floodplain limits extending within the site boundaries.

Existing topographical information for the northern half of the site was obtained from a survey by Van Harten Surveying Inc., dated July 22, 2019. Additional topographical information for the southern half of the site was obtained from a survey by Van Harten Surveying Inc., dated June 7, 2022.

The topography of the site generally falls from an elevation of 509.0 m along the northeastern limits towards the western ditch. The elevation of the ditch ranges from approximately 506.0 m at the northern limits, just south of Eco Parkway, and runs south to an elevation of approximately 505.40 m at a slope of approximately 0.3%. The ditch was not surveyed as part of the additional survey, but it is assumed to continued to run towards the south at a similar slope. The eastern property line ranges between an elevation of 509.0 m at the northeastern corner, to an elevation of approximately 507.3 m at the southeastern corner. The edge-of-gravel elevations fronting the site range between 509.0 m and 509.6 m, meaning the majority of the site is sunken below Eco Parkway. All existing drainage from the site sheet flows across the surface from east-to-west toward the ditch.

A Provincially Significant Wetland (PSW) extends into the southern portion of the site. The site will be developed in a manner that ensures no work will be conducted within a 15 m setback of the PSW.

2.2 Geotechnical Report

A geotechnical investigation was completed by V.A. Wood (Guelph) Incorporated in June 2019 to assess the existing soils and groundwater conditions. A supplemental geotechnical investigation was completed by JLP Services Inc. (formerly V.A. Wood (Guelph)), in January 2023.

The initial investigation consisted of seven boreholes. Surficial topsoil was encountered at all boreholes, with a depth between 150 and 300 mm. This topsoil was underlain with approximately 400 mm of sand at the northeastern corner of the site (BH-2), and approximately 500 mm of organic silty sand at BH4. These sand and organic silty sand layers, as well as the topsoil at the other boreholes, were underlain with silty sand till to the full depth of the borehole.

Groundwater was encountered approximately 0.8 to 2.4 m below the surface during the drilling operation. Piezometers were installed in BH-3 and BH-6, and free water surfaces were discovered to be approximately 0.3 m below the surface. Groundwater elevations are assumed in the Geotechnical report to be between 505.5 m and 506.5 m. The topsoil and loose, saturated zones are not suitable to support the foundations. The Geotechnical Report states the depths to suitable bearing stratum for all the completed boreholes ranges between 2.6 and 3.3 m.

The supplemental geotechnical information consisted of seven boreholes, with two monitoring wells being installed, and focused on the southern portion of the site. Surficial topsoil was encountered, with a depth between 100- and 300-mm. Brown native material was encountered beneath the topsoil and extends to depths between 1.5 m and 1.7 m below the surface. The native material is underlain with sandy silt till that extends to depths between 6.4 and 9.6 m below grade, which is where the boreholes were terminated.

Groundwater was observed to be right below the surface, or at the surface. However, the Geotechnical Investigation states that the actual groundwater table is expected to be below the depth of investigation. The groundwater near the surface is believed to be perched groundwater due to artesian pressure. Dewatering during construction will need to be considered. The supplemental investigation also states that the depth to suitable bearing stratum for foundations is between 2.0 and 2.5 m below grade. Combining both investigations together, the depth to suitable bearing stratum is between 1.8 and 3.3 m below grade.

2.3 Existing Servicing and Utilities

A 150-mm-diameter watermain exists along Eco Parkway, with municipal hydrants along the northern side of the road. A 38-mm-diameter HDPE "Goldstripe" sanitary forcemain also fronts the site within an easement, servicing the domestic flows (washrooms and plumbing fixtures) from the Lystek facility to the east. This forcemain connects to a manhole approximately 150 m west of the site's western limits, where it transitions to a 250-mm-diameter gravity sewer. This gravity sewer then combines with a 600-mm-diameter concrete sanitary sewer, which flows towards the sanitary lagoon system. The Township is currently considering sanitary servicing options for Eco Parkway.

A water tower was commissioned in Dundalk in 2023, which increased the available capacity within the municipal watermain. However, based on initial conversations with the Township, adequate fire pressure is still not expected to be available for the proposed development.

There is no storm sewer infrastructure along Eco Parkway. All runoff from storm events is conveyed to the ditch along the western limits of the site. This tributary flows towards the Foley Drain, south of the site.

Overhead hydro lines run on the northern side of Eco Parkway. A gas distribution main is installed on the southern (site) side of the Eco Parkway right-of-way.

3.0 **REVIEW AGENCIES**

3.1 Township of Southgate

The Township of Southgate will be responsible for the review and approval of the final Site Plan, as well as final Site Servicing, Grading, and Stormwater Management designs.

3.2 Grand River Conservation Authority

The Grand River Conservation Authority will be responsible for reviewing the grading and servicing design since a portion of the development takes place within their estimated floodplain limits. The GRCA has issued a permit to the Owner previously, based on a previous site plan provided to them.

3.3 Ministry of the Environment, Conservation and Parks

The Ministry of the Environment, Conservation and Parks (MECP) has reviewed aspects of this project to date and has granted an Environmental Compliance Approval (ECA) for process-related aspects of this project including waste, odour, and air in 2019 (Reference No. 1984-BD9NBD). An amendment to this ECA is currently in progress. An ECA for the on-site stormwater management facility has been submitted to the MECP for approval (Reference No. 4528-CYWQBN) in December 2023.

4.0 SANITARY SERVICING

Southgate Township does not explicitly state an industrial sanitary flow rate in their Servicing Standards. The MECP Guidelines for Sewage Works explains that sanitary flows for industrial developments vary greatly depending on many factors, including the type of industry/process for which the development is designed. It is noted that building's processes will not contribute to the peak sanitary flow, as the water used for the processes is recycled.

Based on the OBC, Part 8, Table 8.2.1.3.B, Item 10 "factory (with showers)", the average daily flow expected from the Organics Receiving Building is 125 L/person/8-hour shift. Item 15 states that for office buildings, the average expected daily flow is 75 L/person/8-hour shift. The maximum number of employees expected at any given time are as follows:

- Office Building assume 12-hour shifts, 6 employees.
 - 12/8 x 6 x 75 = 675 L/day
- Maintenance Shop assume 12-hour shifts, 3 employees.
- 12/8 x 3 x 125 = 562.5 L/day
- Organics Receiving Building assume 12-hour shifts, 8 employees.
 - 12/8 x 8 x 125 = 1,500 L/day
- Occasional use truckdrivers, maintenance visitors (allocate 1 person)
 - 8/8 x 1 x 75 = 75 L/day

This equates to a total demand of 2,812.50 L/day (1.95 L/min or 0.03 L/s).

The total fixture unit count for the site is assumed to be between 20 and 30. This will be confirmed during detailed design of the building interiors. Also, if it is assumed that the toilets are flush valves, Table 7.4.10.5 of the OBC states that the peak sanitary flow rate that can be expected is 2.1 L/s. According to Southgate Township's standards, the industrial flow rate is to be coupled with an extraneous flow rate of 0.15 L/s/ha, however, it should be noted that no extraneous flows are expected to occur within the system.

The sanitary flow from the site will be conveyed to a pump station located north of the Office Building. Actual discharge from the site will be less than the instantaneous peak flow rate of 2.1 L/s and will be governed by the system curve of the receiving forcemain and the pump selected. A flow rate of approximately 0.4 to 0.6 L/s will be selected for design of the pump station. The pump station will convey sewage via private forcemain towards the existing 38-mm-diameter HDPE "Goldstripe" sanitary forcemain that services the Lystek site to the east. The total dynamic head for the pump station will be specified to overcome pressure in this existing forcemain. A check valve and isolation valve will be included as part of the pump station design to allow for protection and maintenance of the proposed buildings. Additional check valves may be required on the existing forcemain to prevent back pressure.

5.0 WATER SERVICING

5.1 Design Criteria

The MECP states that watermain distribution systems are to be designed to convey the larger of the maximum daily demand combined with fire flow, or the peak hourly demand. Additionally, it is recommended that the average daily flow from any development be conveyed with a resulting pressure within the range of 350 kPa (50 psi) to 470 kPa (70 psi).

The guidelines also stipulate that the minimum resultant pressure under any non-fire demand scenario shall not be less than 275 kPa (40 psi). With the inclusion of fire flows, the minimum residual pressure in the distribution system shall not be less than 140 kPa (20 psi). Static pressure in the system cannot exceed 700 kPa (100 psi) in any scenario.

5.2 Domestic Water Demand

Southgate Township's Servicing Standards direct the domestic water demand calculations for industrial developments to the guidelines outlined within the MECP Drinking-Water Systems guidelines.

However, as uses of the site are known and the equipment and machinery will not contribute to the water demand calculations, the average daily sanitary demand can be used as the average daily domestic water demand. The peaking factor may vary, but a factor of 2.0 was used for the maximum daily demand, and a factor of 4.0 was assumed for the peak hourly demand.

The domestic water demands are summarized in Table I below.

Average Daily Demand	2,812.50 L/day (0.03 L/s)
Peaking Factors	
Maximum Day Peaking Factor (MECP)	2.0
Maximum Hour Peaking Factor (MECP)	4.0
Peak Water Demand	
Total Maximum Day Domestic Demand	0.06 L/s
Total Peak Hourly Domestic Demand	0.12 L/s

Table I: Proposed Domestic Water Demands

The maximum daily demand for the proposed development is estimated to be 0.06 L/s, and the maximum hourly demand is expected to be 0.12 L/s. It should also be noted that the instantaneous peak water demand is assumed to be the same as the peak instantaneous sanitary demand, which is 2.1 L/s.

The site requires $175 \text{ m}^3/\text{day}$ for process water within the Organics Receiving Building, which the Township has agreed to provide from their municipal watermain system. The water allocation agreement will be finalized with the Site Plan Application. Envest is exploring supplementing this allocation with consumption obtained from the neighbouring wastewater treatment facility in the future. It has been identified that this demand will occur over 12 hours, resulting in a total process demand of 4.05 L/s.

5.3 Fire Flow Demand

In addition to the daily domestic demand from the proposed development, fire flow demands are required to assess the adequacy of any proposed watermain system. Triton Engineering Services Limited, who serves as the Township's Engineer, provided an estimated static pressure within the existing 150-mm-diameter watermain on Eco Parkway of 94 psi, based on topography. However, at 20 psi, the available flow in the system is only 45.4 L/s, which would not provide adequate fire protection. The Township commissioned a new water tower in Dundalk in 2023; however, it was noted that the water tower will only marginally increase the pressure on Eco Parkway and there is not sufficient water available to provide fire protection for this development. Therefore, an on-site water supply for fire protection will be required. The available water pressure will be provided prior to finalizing the design, which may reduce the required size of the on-site water supply.

The fire protection water supply will be provided via underground holding tanks. The volume and rate requirements were calculated in accordance with <u>Fire Protection Water Supply Guideline for Part 3 in the OBC</u> (OFM-TG-03-1999). The required volume of water supply is calculated based on volume of the buildings, exposure to other buildings, and a water supply coefficient. The fire demand was calculated for the Organic Receiving Building, as it will require a larger demand than the Office Building and Maintenance Shop.

Minimum Supply of Water (Q = K*V*STOT)

The value of K is provided from Table 1 in OFM-TG-03-1999 and values of S_{TOT} are selected from Figure 1 in the same technical bulletin. Based on a review of the proposed building, its classification, and construction the following is noted:

- The proposed building meets the classification of Low Hazard, Group F Division 3 building (F3), in accordance with the OBC
- The proposed building is of non-combustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2. of the OBC, including loadbearing walls, columns, and arches
- A water supply coefficient, K, of 12 is applicable to the building based on Table 1 of OFM-TG-03-1999
- The building has no exposures to other buildings within 10 m of its footprint and, therefore, the total spatial coefficient is 1, based on no exposure on either side.

With the above, the following is noted regarding the size of the building:

- The building has a footprint of 2,800 m²
- 30% of this footprint has a height of 18.24 m, resulting in a volume of 15,321.6 m³
- 70% of this footprint has a height of 7.63 m, resulting in a volume of 14,954.8 m³
- The total volume is noted to be 30,276.4 m³

Table II below summarizes the calculations.

Table II: Fire Protection Water Supply Calculations

Water Supply Coefficient (K)	12
Building Dimensions	
Building Footprint	2,800 m ²
Building Height	Varies
Volume (V)	30,276.4 m ³
Spatial Coefficients (S _{TOT})	1.0
Minimum Supply of Water ($Q = K^*V^*S_{TOT}$)	363,318.8 L
Minimum Supply Rate ^[1]	9000 L/min (150 L/s)

^[1] From Table 2 of OFM-TG-03-1999

Given the values noted above, the volume of water required for fire protection for the building, \mathbf{Q} , is noted to be 363,319 L. Based on Table 2 of OFM-TG-03-1999, this flow must be delivered at a minimum rate of 9000 L/min or 150 L/s at 140 kPa (20 psi) and must be delivered for at least 30 minutes. At the minimum flow rate, the required volume is sufficient for a constant draw of 40.4 minutes.

The subject property is to be connected to the municipal water supply for domestic water and fire protection use. As the building is not sprinklered, the fire protection will be provided by means of private hydrants on the site. As previously stated, the municipal watermain can currently only provide 45.4 L/s at 140 kPa, and on-site storage is required to account for the remainder of the fire demand.

To calculate the required amount of storage, it is assumed that:

- 4.1 L/s is unavailable for firefighting purposes to provide the maximum daily domestic demand for the facility.
- It is further assumed that, due to hydraulic losses within the piping leading up to the hydrant, approximately 2 psi is lost.

Therefore, approximately 39.3 L/s is available at the private hydrant for fire fighting purposes from the municipal supply, and an additional 110.7 L/s of supplementary water is required for a minimum duration of 30 minutes. A minimum private supply of 199,260 L is required to provide adequate capacity for fire protection on the site.

It is proposed that two Wilkinson Heavy Precast storage tanks (one model H100S and one model H114S) are connected in series to provide the required supply volume. These tanks will provide a combined volume of 214,000 L. The tanks should be installed below grade with a minimum cover of 1.5 m to provide adequate frost protection. These tanks will be connected to a dry hydrant, conforming to <u>NFPA 1142: Standard on Water Supplies</u> for Suburban and Rural Fire Fighting. Annex B of NFPA 1142 should be referred to for specifications for the tanks, and the type of hard suction threaded fitting and cap on the dry hydrant should meet requirements of the municipality and the local fire department.

The water levels in the cistern should be monitored to ensure adequate supply is available in the event of a fire and that no leaks are developed over time. It is recommended that the tanks be equipped with a float sensor to allow for automatic refill if the tanks empty to a certain level. If the cisterns are installed in an area with shallow ground water, the design of the cistern and base shall consider buoyancy. The automatic refill water line is proposed to come from the Office Building/Maintenance Shop to allow for it to be metered. A backflow preventer will also be required on this line within the building.

5.4 Service Design

The water service for the proposed development will be responsible for providing domestic demand to the buildings, as well as some fire demand to a private hydrant. A 150-mm-diameter watermain is proposed to service the private hydrant, and the domestic demand for each building can be serviced via 25-mm-diameter services, threaded from the 150-mm-diameter main. The owner has requested a 100-mm-diameter water service to provide the combined demand for their domestic uses and their process demand of 175 m³/day. The 25-mm-diameter domestic services for each building will be connected to this 100-mm-diameter service. It is anticipated that the Township will require metering and backflow prevention on the domestic services; the development manual did not indicate or provide specifics. As such, metering and backflow prevention of the domestic services will be determined during the detailed design and building permitting phase of the project.

6.0 STORM SERVICING AND STORM WATER MANAGEMENT

As per GRCA requirements, stormwater runoff from the site is to be controlled to pre-development flow peak flow rates for the 2-year through the 100-year storm events. For the purposes of this report, a minor storm event is characterized by storm patterns that occur more frequently (e.g., 25 mm storm, 2-year storm event, 5year storm event) and are used to design and size minor storm system conveyance features such as storm sewers. A major storm event is one that is larger and less frequent in nature (e.g., 100-year and Regional storm) and is typically conveyed via overland flow. Drainage areas were delineated, and catchment parameters were determined for inclusion in pre- and post-development modelling. The stormwater management design for both existing and proposed conditions was completed using the hydraulic modelling software MIDUSS. Modelling for the Site was completed using the 4-hour Chicago Storm distributions. The 4-hour Chicago Storm distribution was determined to generate the greatest runoff volumes between the analyzed storm distributions -this gave greater volume control requirements utilized for sizing the proposed stormwater management measures. This distribution was chosen as the "worst-case scenario" and was therefore selected for use in further analysis and detailed design for the Site. Also, for small drainage areas such as this development, the use of 3-hour to 4-hour Chicago Storms is typical. The modeling also utilized Hurricane Hazel for the Regional event. Since only the last 12 hours of the event were utilized (212 mm rainfall), the pervious Curve Number (CN) values were increased to reflect AMC-III conditions.

Quality control guidelines for the Township are directed to the MECP <u>Stormwater Management Planning and</u> <u>Design Manual</u>. This manual stipulates that "Enhanced" protection that removes a long-term average of 80% of total suspended solids (TSS) for up to the 25 mm storm event is required.

6.1 **Pre-Development Conditions**

The existing conditions were modeled using MIDUSS to determine the peak release rates. The site appears to drain from northeast-to-northwest towards the ditch, with no controls in place. The site consists mostly of grass and an impervious percentage of 0% was used for the entire 4.04 ha development area. Additionally, an external area for the adjacent development consisting mainly of grass and gravel areas was identified along the eastern limits of the site. An impervious percentage of 70% was used for the 0.51 ha external area. A catchment area plan for the pre-development conditions of the Site and a pre-development flow schematic are provided in Figures 1 and 3, respectively. A summary of the catchment parameters utilized under pre-development modelling is shown in Table III, a more detailed summary of parameters can be found in Appendix A.

Catchment ID	Description	Area (ha)	Percent Impervious
101	Existing Site	4.04	0%
102	External Drainage Area East of Site	0.51	70%

Table III: Pre-Development Catchment Parameters

The peak flow rates for the 2-year to 100-year design storm events are summarized in Table IV. These flow rates are not to be exceeded in post-development conditions. Rainfall parameters were gathered from the Ministry of Transportation (MTO) IDF Curve Lookup Tool. The IDF Parameters used in MIDUSS can be found in Appendix A.

Table IV: Pre-Development Peak Flow Summary

Storm Event	Peak Flow Rate (m³/s)		
2-Year	0.086		
5-Year	0.136		
10-Year	0.197		
25-Year	0.303		
50-Year	0.423		
100-Year	0.522		

The proposed quantity controls will be required to limit the post-development peak flow rates to predevelopment rates for all storm events from the 2-year through the 100-year.

6.2 Post-Development Conditions

Post-development peak flows were also modelled using MIDUSS. Post-development peak flow rates are required to be controlled to pre-development rates, or less. The site and external areas were divided into five catchments. A catchment area plan and flow schematic of the post-development conditions are provided within Figures 2 and 4, respectively. A summary of the catchment parameters used are provided in Table V, with a more detailed table provided within Appendix A. The assumed percent impervious for the site is conservative given that large portions of the site will have gravel surfaces which will absorb rainfall into the aggregate, provide storage within the voids of the granular material, and potential infiltration into the subgrade, thereby reducing runoff compared to an asphalt/concrete surface.

Catchment ID	Description	Area (ha)	Percent Impervious
201	Controlled flow to Pond	1.08	90%
202	Uncontrolled to Creek	1.82	5%
203	Containment Area & Driveway	1.14	95%
301	External drainage area east of Site - Drains to 201	0.39	70%
302	External drainage area east of Site - Drains to 202	0.12	70%

Table V: Post-Development Catchment Parameters

The post-development conditions of the Site were modelled without any mitigation measures in place in order to determine how much storage would be required in order to meet quantity control requirements. The results of this analysis are presented in Table VI and shows that, without SWM controls, post-development peak flows exceed pre-development flows by a factor ranging from 2.5 to 6.

Storm Event	Pre-Development Peak Flow Rate (m³/s)	Post-Development Peak Flow Rate (m³/s)	Increase in Flow (%)
2-Year	0.086	0.512	595
5-Year	0.136	0.714	525
10-Year	0.197	0.867	440
25-Year	0.303	1.062	350
50-Year	0.423	1.207	285
100-Year	0.522	1.353	259
Regional	0.674	0.658	-2

Table VI: Comparison of Pre-Development and Post-Development (Uncontrolled) Flow Rates

The following sections outline the stormwater management practices that are proposed to be implemented in order to meet quantity and quality control objectives.

6.2.1 Continuous Flow Dry Pond

In order to attenuate flows directed towards the ditch from catchments 201 and 301, a continuous flow dry pond located west of the proposed office and maintenance shop building is proposed to be installed. The proposed dry pond provides approximately 477.6 m³ of storage with a total depth of 1.00 m. The proposed pond contains 3 piped outlets and an emergency overflow weir that will direct stormwater to the riprap lined spillway south of the pond. A 50 mm orifice plate located at the base of the pond will act as a low flow out to drawdown the runoff generated from the 25 mm storm event. The Drawdown time calculation for the facility for various design storm events is provided in Table 8 within Appendix A. A 300 mm and a 250 mm diameter orifice was placed at an elevation of 506.70 m to control larger storm events, and a 75-mm-diameter horizontal orifice was placed at an elevation of 507.10 m at the top of the control structure to control larger storm events. A 5-m-wide overflow weir is proposed at elevation 507.30. A summary of the design components and operating levels of the proposed dry pond is given in Table VII. A detailed stage-storage-discharge listing is provided in Appendix A.

Table VII: Summary of Dry Pond Design Operating Levels

Component of Pond	Elevation (m)	Volume (m ³)
Bottom of pond & 50 mm diameter low flow orifice invert	506.40	0
300 mm and 250 mm diameter orifice inverts	506.70	111
75 mm diameter horizontal orifice invert	507.10	301
Bottom of emergency overflow weir	507.30	415
Top of Pond	507.40	478

6.2.2 <u>Containment Area</u>

Catchment 203 represents the containment area for the storage tanks behind the proposed organics receiving building, and also includes the southern half of the building and gravel driveway/yard area. The containment area is designed to contain any potential leaks from the storage tanks and to control the 100-year storm in the event it coincides with any spillage. The containment area will include an impermeable liner system. The storage area within the catchment is proposed to hold up to a volume of approximately 2919.6 m³ on the surface at a maximum depth of 1.85 m. A trained staff member will sample the water after a rainfall event, and if it meets

area within the catchment is proposed to hold up to a volume of approximately 2919.6 m³ on the surface at a maximum depth of 1.85 m. A trained staff member will sample the water after a rainfall event, and if it meets storm sewer bylaw standards a valve within the surrounding piped system can be opened to allow runoff to enter the southern riprap spillway and ultimately enter the ditch. A 150-mm-diameter pipe is proposed to convey the clean runoff towards the ditch. Another valve and outlet are proposed to potentially allow for the runoff within the containment area to be reused for processing within the Organic Receiving Building. This outlet is proposed to be directed towards a manhole with a pump that would convey the stormwater to the building through a forcemain. The lowest bottom elevation of the containment area is set at approximately 507.15, and the Pump Shelter is proposed to have a finished floor elevation of 507.50. The top of the containment berm is set to an elevation of 507.95 m at the lowest section.

The performance of the proposed containment area, assuming the outlet valve is open and discharging from the area, is shown within Table 6 in Appendix A and indicates water ponding elevations ranging from 507.28 m to 507.50 m for the 2-year to Regional storm events, respectively. Under the worst-case condition where the downstream valve is closed and all runoff is impounded within the containment area, the 2-year to Regional ponding elevations will range from 507.46 m to 507.79 m events, respectively, which is still below the top of the containment berm at elevation 507.95 m. Therefore, the containment area is capable of safely storing flows generated from all modelled storm events, up to and including the regional storm event.

6.3 Water Quantity/Peak Flow Control

As outlined in section 6.0, peak flow control is required to attenuate runoff generated from the 2-year through 100-year storm events to the peak flow rates recorded under pre-development conditions. The proposed continuous dry pond and containment area measures are able to provide peak flow control to meet the stormwater quantity control objectives for the Site. A peak flow comparison at the Site's outlet is provided within Appendix A and is also summarized in Table VIII.

Storm Event	Pre-Development Peak Flow Rate (m³/s)	Post-Development Peak Flow Rate (m³/s)	Reduction in Flow (%)
2-Year	0.086	0.084	2
5-Year	0.136	0.132	3
10-Year	0.197	0.197	0
25-Year	0.303	0.296	2
50-Year	0.423	0.335	21
100-Year	0.522	0.373	29
Regional	0.674	0.530	21

Table VIII: Comparison of Pre-Development	and Post-Development ((Controlled) Flow Rates
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It should be noted that the modelling results shown in Table VIII account for the unlikely event that flows generated from Catchment 203 are released to the outlet during storm events. In practice, the valve from the containment area is closed under normal conditions and runoff during rainfall events is impounded within the containment area until it is tested to confirm it satisfies the Sewer Use Bylaw criteria prior to release. Therefore, runoff from this catchment would occur well after the storm event and after the combined peak flows from the other catchments has occurred. Under normal operating procedures, with the valve in the containment area closed, post-development flows will be approximately 0.038 m³/s lower than those indicated in Table VIII resulting in a peak flow that is 15% to 47% less than pre-development flow.

Table 6 in Appendix A outlines the proposed pond's performance under all of the storm events modelled. A summary of the maximum ponding elevations during each storm event is shown in Table IX. All storm events, including the Regional event are contained within the SWM facility.

Storm Event	Maximum Ponding Elevation (m)
25 mm	506.813
2-Year	506.895
5-Year	507.012
10-Year	507.082
25-Year	507.168
50-Year	507.232
100-Year	507.297
Regional	507.203

Table IX: Summary of Maxir	num Ponding Elevations	Under Various Sto	rm Events
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A series of catchbasins is proposed in the northern gravel area to collect runoff from the majority of Catchment 201. The runoff is conveyed to an oil/grit separator (OGS) unit through a 450-mm-diameter pipe, and then outlets west to the dry-pond. As previously stated, the runoff from Catchment 203 is controlled manually via a valve. Runoff is directed towards a catchbasin at the western side of the catchment, and a 150-mm-diameter American AVK Resilient Seated Ductile Iron Gate Valve is proposed on the outlet.

Refer to drawings C2-1 and C3-1 for the grading and servicing design of the site. Stormwater modelling results and a storm sewer design sheet can be found in Appendix A.

6.4 Quality Control

Stormwater quality objectives within the site require "Enhanced" protection, resulting in 80% long-term average removal of total suspended solid for the 25 mm storm event.

For flow entering the proposed dry pond, a Stormceptor EFO6 OGS unit was sized to provide 85% TSS removal. This unit will act to remove any total suspended solids from gravel and other hardscaped areas with vehicle traffic and potential salt applications, before being conveyed to the dry pond. It is noted that the GRCA only recognizes a maximum of 50% TSS removal for OGS units - this value was carried forward through the treatment train water quality calculations conducted for the Site. In order to meet the 80% long-term average removal of total suspended solids, the proposed dry pond was sized such that the storage volume provided exceeds the total required water quality storage volume for a "Basic" level of protection (60% TSS removal) with a continuous dry pond structure dictated by Table 3.3.2 in the MECP's Stormwater Management Manual. The drawdown time for the 25 mm event and the MECP water quality volume was 22.8 hours and 23.7 hours, respectively. A drawdown time of 24 to 48 hours is typically preferred; however, it is recognized that for small drainage areas, the storage volumes generated are small and would require unacceptably small orifices to achieve flow rates that would result in drawdown times that range from 24 to 48 hours. As such, the MECP indicates that the drawdown time can be reduced to a minimum of 12 hours. Therefore, at just under 24 hours, the SWM facility provides an appropriate detention time. Using the treatment train calculation shown in Table 9 of Appendix A, it is shown that this treatment train approach can provide the 80% long-term average removal of TSS required. Sizing output for the Stormceptor units along with maintenance information is provided in Appendix A.

It should be noted that catchments 202 and 203 do not require quality control measures as only clean water will be conveyed to the Site's outlet. An OGS unit is proposed to be implemented at the outlet of the containment area (Catchment 203) as an extra quality control measure on top of the monitoring activities proposed under section 6.2.2.

7.0 SITE GRADING

The grading of the site respects the existing grades along all property lines, as well as the road grades on Eco Parkway. The site is graded to comply with slopes outlined as part of the Accessibility for Ontarians with Disabilities Act (AODA), and Southgate Township standards.

The grading allows for the stormwater water management objectives of directing minor and major flows towards the dry-pond and ditch along the western property limits. A portion of the site is graded directly towards this ditch.

The dry-pond has been graded to ensure it is separated from the remainder of the site within the GRCA floodplain area and sufficiently elevated above the groundwater table. The proposed grades of the building and gravel area result in a fill scenario in the GRCA floodplain. As a result, the remaining area of the site within the floodplain, excluding the dry-pond, has been graded to allow for a cut/fill balance.

A containment berm is proposed around the outdoor storage tanks, providing adequate volume to contain the substances in the event of leakage. The containment volume is required to be at least 100% of the above-ground volume of the largest tank plus 10% of the volume of all other tanks. At this time, the tanks are proposed to be 2 m underground, which results in a required secondary containment volume of 3,264 m³ as approved by the MECP. This volume is achieved via a berm surrounding the tanks and pump shelter. The grades within the secondary containment area are designed to direct runoff towards a series of catchbasins that convey runoff towards the northwest, where the outlet is controlled by the valve. The top-of-berm elevations are at a minimum elevation of 507.95 m to allow for a containment volume of approximately 3,301 m³. It should be noted that this volume includes the largest tank area as it is the largest governing factor for the required storage volume. The water will be sampled prior to being released and conveyed to the ditch west of the site.

The maximum ponding elevation during the 100-year storm event is 507.46 m, and the finished floor elevation of the pump shelter is set to an elevation of 507.50 m. This accounts for the total rainfall volume when the outflow pipe valve is shut.

A ramp at approximately 2% is also proposed from the gravel area behind the Organic Receiving Building to the bottom of the containment area, providing access to the pump shelter, and monitoring equipment.

Cut-fill within the GRCA's floodplain results in a net-cut of approximately 24 m³. This is calculated as the difference between a cut of 1,137 m³ and a net fill of 1,113 m³. The volume required for the SWM pond has not been included in these calculations, so the net-gain of floodplain storage is 24 m³. The proposed cut in the GRCA floodplain area has been designed to ensure it is not deeper than 0.5 m from the existing surface.

7.1 Compliance with On-Site and Excess Soil Management Provincial Regulations

The MECP regulation O.Reg. 406/19 "On-Site and Excess Soil Management" under the Environmental Protection Act states that the excavation of excess material, and subsequent off-site disposal of excess soils from this site, will require testing and reporting in the MECP's Environmental Activity and Sector Registry (EASR). The Owner and Contractor will be responsible for complying with all of the noted requirements.

8.0 EROSION AND SEDIMENT CONTROL

Sediment tracked onto the roadway during the course of construction will be cleaned by the Contractor. To help minimize the amount of mud being tracked onto the roadway, a mud mat will be installed at the primary construction exit.

Additionally, silt fence will be installed around the development area to eliminate sediment from leaving the site and will remain in place and be maintained until landscaping has been completed and soil has been vegetated.

Silt fence will also be installed around stockpiles on site, with the stockpiles kept a minimum 2.5 m from the property boundary.

Filter fabric will be wrapped around storm and sanitary structures to prevent silt or sediment-laden water from entering inlets. These will be inspected periodically to ensure that they have been properly installed and function as designed throughout construction.

It is assumed that the Contractor will keep in mind weather conditions when scheduling work to minimize dust migrating to surrounding developments due to construction activities.

The controls will be maintained, and accumulated sediments removed once their capture capacity has been decreased by one third. It is proposed that, during construction activities, visual monitoring will be conducted bi-weekly and within 24 hours of any rainfall event of 25 mm or greater. During the construction period, monitoring will consist of visual observation for the effectiveness of the sediment and erosion controls and sediment migration off site. Construction inspections will be conducted until such time as the construction activities are complete and vegetation has established itself to a density equivalent to 70% of the background native vegetation density.

9.0 CONCLUSIONS

Based on the analysis presented in this report it is concluded that:

- A sanitary forcemain will be required to pump the sanitary flows from the site to the existing forcemain on Eco Parkway.
- The existing 150-mm-diameter watermain within the right-of-way is sufficient to provided domestic water demand for the proposed building.
- The municipal system cannot provide the necessary fire protection for the proposed development. A flow rate of 150 L/s is required to provide fire protection to the site, and only 45.4 L/s is available in the system at 20 psi. Approximately 39.3 L/s will be provided by the municipal main via a private hydrant, and the remaining 110.7 L/s will be provided via underground storage tanks and a dry hydrant.
- Stormwater quantity control is provided via a dry-pond and containment area storage. 2-year through the 100-year storm events are controlled to a peak flow rate lower than the existing conditions peak flow rates.
- Stormwater quality control is provided via an EFO-6 OGS unit, and a treatment train approach is provided with the dry-pond. An additional ERO-6 OGS unit will service the storm runoff released from the containment area.
- Grading of the site complies with AODA and Township of Southgate guidelines.
- Perimeter silt fence, silt fence at the base of all stockpiles, silt sacs in storm structures and a construction entrance mud mat would be required to provide erosion and sediment control.

Envest Corp. – Southgate Renewables Recycling Project Servicing and Stormwater Management Report

All of which is respectfully submitted,

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FIGURES

Figure 1	Pre-Development Catchment Areas
Figure 2	Post-Development Catchment Areas
Figure 3	Pre-Development Flow Schematic
Figure 4	Post-Development Flow Schematic





FIGURE 3

Pre-Development Flow Schematic







DRAWINGS

- C1-1 Existing Conditions Plan (1 of 2)
- C1-2 Existing Conditions Plan (2 of 2)
- C2-1 Grading Plan (1 of 2)
- C2-2 Grading Plan (2 of 2)
- C3-1 Servicing Plan (1 of 2)
- C3-2 Servicing Plan (2 of 2)
- C4-1 Erosion and Sediment Control Plan (1 of 2)
- C4-2 Erosion and Sediment Control Plan (2 of 2)
- C5-1 Notes
- C5-2 Details



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GENERAL NOTES

- LEGAL BOUNDARY DATA AND EXISTING TOPOGRAPHICAL INFORMATION OF THE DUNDALK ECO-PARK LOT (THE SITE) FROM VAN HARTEN SURVEYING INC. DATED JULY 22, 2019 AND JUNE 7, 2022.
- BOREHOLE LOCATIONS AND GEOTECHNICAL INFORMATION FROM DRAFT REPORT BY V.A WOOD (GUELPH) DATED JULY 2019 AND FROM THE SUPPLEMENTAL GEOTECHNICAL INVESTIGATION BY JLP SERVICES INC., DATED JANUARY 13, 2023.
- THIS SET OF PLANS SHALL NOT BE USED FOR CONSTRUCTION UNTIL STAMPED BY THE DESIGN ENGINEER AND APPROVED BY THE LOCAL MUNICIPALITY.
- NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.
- THIS PLAN NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE PERMISSION OF WALTERFEDY.
- THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS, AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED BEFORE STARTING WORK THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM AND THOSE NOT LOCATED PRIOR TO CONSTRUCTION.
- ANY AREA DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ITS ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE CONSULTANT AND AUTHORITY HAVING JURISDICTION. THE CONTRACTOR IS RESPONSIBLE FOR RESTORING ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO MUNICIPAL STANDARDS.
- ALL HEALTH AND SAFETY RELATED SIGNAGE MUST BE POSTED AT THE SITE AS REQUIRED BY APPLICABLE LAW AND BEST MANAGEMENT PRACTICES.
- AT THE END OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE THE CONSULTANT WITH A DIGITAL FILE OF AS-CONSTRUCTED DRAWINGS. THE DRAWINGS MUST REFLECT THE CONSTRUCTED STATE OF THE WORK. SUBMISSION OF UNALTERED DESIGN DRAWINGS AND CONTRACT CHANGES WILL NOT BE ACCEPTED.

EROSION CONTROL NOTES

- ALL EROSION CONTROL FENCING, TEMPORARY FILTRATION AND MUD MATS MUST BE INSTALLED BY THE CONTRACTOR AND INSPECTED BY THE CONSULTANT PRIOR TO COMMENCEMENT OF ANY AREA GRADING, EXCAVATING, OR DEMOLITION. CONTRACTOR TO NOTIFY CONSULTANT FOR INSPECTION.
- ATTACH EROSION CONTROL FENCE TO EXISTING CHAINLINK FENCE WITHIN THE LIMITS OF THE SITE WHERE POSSIBLE. EROSION CONTROL FENCING TO BE PLACED AROUND THE BASE OF ALL STOCKPILES. ALL STOCKPILES
- TO BE KEPT A MINIMUM OF 2.5m FROM PROPERTY LINES.
- FILTER FABRIC TO BE TERRAFIX 270R OR APPROVED EQUIVALENT. MUD MATS TO BE PROVIDED ON SITE AT ALL LOCATIONS WHERE CONSTRUCTION VEHICLES EXIT THE SITE. MUD MATS SHALL BE SUPPLIED AS INSTALLED AS PER THE DETAIL ON DRAWING C4-1. CONTRACTOR TO ENSURE ALL VEHICLES LEAVE THE SITE VIA THE MUD MAT AND THAT THE MAT IS MAINTAINED IN A MANNER TO MAXIMIZE ITS EFFECTIVENESS AT ALL TIMES
- ALL DITCH INLET CATCHBASINS, CATCHBASINS AND CATCHBASIN MANHOLES TO HAVE TEMPORARY FILTRATION INSTALLED AND MAINTAINED AS PER THE DETAIL ON DRAWING C4-1.
- NO ALTERNATE METHODS OF EROSION CONTROL PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY CONSULTANT AND THE AUTHORITY HAVING JURISDICTION.
- ALL EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RE-STABILIZED EITHER BY PAVING OR RESTORATION WITH VEGETATIVE GROUND COVER.
- THE CONTRACTOR IS RESPONSIBLE FOR REMOVING SEDIMENTS FROM THE PUBLIC ROADWAY AND SIDEWALKS AT THE END OF EACH WORK DAY OR AS DIRECTED BY THE CONSULTANT.
- ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSPECTED BY THE CONTRACTOR AFTER MAJOR RAINFALL AND SNOWMELT EVENTS AND CLEANED OR REPLACED AS REQUIRED TO MEET THEIR INTENDED FUNCTION. SEDIMENTS TO BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF ONE THIRD (1/3) THE STRUCTURE CAPACITY.
- THE CONSULTANT SHALL MONITOR SITE DEVELOPMENT TO ENSURE ALL EROSION CONTROLS ARE INSTALLED AND MAINTAINED TO TOWNSHIP OF SOUTHGATE REQUIREMENTS. CONTRACTOR TO COMPLY WITH THE CONSULTANTS INSTRUCTIONS TO INSTALL, MODIFY, OR MAINTAIN EROSION CONTROL WORKS.
- THIS PLAN TO BE READ IN CONJUNCTION WITH THE EXISTING CONDITIONS PLAN, SITE SERVICING PLAN, GRADING PLAN, LANDSCAPING PLAN, AND THE STORM WATER MANAGEMENT REPORT DATED OCTOBER 2020.

GRADING NOTES

- MATCH EXISTING GRADES AT ALL PROPERTY LINES AND/OR LIMITS OF CONSTRUCTION EXCEPT WHERE PROPOSED GRADES ARE NOTED.
- MANAGEMENT OF EXCESS MATERIALS SHALL BE IN ACCORDANCE WITH OPSS 180. ENVIRONMENTALLY IMPACTED SOILS, WHERE AND WHEN ENCOUNTERED, SHALL BE MANAGED ON SITE AS REQUIRED UNTIL SUCH TIME THAT LABORATORY TESTING RESULTS HAVE CONFIRMED THE NATURE OF THE IMPACTS AND A SUITABLE DISPOSAL METHOD.
- SURPLUS MATERIAL OF ALL TYPES NOT REQUIRED FOR BACKFILL, GRADING OR LANDSCAPING SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND BE REMOVED FROM THE SITE AS DIRECTED BY THE CONSULTANT. THE COSTS OF ALL OFFSITE DISPOSAL SHALL BE BORNE BY THE CONTRACTOR UNLESS A SPECIFIC PROVISION IS MADE IN THE CONTRACT DOCUMENTS FOR PAYMENT FROM DISPOSAL OF A SPECIFIC SURPLUS MATERIAL.
- MATERIALS TO BE REMOVED SHALL BE NEATLY SAW-CUT ALONG ITS LIMITS, IN ADVANCE OF THE REMOVAL. THE LIMITS OF REMOVAL SHALL BE AS NOTED ON THE PLANS UNLESS AN EXTENSION OR REDUCTION OF THE MATERIAL TO BE REMOVED IS APPROVED IN ADVANCE BY THE CONSULTANT. AS SUCH THE COSTS OF ANY OVER-EXCAVATION NOT APPROVED IN ADVANCE SHALL BE THE FINANCIAL RESPONSIBILITY OF THE CONTRACTOR. THIS RESPONSIBILITY SHALL ALSO EXTEND TO RESTORATION OR REPLACEMENT OF DISTURBED FEATURES AND SURFACES DUE TO UNAUTHORIZED EXCAVATION.
- ALL FILL PLACED ON SITE SHALL BE COMPACTED TO A MINIMUM 98% SPMDD (UNLESS OTHERWISE RECOMMENDED BY THE GEOTECHNICAL ENGINEER OR ON THE DRAWINGS AND IN THE SPECIFICATIONS). ALL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 200mm LIFTS EXCEPT WHERE UNDER PAVING, AND WALKS WHEN LAYERS SHALL BE 150mm MAX.
- MAXIMUM SLOPE IN GRASSED AREAS TO BE 3:1. SLOPES GREATER THAN 3:1 TO BE LANDSCAPED WITH LOW MAINTENANCE GROUND COVER. MINIMUM SLOPE IN GRASSED AREAS TO BE 1%. GRASS SWALES WITH A SLOPE LESS THAN 1% TO BE UNDERLAIN WITH A FRENCH DRAIN.
- FINISH GRADE AT FOUNDATION WALLS TO BE MINIMUM 150mm BELOW THE TOP OF FOUNDATION WALL/BRICK LINE UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS.
- CONTRACTOR TO PROVIDE POSITIVE DRAINAGE ON ALL SURFACES TO THE APPROPRIATE OUTLET STRUCTURE AREAS OF PONDING CAUSED BY CONSTRUCTION FRROR WILL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE CONSULTANT AT THE CONTRACTORS EXPENSE.
- SHOULD THE NATURE OF THE SOIL AT THE DEPTH INDICATED PROVE UNSATISFACTORY AS DETERMINED BY THE GEOTECHNICAL ENGINEER, THE EXCAVATION SHALL BE CARRIED DOWN TO SUCH A DEEPER LEVEL AS THE GEOTECHNICAL ENGINEER MAY REQUIRE UNTIL A SATISFACTORY BEARING STRATUM IS REACHED
- 9.1. THIS CONTRACTOR SHALL BE PAID THE COST OF SUCH EXTRA EXCAVATION AT THE UNIT PRICE ESTABLISHED IN THE CONTRACT (WRITER TO CONFIRM IN FRONT END).
- 9.2. ALL EXTRA DEPTHS OF EXCAVATION AND FILLING MUST HAVE THEIR AREA AND VOLUME DOCUMENTED BY AN INDEPENDENT INSPECTION AND TESTING COMPANY OR THE CONSULTANT TO QUALIEY FOR PAYMENT
- 9.3. QUANTITIES USED FOR PAYMENT OF EXCAVATION AND FILLING AT EXTRA DEPTHS TO BE DETERMINED BY THE CONSULTANT.

GENERAL SERVICING

- ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE REGULATIONS SET OUT BY THE MUNICIPALITY HAVING JURISDICTION.
- RIGID PIPE BEDDING: CLASS 'B' AS PER OPSD 802.030 (EARTH EXCAVATION, TYPE 1 OR 2 SOIL), OPSD 802.031 (EARTH EXCAVATION, TYPE 3 SOIL), OPSD 802.032 (EARTH EXCAVATION, TYPE 4 SOIL)
- FLEXIBLE PIPE BEDDING: AS PER OPSD 802.010 (EARTH)
- NATIVE FILL MATERIAL IN ACCORDANCE WITH SECTION 31 30 00 SHALL BE DEPOSITED IN THE TRENCH. FOR THE FULL WIDTH OF THE TRENCH, COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY IN LAYERS NOT OVER 300mm DEPTH, EXCEPT WHERE UNDER PAVING, AND WALKS WHEN LAYERS SHALL BE 150mm MAX
- SITE SERVICING CONTRACTOR TO TERMINATE ALL SERVICES 1.0m FROM FOUNDATION WALL AND COORDINATE WITH THE GENERAL OR MECHANICAL CONTRACTOR AS REQUIRED TO FACILITATE THE CONNECTION.
- WHEN BELL AND SPIGOT PIPE IS LAID, THE BELL END OF THE PIPE SHALL BE LAID UPGRADE.
- PIPE SHALL BE KEPT CLEAN AND DRY AS WORK PROGRESSES. THE TRENCH SHALL BE KEPT DRY.
- A REMOVABLE WATERTIGHT BULKHEAD SHALL BE INSTALLED DAILY AT THE OPEN END OF THE LAST PIPE LAID. PIPE SHALL NOT BE LAID UNTIL THE PRECEDING PIPE JOINT HAS BEEN COMPLETED AND THE PIPE IS
- BEDDED AND SECURED IN PLACE.
-). ALL PIPE ENDS SHALL BE THOROUGHLY CLEANED PRIOR TO THE INSTALLATION OF GASKETS. ALL GASKETS TO BE LUBRICATED PRIOR TO BEING INSTALLED OR AS RECOMMENDED BY THE PIPE MANUFACTURER.

- 11. A TEMPORARY LOCATION MARKER 50x75mm SHALL BE PLACED AT THE END OF CONNECTIONS. THE MARKER SHALL BE PLACED 300mm ABOVE THE PLUGGED EI PIPE, CUT AT LEAST 500mm ABOVE THE FINISHED GRADE, AND MARKED WITH BI
- 12. ALL MANHOLES, BASINS, CHAMBERS ETC. TO BE INSTALLED LEVEL AND PLUMB OF THE CONSULTANT.

STORM AND SANITARY SEWER

- 1. POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS: SMOOTH PROFILES, TO OPSS 1 WITH SEPARATE GASKET AND INTEGRAL BELL SYSTEM, IN 6.0m NOMINAL LENGT
- 1.1. 200mm OD AND LARGER: SDR35 PVC WITH 320 kPa STIFFNESS. 2. SUBSURFACE DRAINAGE PIPE AND FITTINGS: TO OPSS 405, PERFORATED PVC
- PE PIPE TO OPSS.MUNI 1840, TO CAN/CSA-B182.1; COMPLETE WITH KNITTED SOC REQUIRED (TERRAFIX 270R OR EQUIVALENT).
- 3. CORRUGATED STEEL PIPE (CSP): TO OPSS 1801 AND CSA G401, COMPLETE WITH NEOPRENE GASKETS, BENDS AND OTHER FITTINGS; JOINTING TO BE 2-PIECE BAI COMPLETE WITH NEOPRENE GASKETS FOR NON-PERFORATED PIPE.
- 4. MANHOLES AND CATCHBASIN MANHOLES TO BE PRECAST 1200mm DIAMETER WI AT 300mm SPACING AS PER OPSD 701.010 UNLESS SPECIFIED OTHERWISE.
- 5. CATCHBASINS TO BE 600mm SQUARE PRECAST AS PER OPSD 705.010. DOUBLE 600x1450mm PRECAST AS PER OPSD 705.020.
- 6. CATCHBASIN MANHOLES, CATCHBASINS, AND DOUBLE CATCHBASINS TO HAVE
- 7. MANHOLE AND CATCHBASIN, FRAMES, GRATES, CASTINGS, LIDS TO BE AS PER 8. CAST IRON FRAMES AND COVERS OR GRATES- STORM SEWERS: TO OPSS 1850
- OPSD 400.020), OPSD 401.010 (A, CLOSED). 9. STORM SEWERS AND SERVICES TO HAVE MINIMUM 1.2m COVER TO TOP OF PIPE
- TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL SHALLOW BURIED SEV ACCORDANCE WITH APPLICABLE 'SEWER PIPE INSULATION DETAIL' INDICATED I 10. ALL PIPES, TO BE INSTALLED FLUSH WITH THE INSIDE WALLS OF THE STRUCTUR
- SMOOTH FINISH 11. ALL MANHOLES TO BE PRE-BENCHED OR BENCHED WITH 30MPa CONCRETE AS
- BENCHING SHALL EXTEND TO THE SPRING LINE OF LARGEST PIPE IN THE MANHO SLOPE OF 1:8
- 12. CONTRACTOR TO SUPPLY AND PAY FOR CCTV INSPECTION OF ALL SEWER LINES 13. ACCEPTANCE OF SEWER LINES AND STRUCTURES SHALL BE MADE AFTER THE (REVIEWED THE CCTV DOCUMENTATION AND VIDEOS, AND EXPRESSED IN WRITII
- LINES AND STRUCTURES ARE ACCEPTABLE. 14. IF CCTV INSPECTIONS SHOW ADDITIONAL CLEANING IS REQUIRED, CLEAN AND F SEWER UNTIL ACCEPTED BY THE CONSULTANT.
- 15. A MINIMUM OF ONE (1) AND MAXIMUM OF THREE (3) ADJUSTMENT UNITS SHALL STRUCTURE TO A MINIMUM HEIGHT OF 75mm AND MAXIMUM OF 300mm. THE FIRST SHALL BE LAID IN A FULL BED OF MORTAR AND ALIGNED WITH THE OPENING IN T SUCCESSIVE ADJUSTMENT UNITS SHALL BE LAID PLUMB TO THE FIRST ADJUSTM ACCORDING TO MANUFACTURER'S RECOMMENDATIONS, FRAMES WITH GRATES SET IN A FULL BED OF MORTAR ON THE ADJUSTMENT UNITS AND SUPPORTED L STONES AND DEBRIS WILL NOT BE PERMITTED FOR USE AS SHIMS.

FORCEMAIN

- 1. FORCEMAIN SHALL BE DR26 PVC WITH GASKETED OR FUSION WELDED JOINTS C FUSION WELDED JOINTS.
- 2. CONSTRUCTION TO CONFORM TO OPSS 412. ALL PRODUCTS TO BE CSA CERTIFI
- 3. INSTALL NO. 14 A.W.C.TYPE T.W.V. 75 660V INSULATED STRANDED COPPER TRAC UNDERGROUND USE ON ALL FORCEMAINS AND SERVICES.
- 4. PIPE BEDDING AND BACKFILL TO CONFORM TO OPSD 802.010 AND 802.013. PIPE TO SPRINGLINE SHALL CONSIST OF GRANULAR "A" . BEDDING FROM SPRINGLINI PIPE SHALL CONSIST OF SAND. TRENCH BACKFILL SHALL CONSIST OF APPROVE COMPACTED TO 95% SPD. SEE FORCEMAIN BEDDING DETAIL.
- 5. ALL FORCEMAINS TO HAVE MIN. 2.0m COVER.
- 6. ALL ELBOW BENDS, BOTH VERTICAL AND HORIZONTAL SHALL BE RESTRAINED A

WATERMAINS

- 1. POLYVINYL CHLORIDE (PVC) PIPE: MANUFACTURED TO CAST IRON OD (CIOD); C WITH INTEGRAL WALL THICKENED BELL DESIGNED FOR JOINT ASSEMBLY USING GASKET CONFORMING TO ASTM D3139 AND CSA B137.3., TO CSA B137.3, COMPLE WIRF
- 1.1. 100 TO 300mm: TO AWWA C900, DR 18, IPEX OR APPROVED EQUAL.
- 2. ALL WATER SERVICING TO HAVE MINIMUM 2.0m COVER.
- 3. ALL WATER SERVICING PROVIDING FIRE FLOWS MUST BE PRESSURE TESTED T OBC PLUMBING CODE.
- 4. FITTINGS: FOR POLYVINYL CHLORIDE (PVC) AND MOLECULARLY ORIENTED POLY (PVCO) PIPE SHALL BE EITHER:
- 4.1. GRAY IRON ACCORDING TO AWWA C110/A21.10.
- 4.2. DUCTILE IRON ACCORDING TO C110/A21.10 OR AWWA C153 AND SHALL BE C ACCORDING TO AWWA C104/A21.4.
- 4.3. INJECTION MOULDED POLYVINYL CHLORIDE, BLUE IN COLOUR AND ACCORD AND CSA B137.2.
- 4.4. PREFABRICATED POLYVINYL CHLORIDE, BLUE IN COLOUR AND ACCORDING CSA B137.3.
- 5. JOINT RESTRAINTS:
- 5.1. FOR PVC PIPE AND FITTINGS: TO ASTM F1674 AND AWWA C111, SERRATED I ON JOINTS UNIFLANGE (SERIES 1300, 1350 & 1360), EBAA (SERIES 1600, 2500 (SERIES 300 & 350): OR WEDGE ACTION TYPE AS MANUFACTURED BY EBAA UNIFLANGE (SERIES 1500) AND STAR STARGRIP 4000, 4100P.
- 5.2. FOR PVCO PIPE (AWWA C909) AND FITTINGS: SERRATED RING TYPE: FOR P UNIFLANGE (SERIES 1360). EBAA (SERIES 2500); WEDGE ACTION TYPE AS MA CLOW (SERIES 2000 TUF GRIP), STAR (STARGRIP 3500).
- 5.3. ALL MECHANICAL JOINTS IN TEMPORARY AND PERMANENT CONNECTIONS MECHANICAL JOINT RESTRAINTS.
- 5.4. WATERMAIN FITTINGS WHICH CHANGE DIRECTIONS VERTICALLY OR HORIZO RESTRAINED BY MECHANICAL JOINT RESTRAINT OR THRUST BLOCKS (OPSE THREADED ROD WILL NOT BE PERMITTED.
- 5.5. WATERMAIN FITTINGS TO BE SUPPLIED WITH MECHANICAL JOINT RESTRAIN PIPE SIZES 150mmØ OR LESS ALL PIPE JOINTS TO BE RESTRAINED WITHIN 5 FITTINGS, IN EACH DIRECTION, UNLESS SHOWN OTHERWISE ON THE CONTR WATERMAIN PIPE SIZES GREATER THAN 150mmØ ALL PIPE JOINTS TO BE RE 10.0m FROM ALL FITTING, IN EACH DIRECTION, UNLESS SHOWN OTHERWISE DRAWINGS. ALL TEES TO HAVE MINIMUM 2.0m SOLID PIPE LENGTH ON EACH PROVIDE A THRUST BLOCK PER OPSD 1103.010.

6. TRACER WIRE:

- 6.1. T.W.U. #12 GAUGE MULTI-STRANDED COPPER WIRE.
- 6.2. PVC WATERMAIN SHALL HAVE TWO STRANDED COPPER, AWG #8 TRACER W AT 5.0m INTERVALS. TRACER WIRE SHALL BE BROUGHT TO THE SURFACE A CONNECTED TO THE LOWER FLANGE OF THE HYDRANT.
- 6.3. DO NOT CONNECT THE TRACER WIRE ON NON-METALLIC SYSTEMS TO NEW WATERMAIN PIPING AND/OR ASSOCIATED FITTINGS
- WATERMAIN VALVES, 100mm AND LARGER, SHALL BE AS PER AWWA C509-MUELI APPROVED EQUIVALENT (OPEN LEFT) INCLUDING VALVE BOX AND DZP-12 5.4kg
- HYDRANTS: CONFORM TO AWWA C502 FOR DRY-BARREL HYDRANTS. WITH TWC AT 180 DEGREES AND A 114.3mm PUMPER NOZZLE WITH A 100mm ULC APPROVE CONNECTION; 32mm SQUARE OPERATING NUT, OPEN COUNTER-CLOCKWISE AN JOINT END; COMPLETE WITH 150mm LEAD, 150mm GATE VALVE, ANCHOR TEE, VA PROVIDED IN ACCORDANCE WITH THE TOWNSHIP OF SOUTHGATE.
- 9. SERVICE PIPE:
- 9.1. SERVICES LESS THAN 100mm: TYPE K SOFT COPPER, TO ASTM B88 OR POL' B137.1 WITH INSERTS (STIFFENER) USED AT CONNECTIONS, OR CROSS-LINK ("MUNICIPEX" BY REHAU AND "BLUE904" BY IPEX). COPPER SERVICES SHALL

ALL CAPPED SERVICE	9.2. SERVICES 100mm OR GREATER: PVC CLASS 150 TO CSA B137.3.	LANDSCAPE NOTES
RIGHT PAINT. TO THE SATISFACTION	10. ANODES TO BE PROVIDED AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION AND TO THE REQUIREMENTS OUTLINED IN THE CONTRACT SPECIFICATIONS. ANODES TO BE DZP-12 5.4kg ANODE	1. ALL WORKMANSHIP SHALL CONFORM TO THE LANDSCAPE ONTARIO SPECIFICATIONS STANDARDS.
	11. PETROLATUM TAPE SYSTEMS: TO BE COMPRISED OF THREE COMPONENTS; PASTE, MASTIC, AND TAPE THAT MEET AWWA C217-09, SUPPLIED BY DENSO NORTH AMERICA INC. OR PETRO COATING SYSTEMS LTD. OR RUSTROL SYSTEMS (INTERPROVINCIAL CORROSION CONTROL COMPANY LTD.). ONLY MATERIAL FROM SUPPLIERS LISTED SHALL BE USED. AT NO TIME SHALL MATERIALS FROM EITHER	 ALL NURSERY STOCK SHALL MEET STANDARDS OF THE CANADIAN NURSERY TRADES ASSOCIATION, LATEST EDITION. ALL PLANT MATERIAL SHALL BE STAKED FOR LOCATION BY LANDSCAPE ARCHITECT AND CONTRACTO
1841 AND CSA B182.2, THS AS FOLLOWS:	SYSTEM BE UTILISED WITH ONE AND OTHER. 11.1. ALL MECHANICAL JOINT RESTRAINTS TO BE WRAPPED WITH APPROVED PETROLEUM TAPE SYSTEM	JOINTLY. 4. BACKFILL IS TO CONSIST OF MATERIAL NATIVE TO THE SITE.
PIPE TO OPSS 1841 OR CK GEOTEXTILE AS	12. PROVIDE ADEQUATE SUMP BELOW CONNECTION, AND PUMPING IF REQUIRED, TO PREVENT CONTAMINATION OF NEW WATERMAIN WITH TRENCH GROUND WATER OR ANY OTHER FOREIGN MATTER.	5. ALL TREES SHALL HAVE AN EARTH SAUCER AT ITS BASE WITH A DIAMETER AS LARGE AS EXCAVATED AREA TO RETAIN WATER.
H COUPLINGS, AND WITH ANGLES	13. ALL WATERMAIN AND SERVICE COMMISSIONING, PRESSURE/LEAKAGE TESTING, DISINFECTION, BACTERIOLOGICAL ANALYSIS AND FLUSHING TO BE SUCCESSFULLY COMPLETED BY THE CONTRACTOR	 ALL BURLAP SHALL BE CUT AND BURIED BELOW SURFACE DURING PLANTING. CONTRACTOR SHALL MAINTAIN ALL LANDSCAPE AREAS UNTIL OWNER'S ACCEPTANCE OF PROJECT
/ITH ALUMINUM STEPS	AND ACCEPTED BY THE TOWNSHIP OF SOUTHGATE AND CONSULTANT PRIOR TO PERMANENT CONNECTION TO WATER DISTRIBUTION SYSTEM. REFER TO CONTRACT SPECIFICATIONS FOR BEQUIREMENTS	8. SPREAD MULCH TO A MINIMUM 100mm COMPACTED DEPTH ON ALL TREE PITS AND PLANTING BEDS.
CATCHBASINS TO BE	 13.1. CONTRACTOR TO SUBMIT A WATERMAIN COMMISSIONING PLAN TO THE CONSULTANT AND TOWNSHIP OF SOUTHGATE AT LEAST TWO WEEKS PRIOR TO CHLORINE RESIDUAL & BACTERIOLOGICAL TESTING. 	 STAKING OF TREES SHALL BE AS PER MUNICIPAL STANDARDS. ALTERNATIVE METHODS MAY BE ACCEPTABLE WITH THE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION. DEPORT ALL DISCREPANCIES IN WRITING TO THE LANDSCAPE ARCHITECT AND CONSULTANT.
A MINIMUM 600mm DEEP	CONSTRUCTION NOTES	11. CONTRACTOR TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO ANY WORK.
OPSS 1850.	GENERAL 1 PRIOR TO CONSTRUCTION THE CONTRACTOR MUST	12. PLANTING MAY BE ADJUSTED TO SUIT LOCATIONS OF SITE UTILITY STRUCTURES/SERVICES.
E. WHERE COVER TO WER PIPE IN	 1.1. CHECK AND VERIFY ALL DIMENSIONS AND EXISTING ELEVATIONS WHICH INCLUDES, BUT IS NOT LIMITED TO, THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS AND EXISTING INVERTS. 	13. SUBMIT A WRITTEN GUARANTEE TO THE EFFECT THAT ALL PLANTS ACCEPTED DURING THE PERIOD O JANUARY 1st TO JULY 15th SHALL BE GUARANTEED UNTIL JULY 15th THE FOLLOWING YEAR. PLANTS ACCEPTED DURING THE PERIOD OF JULY 15th TO DECEMBER 31st SHALL BE GUARANTEED FOR ONE YEAR FROM THE DATE OF ACCEPTANCE. THE GUARANTEE PERIODS LISTED ABOVE SHALL APPLY TO
N DRAWING DETAILS. RE AND PARGED TO A	1.2. OBTAIN ALL UTILITY LOCATES AND REQUIRED PERMITS AND LICENSES.	ALL "NURSERY GROWN" PLANTS.
PER OPSD 701.021.	1.3. VERIFY THAT THE FINISHED FLOOR ELEVATIONS COMPLY WITH THE FINAL ARCHITECTURAL DRAWINGS.	
OLE AND SHALL HAVE A	1.4. CONFIRM ALL DRAWINGS USED FOR CONSTRUCTION ARE OF THE MOST RECENT REVISION.	 CHECK AND VERIFY ALL DIMENSIONS AND QUANTITIES PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES ARE TO BE REPORTED TO THE LANDSCAPE ARCHITECT AND CONSULTANT. QUANTITIES NOTED WITHIN THE PLAN SUPERSEDE THOSE IN THE PLANT SCHEDULE. ANY
S AND STRUCTURES.	1.5. REPORT DISCREPANCIES IN EXISTING CONDITION INFORMATION IMMEDIATELY TO THE CONSULTANT.	16. PLANTING BEDS ARE TO BE MOUNDED A MINIMUM 100mm.
ING THAT THE SEWER	2. THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR DAMAGE TO EXISTING WORKS. DAMAGE SHALL BE RECTIFIED TO THE SATISFACTION OF THE CONSULTANT AND OWNER.	17. SOD ANY AREAS MARKED WITH NURSERY SOD ON 200mm CLEAN TOPSOIL. FINE GRADE AND SOD ALL
RE-INSPECT THE BE INSTALLED ON EACH	 THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY SUPPORT AND/OR RELOCATION OF EXISTING UTILITIES DURING CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE AND COMPLY WITH THE REQUIREMENTS OF ALL UTILITY COMPANIES WHEN CROSSING OR WORKING NEAR THEIR PLANT. 	AS REQUIRED. REFER TO WRITTEN SPECIFICATIONS AND REPAIR DAMAGE TO ADJACENT PROPERTIES AS REQUIRED. REFER TO WRITTEN SPECIFICATION RELATED TO THIS PROJECT FOR TURF GRASS MIXTURE. 18. FINAL INSPECTION AND ACCEPTANCE OF PLANTING WORK SHALL COINCIDE WITH THE FINAL
ST ADJUSTMENT UNIT THE STRUCTURE. MENT UNIT AND SEALED S OR COVERS SHALL BE JSING SHIMS. ROCKS,	 THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE ACCURACY OF ALL TEMPORARY BENCHMARKS ESTABLISHED FOR DESIGN PURPOSES, PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE COMMENCING WORK. 	INSPECTION AND ACCEPTANCE OF ALL WORK INCLUDED IN THE CONTRACT.19. AT THE TIME OF FINAL INSPECTION ALL PLANTS SHALL BE IN A HEALTHY, VIGOUROUS GROWING CONDITION, PLANTED IN FULL ACCORDANCE WITH DRAWINGS AND CONDITIONS.
	5. THE CONTRACTOR SHALL CONTACT THE CONSULTANT 48 HOURS PRIOR TO COMMENCING WORK TO DETERMINE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION.	
OR DR17 HDPE WITH	6. THE RIGHT-OF-WAY (INCLUDING THE BOULEVARD) IS NOT TO BE USED FOR ANY CONSTRUCTION ACTIVITY UNTIL A WORK PERMIT HAS BEEN OBTAINED AS PER THE TOWNSHIP OF SOUTHGATE REQUIREMENTS.	
CK WIRE RATED FOR	7. ALL WORK ON THE MUNICIPAL RIGHT-OF-WAY WILL BE INSTALLED BY THE SITE CONTRACTOR UPON SUCCESSFUL APPLICATION FOR A WORK PERMIT BY THE CONTRACTOR.	
E EMBEDMENT MATERIAL IE TO 300MM ABOVE THE ED NATIVE MATERIAL	8. LIMIT CONSTRUCTION TO ACCEPTABLE TIMES WITHIN THE TOWNSHIP OF SOUTHGATE NOISE BYLAW. CONSTRUCTION HOURS ARE 7AM TO 8PM MONDAY TO SATURDAY, AND 9AM TO 6PM ON SUNDAY, WITHOUT EXCEPTION.	
AT JOINTS.	9. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR THEIR REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, THEY MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO TOWNSHIP OF SOUTHGATE ENGINEERING DEVELOPMENT DIVISION, PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNER'S & CONTRACTOR'S OWN RISK.	
	TRAFFIC, ACCESS, SAFETY	
COLOUR CODED BLUE, S AN ELASTOMERIC ETE WITH TRACER	 PEDESTRIANS MUST BE ASSURED SAFE PASSAGE ALONG ECO PARKWAY AT ALL TIMES. ALL PEDESTRIAN WALKWAYS MUST BE MAINTAINED AS LONG AS POSSIBLE AFTER WHICH TIME IT IS TEMPORARILY REPLACED BY A SUITABLE GRANULAR MATERIAL TO THE SATISFACTION OF THE CONSULTANT AND TOWNSHIP OF SOUTHGATE. 	
	2. ON STREET PARKING WILL NOT BE PERMITTED FOR ANY CONSTRUCTION VEHICLES OR CONSTRUCTION STAFF. THE CONTRACTOR SHALL PROVIDE ADEQUATE PARKING FACILITIES ON SITE TO SUIT THE NATURE AND LOCATION OF THE WORK.	
O 200 PSI AS PER THE	3. FOR EMERGENCY RESPONSE, CONTRACTOR MUST MAINTAIN CONSTRUCTION ACCESS FREE AND CLEAR OF DEBRIS, MATERIALS, VEHICLES, AND EQUIPMENT.	
YVINYL CHLORIDE	4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNALS, DELINEATORS, MARKERS, AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS OF THE TOWNSHIP OF SOUTHGATE AND THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.	
CEMENT LINED	REMOVALS 1. ALL REMOVALS TO BE IN ACCORDANCE WITH OPSS.MUNI 510.	
DING TO AWWA C907	CONCRETE	
TO AWWA C905 AND	 UNSHRINKABLE FILL: TO OPSS 1359, 28-DAY COMPRESSIVE STRENGTH: 0.4 - 0.7 MPa, MAXIMUM 25mm COURSE AGGREGATE SIZE. SUBMIT ONE CODY OF ALL PROPOSED CONCRETE MIX DECIONS DIRECTLY TO THE CONSULTANT A 	
	MINIMUM OF TWO WEEKS IN ADVANCE OF SCHEDULED CONCRETE POURING.	
(SERIES 2000PV), OR	<u>GRANULAR</u> ALL GRANULAR BASE, SUBBASE, SUBGRADE AND BACKFILL TO BE PROVIDED AS PER OPSS.MUNI 1010 AND INSTALLED AS PER OPSS.MUNI 314. 	
PUSH ON JOINTS ANUFACTURED BY	 COARSE GRANULAR FILL: MATERIAL AS SPECIFIED BELOW; COMPACTED TO 98% STANDARD PROCTOR MAXIMUM DRY DENSITY, UNLESS SPECIFIED OTHERWISE, IN LIFTS NOT EXCEEDING 300mm IN COMPACTED THICKNESS; MOISTURE CONTENT WITHIN PLUS OR MINUS 2% OF THE REQUIREMENTS OF ASTM D698 	
TO INCLUDE	2.1. GRANULAR 'B', TYPE 2 TO OPSS.MUNI 1010.	
ONTALLY TO BE FULLY D 1103.01 AND 1103.02).	 FINE GRANULAR FILL: MATERIAL AS SPECIFIED BELOW; COMPACTED TO 98% STANDARD PROCTOR MAXIMUM DRY DENSITY, UNLESS SPECIFIED OTHERWISE, IN LIFTS NOT EXCEEDING 150mm IN COMPACTED THICKNESS; MOISTURE CONTENT WITHIN PLUS OR MINUS 2% OF THE REQUIREMENTS OF ASTM D698. 	
NTS. FOR WATERMAIN 5.0m FROM ALL	3.1. GRANULAR 'A' TO OPSS.MUNI 1010.	
ESTRAINED WITHIN	EARTHWORK 1. IN ACCORDANCE WITH THE TOWNSHIP OF SOUTHGATE SITE ALTERATION BY-LAW; NO FILLING,	
I RUN OF THE TEE, OR	PRE-GRADING OR TREE REMOVAL SHALL OCCUR, IN ADVANCE OF THE FINAL SITE PLAN ENGINEERING ACCEPTANCE, WITHOUT PERMIT. SHOULD THE DEVELOPER OR CONTRACTOR WISH TO PREPARE THE SITE FOR CONSTRUCTION PRIOR TO ENGINEERING ACCEPTANCE, AN APPLICATION FOR A SITE ALTERATION PERMIT MUST BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEERING AND CONSTRUCTION DIVISION FOR REVIEW AND APPROVAL.	
VIRE STRAPPED TO TOP	 ANY AREAS WHICH REQUIRE FILL IN EXCESS OF 0.30m ARE SUBJECT TO COMPACTION TESTS AND SUCH TESTS MUST SHOW A MINIMUM COMPACTION OF 98% SPMDD AT ALL DEPTHS. 	
OR EXISTING METALLIC	3. RETAINING WALLS TO BE DESIGNED BY OTHERS. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL PROPOSED RETAINING WALLS, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER CERTIFIED IN THE PROVINCE OF ONTARIO TO THE CONSULTANT, PRIOR TO CONSTRUCTION. SHOP DRAWINGS TO BE APPROVED BY CONSULTANT IN ADVANCE OF CONSTRUCTION THE CONTRACTOR SHALL PROVIDE A CERTIFICATE OF	
LER A2360-23 OR	COMPLETION COMPLETED BY A CERTIFIED INSPECTION COMPANY BEFORE ACCEPTANCE OF THE WORK.	
ANODE. 9 63.5mm HOSE NOZZLES ED STORTZ ID HAVE MECHANICAL ALVE AND BOX	TOPSOIL/SOD 1. TOPSOIL TO BE PROVIDED AND INSTALLED AS PER OPSS 802. SOD TO BE PROVIDED AND INSTALLED AS PER OPSS 803. <u>OTHER</u>	
YETHYLENE TO CSA KED POLYETHYLENE L HAVE 5.5Kg ANODE.	1. ALL EXISTING SIGNS, MAIL BOXES, POSTS, ETC., WHICH MUST BE REMOVED TO ACCOMMODATE CONSTRUCTION SHALL BE SALVAGED AND REINSTATED AS DIRECTED BY THE CONTRACT ADMINISTRATOR IN EQUAL OR BETTER CONDITION. THE CONTRACTOR SHALL MAKE GOOD ANY DAMAGE CAUSED TO SUCH FACILITIES AT HIS OWN EXPENSE. ALL EXISTING TRAFFIC CONTROL SIGNS MUST BE REINSTATED BY THE END OF EACH WORKING DAY. EXISTING STOP CONTROL SIGNS SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION TO THE SATISFACTION OF THE ROAD AUTHORITY AND THE CONTRACT ADMINISTRATOR.	

PECIFICATIONS STANDARDS.

PE ARCHITECT AND CONTRACTOR







150mm

SHALLOW PIPE INSULATION DETAIL

INSULATION TO BE 1.8m WIDE FOR PIPES UP TO 250mmØ AND 2.4m WIDE

NOTE:

FOR PIPES 300mmØ TO 600mmØ

- GRANULAR 'A' COMPACTED TO 95%

SPMDD

N.T.S.







- WEIR ELEV = 507.30 ← PERFORATIONS TO BE 19.05mmø, SPACED 100mm APART HORIZONTALLY AND VERTICALLY ON 10 ROWS IN TOTAL WITH 75 HOLES PER ROW. CENTRELINE ELEVATION OF BOTTOM ROW = 506.40. CENTRELINE ELEVATION OF TOP ROW = 507.30

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APPENDIX A

Stormwater Management Information

- SWM Summary Tables
- Drawdown Time Calculations
- Quality Control Calculations
- OGS Unit Sizing Reports

Ontario 😵 IDF CURVE LOOKUP

Active coordinate

44° 9' 45" N, 80° 22' 44" W (44.162500,-80.379167) Retrieved: Wed, 17 Apr 2024 21:11:48 GMT

Location summary

These are the locations in the selection.

IDF Curve: 44° 9' 45" N, 80° 22' 44" W (44.162500,-80.379167)

Results

An IDF curve was found.

Coefficient summary

IDF Curve: 44° 9' 45" N, 80° 22' 44" W (44.162500,-80.379167)

Retrieved: Wed, 17 Apr 2024 21:11:48 GMT

Data year: 2010

IDF	curve	year:	201	0
II)⊢	CUIVA	vear	201	
	cuive	year.	201	

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Α	23.1	30.6	35.6	41.8	46.4	51.0
В	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

Rainfall intensity (mm hr⁻¹)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	131.2	80.8	60.9	37.5	23.1	14.2	6.6	4.1	2.5
5-yr	173.8	107.1	80.6	49.7	30.6	18.8	8.7	5.4	3.3
10-yr	202.2	124.6	93.8	57.8	35.6	21.9	10.2	6.3	3.9
25-yr	237.4	146.3	110.2	67.9	41.8	25.7	11.9	7.4	4.5
50-yr	263.6	162.3	122.3	75.3	46.4	28.6	13.3	8.2	5.0
100-yr	289.7	178.4	134.4	82.8	51.0	31.4	14.6	9.0	5.5

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	10.9	13.5	15.2	18.8	23.1	28.5	39.6	48.8	60.1
5-yr	14.5	17.8	20.2	24.8	30.6	37.7	52.5	64.6	79.6
10-yr	16.9	20.8	23.5	28.9	35.6	43.9	61.0	75.2	92.7
25-yr	19.8	24.4	27.5	33.9	41.8	51.5	71.7	88.3	108.8
50-yr	22.0	27.1	30.6	37.7	46.4	57.2	79.6	98.0	120.8
100-yr	24.1	29.7	33.6	41.4	51.0	62.8	87.5	107.7	132.7

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MTO storm parameters adjusted for T _c time in minutes for use in MIDUSS									
i = A / T_c^B where: i = intensity (mm/hr) Tc = Time of concentration (min)									
Return Period -	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr			
А	A 404.1 535.4 622.8 731.3 811.8 892.3								
В	0.699	0.699 0.699 0.699 0.699 0.699 0.699							

TABLE 1 DESIGN STORM PARAMETERS

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT SOUTHGATE RENEWABLES RECYCLING PROJECT DUNDALK, ONTARIO

	IDF S	Storm Param	eters	Time of Peak Ratio	Storm Duration	Total Rainfall	Max. Rainfall Intensity
Design Storm	а	b	с	r r	D		
					(h)	(mm)	(mm/h)
25-mm	449.205	0.00	0.780	0.4	4	25.0	128.0
2-Year	404.1	0.00	0.699	0.4	4	35.1	131.2
5-Year	535.4	0.00	0.699	0.4	4	46.4	173.8
10-Year	622.8	0.00	0.699	0.4	4	54.0	202.2
25-Year	731.3	0.00	0.699	0.4	4	63.4	237.4
50-Year	811.8	0.00	0.699	0.4	4	70.4	263.6
100-Year	892.3	0.00	0.699	0.4	4	77.4	289.7
Regional ²	-	-	-	-	-	212.0	53.0

Notes:

(1) IDF Information taken from MTO's IDF Curve Lookup Tool

(2) Regional storm event modelled using the Hurricane Hazel (Last 12 hours) mass curve

TABLE 2 EXISTING CATCHMENT PARAMETERS

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT SOUTHGATE RENEWABLES RECYCLING PROJECT DUNDALK, ONTARIO

			Percent			Mannings F	loughness	SCS Curv	/e Number
Subcatchment	Comment	Area (ha)	Impervious (%)	Flow Length (m)	Slope (%)	Impervious	Pervious	Pervious	Impervious
To Western Drainage Ditch									
101	Existing Site	4.04	0	60	3.0	0.015	0.250	75.00	98.00
102	External drainage area north of Site	0.51	70	49	2.5	0.015	0.250	75.00	98.00
Total Area		4.55	8						

Note: Under the Regional Storm conditions CNIII values were used for pervious areas (CN = 88)

TABLE 3 PROPOSED CATCHMENT PARAMETERS

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT SOUTHGATE RENEWABLES RECYCLING PROJECT DUNDALK, ONTARIO

			Percent			Mannings F	Roughness	SCS Cur	ve Number
Subcatchment	Comment	Area	Impervious	Flow Length	Slope	Impervious	Pervious	Pervious	Impervious
		(ha)	(%)	(m)	(%)				
<u>To Western Drainage Ditch</u>									
201	Controlled flow to Pond	1.08	90	80	2.0	0.015	0.250	75.00	98.00
202	Uncontrolled to Creek	1.82	5	80	0.5	0.015	0.250	75.00	98.00
203	Containment Area	1.14	95	35	0.5	0.015	0.250	75.00	98.00
301	External drainage area north of Site - Drains to 201	0.39	70	50	1.0	0.015	0.250	75.00	98.00
302	External drainage area north of Site - Drains to 202	0.12	70	50	1.0	0.015	0.250	75.00	98.00
Total Area		4.55	55						

Note: Under the Regional Storm conditions CNIII values were used for pervious areas (CN = 88)

TABLE 4 RUNOFF VOLUME SUMMARY

Subcatchment			Design Storms								
	25-mm	2-year	5-year	10-year	25-year	50-year	100-year	Regional			
	(m ³)										
Existing Conditions											
To Drainage Ditch											
101	109.11	256.66	474.87	643.64	874.12	1054.60	1249.24	7221.92			
102	75.64	116.07	164.15	196.87	238.17	269.53	301.11	989.48			
Proposed Conditions											
To Drainage Ditch											
201	194.68	291.62	406.54	484.72	581.99	654.61	727.57	2188.58			
202	65.00	137.10	240.73	319.68	426.66	511.22	599.46	3278.98			
203	214.20	321.60	447.65	531.67	636.48	714.34	791.70	2335.31			
301	56.74	87.55	124.87	150.33	182.60	206.91	231.29	769.78			
202	17.46	26.94	38 / 2	46.26	56 10	63.66	71 17	236.85			

TABLE 5 PEAK FLOW SUMMARY

Subcatchment				Desig	n Storms			
	Chicago 25-mm (m ³ /s)	Chicago 2-Year (m ³ /s)	Chicago 5-Year (m ³ /s)	Chicago 10-Year (m ³ /s)	Chicago 25-Year (m ³ /s)	Chicago 50-Year (m ³ /s)	Chicago 100-Year (m ³ /s)	MRD Regional (m ³ /s)
Existing Conditions								
To Outlet								
101	0.016	0.044	0.114	0.170	0.261	0.374	0.465	0.603
102	0.069	0.081	0.116	0.139	0.169	0.191	0.214	0.072
Proposed Conditions								
To Outlet								
201	0.181	0.200	0.273	0.332	0.405	0.460	0.516	0.159
202	0.018	0.022	0.033	0.047	0.070	0.097	0.119	0.271
203	0.195	0.218	0.315	0.382	0.465	0.527	0.588	0.169
301	0.049	0.055	0.080	0.097	0.118	0.134	0.150	0.058
302	0.015	0.017	0.024	0.030	0.036	0.041	0.046	0.018

TABLE 6 STORMWATER MANAGEMENT MEASURE PERFORMANCE SUMMARY

Storage Element	Design Storm	Peak Inflow	Peak Outflow	Max. Storage Volume	Max. Ponding Elevation
		(m ³ /s)	(m ³ /s)	(m ³)	(m)
Dry Pond - Capture	s flows from Catchme	nts 201 and 301			
	25-mm	0.23	0.019	159.235	506.813
	2-year	0.256	0.045	197.001	506.895
	5-year	0.353	0.067	254.591	507.012
	10-year	0.428	0.122	291.188	507.082
	25-year	0.523	0.190	338.445	507.168
	50-year	0.594	0.212	374.980	507.232
	100-year	0.666	0.232	413.763	507.297
	Regional	0.217	0.203	358.175	507.203
Containment Area S	Storage - Captures flow	vs from Catchment 2	203		
	25-mm	0.195	0.071	90.411	507.240
	2-year	0.218	0.037	117.102	507.257
	5-year	0.315	0.037	187.573	507.285
	10-year	0.382	0.038	238.622	507.305
	25-year	0.465	0.038	305.916	507.332
	50-year	0.527	0.038	358.050	507.352
	100-year	0.588	0.039	412.581	507.366
	Regional	0.169	0.041	974.026	507.501

TABLE 7 OUTLET SUMMARY COMPARISON

	To Creek						
Design Storm Event	Existing Conditions (m ³ /s)	Proposed (no mitigation) (m ³ /s)	Proposed (with mitigation) (m ³ /s)				
25-mm	0.071	0.458	0.071				
2-year	0.086	0.512	0.084				
5-year	0.136	0.714	0.132				
10-year	0.197	0.867	0.197				
25-year	0.303	1.062	0.296				
50-year	0.423	1.207	0.335				
100-year	0.522	1.353	0.373				
Regional Storm	0.674	0.658	0.530				

TABLE 8 DRAWDOWN TIME CALCULATION

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT SOUTHGATE RENEWABLES RECYCLING PROJECT DUNDALK, ONTARIO

Low Flow Outlet Information			
Orifice Diameter	50.000	mm	
Time to release all of 25mm storm event ¹	1370.000	minutes	
	22.833	hours	

					Drain Down	
Design Storm	Inflow	Outflow ¹	Water Surface Elevation	Storage	Time ²	Drain Down Time ²
	(m ³ /s)	(m ³ /s)	(m)	(m ³)	(hrs)	(days)
Proposed Conditions						
25mm	0.241	0.086	506.93	159	22.83	0.95
10 Year	0.428	0.122	507.08	302	23.67	0.99
25 Year	0.523	0.190	507.17	352	23.75	0.99
MOE Quality Control Volume ³	-	-	507.16	347	23.74	0.99

Note:

1. Outflow from the pond and the time to release the peak volume from the 25 mm storm event were taken from the pond's Outflow Hydrograph generated in MIDUSS. These values do not include infiltration

2. Drain Down Time based on outflow hydrograph generated by MIDUSS modelling

3. MOE Drawdown Time was estimated using a linear interpolation drawn down times listed for the 10-year and 25-year storm events from MIDUSS

TABLE 9 WATER QUALITY CONTROL SUMMARY

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT SOUTHGATE RENEWABLES RECYCLING PROJECT DUNDALK, ONTARIO

Pond for WQ Event		
Area (ha)	Percent Impervious (%)	_
0.390	70	
1.050	90	
Contributing Drainage Area =	1.440	ha
Impervious Level =	84.6	%
Duality Storage Volume Per Hectare =	241	m ³ /ha
ired Water Quality Storage Volume =	347	m ³
Total Provided Storage Volume =	478	m³
	Pond for WQ Event Area (ha) 0.390 1.050 Contributing Drainage Area = Impervious Level = Quality Storage Volume Per Hectare = ired Water Quality Storage Volume = Total Provided Storage Volume =	Contributing Drainage Area = 1.440 Impervious Level = 84.6 Quality Storage Volume Per Hectare = 241 red Water Quality Storage Volume = 347 Total Provided Storage Volume = 478

ype Sto	orage Vol	ume (m³/ha	a) for Impervi	ous Level
2				
3	5%	55%	70%	85%
	20	20	20	20
,	60	60	60	60
Pond/	60	70	75	80
	60	75	85	95
ontinu	90	150	200	240
	Pond/	Pond/ 60 60 continu 90	Pond/ 60 70 60 75 continu 90 150	Pond/ 60 70 75 60 75 85 continu 90 150 200

1. Galleries are represented by dry ponds (60% long-term S.S. Removal)

Oil Grit Seperator Sizing			
	OGS Size =	STC EF06	
	Designed TSS Removal Efficiency =	85	%
	Claimed TSS Removal Efficiency =	50	%

Overall Water Quality Perf	ormance - Treatment Trai	n									
Drainage Area ID	Drainage Area	Primary Removal Feature	Percentage Removed	Percentage Remaining	Secondary Removal Feature	Percentage Removed	Percentage Remaining	Tertiary Removal Feature	Percentage Removed	Total Removal Efficiency	Weighted Efficiency
201	0.440	Dry Pond	60%	40%	OGS	50%	20%	-	0%	80%	80%
Total Removal Efficiency											80%

Notes:

1. Subcatchments 301 and 302 (external areas) are not to be redeveloped and do not require water quality treatment

2. Impervious areas within subcatchments 302 and 202 are directed to pervious areas, and are therefore not considered for water quality treatment

3. Flows from catchment 203 will be monitored by a trained staff member - only clean water will be allowed to leave the containment facility

APPENDIX A

STORMWATER MANAGEMENT MEASURE STAGE-STORAGE CURVES

Level (m)Discharge (m³/s)Volume (m³)506.40.000000506.50.0014634.948506.60.0023171.40165506.70.00292110.90055506.80.01578153.5096506.90.04667199.29075507.00.10140248.30585507.10.16390300.60325507.20.20200356.2584	Pond 1 - Recieves	flows from catchments 20	1 and EXT-1
506.4 0.00000 0 506.5 0.00146 34.948 506.6 0.00231 71.40165 506.7 0.00292 110.90055 506.8 0.01578 153.5096 506.9 0.04667 199.29075 507.0 0.10140 248.30585 507.1 0.16390 300.60325 507.2 0.20200 356.2584	Level (m)	Discharge (m ³ /s)	Volume (m ³)
506.50.0014634.948506.60.0023171.40165506.70.00292110.90055506.80.01578153.5096506.90.04667199.29075507.00.10140248.30585507.10.16390300.60325507.20.20200356.2584	506.4	0.00000	0
506.60.0023171.40165506.70.00292110.90055506.80.01578153.5096506.90.04667199.29075507.00.10140248.30585507.10.16390300.60325507.20.20200356.2584	506.5	0.00146	34.948
506.70.00292110.90055506.80.01578153.5096506.90.04667199.29075507.00.10140248.30585507.10.16390300.60325507.20.20200356.2584	506.6	0.00231	71.40165
506.80.01578153.5096506.90.04667199.29075507.00.10140248.30585507.10.16390300.60325507.20.20200356.2584	506.7	0.00292	110.90055
506.90.04667199.29075507.00.10140248.30585507.10.16390300.60325507.20.20200356.2584	506.8	0.01578	153.5096
507.00.10140248.30585507.10.16390300.60325507.20.20200356.2584	506.9	0.04667	199.29075
507.10.16390300.60325507.20.20200356.2584	507.0	0.10140	248.30585
507.2 0.20200 356.2584	507.1	0.16390	300.60325
	507.2	0.20200	356.2584
507.3 0.23270 415.2879	507.3	0.23270	415.2879
507.35 0.33240 446.04345	507.35	0.33240	446.04345
507.4 0.50230 477.6141	507.4	0.50230	477.6141

Weir Information	
Elevation (m)	507.3
Coefficient	0.9
Crest width (m)	5
left slope	0
right slope	0

	Outflow	Pipe Information		
Component	Orifice 1	Orifice 2	Orifice 3	Orifice 4
Orifice Diameter (m)	0.075	0.250	0.350	0.075
Orifice Invert (m)	506.400	506.700	506.700	507.100
Orifice Coefficient	0.650	0.650	0.650	0.650

APPENDIX A

STORMWATER MANAGEMENT MEASURE STAGE-STORAGE CURVES

Pond 2 - Recie	ves flows from catchment	203
Level (m)	Discharge (m ³ /s)	Volume (m ³)
506.05	0	0
507.05	0.03373	2
507.15	0.03538	6.932
507.25	0.03695	99.984
507.35	0.03846	351.582
507.45	0.03991	741.19
507.55	0.04131	1197.54
507.65	0.04266	1666.8
507.75	0.04398	2153.836
507.85	0.04525	2658.672
507.90	0.04587	2919.547

Outflow Pipe Information	
Upstream Invert (m)	506.05
Downstream Invert (m)	505.98
Pipe Length (m)	13.9
Pipe Diameter (m)	0.15
Manning's n	0.015
Entry loss coefficient	0.5





Province:	Ontario		Project Name:	Envest Southgate			
City:	Dundalk		Project Number:	2021-0713-10			
Nearest Rainfall Station:	OWEN SOUND MOE		Designer Name:	Circe Mahoney			
Climate Station Id:	6116132		Designer Company:	WalterFedy			
Years of Rainfall Data:	40		Designer Email:	cmahoney@walter	cmahoney@walterfedy.com		
			Designer Phone:	613-532-8941			
Site Name:	Name:		EOR Name:				
Drainage Area (ha):	1.14		EOR Company:				
% Imperviousness:	95.00		EOR Email:				
Runoff Co	efficient 'c': 0.87		EOR Phone:				
	Fig.]	
Particle Size Distribution:	Fine			Net Annua	I Sediment	t	
Target TSS Removal (%):	80.0			(ISS) Load	Reduction		
Required Water Quality Runof	Volume Capture (%):			Sizing S	ummary		
Estimated Water Quality Flow	Rate (L/s):	37.46		Stormceptor	TSS Remov	val	
Oil / Fuel Spill Risk Site?		Yes		Model	Provided ((%)	
Upstream Flow Control?		Yes		EFO4	75		
Upstream Orifice Control Flow	Rate to Stormceptor (L/s):	27.00		EFO6	85		
Peak Conveyance (maximum) I	Flow Rate (L/s):			EFO8	92		
Influent TSS Concentration (mg	g/L):			EFO10	95		
Estimated Average Annual Sed	iment Volume (L/yr):	1056		EFO12	99		
			Recommended S	tormceptor EFO	Model:	EFO	
	Estimat	ed Net Ar	nual Sediment (T	SS) Load Reduct	ion (%):	85	
		\A	later Quality Rung	off Volume Cant	uro (%)·	> 00	
		~ ~	ater Quanty Nun	m volume capt	uie (70).	- 50	





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 (%)		
0.50	10.3	10.3	1.38	83.0	31.0	100	10.3	10.3		
1.00	20.8	31.1	2.76	165.0	63.0	100	20.8	31.1		
2.00	15.1	46.2	5.51	331.0	126.0	93	14.1	45.2		
3.00	10.1	56.3	8.27	496.0	189.0	86	8.6	53.8		
4.00	7.7	64.0	11.03	662.0	252.0	81	6.2	60.1		
5.00	6.4	70.4	13.79	827.0	315.0	78	5.0	65.1		
6.00	4.6	75.1	16.54	993.0	377.0	75	3.5	68.6		
7.00	3.4	78.4	19.30	1158.0	440.0	72	2.4	71.0		
8.00	2.7	81.1	22.06	1323.0	503.0	69	1.9	72.9		
9.00	18.9	100.0	24.81	1489.0	566.0	66	12.5	85.4		
10.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
11.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
12.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
13.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
14.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
15.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
16.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
17.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
18.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
19.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
20.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
21.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
22.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
23.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
24.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
25.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
30.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
35.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
40.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
45.00	0.0	100.0	27.00	1620.0	616.0	65	0.0	85.4		
	•	•	Es	timated Ne	t Annual Sedim	ent (TSS) Loa	d Reduction =	85 %		

Climate Station ID: 6116132 Years of Rainfall Data: 40



Stormceptor[®]









	Maximum Pipe Diameter / Peak Conveyance												
Stormceptor EF / EFO	Model Diameter		Model Diameter		Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inle Diame	et Pipe eter	Max Out Diame	let Pipe eter	Peak Cor Flow	nveyance 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[®] 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.











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.

r onatant capacity												
Stormceptor EF / EFO	Moo Diam	del eter	Depth Pipe In Sump	(Outlet vert to Floor)	Oil Volume Recommended Sediment S Maintenance Depth *		ecommended Maximum Sediment Sediment Volume ntenance Depth *		num 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

Pollutant Capacity

*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/ft³)

Feature	Benefit	Feature Appeals To		
Patent-pending enhanced flow treatment	Superior, verified third-party	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/m² to 1400 L/min/m², 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/m² and 1400 L/min/m² 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/m² shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m², and shall be calculated using a simple proportioning formula, with 1400 L/min/m² 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/m².

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/m².

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





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/m² to 2600 L/min/m²) 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.







Province:	Ontario		Project Na	me:	Envest Southgate		
City:	Dundalk		Project Nu	mber:	2021-0713-10		
Nearest Rainfall Station:	OWEN SOUND MOE		Designer N	lame:	Circe Mahoney		
Climate Station Id:	6116132		Designer C	ompany:	WalterFedy		
Years of Rainfall Data:	40		Designer E	mail:	cmahoney@walter	fedy.com	
			Designer P	hone:	613-532-8941		
Site Name:	Controlled to Pond		EOR Name	:			
Drainage Area (ha):	1.47		EOR Comp	any:			
% Imperviousness:	85.00		EOR Email:				
Runoff	Coefficient 'c': 0.81	_	LOK Phone	2:			
Particle Size Distribution:	Fine				Not Annua	l Sadimar	+
Target TSS Removal (%):	80.0				het Annua	Reduction	n
Dequired Water Quality Pur	off Volume Conture (%)	-			Sizing S	ummary	•
Estimated Water Quality Run	w Rate (L/s):	11 97			Stormcontor	TSS Pome	wal
		×]	Model	Provided	(%)
		res]]	FFO4	68	<u>···</u>
Upstream Flow Control?		No]	EFOG	00 91	
Peak Conveyance (maximun	n) Flow Rate (L/s):]		00	
Influent TSS Concentration (mg/L):				EFU8	88	
Estimated Average Annual S	ediment Volume (L/yr):	1161			EFO10	92	
					EFO12	95	
			Recomm	nended Sto	rmceptor EFO	Model:	EFO
	Estim	nated Net A	Annual Sec	diment (TSS	5) Load Reduct	ion (%):	81
		,	Water Qua	ality Runofi	Volume Capt	ure (%):	> 9(





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







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 (%)
0.50	10.3	10.3	1.66	99.0	38.0	100	10.3	10.3
1.00	20.8	31.1	3.31	199.0	76.0	100	20.8	31.1
2.00	15.1	46.2	6.62	397.0	151.0	89	13.5	44.6
3.00	10.1	56.3	9.93	596.0	227.0	82	8.3	52.9
4.00	7.7	64.0	13.24	794.0	302.0	78	6.1	59.0
5.00	6.4	70.4	16.55	993.0	378.0	75	4.8	63.8
6.00	4.6	75.1	19.86	1192.0	453.0	72	3.3	67.1
7.00	3.4	78.4	23.17	1390.0	529.0	68	2.3	69.4
8.00	2.7	81.1	26.48	1589.0	604.0	65	1.8	71.2
9.00	2.6	83.7	29.79	1787.0	680.0	64	1.7	72.8
10.00	1.9	85.6	33.10	1986.0	755.0	63	1.2	74.0
11.00	1.7	87.3	36.41	2185.0	831.0	63	1.1	75.1
12.00	1.2	88.5	39.72	2383.0	906.0	62	0.7	75.8
13.00	1.1	89.6	43.03	2582.0	982.0	62	0.7	76.5
14.00	0.7	90.3	46.34	2781.0	1057.0	60	0.4	76.9
15.00	0.6	90.9	49.65	2979.0	1133.0	59	0.4	77.3
16.00	0.7	91.6	52.96	3178.0	1208.0	57	0.4	77.7
17.00	0.6	92.3	56.27	3376.0	1284.0	55	0.4	78.0
18.00	0.8	93.0	59.58	3575.0	1359.0	53	0.4	78.4
19.00	0.3	93.3	62.89	3774.0	1435.0	51	0.2	78.6
20.00	0.9	94.2	66.20	3972.0	1510.0	48	0.4	79.0
21.00	0.7	94.9	69.51	4171.0	1586.0	46	0.3	79.3
22.00	0.5	95.3	72.82	4369.0	1661.0	44	0.2	79.5
23.00	1.0	96.3	76.13	4568.0	1737.0	42	0.4	79.9
24.00	0.9	97.2	79.44	4767.0	1812.0	40	0.4	80.3
25.00	0.1	97.3	82.75	4965.0	1888.0	39	0.1	80.4
30.00	1.6	98.9	99.30	5958.0	2265.0	32	0.5	80.9
35.00	0.2	99.1	115.86	6951.0	2643.0	28	0.1	80.9
40.00	0.4	99.5	132.41	7944.0	3021.0	24	0.1	81.0
45.00	0.4	99.9	148.96	8937.0	3398.0	22	0.1	81.1
			Es	timated Ne	t Annual Sedim	ent (TSS) Loa	d Reduction =	81 %

Climate Station ID: 6116132 Years of Rainfall Data: 40



Stormceptor[®]









	Maximum Pipe Diameter / Peak Conveyance												
Stormceptor EF / EFO	Model Diameter		Model Diameter		Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inle Diame	et Pipe eter	Max Out Diame	let Pipe eter	Peak Cor Flow	nveyance 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[®] 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.











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.

r onatant capacity												
Stormceptor EF / EFO	Moo Diam	del eter	Depth Pipe In Sump	(Outlet vert to Floor)	Oil Volume Recommended Sediment S Maintenance Depth *		ecommended Maximum Sediment Sediment Volume ntenance Depth *		num 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

Pollutant Capacity

*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/ft³)

Feature	Benefit	Feature Appeals To		
Patent-pending enhanced flow treatment	Superior, verified third-party	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/m² to 1400 L/min/m², 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/m² and 1400 L/min/m² 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/m² shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m², and shall be calculated using a simple proportioning formula, with 1400 L/min/m² 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/m².

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/m².

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





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/m² to 2600 L/min/m²) 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.





Owner's Manual



Stormceptor is protected by one or more of the following patents:

Canadian Patent No. 2,137,942 Canadian Patent No. 2,180,305 Canadian Patent No. 2,327,768 Canadian Patent No. 2,694,159 Canadian Patent No. 2,697,287 U.S. Patent No. 6,068,765 U.S. Patent No. 6,371,690 U.S. Patent No. 7,582,216 U.S. Patent No. 7,666,303 Australia Patent No. 693.164 Australia Patent No. 729,096 Australia Patent No. 2008,279,378 Australia Patent No. 2008,288,900 Japanese Patent No. 5,997,750 Japanese Patent No. 5,555,160 Korean Patent No. 0519212 Korean Patent No. 1451593 New Zealand Patent No. 583,008 New Zealand Patent No. 583,583 South African Patent No. 2010/00682 South African Patent No. 2010/01796 Patent pending

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- **1** Stormceptor EF Overview
- 2 Stormceptor EF Operation, Components
- 3 Stormceptor EF Model Details
- 4 Stormceptor EF Identification
- 5 Stormceptor EF Inspection & Maintenance
- 6 Stormceptor Contacts

OVERVIEW

Stormceptor® EF is a continuation and evolution of the most globally recognized oil grit separator (OGS) stormwater treatment technology - *Stormceptor®*. Also known as a hydrodynamic separator, the enhanced flow Stormceptor EF is a high performing oil grit separator that effectively removes a wide variety of pollutants from stormwater and snowmelt runoff at flow rates higher than the original Stormceptor. Stormceptor EF captures and retains sediment (TSS), free oils, gross pollutants and other pollutants that attach to particles, such as nutrients and metals. Stormceptor EF's patent-pending treatment and scour prevention platform ensures sediment is retained during all rainfall events.

Stormceptor EF offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe, multiple inlet pipes, and/or from the surface through an inlet grate. Stormceptor EF can also serve as a junction structure, accommodate a 90-degree inlet to outlet bend angle, and be modified to ensure performance in submerged conditions. With its scour prevention and internal bypass, Stormceptor EF can be installed online, eliminating the need for costly additional bypass structures.

OPERATION

- Stormwater enters the Stormceptor upper chamber through the inlet pipe(s) or a surface inlet grate. A specially designed insert reduces the influent velocity by creating a pond upstream of the insert's weir. Sediment particles immediately begin to settle. Swirling flow sweeps water, sediment, and floatables across the sloped surface of the insert to the inlet opening of the drop pipe, where a strong vortex draws water, sediment, oil, and debris down the drop pipe cone.
- Influent exits the cone into the drop pipe duct. The duct has two large rectangular outlet openings as well as perforations in the backside and floor of the duct. Influent is diffused through these various opening in multiple directions and at low velocity into the lower chamber.
- Free oils and other floatables rise up within the channel surrounding the central riser pipe and are trapped beneath the insert, while sediment settles to the sump. Pollutants are retained for later removal during maintenance cleaning.
- Treated effluent enters the outlet riser, moves upward, and discharges to the top side of the insert downstream of the weir, where it flows out the outlet pipe.
- During intense storm events with very high influent flow rates, the pond height on the upstream side of the weir may exceed the height of the weir, and the excess flow passes over the top of the weir to the downstream side of the insert, and exits through the outlet pipe. This internal bypass feature allows for in-line installation, avoiding the cost of additional bypass structures. During bypass, the pond separates sediment from all incoming flows, while full treatment in the lower chamber continues at the maximum flow rate.
- Stormceptor EF's patent-pending enhanced flow and scour prevention technology ensures pollutants are captured and retained, allowing excess flows to bypass during infrequent, high intensity storms.



COMPONENTS



Figure 2


- Insert separates vessel into upper and lower chambers, and provides double-wall containment of hydrocarbons
- Weir creates stormwater ponding and driving head on top side of insert
- Drop pipe conveys stormwater and pollutants into the lower chamber
- **Outlet riser** conveys treated stormwater from the lower chamber to the outlet pipe, and provides primary inspection and maintenance access into the lower chamber
- **Outlet riser vane** prevents formation of a vortex in the outlet riser during high flow rate conditions
- Outlet platform (optional) safety platform in the event of manned entry into the unit
- Oil inspection pipe primary access for measuring oil depth

PRODUCT DETAILS

METRIC DIMENSIONS AND CAPACITIES

Table 1

Stormceptor Model	Inside Diameter (m)	Minimum Surface to Outlet Invert Depth (mm)	Depth Below Outlet Pipe Invert (mm)	Wet Volume (L)	Sediment Capacity ¹ (m ³)	Hydrocarbon Storage Capacity ² (L)	Maximum Flow Rate into Lower Chamber ³ (L/s)	Peak Conveyance Flow Rate ⁴ (L/s)
EF4 / EFO4	1.22	915	1524	1780	1.19	265	22.1 / 10.4	425
EF6 / EFO6	1.83	915	1930	5070	3.47	610	49.6 / 23.4	990
EF8 / EFO8	2.44	1219	2591	12090	8.78	1070	88.3 / 41.6	1700
EF10 / EFO10	3.05	1219	3251	23700	17.79	1670	138 / 65	2830
EF12 / EFO12	3.66	1524	3886	40800	31.22	2475	198.7 / 93.7	2830

¹Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.

² Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.

³ EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 1135 L/min/m². EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 535 L/min/m². ⁴ Peak Conveyance Flow Rate is limited by a maximum velocity of 1.5 m/s.

U.S. DIMENSIONS AND CAPACITIES

Table 2

Stormceptor Model	Inside Diameter (ft)	Minimum Surface to Outlet Invert Depth (in)	Depth Below Outlet Pipe Invert (in)	Wet Volume (gal)	Sediment Capacity ¹ (ft ³)	Hydrocarbon Storage Capacity ² (gal)	Maximum Flow Rate into Lower Chamber ³ (cfs)	Peak Conveyance Flow Rate ⁴ (cfs)
EF4 / EFO4	4	36	60	471	42	70	0.78 / 0.37	15
EF6 / EFO6	6	36	76	1339	123	160	1.75 / 0.83	35
EF8 / EFO8	8	48	102	3194	310	280	3.12 / 1.47	60
EF10 / EFO10	10	48	128	6261	628	440	4.87 / 2.30	100
EF12 / EFO12	12	60	153	10779	1103	655	7.02 / 3.31	100

¹Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.

² Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.

³ EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 27.9 gpm/ft². EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 13.1 gpm/ft².

⁴ Peak Conveyance Flow Rate is limited by a maximum velocity of 5 fps.

IDENTIFICATION

Each Stormceptor EF/EFO unit is easily identifiable by the trade name *Stormceptor*[®] embossed on the access cover at grade as shown in **Figure 3**. The tradename *Stormceptor*[®] is also embossed on the top of the insert upstream of the weir as shown in **Figure 3**.



Figure 4

The specific Stormceptor EF/EFO model number is identified on the top of the aluminum Drop Pipe as shown in **Figure 4**. The unit serial number is identified on the top of the insert upstream of the weir as shown in **Figure 4**.



INSPECTION AND MAINTENANCE

It is very important to perform regular inspection and maintenance. Regular inspection and maintenance ensures maximum operation efficiency, keeps maintenance costs low, and provides continued of natural waterways.

Quick Reference

- Typical inspection and maintenance is performed from grade
- Remove manhole cover(s) or inlet grate to access insert and lower chamber NOTE: EF4/EFO4 requires the removal of a flow deflector beneath inlet grate
- Use Sludge Judge[®] or similar sediment probe to check sediment depth through the **outlet riser**
- Oil dipstick can be inserted through the oil inspection pipe
- Visually inspect the **insert** for debris, remove debris if present
- Visually inspect the drop pipe opening for blockage, remove blockage if present
- Visually inspect insert and weir for damage, schedule repair if needed
- Insert vacuum hose and jetting wand through the outlet riser and extract sediment and floatables
- Replace flow deflector (EF4/EFO4), inlet grate, and cover(s)
- NOTE: If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess pollutant accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- o Inspections should also be performed immediately after oil, fuel, or other chemical spills.

What equipment is typically required for inspection?

- o Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- o Flashlight
- o Camera
- Data log / Inspection Report
- Safety cones and caution tape
- o Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

When is maintenance cleaning needed?

- If the post-construction inspection indicates presence of construction sediment of a depth greater than a few inches, maintenance is recommended at that time.
- For optimum performance and normal operation the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, see **Table 3**.
- o Maintain immediately after an oil, fuel, or other chemical spill.

Table 3						
Recommended Sediment Depths for						
Maintenance Service*						
MODEL	Sediment Depth					
MODEL	(in/mm)					
EF4 / EFO4	8 / 203					
EF6 / EFO6	12 /305					
EF8 / EFO8	24 / 610					
EF10 / EFO10	24 / 610					
EF12 / EF012	24 / 610					

* Based on a minimum distance of 40 inches (1,016 mm) from bottom of outlet riser to top of sediment bed

The frequency of inspection and maintenance may need to be adjusted based on site conditions to ensure the unit is operating and performing as intended. Maintenance costs will vary based on the size of the unit, site conditions, local requirements, disposal costs, and transportation distance.

What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- o Flashlight
- o Camera
- Data log / Inspection Report
- o Safety cones
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required (adhere to all OSHA / CCOSH standards)

What conditions can compromise Stormceptor performance?

- Presence of construction sediment and debris in the unit prior to activation
- Excessive sediment depth beyond the recommended maintenance depth
- o Oil spill in excess of the oil storage capacity
- Clogging or restriction of the drop pipe inlet opening with debris
- o Downstream blockage that results in a backwater condition

Maintenance Procedures

- Maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is maintained from grade through a standard surface manhole access cover or inlet grate.
- In the case of submerged or tailwater conditions, extra measures are likely required, such as plugging the inlet and outlet pipes prior to conducting maintenance.
- Inspection and maintenance of upstream catch basins and other stormwater conveyance structures is also recommended to extend the time between future maintenance cycles.



- Sediment depth inspections are performed through the **Outlet Riser** and oil presence can be determined through the **Oil Inspection Pipe**.
- Oil presence and sediment depth are determined by inserting a Sludge Judge[®] or measuring stick to quantify the pollutant depths.



- -
- Visually inspect the insert, weir, and drop pipe inlet opening to ensure there is no damage or blockage.
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

• When maintenance is required, a standard vacuum truck is used to remove the pollutants from the lower chamber of the unit through the **Outlet Riser**.



Figure 9



NOTE: The Outlet Riser Vane is durable and flexible and designed to allow maintenance activities with minimal, if any, interference.

Removable Flow Deflector

• Top grated inlets for the Stormceptor EF4/EFO4 model requires a removable flow deflector staged underneath a 24-inch x 24-inch (600 mm x 600 mm) square inlet grate to direct flow towards the inlet side of the insert, and avoid flow and pollutants from entering the outlet side of the insert from grade. The EF6/EFO6 and larger models do not require the flow deflector.





Figure 11

Hydrocarbon Spills

Stormceptor is often installed on high pollutant load hotspot sites with vehicular traffic where hydrocarbon spill potential exists. Should a spill occur, or presence of oil be identified within a Stormceptor EF/EFO, it should be cleaned immediately by a licensed liquid waste hauler.

Disposal

Maintenance providers are to follow all federal, state/ provincial, and local requirements for disposal of material.

Oil Sheens

When oil is present in stormwater runoff, a sheen may be noticeable at the Stormceptor outlet. An oil rainbow or sheen can be noticeable at very low oil concentrations (< 10 mg/L). Despite the appearance of a sheen, Stormceptor EF/EFO may still be functioning as intended.

Oil Level Alarm

To mitigate spill liability with 24/7 detection, an electronic monitoring system can be employed to trigger a visual and audible alarm when a pre-set level of oil is captured within the lower chamber or when an oil spill occurs. The oil level alarm is available as an optional feature to include with Stormceptor EF/EFO as shown in **Figure 11**. For additional details about the Oil Level Alarm please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-systems.



OIL ALARM PROBE INSTALLED
ON DOWNSTREAM SIDE OF
WEIR.

Figure 12

Replacement Parts

Stormceptor has no moving parts to wear out. Therefore inspection and maintenance activities are generally focused on pollutant removal. Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. However, if replacement parts are necessary, they may be purchased by contacting your local Stormceptor representative.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit:

Recommended Sediment Maintenance Depth: _____

DATE	SEDIMENT DEPTH (inch or mm)	OIL DEPTH (inch or mm)	SERVICE REQUIRED (Yes / No)	MAINTENANCE PERFORMED	MAINTENANCE PROVIDER	COMMENTS

Other Comments:

Contact Information

Questions regarding Stormceptor EF/EFO can be addressed by contacting your local Stormceptor representative or by visiting our website at <u>www.stormceptor.com</u>.

Imbrium Systems Inc. & Imbrium Systems LLC

Canada	1-416-960-9900 / 1-800-565-4801
United States	1-301-279-8827 / 1-888-279-8826
International	+1-416-960-9900 / +1-301-279-8827

www.imbriumsystems.com www.stormceptor.com info@imbriumsystems.com

APPENDIX B

MIDUSS Modelling Files

MIDUSS Hydrologic Modelling

Pre-Development

			MIDUSS Output	>"
			MIDUSS version	Version 2.25 rev. 467"
			MIDUSS created	Julv 6, 2008"
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			2021-0713-10\New SWM	Files\MIDUSS modelling\Pre-Development"
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			Company	WalterFedy"
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	51	5 999	Time Sten"	
		240 000	Max Storm length"	
		1500 000	Max Hydrograph"	
	32	ST	ORM Chicago storm"	
	52	1	Chicago storm"	
		119 205	Coefficient A"	
		449.209	Constant B"	
		0.000	Exponent C"	
		0.780	Exponence C Enaction P"	
		240 000	Praction K	
		240.000	Duration Time step multipliep"	
		1.000 Ma	vinum intensity	125 797 mm/hn"
		Ma	aximum incensicy	123.707 IIIII/III ⁻
			001 ueptii	25.000 IIIII
	22	6	UUTIYU HYUROgraph exte	ISTON USED IN CHIS FILE
	33	۲ ۲	Triangulan SCS"	
		1	Fridigular SCS	
		1	Equal tengen	
		102	SCS method	
		70 000	External drainage area e	ast of Site
		70.000	% Impervious	
		0.510	lotal Area	
		49.000	Flow length"	
		2.500	Overland Slope"	
		0.153	Pervious Area	
		49.000	Pervious length"	
		2.500	Pervious slope"	
		0.35/	Impervious Area"	
		49.000	Impervious length"	
		2.500	Impervious slope"	
		0.250	Pervious Manning 'n'"	
		75.000	Pervious SCS Curve No."	
"		0.108	Pervious Runoff coeffici	ent"
		0.100	Pervious Ia/S coefficien	t"
"		8.467	Pervious Initial abstrac	tion"
"		0.015	Impervious Manning 'n'"	
		98.000	Impervious SCS Curve No.	
"		0.801	Impervious Runoff coeffi	cient"
"		0.100	Impervious Ia/S coeffici	ent"
"		0.518	Impervious Initial abstr	action"

"		0.069	0.000	0.000	0.000 0	.m/sec"	
"		Catchment 102	Pe	ervious	Impervious	Total Area	п
"		Surface Area	0.	153	0.357	0.510	hectare"
"		Time of concentra	ation 39	.467	2.666	4.677	minutes"
"		Time to Centroid	19	7.740	120.862	125.063	minutes"
"		Rainfall depth	25	.000	25.000	25.000	mm"
"		Rainfall volume	38	8.25	89.25	127.50	c.m"
"		Rainfall losses	22	2.299	4.971	10.170	mm"
"		Runoff depth	2.	701	20.029	14.830	mm"
"		Runoff volume	4.	13	71.50	75.64	c.m"
"		Runoff coefficie	nt 0.	108	0.801	0.593	
"		Maximum flow	0.	001	0.069	0.069	c.m/sec"
"	40	HYDROGRAPH Add R	unoff "				
"	4	Add Runoff "					
"		0.069	0.069	0.000	0.000"		
"	40	HYDROGRAPH Copy	to Outflo	w"			
"	8	Copy to Outfle	ow"				
"		0.069	0.069	0.069	0.000"		
"	40	HYDROGRAPH Next	link "				
"	5	Next link "					
"		0.069	0.069	0.069	0.000"		
"	33	CATCHMENT 101"					
"	1	Triangular SC	S"				
"	1	Equal length"					
"	1	SCS method"					
"	101	Existing site	conditio	ons"			
"	0.000	% Impervious"					
"	4.040	Total Area"					
"	60.000	Flow length"					
"	3.000	Overland Slope	e"				
"	4.040	Pervious Area	11				
"	60.000	Pervious leng	th"				
"	3.000	Pervious slop	e"				
"	0.000	Impervious Are	ea"				
"	60.000	Impervious le	ngth"				
"	3.000	Impervious slo	ope"				
"	0.250	Pervious Mann:	ing 'n'"				
"	75.000	Pervious SCS (Curve No.				
"	0.108	Pervious Runo [.]	ff coeffi	.cient"			
"	0.100	Pervious Ia/S	coeffici	.ent"			
"	8.467	Pervious Init:	ial abstr	action"			
"	0.015	Impervious Ma	nning 'n'	"			
"	98.000	Impervious SC	S Curve N	lo."			
"	0.000	Impervious Ru	noff coef	ficient"			
"	0.100	Impervious Ia	/S coeffi	.cient"			
"	0.518	Impervious In:	itial abs	traction"			
"		0.016	0.069	0.069	0.000 0	.m/sec"	
"		Catchment 101	Pe	ervious	Impervious	Total Area	
"		Surface Area	4.	040	0.000	4.040	hectare"
"		Time of concentra	ation 42	2.194	2.851	42.194	minutes"

п	Time to Centroid	201.895	0.000	201.89	5 minutes"
п	Rainfall depth	25.000	25.000	25.000	mm"
	Rainfall volume	1010.00	0.00	1010.0	0 c.m"
	Rainfall losses	22.299	25.000	22.299	mm"
	Runoff depth	2.701	0.000	2.701	mm"
	Runoff volume	109.11	0.00	109.11	c.m"
	Runoff coefficient	0.108	0.000	0.108	п
	Maximum flow	0.016	0.000	0.016	c.m/sec"
" 40	HYDROGRAPH Add Runoff	п			
"	4 Add Runoff "				
"	0.016 0.07	71 0.069	0.000"		
" 40	HYDROGRAPH Copy to Out	tflow"			
"	8 Copy to Outflow"				
"	0.016 0.07	71 0.071	0.000"		
" 38	START/RE-START TOTALS	101"			
"	3 Runoff Totals on EX	KIT"			
"	Total Catchment area		4	.550	hectare"
"	Total Impervious area		e	.357	hectare"
"	Total % impervious		7	.846"	
" 19	EXIT"				

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"			Output filename:	2 Year Pre-Development.out"
			Licensee name:	Circe Mahoney"
			Company	WalterFedy"
			Date & Time last used:	2024-05-02 at 8:09:35 AM"
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		5.000	Time Step"	
		240,000	Max. Storm length"	
		1500,000	Max, Hydrograph"	
	32	ST	ORM Chicago storm"	
	52	1	Chicago storm"	
		404 100	Coefficient A"	
		404.100	Constant B"	
		0.000	Exponent C"	
		0.099	Exponence C Enaction R"	
		240 000	Praction K	
		240.000	Time stop multipliop"	
		1.000 M-	vinum intoncity	109 /20 mm/hn"
		Ma	tal danth	120.450 IIIII/ III*
			002byd Uydnograph oyt	55.050 mm
	22	0	UUZIIYU HYUROgraph exte	ension used in this file
	22	1	Triangulan SCS"	
		1	Faual longth"	
		1	Equal tengen	
		102	SCS method	ant of Cito"
		70,000	External urainage area e	east of sile
		70.000	% Impervious	
		0.510	lotal Area	
		49.000	Flow length"	
		2.500	Overland Slope"	
		0.153	Pervious Area"	
		49.000	Pervious length"	
		2.500	Pervious slope"	
		0.357	Impervious Area"	
		49.000	Impervious length"	
"		2.500	Impervious slope"	
"		0.250	Pervious Manning 'n'"	
"		75.000	Pervious SCS Curve No."	
"		0.181	Pervious Runoff coeffic:	ient"
"		0.100	Pervious Ia/S coefficier	it"
"		8.467	Pervious Initial abstra	ction"
"		0.015	Impervious Manning 'n'"	
"		98.000	Impervious SCS Curve No	, II ,
"		0.850	Impervious Runoff coeff:	icient"
"		0.100	Impervious Ia/S coeffic:	ient"
"		0.518	Impervious Initial abst	raction"

"	0.081	0.000	0.000	0.000 0	.m/sec"	
"	Catchment 102	F	Pervious	Impervious	Total Area	"
"	Surface Area	(0.153	0.357	0.510	hectare"
"	Time of concentra	ation 2	29.058	2.592	4.808	minutes"
"	Time to Centroid	-	184.544	122.778	127.949	minutes"
"	Rainfall depth	3	35.058	35.058	35.058	mm"
"	Rainfall volume	-	53.64	125.16	178.79	c.m"
"	Rainfall losses	2	28.706	5.266	12.298	mm"
"	Runoff depth	e	5.351	29.791	22.759	mm"
"	Runoff volume	G	9.72	106.36	116.07	c.m"
"	Runoff coefficier	nt (0.181	0.850	0.649	
"	Maximum flow	(0.002	0.081	0.081	c.m/sec"
"	40 HYDROGRAPH Add Ru	unoff "				
"	4 Add Runoff "					
"	0.081	0.081	0.000	0.000"		
"	40 HYDROGRAPH Copy t	o Outf	low"			
"	8 Copy to Outflo	w"				
"	0.081	0.081	0.081	0.000"		
"	40 HYDROGRAPH Next]	link "				
"	5 Next link "					
"	0.081	0.081	0.081	0.000"		
"	33 CATCHMENT 101"					
"	1 Triangular SCS	5"				
"	1 Equal length"					
"	1 SCS method"					
"	101 Existing site	condit	ions"			
"	0.000 % Impervious"					
"	4.040 Total Area"					
"	60.000 Flow length"					
"	3.000 Overland Slope	<u>'</u> "				
"	4.040 Pervious Area"					
"	60.000 Pervious lengt	:h"				
"	3.000 Pervious slope	2"				
"	0.000 Impervious Are	ea"				
"	60.000 Impervious ler	ngth"				
"	3.000 Impervious slo	ope"				
"	0.250 Pervious Manni	ing 'n''	11			
"	75.000 Pervious SCS (Curve No	o."			
"	0.181 Pervious Runof	f coef	ficient"			
"	0.100 Pervious Ia/S	coeffic	cient"			
"	8.467 Pervious Initi	ial abst	traction"			
"	0.015 Impervious Mar	nning 'r	n'"			
"	98.000 Impervious SCS	5 Curve	No."			
"	0.000 Impervious Rur	noff coe	efficient"			
"	0.100 Impervious Ia/	'S coeft	ficient"			
"	0.518 Impervious Ini	itial al	ostraction"	I		
"	0.044	0.081	0.081	0.000 0	.m/sec"	
"	Catchment 101	F	Pervious	Impervious	Total Area	
"	Surface Area	4	4.040	0.000	4.040	hectare"
"	Time of concentra	ation 3	31.066	2.772	31.066	minutes"

	Time to Centroid	187.575	123.121	187.57	5 minutes"
п	Rainfall depth	35.058	35.058	35.058	mm"
п	Rainfall volume	1416.32	0.00	1416.3	2 c.m"
"	Rainfall losses	28.705	5.320	28.704	mm"
"	Runoff depth	6.353	29.737	6.353	mm"
"	Runoff volume	256.66	0.00	256.66	c.m"
п	Runoff coefficient	0.181	0.000	0.181	"
"	Maximum flow	0.044	0.000	0.044	c.m/sec"
" 40	HYDROGRAPH Add Runoff	п			
п	4 Add Runoff "				
	0.044 0.0	86 0.081	0.000"		
" 40	HYDROGRAPH Copy to Ou	tflow"			
п	8 Copy to Outflow"				
	0.044 0.0	86 0.086	0.000"		
" 38	START/RE-START TOTALS	101"			
	3 Runoff Totals on E	XIT"			
	Total Catchment area		4	.550	hectare"
"	Total Impervious area		0	.357	hectare"
"	Total % impervious		7	.846"	
" 19	EXIT"				

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		MIDUSS created	July 6, 2008"
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		2021-0713-10\New SWM	Files\MIDUSS modelling\Pre-Development"
		Output filename:	5 Year Pre-Development.out"
		Licensee name:	Circe Mahoney"
		Company	WalterFedy"
		Date & Time last used:	2024-05-02 at 8:12:55 AM"
 31	тт	ME PARAMETERS"	
 51	5.000	Time Step"	
	240,000	Max. Storm length"	
	1500.000	Max. Hydrograph"	
 32	ST	ORM Chicago storm"	
 52	1	Chicago storm"	
	535 400	Coefficient A"	
	0 000 0 000	Constant B"	
	0.000	Exponent C"	
	0.055	Exponence C Eraction R"	
	240 000	Duration"	
	1 000	Time sten multinlier"	
	4.000 Ma	vinum intensity	170 160 mm/hr"
	Tc	tal denth	46 448 mm"
	6	005hvd Hydrogranh ext	ansion used in this file"
 22	CA CA	TCHMENT 102"	
 55	1	Triangular SCS"	
	1	Faual length"	
	1	SCS method"	
	102	External drainage area	ast of Site"
	70 000	% Impervious"	
	0.000	Total Area"	
	10 000	Flow length"	
	2 500	Ovenland Slope"	
	2.500	Popyious Apos"	
	10 000	Penvious length"	
	49.000	Pervious tengen	
	2.300	Tmponyious Apos"	
	40 000	Impervious Area	
	49.000	Impervious rengen	
	2.500	Denvious Monning 'n'"	
	0.250	Pervious Maining II	
	/5.000	Pervious SCS Curve No.	iont"
	0.255	Pervious Runott Coettic.	1011L
	0.100	Pervious 1a/S coefficient	ll ation"
	ð.46/	Terry Tous Initial abstrac	
	00 000	Impervious Manning h	n
	98.000	Impervious SUS Curve No.	
	0.881	Impervious Kunott Coett:	LCIENC Sout"
	0.100	Impervious Ia/S coettic:	Lent
	0.518	Impervious Initial absti	raction

"	0.116	0.000	0.000	0.000 0	.m/sec"	
"	Catchment 102	Pe	ervious	Impervious	Total Area	"
"	Surface Area	0.	.153	0.357	0.510	hectare"
"	Time of concentrat	ion 21	L.673	2.293	4.416	minutes"
"	Time to Centroid	17	71.053	120.950	126.439	minutes"
"	Rainfall depth	46	5.448	46.448	46.448	mm"
"	Rainfall volume	71	L.07	165.82	236.89	c.m"
"	Rainfall losses	34	1.695	5.507	14.263	mm"
"	Runoff depth	11	L.754	40.942	32.185	mm"
"	Runoff volume	17	7.98	146.16	164.15	c.m"
"	Runoff coefficient	. 0.	. 253	0.881	0.693	
"	Maximum flow	0.	.004	0.115	0.116	c.m/sec"
"	40 HYDROGRAPH Add Rur	off "				
"	4 Add Runoff "					
"	0.116	0.116	0.000	0.000"		
"	40 HYDROGRAPH Copy to	0utflo	ow"			
"	8 Copy to Outflow	ı"				
"	0.116	0.116	0.116	0.000"		
"	40 HYDROGRAPH Next li	.nk "				
"	5 Next link "					
"	0.116	0.116	0.116	0.000"		
"	33 CATCHMENT 101"					
"	1 Triangular SCS"	I				
"	1 Equal length"					
"	1 SCS method"					
"	101 Existing site o	onditio	ons"			
"	0.000 % Impervious"					
"	4.040 Total Area"					
"	60.000 Flow length"					
"	3.000 Overland Slope"	1				
"	4.040 Pervious Area"					
"	60.000 Pervious length	า"				
"	3.000 Pervious slope"	I				
"	0.000 Impervious Area	a"				
	60.000 Impervious leng	gth"				
	3.000 Impervious slop	e"				
	0.250 Pervious Mannir	ng 'n'"				
	75.000 Pervious SCS Cu	irve No.				
	0.253 Pervious Runoff	· coeffi	icient"			
	0.100 Pervious Ia/S o	coettici	lent"			
	8.467 Pervious Initia	il abstr	raction"			
	0.015 Impervious Manr	ning 'n'				
	98.000 Impervious SCS	Curve N				
	0.000 Impervious Runc	off coef	fficient"			
	0.100 Impervious Ia/S	coetti	LCIENT"			
	0.518 Impervious Init	al abs	straction"	0 000		
	0.114 Cotoburgati 101	0.110	0.116	0.000 0	.m/sec	
	Catchment 101	Pe	ervious	impervious	IOTAL Area	h
	Surtace Area	4.	.040	0.000	4.040	nectare"
	lime of concentrat	ion 23	3.1/0	2.451	23.1/0	minutes"

"		Time to Centroid	173.417	121.267	173.41	7 minutes"
"		Rainfall depth	46.448	46.448	46.448	mm"
"		Rainfall volume	1876.51	0.00	1876.5	2 c.m"
"		Rainfall losses	34.694	5.487	34.694	. mm''
"		Runoff depth	11.754	40.962	11.754	. mm"
"		Runoff volume	474.87	0.00	474.87	c.m"
"		Runoff coefficient	0.253	0.000	0.253	п
"		Maximum flow	0.114	0.000	0.114	c.m/sec"
" 4	40	HYDROGRAPH Add Run	off "			
"		4 Add Runoff "				
"		0.114	0.136 0.11	6 0.000'	•	
" 4	40	HYDROGRAPH Copy to	Outflow"			
"		8 Copy to Outflow	"			
"		0.114	0.136 0.13	6 0.000'	•	
"	38	START/RE-START TOT	ALS 101"			
"		3 Runoff Totals o	n EXIT"			
"		Total Catchment ar	ea	2	1.550	hectare"
"		Total Impervious a	rea	6	9.357	hectare"
"		Total % impervious		7	7.846"	
"	19	EXIT"				

"			MIDUSS Output	·····>"
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"			MIDUSS created	July 6, 2008"
"		10	Units used:	ie METRIC"
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			Company	WalterFedy"
			Date & Time last used:	2024-05-02 at 8:15:55 AM"
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	-	5,000	Time Step"	
		240,000	Max. Storm length"	
		1500.000	Max. Hydrograph"	
	32	ST	ORM Chicago storm"	
	52	1	Chicago storm"	
		622 800	Coefficient A"	
		022.000	Constant B"	
		0.000	Exponent C"	
		0.000	Exponence C Eraction R"	
		210 000	Duration"	
		1 000	Time sten multinlier"	
		M⊃	vinum intensity	107 037 mm/hr"
		То	tal denth	5/ 031 mm"
		6	010 Hydrograph ovt	onsion used in this file"
	22	С Л	TCHMENT 102"	
	22	1	Triangulan SCS"	
		1	Faual length"	
		1	SCS mothod"	
		102	External drainage area	and of Sita"
		70 000	% Impopyious"	
		70.000	% Impervious	
		40.000	Total Area	
		49.000	Flow length Overland Slene"	
		2.500	Depuique Apaz"	
		0.155	Pervious Area	
		49.000	Pervious length	
		2.500	Pervious slope"	
		0.357	Impervious Area	
		49.000	Impervious length	
		2.500	Impervious slope	
		0.250	Pervious Manning 'n'"	
		/5.000	Pervious SCS Curve No."	·
		0.295	Pervious Runott coettic:	lent
		0.100	Pervious la/S coefficier	
		8.467	Pervious Initial abstrac	ction"
		0.015	Impervious Manning 'n'"	
		98.000	Impervious SCS Curve No.	,
		0.894	Impervious Runott coeff	LClent
		0.100	Impervious Ia/S coeffic	Lent"
"		0.518	Impervious Initial abstr	raction"

"	0.139	0.000	0.000	0.000 0	.m/sec"	
"	Catchment 102	P	ervious	Impervious	Total Area	"
"	Surface Area	0	.153	0.357	0.510	hectare"
"	Time of concentrat	ion 1	8.894	2.149	4.220	minutes"
"	Time to Centroid	1	65.491	120.122	125.733	minutes"
"	Rainfall depth	54	4.031	54.031	54.031	mm"
"	Rainfall volume	8	2.67	192.89	275.56	c.m"
"	Rainfall losses	3	8.116	5.707	15.429	mm"
"	Runoff depth	1	5.915	48.324	38.601	mm"
"	Runoff volume	24	4.35	172.52	196.87	c.m"
"	Runoff coefficient	: 0	.295	0.894	0.714	
"	Maximum flow	0	.007	0.138	0.139	c.m/sec"
"	40 HYDROGRAPH Add Rur	noff "				
"	4 Add Runoff "					
"	0.139	0.139	0.000	0.000"		
"	40 HYDROGRAPH Copy to	0utfl	ow"			
"	8 Copy to Outflow	ı"				
"	0.139	0.139	0.139	0.000"		
"	40 HYDROGRAPH Next li	.nk "				
"	5 Next link "					
"	0.139	0.139	0.139	0.000"		
"	33 CATCHMENT 101"					
"	1 Triangular SCS"	I I				
"	1 Equal length"					
"	1 SCS method"					
"	101 Existing site o	onditi	ons"			
"	0.000 % Impervious"					
"	4.040 Total Area"					
"	60.000 Flow length"					
"	3.000 Overland Slope	I				
"	4.040 Pervious Area"					
"	60.000 Pervious length	า"				
"	3.000 Pervious slope"	I				
"	0.000 Impervious Area	a"				
"	60.000 Impervious leng	gth"				
"	3.000 Impervious slop	e"				
"	0.250 Pervious Mannir	ng 'n'"				
"	75.000 Pervious SCS Cu	irve No	•"			
"	0.295 Pervious Runoff	coeff	icient"			
"	0.100 Pervious Ia/S o	oeffic	ient"			
"	8.467 Pervious Initia	al abst	raction"			
"	0.015 Impervious Manr	ning 'n				
"	98.000 Impervious SCS	Curve	No."			
"	0.000 Impervious Runc	off coe	fficient"			
"	0.100 Impervious Ia/S	coeff	icient"			
"	0.518 Impervious Init	ial ab	straction"			
"	0.170	0.139	0.139	0.000 0	.m/sec"	
"	Catchment 101	P	ervious	Impervious	Total Area	"
"	Surface Area	4	.040	0.000	4.040	hectare"
"	Time of concentrat	ion 2	0.199	2.298	20.199	minutes"

"	Time to Centroid	167.558	120.367	167.55	8 minutes"
"	Rainfall depth	54.031	54.031	54.031	mm"
"	Rainfall volume	2182.84	0.00	2182.84	4 c.m"
"	Rainfall losses	38.099	5.636	38.099	mm"
"	Runoff depth	15.932	48.394	15.932	mm"
"	Runoff volume	643.64	0.00	643.64	c.m"
"	Runoff coefficient	0.295	0.000	0.295	"
"	Maximum flow	0.170	0.000	0.170	c.m/sec"
" 40	HYDROGRAPH Add Runoff	п			
"	4 Add Runoff "				
"	0.170 0.19	97 0.139	0.000"		
" 40	HYDROGRAPH Copy to Out	tflow"			
"	8 Copy to Outflow"				
"	0.170 0.19	97 0.197	0.000"		
" 38	START/RE-START TOTALS	101"			
"	3 Runoff Totals on EX	KIT"			
"	Total Catchment area		4	.550	hectare"
"	Total Impervious area		0	.357	hectare"
"	Total % impervious		7	.846"	
" 19	EXIT"				

"			MIDUSS Output	>"
"			MIDUSS version	Version 2.25 rev. 467"
"			MIDUSS created	July 6, 2008"
"		10	Units used:	ie METRIC"
"			Job folder:	C:\Users\cmahoney\Documents\2024 Work\"
"			2021-0713-10\New SWM	Files\MIDUSS modelling\Pre-Development"
"			Output filename:	25 Year Pre-Development.out"
			Licensee name:	Circe Mahonev"
			Company	WalterFedy"
			Date & Time last used:	2024-05-02 at 8:18:40 AM"
	31	TI	ME PARAMETERS"	
	-	5.000	Time Step"	
		240.000	Max. Storm length"	
		1500.000	Max. Hydrograph"	
	32	ST	ORM Chicago storm"	
	52	1	Chicago storm"	
		731 300	Coefficient A"	
		0 000	Constant B"	
		0.000	Exponent C"	
		0.000	Exponence C Enaction R"	
		240 000	Praction "	
		1 000	Time step multipliep"	
		1.000	vinum intensity	222 421 mm/hn"
		га	tal dopth	232.421 IIIII/III
		10 C	O2Ebyd Uydnograph oyt	05.444 mm
	22	6	TCUMENT 102"	ension used in this file
	55		Triangulan SCS"	
		1	Triangular SCS	
		1	Equal length	
		102	SCS metrica	
		70 000	External drainage area e	east of Site
		70.000	% Impervious	
		0.510	lotal Area	
		49.000	Flow length"	
		2.500	Overland Slope"	
		0.153	Pervious Area"	
		49.000	Pervious length"	
		2.500	Pervious slope"	
		0.357	Impervious Area"	
		49.000	Impervious length"	
		2.500	Impervious slope"	
		0.250	Pervious Manning 'n'"	
		75.000	Pervious SCS Curve No."	
"		0.340	Pervious Runoff coeffic:	ient"
"		0.100	Pervious Ia/S coefficier	nt"
		8.467	Pervious Initial abstrac	ction"
"		0.015	Impervious Manning 'n'"	
		98.000	Impervious SCS Curve No	," •
"		0.906	Impervious Runoff coeff:	icient"
"		0.100	Impervious Ia/S coeffic:	ient"
"		0.518	Impervious Initial abst	raction"

"	0.169	0.000	0.000	0.000 0	.m/sec"	
"	Catchment 102		Pervious	Impervious	Total Area	"
"	Surface Area		0.153	0.357	0.510	hectare"
"	Time of concentra	ation	16.508	2.009	4.021	minutes"
"	Time to Centroid		160.469	119.364	125.067	minutes"
"	Rainfall depth		63.444	63.444	63.444	mm"
"	Rainfall volume		97.07	226.49	323.56	c.m"
"	Rainfall losses		41.846	5.985	16.743	mm"
"	Runoff depth		21.598	57.459	46.701	mm"
"	Runoff volume		33.04	205.13	238.17	c.m"
"	Runoff coefficier	nt	0.340	0.906	0.736	"
"	Maximum flow		0.011	0.167	0.169	c.m/sec"
"	40 HYDROGRAPH Add Ru	unoff "				
"	4 Add Runoff "					
"	0.169	0.169	0.000	0.000"		
"	40 HYDROGRAPH Copy 1	to Outf	low"			
"	8 Copy to Outflo	ow"				
"	0.169	0.169	0.169	0.000"		
"	40 HYDROGRAPH Next	link "				
"	5 Next link "					
"	0.169	0.169	0.169	0.000"		
"	33 CATCHMENT 101"					
"	1 Triangular SCS	5"				
"	1 Equal length"					
"	1 SCS method"					
"	101 Existing site	condit	ions"			
"	0.000 % Impervious"					
"	4.040 Total Area"					
"	60.000 Flow length"					
"	3.000 Overland Slope	2"				
"	4.040 Pervious Area'	•				
"	60.000 Pervious lengt	th"				
"	3.000 Pervious slope	ē				
"	0.000 Impervious Are	ea"				
"	60.000 Impervious ler	ngth"				
	3.000 Impervious slo	ope"				
	0.250 Pervious Mann	ing 'n'				
	75.000 Pervious SCS (Curve N	0."			
	0.341 Pervious Runo	ff coef	ficient"			
	0.100 Pervious Ia/S	coetti	cient"			
	8.467 Pervious Init:	ial abs	traction"			
	0.015 Impervious Mar	nning '	n'"			
	98.000 Impervious SCS	s Curve	NO."			
	0.000 Impervious Rur	10++ CO	etticient"			
	0.100 Impervious Ia	'S coef	ticient"			
	0.518 Impervious In	Itial a	pstraction"	0.000		
	0.261	0.169	0.169	0.000 0	.m/sec"	
	Catchment 101		Pervious	Impervious	Iotal Area	
	Surtace Area		4.040	0.000	4.040	nectare"
	lime of concentra	ation	1/.649	2.148	17.649	minutes"

	Time to Centroid	162.240	119.532	162.24	0 minutes"
п	Rainfall depth	63.444	63.444	63.444	mm"
п	Rainfall volume	2563.12	0.00	2563.12	2 c.m"
п	Rainfall losses	41.807	5.860	41.807	mm"
п	Runoff depth	21.637	57.583	21.637	mm"
п	Runoff volume	874.12	0.00	874.12	c.m"
п	Runoff coefficient	0.341	0.000	0.341	"
п	Maximum flow	0.261	0.000	0.261	c.m/sec"
" 40	HYDROGRAPH Add Runoff	п			
	4 Add Runoff "				
	0.261 0.30	0.169	0.000"		
" 40	HYDROGRAPH Copy to Ou [.]	tflow"			
	8 Copy to Outflow"				
"	0.261 0.30	0.303	0.000"		
" 38	START/RE-START TOTALS	101"			
"	3 Runoff Totals on EX	XIT"			
"	Total Catchment area		4	.550	hectare"
"	Total Impervious area		0	.357	hectare"
"	Total % impervious		7	.846"	
" 19	EXIT"				

"			MIDUSS Output	·····>"
"			MIDUSS version	Version 2.25 rev. 467"
"			MIDUSS created	July 6, 2008"
"		10	Units used:	ie METRIC"
"			Job folder:	C:\Users\cmahoney\Documents\2024 Work\"
"			2021-0713-10\New SWM	Files\MIDUSS modelling\Pre-Development"
"			Output filename:	50 Year Pre-Development.out"
			Licensee name:	Circe Mahoney"
			Company	WalterFedy"
			Date & Time last used:	2024-05-02 at 8:22:26 AM"
	31	TI	ME PARAMETERS"	
	-	5.000	Time Step"	
		240.000	Max. Storm length"	
		1500.000	Max. Hydrograph"	
	32	ST	ORM Chicago storm"	
	52	1	Chicago storm"	
		811 800	Coefficient A"	
		0 000	Constant B"	
		0.000	Exponent C"	
		0.000	Exponence C Eraction B"	
		210 000	Duration"	
		1 000	Time sten multinlier"	
		1.000 Ma	vinum intensity	258 005 mm/hr"
		Ma To	tal dopth	230.005 mm"
		6	050 hyd Hydnograph ovt	10.427 mm
	22	о С А	TCHMENT 102"	
	55	1	Triangulan SCS"	
		1	Equal length"	
		1	SCS mothod"	
		102	External drainage area	and of Sita"
		70 000	% Impopyious"	
		70.000	% impervious	
		40.000	Total Area	
		49.000	Flow length Overland Clene"	
		2.500	Overland Slope	
		0.155	Pervious Area	
		49.000	Pervious length	
		2.500	Pervious slope"	
		0.357	Impervious Area	
		49.000	Impervious length"	
		2.500	Impervious slope"	
		0.250	Pervious Manning 'n'"	
		/5.000	Pervious SCS Curve No."	
		0.3/1	Pervious Runott coettic:	lent
		0.100	Pervious la/S coefficier	
		8.467	Pervious Initial abstrac	ction"
		0.015	Impervious Manning 'n'"	
		98.000	Impervious SCS Curve No.	
		0.913	Impervious Runott coeff	LC1ent"
		0.100	Impervious Ia/S coeffic	lent"
"		0.518	Impervious Initial abstr	raction"

"	0.191	0.000	0.000	0.000 c	.m/sec"	
"	Catchment 102	Pe	rvious	Impervious	Total Area	"
"	Surface Area	0.	153	0.357	0.510	hectare"
"	Time of concentrat	ion 15	.196	1.923	3.894	minutes"
"	Time to Centroid	15	7.490	118.852	124.589	minutes"
"	Rainfall depth	70	.427	70.427	70.427	mm"
"	Rainfall volume	10	7.75	251.43	359.18	c.m"
"	Rainfall losses	44	.269	6.139	17.578	mm"
"	Runoff depth	26	.159	64.289	52.850	mm"
"	Runoff volume	40	.02	229.51	269.53	c.m"
"	Runoff coefficient	. 0.	371	0.913	0.750	
"	Maximum flow	0.	015	0.188	0.191	c.m/sec"
"	40 HYDROGRAPH Add Rur	off "				
"	4 Add Runoff "					
"	0.191	0.191	0.000	0.000"		
"	40 HYDROGRAPH Copy to	0utflo	w"			
"	8 Copy to Outflow	<i>ı</i> "				
"	0.191	0.191	0.191	0.000"		
"	40 HYDROGRAPH Next li	.nk "				
"	5 Next link "					
"	0.191	0.191	0.191	0.000"		
"	33 CATCHMENT 101"					
"	1 Triangular SCS"	I				
"	1 Equal length"					
"	1 SCS method"					
"	101 Existing site o	onditio	ns"			
"	0.000 % Impervious"					
"	4.040 Total Area"					
"	60.000 Flow length"					
"	3.000 Overland Slope"	1				
"	4.040 Pervious Area"					
"	60.000 Pervious length	า"				
"	3.000 Pervious slope"	I				
"	0.000 Impervious Area	a"				
	60.000 Impervious leng	gth"				
	3.000 Impervious slop	e"				
	0.250 Pervious Mannir	ng 'n'"				
	75.000 Pervious SCS Cu	irve No.				
	0.371 Pervious Runoff	· coeffi	cient"			
	0.100 Pervious Ia/S o	coettici	ent"			
	8.467 Pervious Initia	il abstr	action"			
	0.015 Impervious Manr	ning 'n'				
	98.000 Impervious SCS	Curve N	0."			
	0.000 Impervious Rund	ott coet	ficient"			
	0.100 Impervious Ia/S	coetti	cient"			
	0.518 Impervious Init	ial abs	traction"	0 000		
	0.3/4 Catalana 101	0.191	0.191	U.UUU C	.m/sec	
	Catchment 101	Pe	rvious	impervious	IOTAL Area	haats: "
	Surtace Area	4.	040	0.000	4.040	nectare"
	lime of concentrat	:10n 16	.246	2.056	16.246	minutes"

п	Time to Centroid	159.296	119.065	159.29	5 minutes"
	Rainfall depth	70.427	70.427	70.427	mm"
"	Rainfall volume	2845.26	0.00	2845.2	7 c.m"
"	Rainfall losses	44.323	6.053	44.323	mm"
"	Runoff depth	26.104	64.374	26.104	mm"
"	Runoff volume	1054.60	0.00	1054.60	0 c.m"
"	Runoff coefficient	0.371	0.000	0.371	"
"	Maximum flow	0.374	0.000	0.374	c.m/sec"
" 46	HYDROGRAPH Add Runoff				
"	4 Add Runoff "				
"	0.374 0.43	23 0.191	0.000"		
" 46	HYDROGRAPH Copy to Ou	tflow"			
"	8 Copy to Outflow"				
"	0.374 0.4	23 0.423	0.000"		
" 38	START/RE-START TOTALS	101"			
"	3 Runoff Totals on E	XIT"			
"	Total Catchment area		4	.550	hectare"
"	Total Impervious area		0	.357	hectare"
"	Total % impervious		7	.846"	
" 19	EXIT"				

"			MIDUSS Output	>"
"			MIDUSS version	Version 2.25 rev. 467"
"			MIDUSS created	July 6, 2008"
"		10	Units used:	ie METRIC"
"			Job folder:	C:\Users\cmahoney\Documents\2024 Work\"
"			2021-0713-10\New SWM	Files\MIDUSS modelling\Pre-Development"
"			Output filename:	100 Year Pre-Development.out"
			Licensee name:	Circe Mahonev"
			Company	WalterFedy"
			Date & Time last used:	2024-05-02 at 8:23:41 AM"
	31	TI	ME PARAMETERS"	
	-	5.000	Time Step"	
		240.000	Max. Storm length"	
		1500.000	Max. Hydrograph"	
	32	ST	ORM Chicago storm"	
	52	1	Chicago storm"	
		892 300	Coefficient A"	
		0 000	Constant B"	
		0.000	Exponent C"	
		0.000	Exponence C Eraction R"	
		210 000	Duration"	
		1 000	Time sten multinlier"	
		Ma	vinum intensity	283 589 mm/hr"
		То	tal denth	77 /11 mm"
		6	100 Hydrogranh exte	ancion used in this file"
	22	Сл Сл	TCHMENT 102"	
	55	1	Triangular SCS"	
		1	Faual length"	
		1	SCS method"	
		102	External drainage area	ast of Site"
		70 000	% Impervious"	
		0.000	Total Area"	
		19 000	Flow length"	
		2 500	Ovenland Slope"	
		2.J00 0 153	Popyious Apos"	
		10 000	Pervious Area	
		49.000	Pervious rengen	
		2.300	Tervious stope	
		40.000	Impervious Area	
		49.000	Impervious rengen	
		2.500	Impervious Stope	
		0.250	Pervious Maining II	
		/5.000	Pervious SCS Curve No.	
		0.399	Pervious Runott Coettic	
		0.100	Pervious 1a/S coefficier	
		8.46/	Terryious Initial abstrac	
		0.015	Impervious Manning 'n'	"
		98.000	Impervious SLS Curve No.	•
		0.918	Impervious Runott coett	LCIENT
		0.100	Impervious Ia/S coettic	LENT
		0.518	Impervious Initial abstr	raction

"		0.214	0.000	0.000	0.000 (c.m/sec"	
"		Catchment 102		Pervious	Impervious	Total Area	"
"		Surface Area		0.153	0.357	0.510	hectare"
"		Time of concentr	ration	14.140	1.849	3.780	minutes"
"		Time to Centroid	t	155.046	118.394	124.151	minutes"
"		Rainfall depth		77.411	77.411	77.411	mm"
"		Rainfall volume		118.44	276.36	394.80	c.m"
"		Rainfall losses		46.499	6.313	18.369	mm"
"		Runoff depth		30.912	71.098	59.042	mm"
"		Runoff volume		47.30	253.82	301.11	c.m"
"		Runoff coefficie	ent	0.399	0.918	0.763	п
"		Maximum flow		0.018	0.209	0.214	c.m/sec"
"	40	HYDROGRAPH Add F	Runoff "				
"	4	4 Add Runoff "					
"		0.214	0.214	0.000	0.000"		
"	40	HYDROGRAPH Copy	to Outf	low"			
"	:	B Copy to Outf	Low"				
"		0.214	0.214	0.214	0.000"		
"	40	HYDROGRAPH Next	link "				
"	!	5 Next link "					
"		0.214	0.214	0.214	0.000"		
"	33	CATCHMENT 101"					
"		1 Triangular SC	CS"				
"		1 Equal length'	•				
"		<pre>1 SCS method"</pre>					
"	10:	1 Existing site	e condit	ions"			
"	0.00	0 % Impervious'	•				
"	4.040	ð Total Area"					
"	60.00	9 Flow length"					
"	3.00	Ø Overland Slop	be"				
"	4.040	9 Pervious Area	э"				
"	60.00	ð Pervious leng	gth"				
"	3.00	Ø Pervious slop	be"				
"	0.00	Impervious Ar	rea"				
	60.00	Impervious le	ength"				
	3.00	0 Impervious s	Lope"				
	0.250	9 Pervious Manr	ning 'n'				
	75.00	0 Pervious SCS	Curve N	0."			
	0.399	9 Pervious Runo	ott coet	ficient"			
	0.10	Ø Pervious Ia/S	s coetti	cient"			
	8.46	7 Pervious Init	tial abs	traction"			
	0.01	5 Impervious Ma	anning '	n'"			
	98.00	<pre> Impervious S(The second secon</pre>	LS Curve	NO."			
	0.00	Impervious Ru	unott co	etticient"			
	0.10	Ø Impervious Ia	a/S coef	+icient"			
	0.51	s Impervious Ir	nitial a	pstraction'			
		0.465	0.214	0.214	0.000 (.m/sec"	
		Catchment 101		Pervious	Impervious	IOTAL Area	
		Surtace Area		4.040	0.000	4.040	nectare"
		lime of concentr	ration	15.117	1.9/7	15.117	minutes"

"		Time to Centroid		156.670	118.640	156.67	70 minutes"
"		Rainfall depth		77.411	77.411	77.411	L mm"
"		Rainfall volume		3127.41	0.00	3127.4	41 c.m"
"		Rainfall losses		46.489	6.217	46.489) mm"
"		Runoff depth		30.922	71.195	30.922	2 mm"
"		Runoff volume		1249.23	0.00	1249.2	24 c.m"
"		Runoff coefficient		0.399	0.000	0.399	"
"		Maximum flow		0.465	0.000	0.465	c.m/sec"
"	40	HYDROGRAPH Add Run	off '				
"		4 Add Runoff "					
"		0.465	0.522	2 0.214	0.000)"	
"	40	HYDROGRAPH Copy to	Out	flow"			
"		8 Copy to Outflow					
"		0.465	0.522	2 0.522	0.000)"	
"	38	START/RE-START TOT	ALS 1	101"			
"		3 Runoff Totals o	n EXI	ET"			
"		Total Catchment ar	ea			4.550	hectare"
"		Total Impervious a	rea			0.357	hectare"
"		Total % impervious				7.846"	
"	19	EXIT"					

		MIDUSS Output>"
"		MIDUSS version Version 2.25 rev. 467"
н		MIDUSS created July 6, 2008"
н	10	Units used: ie METRIC"
н		Job folder: C:\Users\cmahonev\Documents\2024 Work\"
п		2021-0713-10\New SWM Files\MIDUSS modelling\Pre-Development"
п		Output filename: Regional Pre-Development.out"
н		Licensee name: Circe Mahonev"
н		Company WalterFedy"
н		Date & Time last used: 2024-05-08 at 7:55:39 AM"
" 31	ТТ	ME PARAMETERS"
"	5.000	Time Step"
	720.000	Max. Storm length"
	1500,000	Max. Hydrograph"
" 32	ST	TORM Mass Curve"
"	3	Mass Curve"
п	212 000	Rainfall denth"
п	720 000	Duration"
п	120.000	C:\Program Files (x86)\MTDUSSNet\Hazel12 mrd Hurricane Hazel
(last	12 h)"	
(1030	12 II) Ma	ovimum intensity 53,000 mm/hr"
п	To	212,000 mm/m
п	6	250hvd Hydrograph extension used in this file"
" 22	сл С	TCHMENT 102"
"	1	Triangular SCS"
	1	Faual length"
	1	SCS method"
	102	External drainage area east of Site"
	70 000	V Imponyious"
	0.000	Total Apea"
	10 000	Flow longth"
	2 500	Ovenland Slope"
	2.500	Donvious Anos"
	40.000	Pervious Area
	49.000	Pervious length Dervious slope"
	2.300	Imponyious Apop"
	40.000	Impervious Area
	49.000	Impervious length
	2.500	Impervious slope
	0.250	Pervious Manning II
	88.000	Pervious SCS Curve No.
	0.841	Pervious Runott Coetticient
	0.100	Pervious la/S coefficient
	3.464	Pervious Initial abstraction
	0.015	Impervious Manning 'n'
	98.000	Impervious SCS Curve No."
	0.94/	Impervious Kunott coetticient"
	0.100	Impervious Ia/S COetticient"
	0.518	Impervious Initial abstraction
	-	0.0/2 0.000 0.000 0.000 c.m/sec"
.,	Ca	atchment 102 Pervious Impervious Total Area "

"	Surface Area	0.153	0.357	0.510	hectare"	
"	Time of concentration	19.682	3.591	8.029	minutes"	
"	Time to Centroid	522.490	473.408	486.944	minutes"	
"	Rainfall depth	212.000	212.000	212.000	mm"	
"	Rainfall volume	324.36	756.84	1081.20	c.m"	
"	Rainfall losses	33.643	11.273	17.984	mm"	
"	Runoff depth	178.357	200.727	194.016	mm"	
"	Runoff volume	272.89	716.60	989.48	c.m"	
"	Runoff coefficient	0.841	0.947	0.915	"	
"	Maximum flow	0.023	0.052	0.072	c.m/sec"	
"	40 HYDROGRAPH Add Runoff	н				
"	4 Add Runoff "					
"	0.072 0.07	2 0.000	0.000"			
"	40 HYDROGRAPH Copy to Out	flow"				
"	8 Copy to Outflow"					
"	0.072 0.07	2 0.072	0.000"			
"	40 HYDROGRAPH Next link "	1				
"	5 Next link "					
"	0.072 0.07	2 0.072	0.000"			
"	33 CATCHMENT 101"					
"	1 Triangular SCS"					
	1 Equal length"					
	1 SCS method"					
	101 Existing site condi	tions"				
	0.000 % Impervious"					
	4.040 lotal Area"					
	60.000 Flow length"					
	3.000 Overland Slope					
	4.040 Pervious Area					
	2 000 Pervious length					
п	6 666 Imponyious Apop"					
	60.000 Impenvious longth"					
п	2 000 Impenvious slope"					
	0.250 Popyious Manning 'n					
	88 000 Pervious SCS Curve	No "				
	0 843 Pervious Runoff coe	officient"				
	0.100 Pervious Ta/S coeff	icient"				
	3.464 Pervious Initial ab	straction"				
	0.015 Impervious Manning	'n'"				
	98,000 Impervious SCS Curv	ve No."				
	0.000 Impervious Runoff o	oefficient"				
n	0.100 Impervious Ia/S coe	fficient"				
	0.518 Impervious Initial	abstraction'	п			
"	0.603 0.07	2 0.072	0.000	.m/sec"		
"	Catchment 101	Pervious	Impervious	Total Area	п	
"	Surface Area	4.040	0.000	4.040	hectare"	
"	Time of concentration	21.042	3.840	21.042	minutes"	
"	Time to Centroid	524.177	474.621	524.177	minutes"	
"	Rainfall depth	212.000	212.000	212.000	mm"	
"		Rainfall volume	8564.79	0.01	8564.80	c.m"
---	----	------------------------	---------	---------	---------	----------
"		Rainfall losses	33.240	10.816	33.240	mm"
"		Runoff depth	178.760	201.184	178.760	mm"
"		Runoff volume	7221.91	0.01	7221.92	c.m"
"		Runoff coefficient	0.843	0.000	0.843	"
"		Maximum flow	0.603	0.000	0.603	c.m/sec"
"	40	HYDROGRAPH Add Runoff	п			
"		4 Add Runoff "				
"		0.603 0.67	4 0.072	0.000"		
"	40	HYDROGRAPH Copy to Out	flow"			
"		8 Copy to Outflow"				
"		0.603 0.67	4 0.674	0.000"		
"	38	START/RE-START TOTALS	101"			
"		3 Runoff Totals on EX	IT"			
"		Total Catchment area		4	.550	hectare"
"		Total Impervious area		0	.357	hectare"
"		Total % impervious		7	.846"	
"	19	EXIT"				

MIDUSS Hydrologic Modelling

Post-Development (Uncontrolled - No SWM)

... MIDUSS Output ----->" ... Version 2.25 rev. 467" MIDUSS version ... MIDUSS created July 6, 2008" ... 10 Units used: ie METRIC" ... C:\Users\cmahoney\Documents\2024 Work\" Job folder: ... 2021-0713-10\New SWM Files\MIDUSS modelling\Post-Development - no mitigation" н 25 mm Developed Rev1.out" Output filename: п Licensee name: Circe Mahoney" ... WalterFedy" Company ... Date & Time last used: 2024-05-08 at 12:22:43 PM" ... 31 TIME PARAMETERS" ... Time Step" 5.000 п Max. Storm length" 240.000 п 1500.000 Max. Hydrograph" п 32 STORM Chicago storm" п Chicago storm" 1 ... 449.205 Coefficient A" ... Constant B" 0.000 ... 0.780 Exponent C" п 0.400 Fraction R" п Duration" 240.000 ... 1.000 Time step multiplier" н Maximum intensity mm/hr" 125.787 ... Total depth 25.000 mm" ... 001hyd Hydrograph extension used in this file" 6 ... 33 CATCHMENT 301" ... Triangular SCS" 1 ... 1 Equal length" н 1 SCS method" ... External catchment area - drains to 201" 301 ... 70.000 % Impervious" ... 0.390 Total Area" ... Flow length" 50.000 ... Overland Slope" 1.000 н 0.117 Pervious Area" ... 50.000 Pervious length" п 1.000 Pervious slope" ... 0.273 Impervious Area" ... Impervious length" 50.000 ... Impervious slope" 1.000 п Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... 0.108 Pervious Runoff coefficient" н 0.100 Pervious Ia/S coefficient" ... Pervious Initial abstraction" 8.467 ... Impervious Manning 'n'" 0.015 ... 98.000 Impervious SCS Curve No." ... Impervious Runoff coefficient" 0.785 ... 0.100 Impervious Ia/S coefficient"

... Impervious Initial abstraction" 0.518 ... 0.049 0.000 0.000 c.m/sec" 0.000 ... Impervious Total Area " Catchment 301 Pervious ... Surface Area 0.117 0.273 0.390 hectare" ... Time of concentration 3.553 minutes" 52.587 6.284 ... Time to Centroid 217.722 122.821 128.107 minutes" ... Rainfall depth mm" 25.000 25.000 25.000 ... c.m" Rainfall volume 29.25 68.25 97.50 п Rainfall losses 22.299 5.375 10.452 mm" ... Runoff depth 2.701 14.548 mm" 19.625 ... Runoff volume 3.16 53.58 56.74 c.m" ... н Runoff coefficient 0.108 0.785 0.582 ... Maximum flow 0.000 0.049 0.049 c.m/sec" п HYDROGRAPH Add Runoff " 40 п 4 Add Runoff " ... 0.049 0.049 0.000 0.000" н HYDROGRAPH Copy to Outflow" 40 " Copy to Outflow" 8 ... 0.000" 0.049 0.049 0.049 ... HYDROGRAPH Next link " 40 ... 5 Next link " ... 0.000" 0.049 0.049 0.049 н 33 CATCHMENT 201" п 1 Triangular SCS" 1 Equal length" ... SCS method" 1 ... 201 Controlled flow to Pond" ... 90.000 % Impervious" ... Total Area" 1.080 н 80.000 Flow length" ... Overland Slope" 2.000 ... Pervious Area" 0.108 ... 80.000 Pervious length" ... Pervious slope" 2.000 ... Impervious Area" 0.972 н 80.000 Impervious length" ... Impervious slope" 2.000 ... Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... Pervious Runoff coefficient" 0.108 ... Pervious Ia/S coefficient" 0.100 ... Pervious Initial abstraction" 8.467 ... Impervious Manning 'n'" 0.015 ... 98.000 Impervious SCS Curve No." н 0.789 Impervious Runoff coefficient" ... Impervious Ia/S coefficient" 0.100 ... 0.518 Impervious Initial abstraction" ... 0.181 0.049 0.049 0.000 c.m/sec" ... Catchment 201 Impervious Total Area " Pervious ... 0.972 Surface Area 0.108 1.080 hectare"

"	Ti	me of concentration	56.630	3.826	4.617	minutes"
"	Ti	me to Centroid	223.882	123.247	124.755	minutes"
"	Ra	infall depth	25.000	25.000	25.000	mm"
"	Ra	infall volume	27.00	243.00	270.00	c.m"
"	Ra	infall losses	22.300	5.271	6.974	mm"
"	Ru	noff depth	2.700	19.729	18.026	mm"
"	Ru	noff volume	2.92	191.77	194.68	c.m"
	Ru	noff coefficient	0.108	0.789	0.721	
	Ma	ximum flow	0.000	0.181	0.181	c.m/sec"
"	40 HY	DROGRAPH Add Runoff	"			,
	4	Add Runoff "				
		0.181 0.23	0 0.049	0.000"		
	40 HY	DROGRAPH Copy to Out	flow"			
"	8	Copy to Outflow"				
	-	0.181 0.23	0 0.230	0.000"		
	40 HY	DROGRAPH Combine	1"			
	6	Combine "	-			
	1	Node #"				
	-	Outlet to Creek"				
	Ма	ximum flow	0.2	30 c.m/s	ec"	
	Hv	drograph volume	251.4	19 c.m"		
	.,	0.181 0.23	0 0.230	0.230"		
	40 HY	DROGRAPH Start - New	Tributarv"			
	2	Start - New Tributa	rv"			
"	-	0.181 0.00	0.230	0.230"		
"	33 CA	TCHMENT 302"				
"	1	Triangular SCS"				
	1	Equal length"				
	1	SCS method"				
"	302	External drainage a	rea - drains	s to 202"		
"	70.000	% Impervious"				
"	0.120	Total Area"				
	50.000	Flow length"				
"	1.000	Overland Slope"				
"	0.036	Pervious Area"				
"	50.000	Pervious length"				
"	1.000	Pervious slope"				
"	0.084	Impervious Area"				
"	50.000	Impervious length"				
"	1.000	Impervious slope"				
"	0.250	Pervious Manning 'n				
"	75.000	Pervious SCS Curve I	No."			
"	0.108	Pervious Runoff coe	fficient"			
"	0.100	Pervious Ia/S coeff:	icient"			
"	8.467	Pervious Initial ab	straction"			
"	0.015	Impervious Manning	'n'"			
"	98.000	Impervious SCS Curve	e No."			
"	0.785	Impervious Runoff co	oefficient"			
"	0.100	Impervious Ia/S coe	fficient"			
"	0.518	Impervious Initial	abstraction'	n		

"	0.015	0.000	0.230	0.230 c	.m/sec"	
"	Catchment 302	Pe	rvious	Impervious	Total Area	"
"	Surface Area	0.0	036	0.084	0.120	hectare"
"	Time of concentra	ation 52	.587	3.553	6.284	minutes"
"	Time to Centroid	21	7.722	122.821	128.107	minutes"
"	Rainfall depth	25	.000	25.000	25.000	mm"
"	Rainfall volume	9.0	00	21.00	30.00	c.m"
"	Rainfall losses	22	.299	5.375	10.452	mm"
"	Runoff depth	2.	701	19.625	14.548	mm"
"	Runoff volume	0.9	97	16.48	17.46	c.m"
"	Runoff coefficier	nt 0.1	108	0.785	0.582	
"	Maximum flow	0.0	000	0.015	0.015	c.m/sec"
"	40 HYDROGRAPH Add Ru	unoff "				
"	4 Add Runoff "					
"	0.015	0.015	0.230	0.230"		
"	40 HYDROGRAPH Copy	to Outflow	w"			
	8 Copy to Outfle	ow"				
"	0.015	0.015	0.015	0.230"		
"	40 HYDROGRAPH Next 1	link "				
	5 Next link "					
"	0.015	0.015	0.015	0.230"		
"	33 CATCHMENT 202"					
"	1 Triangular SCS	5"				
	1 Equal length"					
"	1 SCS method"					
"	202 Uncontrolled	to creek"				
"	5.000 % Impervious"					
"	1.820 Total Area"					
"	80.000 Flow length"					
"	0.500 Overland Slope	<u>e</u> "				
"	1.729 Pervious Area	•				
"	80.000 Pervious leng	th"				
"	0.500 Pervious slope	<u>e</u> "				
"	0.091 Impervious Are	ea"				
"	80.000 Impervious le	ngth"				
"	0.500 Impervious slo	ope"				
"	0.250 Pervious Mann	ing 'n'"				
"	75.000 Pervious SCS (Curve No.				
"	0.108 Pervious Runo	ff coeffi	cient"			
"	0.100 Pervious Ia/S	coeffici	ent"			
"	8.467 Pervious Init:	ial abstra	action"			
"	0.015 Impervious Man	nning 'n'				
"	98.000 Impervious SC	5 Curve No	o."			
"	0.804 Impervious Ru	noff coef	ficient"			
"	0.100 Impervious Ia	/S coeffi	cient"			
"	0.518 Impervious In	itial abs [.]	traction"	•		
"	0.018	0.015	0.015	0.230 c	.m/sec"	
"	Catchment 202	Pe	rvious	Impervious	Total Area	п
"	Surface Area	1.	729	0.091	1.820	hectare"
"	Time of concentra	ation 85	.835	5.799	63.302	minutes"

"	Tir	me to Centroid	268.3	350	126.695	228.470	minutes"
"	Ra:	infall depth	25.00	90	25.000	25.000	mm"
"	Ra:	infall volume	432.2	25	22.75	455.00	c.m"
"	Ra	infall losses	22.29	99	4.891	21.429	mm"
"	Rui	noff depth	2.703	1	20.109	3.571	mm"
"	Rui	noff volume	46.76	9	18.30	65.00	c.m"
"	Rui	noff coefficient	0.108	3	0.804	0.143	п
"	Max	ximum flow	0.004	1	0.017	0.018	c.m/sec"
"	40 HYI	DROGRAPH Add Runof	f "				
"	4	Add Runoff "					
"		0.018 0.	033	0.015	0.230"		
"	40 HYI	DROGRAPH Copy to C	Outflow"				
"	8	Copy to Outflow"					
"		0.018 0.	033	0.033	0.230"		
"	40 HYI	DROGRAPH Combine	e 1"				
"	6	Combine "					
"	1	Node #"					
"		Outlet to Creek"					
"	Max	ximum flow		0.26	53 c.m/se	ec"	
"	Нус	drograph volume		333.87	75 c.m"		
"		0.018 0.	033	0.033	0.263"		
"	40 HYI	DROGRAPH Start - N	lew Tribu	utary"			
"	2	Start - New Tribu	itary"				
"		0.018 0.	000	0.033	0.263"		
"	33 CA	TCHMENT 203"					
"	1	Triangular SCS"					
"	1	Equal length"					
"	1	SCS method"					
"	203	Containment area"	I				
	95.000	% Impervious"					
	1.140	Total Area"					
	35.000	Flow length"					
	0.500	Overland Slope"					
	0.057	Pervious Area"					
	35.000	Pervious length"					
"	0.500	Pervious slope"					
	1.083	Impervious Area"					
	35.000	Impervious length	ו"				
	0.500	Impervious slope"					
	0.250	Pervious Manning	'n'"				
	75.000	Pervious SCS Curv	ve No."				
	0.108	Pervious Runoff c	coefficie	ent"			
	0.100	Pervious Ia/S coe	efficient	t"			
	8.467	Pervious Initial	abstract	tion"			
	0.015	Impervious Mannir	ng 'n'"				
	98.000	Impervious SCS Cu	irve No.'	•			
	0.785	Impervious Runoff	- coetti	:ient"			
	0.100	Impervious Ia/S c	coetticie	ent"			
	0.518	Impervious Initia	a⊥ abstra	action'		,	
		0.195 0.	000	0.033	0.263 0	c.m/sec"	

		Catchment	t 203		Pervi	lous	Impe	rvious	Total A	Area		
"		Surface A	Area		0.057	7	1.08	3	1.140		hectare'	ľ
"		Time of d	concentrat	tion	52.27	70	3.53	1	3.882		minutes'	ľ
"		Time to C	Centroid		217.2	234	122.	771	123.450	9	minutes'	ı
"		Rainfall	depth		25.00	90	25.0	00	25.000		mm"	
"		Rainfall	volume		14.25	5	270.	75	285.00		c.m"	
"		Rainfall	losses		22.29	99	5.36	3	6.210		mm"	
"		Runoff de	epth		2.701	L	19.6	37	18.790		mm"	
"		Runoff vo	olume		1.54		212.	66	214.20		c.m"	
"		Runoff co	oefficient	t	0.108	3	0.78	5	0.752			
"		Maximum f	flow		0.000)	0.19	5	0.195		c.m/sec'	1
"	40	HYDROGRAF	PH Add Rur	noff "								
"	4	4 Add Ru	unoff "									
"		6	0.195	0.195	5	0.033		0.263"				
"	40	HYDROGRAF	PH Copy to	o Outf	low"							
"	:	8 Copy t	to Outflow	v"								
"		6	0.195	0.195	5	0.195		0.263"				
"	40	HYDROGRAF	PH Combi	ine	1"							
"		6 Combir	ne "									
"	:	1 Node‡	#"									
"		Outlet	t to Creel	<"								
"		Maximum 1	flow			0.45	58	c.m/se	ec"			
"		Hydrograp	ph volume			548.07	79	c.m"				
		6	0.195	0.195	5	0.195		0.458"				
"	38	START/RE-	-START TO	FALS 2	203"							
		3 Runoff	f Totals d	on EXI	IT"							
"		Total Cat	tchment ar	rea				4.	.550	hect	care"	
"		Total Imp	pervious a	area				2.	. 503	hect	care"	
		Total % i	impervious	5				55.	.011"			
"	19	EXIT"										

... MIDUSS Output ----->" ... Version 2.25 rev. 467" MIDUSS version ... MIDUSS created July 6, 2008" ... 10 Units used: ie METRIC" ... C:\Users\cmahoney\Documents\2024 Work\" Job folder: ... 2021-0713-10\New SWM Files\MIDUSS modelling\Post-Development - no mitigation" н 2 Year Developed Rev1.out" Output filename: п Licensee name: Circe Mahoney" ... WalterFedy" Company ... Date & Time last used: 2024-05-08 at 12:26:00 PM" ... 31 TIME PARAMETERS" ... Time Step" 5.000 п Max. Storm length" 240.000 п 1500.000 Max. Hydrograph" п 32 STORM Chicago storm" п Chicago storm" 1 ... 404.100 Coefficient A" ... Constant B" 0.000 ... 0.699 Exponent C" п 0.400 Fraction R" п Duration" 240.000 ... 1.000 Time step multiplier" н Maximum intensity mm/hr" 128.430 ... Total depth 35.058 mm" ... 002hyd Hydrograph extension used in this file" 6 ... 33 CATCHMENT 301" ... Triangular SCS" 1 ... 1 Equal length" п 1 SCS method" ... External catchment area - drains to 201" 301 ... 70.000 % Impervious" ... 0.390 Total Area" ... Flow length" 50.000 ... Overland Slope" 1.000 н 0.117 Pervious Area" ... 50.000 Pervious length" п 1.000 Pervious slope" ... 0.273 Impervious Area" ... Impervious length" 50.000 ... Impervious slope" 1.000 п Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... 0.181 Pervious Runoff coefficient" н 0.100 Pervious Ia/S coefficient" ... Pervious Initial abstraction" 8.467 ... Impervious Manning 'n'" 0.015 ... 98.000 Impervious SCS Curve No." ... Impervious Runoff coefficient" 0.837 ... Impervious Ia/S coefficient" 0.100

... Impervious Initial abstraction" 0.518 ... 0.055 0.000 0.000 c.m/sec" 0.000 ... Catchment 301 Impervious Total Area " Pervious ... Surface Area 0.117 0.273 0.390 hectare" ... Time of concentration 3.454 minutes" 38.717 6.449 ... Time to Centroid 199.134 124.574 130.905 minutes" ... Rainfall depth mm" 35.058 35.058 35.058 ... c.m" Rainfall volume 41.02 95.71 136.72 п Rainfall losses 28.704 5.713 12.610 mm" ... Runoff depth 6.354 29.345 22.447 mm" ... Runoff volume 7.43 80.11 87.55 c.m" ... н Runoff coefficient 0.181 0.837 0.640 ... Maximum flow 0.001 0.055 0.055 c.m/sec" н HYDROGRAPH Add Runoff " 40 п 4 Add Runoff " ... 0.055 0.000 0.000" 0.055 н HYDROGRAPH Copy to Outflow" 40 " Copy to Outflow" 8 ... 0.000" 0.055 0.055 0.055 ... HYDROGRAPH Next link " 40 ... 5 Next link " ... 0.055 0.000" 0.055 0.055 н 33 CATCHMENT 201" п 1 Triangular SCS" 1 Equal length" ... SCS method" 1 ... 201 Controlled flow to Pond" ... 90.000 % Impervious" ... Total Area" 1.080 н 80.000 Flow length" ... Overland Slope" 2.000 ... Pervious Area" 0.108 ... 80.000 Pervious length" ... Pervious slope" 2.000 ... Impervious Area" 0.972 н 80.000 Impervious length" ... Impervious slope" 2.000 ... Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... Pervious Runoff coefficient" 0.181 ... Pervious Ia/S coefficient" 0.100 п Pervious Initial abstraction" 8.467 ... Impervious Manning 'n'" 0.015 ... 98.000 Impervious SCS Curve No." н 0.836 Impervious Runoff coefficient" ... Impervious Ia/S coefficient" 0.100 ... 0.518 Impervious Initial abstraction" ... 0.200 0.055 0.055 0.000 c.m/sec" ... Catchment 201 Impervious Total Area " Pervious ... 0.972 Surface Area 0.108 1.080 hectare"

"	Ti	me of concentration	41.694	3.720	4.613	minutes"
"	Ti	me to Centroid	203.630	125.095	126.943	minutes"
"	Ra	infall depth	35.058	35.058	35.058	mm"
"	Ra	infall volume	37.86	340.76	378.62	c.m"
"	Ra	infall losses	28.705	5.762	8.056	mm"
"	Ru	noff depth	6.353	29.296	27.002	mm"
"	Ru	noff volume	6.86	284.76	291.62	c.m"
"	Ru	noff coefficient	0.181	0.836	0.770	
"	Ma	ximum flow	0.001	0.200	0.200	c.m/sec"
"	40 HY	DROGRAPH Add Runoff	"			·
"	4	Add Runoff "				
"		0.200 0.25	6 0.055	0.000"		
"	40 HY	DROGRAPH Copy to Out	flow"			
"	8	Copy to Outflow"				
"		0.200 0.25	6 0.256	0.000"		
"	40 HY	DROGRAPH Combine	1"			
"	6	Combine "				
"	1	Node #"				
"		Outlet to Creek"				
"	Ма	ximum flow	0.2	56 c.m/s	ec"	
"	Hy	drograph volume	379.10	62 c.m"		
"		0.200 0.25	6 0.256	0.256"		
"	40 HY	DROGRAPH Start - New	Tributary"			
"	2	Start - New Tributa	ry"			
"		0.200 0.00	0.256	0.256"		
"	33 CA	TCHMENT 302"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	1	SCS method"				
"	302	External drainage a	rea - drains	s to 202"		
"	70.000	% Impervious"				
"	0.120	Total Area"				
"	50.000	Flow length"				
"	1.000	Overland Slope"				
"	0.036	Pervious Area"				
"	50.000	Pervious length"				
"	1.000	Pervious slope"				
"	0.084	Impervious Area"				
"	50.000	Impervious length"				
"	1.000	Impervious slope"				
"	0.250	Pervious Manning 'n				
"	75.000	Pervious SCS Curve I	No."			
	0.181	Pervious Runoff coe	fficient"			
	0.100	Pervious Ia/S coeff:	icient"			
	8.467	Pervious Initial ab	straction"			
	0.015	Impervious Manning	'n'"			
	98.000	Impervious SCS Curve	e No."			
	0.837	Impervious Runoff co	oetticient"			
	0.100	Impervious Ia/S coe	fficient"			
"	0.518	Impervious Initial a	abstraction'			

	0.01	7 0.000	0.256	0.256 0	c.m/sec"	
"	Catchment 30	2	Pervious	Impervious	Total Area	н
"	Surface Area		0.036	0.084	0.120	hectare"
"	Time of conc	entration	38.718	3.454	6.449	minutes"
"	Time to Cent	roid	199.134	124.574	130.905	minutes"
"	Rainfall dep	th	35.058	35.058	35.058	mm"
"	Rainfall vol	ume	12.62	29.45	42.07	c.m"
"	Rainfall los	ses	28.704	5.713	12.610	mm"
"	Runoff depth		6.354	29.345	22.447	mm"
"	Runoff volum	e	2.29	24.65	26.94	c.m"
"	Runoff coeff	icient	0.181	0.837	0.640	
"	Maximum flow		0.000	0.017	0.017	c.m/sec"
"	40 HYDROGRAPH A	dd Runoff '	II.			
"	4 Add Runof	f "				
"	0.01	7 0.017	7 0.256	0.256"		
"	40 HYDROGRAPH C	opy to Outi	flow"			
"	8 Copy to O	utflow"				
"	0.01	7 0.017	7 0.017	0.256"		
"	40 HYDROGRAPH N	ext link "				
"	5 Next link	н				
"	0.01	7 0.017	7 0.017	0.256"		
"	33 CATCHMENT 20	2"				
"	1 Triangula	r SCS"				
"	1 Equal len	gth"				
"	1 SCS metho	d"				
"	202 Uncontrol	led to cree	ek"			
"	5.000 % Impervi	ous"				
"	1.820 Total Are	a"				
"	80.000 Flow leng	th"				
"	0.500 Overland	Slope"				
"	1.729 Pervious	Area"				
"	80.000 Pervious	length"				
"	0.500 Pervious	slope"				
"	0.091 Imperviou	s Area"				
"	80.000 Imperviou	s length"				
"	0.500 Imperviou	s slope"				
"	0.250 Pervious	Manning 'n'				
"	75.000 Pervious	SCS Curve N	No."			
"	0.181 Pervious	Runoff coef	fficient"			
"	0.100 Pervious	Ia/S coeffi	icient"			
"	8.467 Pervious	Initial abs	straction"			
"	0.015 Imperviou	s Manning '	'n'"			
"	98.000 Imperviou	s SCS Curve	e No."			
"	0.854 Imperviou	s Runoff co	pefficient"			
"	0.100 Imperviou	s Ia/S coef	fficient"			
"	0.518 Imperviou	s Initial a	abstraction'	ı		
"	0.02	2 0.017	7 0.017	0.256 0	.m/sec"	
"	Catchment 20	2	Pervious	Impervious	Total Area	
"	Surface Area		1.729	0.091	1.820	hectare"
"	Time of conc	entration	63.196	5.638	51.760	minutes"

"	Ti	me to Centroid	2	236.123	128.286	214.698	minutes"
"	Ra	infall depth	3	35.058	35.058	35.058	mm"
"	Ra	infall volume	6	506.14	31.90	638.05	c.m"
"	Ra	infall losses	2	28.704	5.125	27.525	mm"
"	Ru	noff depth	6	5.354	29.932	7.533	mm"
"	Ru	noff volume	1	L09.86	27.24	137.10	c.m"
"	Ru	noff coefficie	nt 🤅	0.181	0.854	0.215	
"	Ma	ximum flow	6	0.011	0.020	0.022	c.m/sec"
"	40 HY	DROGRAPH Add R	unoff "				
"	4	Add Runoff "					
"		0.022	0.039	0.017	0.256"		
"	40 HY	DROGRAPH Copy	to Outf]	Low"			
"	8	Copy to Outfl	ow"				
"		0.022	0.039	0.039	0.256"		
"	40 HY	DROGRAPH Com	bine	1"			
"	6	Combine "					
"	1	Node #"					
"		Outlet to Cre	ek"				
"	Ma	ximum flow		0.29	94 c.m/se	ec"	
"	Hy	drograph volum	e	543.19	98 c.m"		
"		0.022	0.039	0.039	0.294"		
"	40 HY	DROGRAPH Start	- New 1	[ributary"			
"	2	Start - New T	ributary	/"			
"		0.022	0.000	0.039	0.294"		
"	33 CA	TCHMENT 203"					
"	1	Triangular SC	S"				
	1	Equal length"					
	1	SCS method"					
	203	Containment a	rea"				
	95.000	% Impervious"					
	1.140	Total Area"					
	35.000	Flow length"					
	0.500	Overland Slop	e"				
	0.057	Pervious Area					
	35.000	Pervious leng	th"				
	0.500	Pervious slop	e"				
	1.083	Impervious Ar	ea"				
	35.000	Impervious le	ngth"				
	0.500	Impervious si	ope"				
	0.250	Pervious Mann	ing 'n''				
	/5.000	Pervious SCS	Curve No)." 			
	0.181	Pervious Runo	tt coeti	ficient"			
	0.100	Pervious Ia/S	coettic				
	8.46/	rervious init	iai abst	raction"			
	0.015	Impervious Ma	nning 'r	1			
	98.000	Impervious SC	s curve				
	0.030	Imperivious Ru	NOTT COE	etticient"			
	0.100	Imponutous Ia	/S COET1				
	0.218	Impervious In	TCIAL AL		0.004	- m/="	
		0.210	0.000	0.039	0.294 (m/sec	

	Catchment 203	Pervious	Impervious	Total Are	a "
	Surface Area	0.057	1.083	1.140	hectare"
	Time of concentration	38.484	3.433	3.828	minutes"
	Time to Centroid	198.783	124.528	125.365	minutes"
	Rainfall depth	35.058	35.058	35.058	mm"
	Rainfall volume	19.98	379.67	399.66	c.m"
	Rainfall losses	28.705	5.697	6.847	mm"
	Runoff depth	6.353	29.361	28.211	mm"
	Runoff volume	3.62	317.98	321.60	c.m"
	Runoff coefficient	0.181	0.838	0.805	
	Maximum flow	0.001	0.218	0.218	c.m/sec"
" 40	HYDROGRAPH Add Runoff '				
	4 Add Runoff "				
	0.218 0.218	8 0.039	0.294"		
" 40	HYDROGRAPH Copy to Out	flow"			
	8 Copy to Outflow"				
	0.218 0.218	8 0.218	0.294"		
" 40	HYDROGRAPH Combine	1"			
	6 Combine "				
	1 Node #"				
	Outlet to Creek"				
	Maximum flow	0.5	12 c.m/se	ec"	
	Hydrograph volume	864.7	98 c.m"		
	0.218 0.218	8 0.218	0.512"		
" 38	START/RE-START TOTALS 2	203"			
	3 Runoff Totals on EX.	IT"			
	Total Catchment area		4	.550 he	ctare"
	Total Impervious area		2	.503 he	ctare"
	Total % impervious		55	.011"	
" 19	EXIT"				

... MIDUSS Output ----->" ... Version 2.25 rev. 467" MIDUSS version ... MIDUSS created July 6, 2008" ... 10 Units used: ie METRIC" ... C:\Users\cmahoney\Documents\2024 Work\" Job folder: ... 2021-0713-10\New SWM Files\MIDUSS modelling\Post-Development - no mitigation" н 5 Year Developed Rev1.out" Output filename: п Licensee name: Circe Mahoney" ... WalterFedy" Company ... Date & Time last used: 2024-05-08 at 12:27:42 PM" ... 31 TIME PARAMETERS" ... Time Step" 5.000 п Max. Storm length" 240.000 п 1500.000 Max. Hydrograph" п 32 STORM Chicago storm" п Chicago storm" 1 ... 535.400 Coefficient A" ... Constant B" 0.000 ... 0.699 Exponent C" п 0.400 Fraction R" н Duration" 240.000 ... 1.000 Time step multiplier" н Maximum intensity mm/hr" 170.160 ... Total depth 46.448 mm" ... 005hyd Hydrograph extension used in this file" 6 ... 33 CATCHMENT 301" ... Triangular SCS" 1 ... 1 Equal length" н 1 SCS method" ... External catchment area - drains to 201" 301 ... 70.000 % Impervious" ... 0.390 Total Area" ... Flow length" 50.000 ... Overland Slope" 1.000 н 0.117 Pervious Area" ... 50.000 Pervious length" п 1.000 Pervious slope" ... 0.273 Impervious Area" ... Impervious length" 50.000 ... Impervious slope" 1.000 п Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... 0.253 Pervious Runoff coefficient" н 0.100 Pervious Ia/S coefficient" ... Pervious Initial abstraction" 8.467 ... Impervious Manning 'n'" 0.015 ... 98.000 Impervious SCS Curve No." ... Impervious Runoff coefficient" 0.876 ... 0.100 Impervious Ia/S coefficient"

...

Impervious Initial abstraction" 0.518 ... 0.080 0.000 0.000 c.m/sec" 0.000 ... Impervious Total Area " Catchment 301 Pervious ... Surface Area 0.117 0.273 0.390 hectare" ... Time of concentration 5.898 minutes" 28.877 3.055 ... Time to Centroid 182.422 122.455 129.058 minutes" ... Rainfall depth mm" 46.448 46.448 46.448 ... c.m" Rainfall volume 54.34 126.80 181.15 п Rainfall losses 34.697 5.744 14.430 mm" ... Runoff depth 11.752 40.705 32.019 mm" ... Runoff volume 13.75 111.12 124.87 c.m" ... н Runoff coefficient 0.253 0.876 0.689 ... Maximum flow 0.003 0.079 0.080 c.m/sec" п HYDROGRAPH Add Runoff " 40 п 4 Add Runoff " ... 0.080 0.000 0.000" 0.080 н HYDROGRAPH Copy to Outflow" 40 " Copy to Outflow" 8 ... 0.000" 0.080 0.080 0.080 ... HYDROGRAPH Next link " 40 ... 5 Next link " ... 0.000" 0.080 0.080 0.080 н 33 CATCHMENT 201" п 1 Triangular SCS" 1 Equal length" ... SCS method" 1 ... 201 Controlled flow to Pond" ... 90.000 % Impervious" ... Total Area" 1.080 п 80.000 Flow length" ... Overland Slope" 2.000 ... 0.108 Pervious Area" ... 80.000 Pervious length" ... Pervious slope" 2.000 ... Impervious Area" 0.972 н 80.000 Impervious length" ... 2.000 Impervious slope" ... Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... Pervious Runoff coefficient" 0.253 ... Pervious Ia/S coefficient" 0.100 п Pervious Initial abstraction" 8.467 ... 0.015 Impervious Manning 'n'" ... 98.000 Impervious SCS Curve No." н 0.872 Impervious Runoff coefficient" ... Impervious Ia/S coefficient" 0.100 ... 0.518 Impervious Initial abstraction" ... 0.273 0.080 0.080 0.000 c.m/sec" ... Catchment 201 Impervious Total Area " Pervious ... 0.972 Surface Area 0.108 1.080 hectare"

"	Ti	me of concentration	31.097	3.290	4.158	minutes"
"	Ti	me to Centroid	185.907	122.984	124.949	minutes"
"	Ra	infall depth	46.448	46.448	46.448	mm"
"	Ra	infall volume	50.16	451.48	501.64	c.m"
"	Ra	infall losses	34.692	5.929	8.806	mm"
"	Ru	noff depth	11.757	40.519	37.643	mm"
"	Ru	noff volume	12.70	393.84	406.54	c.m"
"	Ru	noff coefficient	0.253	0.872	0.810	
"	Ma	ximum flow	0.002	0.273	0.273	c.m/sec"
"	40 HY	DROGRAPH Add Runoff '	п			
"	4	Add Runoff "				
"		0.273 0.35	3 0.080	0.000"		
"	40 HY	DROGRAPH Copy to Out [.]	flow"			
"	8	Copy to Outflow"				
"		0.273 0.353	3 0.353	0.000"		
"	40 HY	DROGRAPH Combine	1"			
"	6	Combine "				
"	1	Node #"				
"		Outlet to Creek"				
"	Ma	ximum flow	0.3	53 c.m/s	ec"	
"	Hy	drograph volume	531.43	14 c.m"		
		0.273 0.353	3 0.353	0.353"		
"	40 HY	DROGRAPH Start - New	Tributary"			
	2	Start - New Tributa	ry"			
		0.273 0.000	0 0.353	0.353"		
	33 CA	TCHMENT 302"				
	1	Triangular SCS"				
	1	Equal length"				
	1	SCS method"				
	302	External drainage a	rea - drains	s to 202"		
	70.000	% Impervious				
	0.120					
	50.000	Flow length				
	1.000	Deputance Apop"				
	0.030 50.000	Pervious Area				
	1 000	Pervious rengen				
	1.000	Imponyious Apos"				
	50.004	Impervious length"				
	1 000	Impervious slope"				
	0 250	Pervious Manning 'n				
	75 000	Pervious SCS Curve I	No "			
	0.253	Pervious Runoff coe	fficient"			
	0.100	Pervious Ja/S coeff	icient"			
	8.467	Pervious Initial ab	straction"			
"	0.015	Impervious Manning	'n'"			
"	98.000	Impervious SCS Curve	e No."			
"	0.876	Impervious Runoff co	oefficient"			
"	0.100	Impervious Ia/S coe	fficient"			
"	0.518	Impervious Initial	abstraction'	u –		

"	0.024	0.000	0.353	0.353 (c.m/sec"	
"	Catchment 302	Per	vious	Impervious	Total Area	
"	Surface Area	0.0	36	0.084	0.120	hectare"
"	Time of concentrat	ion 28.	877	3.055	5.898	minutes"
"	Time to Centroid	182	.422	122.455	129.058	minutes"
"	Rainfall depth	46.4	448	46.448	46.448	mm"
"	Rainfall volume	16.	72	39.02	55.74	c.m"
"	Rainfall losses	34.0	597	5.744	14.430	mm"
"	Runoff depth	11.	752	40.705	32.019	mm"
"	Runoff volume	4.2	3	34.19	38.42	c.m"
"	Runoff coefficient	0.2	53	0.876	0.689	
"	Maximum flow	0.0	91	0.024	0.024	c.m/sec"
"	40 HYDROGRAPH Add Run	off "				
"	4 Add Runoff "					
"	0.024	0.024	0.353	0.353"		
"	40 HYDROGRAPH Copy to	Outflow	п			
"	8 Copy to Outflow	ı"				
"	0.024	0.024	0.024	0.353"		
"	40 HYDROGRAPH Next li	.nk "				
"	5 Next link "					
"	0.024	0.024	0.024	0.353"		
"	33 CATCHMENT 202"					
"	1 Triangular SCS"					
"	1 Equal length"					
"	1 SCS method"					
"	202 Uncontrolled to	creek"				
"	5.000 % Impervious"					
"	1.820 Total Area"					
"	80.000 Flow length"					
"	0.500 Overland Slope"					
"	1.729 Pervious Area"					
"	80.000 Pervious length	, "				
"	0.500 Pervious slope"					
"	0.091 Impervious Area	, "				
"	80.000 Impervious leng	th"				
"	0.500 Impervious slop	e"				
"	0.250 Pervious Mannin	ig 'n'"				
"	75.000 Pervious SCS Cu	rve No."				
"	0.253 Pervious Runoff	coeffic:	ient"			
"	0.100 Pervious Ia/S c	oefficie	nt"			
"	8.467 Pervious Initia	l abstra	ction"			
"	0.015 Impervious Mann	ing 'n'"				
"	98.000 Impervious SCS	Curve No	•"			
"	0.886 Impervious Runo	off coeff:	icient"			
"	0.100 Impervious Ia/S	coeffic	ient"			
"	0.518 Impervious Init	ial abst	raction'			
"	0.033	0.024	0.024	0.353 0	.m/sec"	
"	Catchment 202	Per	vious	Impervious	Total Area	
"	Surface Area	1.7	29	0.091	1.820	hectare"
"	Time of concentrat	ion 47.	135	4.986	40.579	minutes"

"	Tir	ne to Centroid		211.196	12	5.881	197.928	minutes"
"	Ra:	infall depth		46.448	46	.448	46.448	mm"
"	Ra:	infall volume		803.09	42	.27	845.36	c.m"
"	Ra:	infall losses		34.691	5.3	306	33.222	mm"
"	Rui	noff depth		11.758	41	.142	13.227	mm"
"	Rui	noff volume		203.29	37	.44	240.73	c.m"
"	Rui	noff coefficie	nt	0.253	0.8	886	0.285	
"	Max	kimum flow		0.027	0.0	927	0.033	c.m/sec"
"	40 HYI	DROGRAPH Add R	unoff "	I				
"	4	Add Runoff "						
"		0.033	0.056	5 0.6)24	0.353"		
"	40 HYI	DROGRAPH Copy	to Outf	low"				
"	8	Copy to Outfl	ow"					
"		0.033	0.056	5 0.6	956	0.353"		
"	40 HYI	DROGRAPH Com	bine	1"				
"	6	Combine "						
"	1	Node #"						
"		Outlet to Cre	ek"					
"	Max	kimum flow		6	.398	c.m/se	ec"	
"	Нус	drograph volum	e	816	.567	c.m"		
"		0.033	0.056	5 0.6	956	0.398"		
"	40 HYI	DROGRAPH Start	- New	Tributar	`У"			
"	2	Start - New T	ributar	`У"				
"		0.033	0.000	0.0	956	0.398"		
"	33 CA ⁻	TCHMENT 203"						
	1	Triangular SC	S"					
"	1	Equal length"						
"	1	SCS method"						
	203	Containment a	rea"					
	95.000	% Impervious"						
	1.140	Total Area"						
	35.000	Flow length"						
	0.500	Overland Slop	e"					
	0.057	Pervious Area						
	35.000	Pervious leng	th"					
	0.500	Pervious slop	e"					
	1.083	Impervious Ar	ea"					
	35.000	Impervious le	ngth"					
	0.500	Impervious sl	ope"					
	0.250	Pervious Mann	ing 'n'					
	/5.000	Pervious SCS	Curve N					
	0.253	Pervious Runo	tt coet	+icient'				
	0.100	Pervious Ia/S	coetti	cient"				
	8.46/	Pervious Init	ial abs	straction	1			
	0.015	Impervious Ma	nning '	n'" 				
	98.000	Impervious SC	S Curve	NO."	т п			
	0.8//	Impervious Ru	NOTT CC	etticier	IC I			
	0.100	Impervious la	/S coet	TICLENT'				
	0.518	Impervious In	itial a	pstracti	on"	0 000		
		0.315	0.000	0.6	156	0.398 0	.m/sec"	

	Catchment 203	Pervious	Impervious	Total A	Area "
п	Surface Area	0.057	1.083	1.140	hectare"
п	Time of concentration	28.703	3.036	3.420	minutes"
п	Time to Centroid	182.153	122.412	123.306	5 minutes"
п	Rainfall depth	46.448	46.448	46.448	mm"
п	Rainfall volume	26.48	503.04	529.51	c.m"
	Rainfall losses	34.700	5.733	7.181	mm''
п	Runoff depth	11.749	40.716	39.268	mm"
п	Runoff volume	6.70	440.95	447.65	c.m"
	Runoff coefficient	0.253	0.877	0.845	п
	Maximum flow	0.001	0.315	0.315	c.m/sec"
" 40	HYDROGRAPH Add Runoff	п			
п	4 Add Runoff "				
	0.315 0.31	.5 0.056	0.398"		
" 40	HYDROGRAPH Copy to Out	flow"			
	8 Copy to Outflow"				
	0.315 0.31	.5 0.315	0.398"		
" 40	HYDROGRAPH Combine	1"			
	6 Combine "				
	1 Node #"				
	Outlet to Creek"				
	Maximum flow	0.7	14 c.m/s	ec"	
	Hydrograph volume	1258.2	15 c.m"		
	0.315 0.31	.5 0.315	0.714"		
" 38	START/RE-START TOTALS	203"			
	3 Runoff Totals on EX	(IT"			
	Total Catchment area		4	.550	hectare"
	Total Impervious area		2	.503	hectare"
	Total % impervious		55	.011"	
" 19	EXIT"				

... MIDUSS Output ----->" ... Version 2.25 rev. 467" MIDUSS version ... MIDUSS created July 6, 2008" ... 10 Units used: ie METRIC" ... C:\Users\cmahoney\Documents\2024 Work\" Job folder: ... 2021-0713-10\New SWM Files\MIDUSS modelling\Post-Development - no mitigation" н 10 Year Developed Rev1.out" Output filename: п Licensee name: Circe Mahoney" ... WalterFedy" Company ... Date & Time last used: 2024-05-08 at 12:29:07 PM" ... 31 TIME PARAMETERS" ... Time Step" 5.000 п Max. Storm length" 240.000 п 1500.000 Max. Hydrograph" п 32 STORM Chicago storm" п Chicago storm" 1 ... 622.800 Coefficient A" ... Constant B" 0.000 ... 0.699 Exponent C" п 0.400 Fraction R" н Duration" 240.000 ... 1.000 Time step multiplier" н Maximum intensity 197.937 mm/hr" ... Total depth 54.031 mm" ... 010hyd Hydrograph extension used in this file" 6 ... 33 CATCHMENT 301" ... Triangular SCS" 1 ... 1 Equal length" н 1 SCS method" ... External catchment area - drains to 201" 301 ... 70.000 % Impervious" ... 0.390 Total Area" ... Flow length" 50.000 ... Overland Slope" 1.000 н 0.117 Pervious Area" ... 50.000 Pervious length" п 1.000 Pervious slope" ... 0.273 Impervious Area" ... Impervious length" 50.000 ... Impervious slope" 1.000 п Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... 0.295 Pervious Runoff coefficient" н 0.100 Pervious Ia/S coefficient" ... Pervious Initial abstraction" 8.467 ... 0.015 Impervious Manning 'n'" п 98.000 Impervious SCS Curve No." ... Impervious Runoff coefficient" 0.893 ... Impervious Ia/S coefficient" 0.100

... Impervious Initial abstraction" 0.518 ... 0.097 0.000 0.000 c.m/sec" 0.000 ... Impervious Total Area " Catchment 301 Pervious ... Surface Area 0.117 0.273 0.390 hectare" ... Time of concentration 2.864 minutes" 25.174 5.629 ... minutes" Time to Centroid 175.554 121.463 128.167 ... Rainfall depth mm" 54.031 54.031 54.031 ... c.m" Rainfall volume 63.22 147.50 210.72 п Rainfall losses 38.105 5.788 15.483 mm" ... Runoff depth 15.926 48.242 38.547 mm" ... Runoff volume 18.63 131.70 150.33 c.m" ... н Runoff coefficient 0.295 0.893 0.713 ... Maximum flow 0.004 0.096 0.097 c.m/sec" ... HYDROGRAPH Add Runoff " 40 п 4 Add Runoff " ... 0.097 0.097 0.000 0.000" н HYDROGRAPH Copy to Outflow" 40 " Copy to Outflow" 8 ... 0.097 0.000" 0.097 0.097 ... HYDROGRAPH Next link " 40 ... 5 Next link " ... 0.097 0.000" 0.097 0.097 н 33 CATCHMENT 201" п 1 Triangular SCS" ... 1 Equal length" ... SCS method" 1 ... 201 Controlled flow to Pond" ... 90.000 % Impervious" ... Total Area" 1.080 н 80.000 Flow length" ... Overland Slope" 2.000 ... 0.108 Pervious Area" ... 80.000 Pervious length" ... Pervious slope" 2.000 ... Impervious Area" 0.972 н 80.000 Impervious length" ... Impervious slope" 2.000 ... Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... Pervious Runoff coefficient" 0.295 ... Pervious Ia/S coefficient" 0.100 ... Pervious Initial abstraction" 8.467 ... 0.015 Impervious Manning 'n'" ... 98.000 Impervious SCS Curve No." н 0.890 Impervious Runoff coefficient" ... Impervious Ia/S coefficient" 0.100 ... 0.518 Impervious Initial abstraction" ... 0.332 0.097 0.097 0.000 c.m/sec" ... Catchment 201 Impervious Total Area " Pervious ... 0.972 Surface Area 0.108 1.080 hectare"

II.	Ti	me of concentration	27.110	3.084	3.937	minutes"
п	Ti	me to Centroid	178.636	121.923	123.937	minutes"
п	Ra	ainfall depth	54.031	54.031	54.031	mm"
н	Ra	ainfall volume	58.35	525.18	583.53	c.m"
н	Ra	ainfall losses	38.091	5.933	9.149	mm"
п	Ru	unoff depth	15.940	48.098	44.882	mm"
п	Ru	noff volume	17.21	467.51	484.72	c.m"
н	Ru	noff coefficient	0.295	0.890	0.831	"
н	Ma	aximum flow	0.004	0.331	0.332	c.m/sec"
" 40	НУ	DROGRAPH Add Runoff				
п	4	Add Runoff "				
н		0.332 0.42	8 0.097	0.000"		
" 40	НУ	DROGRAPH Copy to Out	flow"			
п	8	Copy to Outflow"				
II		0.332 0.42	8 0.428	0.000"		
" 40	НУ	/DROGRAPH Combine	1"			
II.	6	Combine "				
II.	1	Node #"				
н		Outlet to Creek"				
II.	Ma	aximum flow	0.4	28 c.m/s	ec"	
II.	Ну	/drograph volume	635.0	57 c.m"		
п		0.332 0.42	8 0.428	0.428"		
" 40	HY	/DROGRAPH Start - New	Tributary"			
п	2	Start - New Tributa	ry"			
II		0.332 0.00	0 0.428	0.428"		
" 33	CA	ATCHMENT 302"				
II	1	Triangular SCS"				
II	1	Equal length"				
II.	1	SCS method"				
	302	External drainage a	rea - drain	s to 202"		
	70.000	% Impervious"				
II	0.120	Total Area"				
II	50.000	Flow length"				
11	1.000	Overland Slope"				
	0.036	Pervious Area"				
	50.000	Pervious length"				
	1.000	Pervious slope"				
	0.084	Impervious Area"				
	50.000	Impervious length"				
	1.000	Impervious slope"				
	0.250	Pervious Manning 'n				
	75.000	Pervious SCS Curve	No."			
	0.295	Pervious Runott coe	fficient"			
	0.100	Pervious Ia/S coeff	icient"			
	8.467	Pervious Initial ab	straction"			
	0.015	Impervious Manning	'n'"			
	98.000	Impervious SCS Curv	e No."			
	0.893	Impervious Runott c	oetticient"			
	0.100	Impervious Ia/S coe	++icient"			
•	0.518	Impervious Initial	abstraction			

"	0.030	0.000	0.428	0.428 0	c.m/sec"	
"	Catchment 302		Pervious	Impervious	Total Area	п
"	Surface Area		0.036	0.084	0.120	hectare"
"	Time of concent	ration	25.174	2.864	5.629	minutes"
"	Time to Centroi	d	175.554	121.463	128.167	minutes"
"	Rainfall depth		54.031	54.031	54.031	mm"
"	Rainfall volume		19.45	45.39	64.84	c.m"
"	Rainfall losses		38.105	5.788	15.483	mm"
"	Runoff depth		15.926	48.242	38.547	mm"
"	Runoff volume		5.73	40.52	46.26	c.m"
"	Runoff coeffici	ent	0.295	0.893	0.713	
"	Maximum flow		0.001	0.030	0.030	c.m/sec"
"	40 HYDROGRAPH Add	Runoff "				
"	4 Add Runoff "					
"	0.030	0.030	0.428	0.428"		
"	40 HYDROGRAPH Copy	to Outf	low"			
"	8 Copy to Outf	low"				
"	0.030	0.030	0.030	0.428"		
"	40 HYDROGRAPH Next	link "				
"	5 Next link "					
"	0.030	0.030	0.030	0.428"		
"	33 CATCHMENT 202"					
"	1 Triangular S	CS"				
"	1 Equal length	п				
"	1 SCS method"					
"	202 Uncontrolled	to cree	ek"			
"	5.000 % Impervious	п				
"	1.820 Total Area"					
"	80.000 Flow length"					
"	0.500 Overland Slo	pe"				
"	1.729 Pervious Are	a"				
"	80.000 Pervious len	gth"				
"	0.500 Pervious slo	pe"				
"	0.091 Impervious A	rea"				
"	80.000 Impervious l	ength"				
"	0.500 Impervious s	lope"				
"	0.250 Pervious Man	ning 'n'	н			
"	75.000 Pervious SCS	Curve N	lo."			
"	0.295 Pervious Run	off coef	ficient"			
"	0.100 Pervious Ia/	S coeffi	.cient"			
"	8.467 Pervious Ini	tial abs	traction"			
"	0.015 Impervious M	anning '	n'"			
"	98.000 Impervious S	CS Curve	No."			
"	0.899 Impervious R	unoff co	efficient"			
"	0.100 Impervious I	a/S coef	ficient"			
"	0.518 Impervious I	nitial a	bstraction'	ı		
"	0.047	0.030	0.030	0.428 0	.m/sec"	
"	Catchment 202		Pervious	Impervious	Total Area	
"	Surface Area		1.729	0.091	1.820	hectare"
"	Time of concent	ration	41.090	4.675	36.053	minutes"

"	Ti	me to Centroid	20	1.083	124.752	190.524	minutes"
"	Ra	infall depth	54	.031	54.031	54.031	mm"
"	Ra	infall volume	93	84.19	49.17	983.36	c.m"
"	Ra	infall losses	38	8.099	5.433	36.466	mm"
"	Ru	noff depth	15	.932	48.597	17.565	mm"
"	Ru	noff volume	27	'5.46	44.22	319.68	c.m"
"	Ru	noff coefficien	t 0.	295	0.899	0.325	
"	Ma	ximum flow	0.	044	0.032	0.047	c.m/sec"
"	40 HY	DROGRAPH Add Ru	noff "				
"	4	Add Runoff "					
"		0.047	0.069	0.030	0.428"		
"	40 HY	DROGRAPH Copy t	o Outflo	w"			
"	8	Copy to Outflo	w"				
"		0.047	0.069	0.069	0.428"		
"	40 HY	DROGRAPH Comb	ine 1	."			
"	6	Combine "					
"	1	Node #"					
		Outlet to Cree	k"		_		
	Ma	ximum flow		0.48	s c.m/se	ec"	
	Hye	drograph volume		1000.99)7 c.m"		
		0.047	0.069	0.069	0.485"		
	40 HY	DROGRAPH Start	- New Ir	'ibutary"			
	2	Start - New Ir	ibutary"		0 405"		
	22 64	0.047	0.000	0.069	0.485"		
	33 CA	TRIANI 203					
	1	Irlangular SCS					
	1	Equal length					
	1 202	SCS method	oo"				
	05 000	V Transvious"	ea				
	1 1/0	Total Area"					
	35 000	Flow length"					
	0 500	Ovenland Slone					
	0.500	Pervious Area"					
	35 000	Pervious lengt	h"				
	0.500	Pervious slope	п П				
	1.083	Impervious Are	a"				
	35,000	Impervious len	gth"				
	0.500	Impervious slo	pe"				
	0.250	Pervious Manni	ng 'n'"				
	75.000	Pervious SCS C	urve No.				
	0.295	Pervious Runof	f coeffi	.cient"			
"	0.100	Pervious Ia/S	coeffici	.ent"			
"	8.467	Pervious Initi	al abstr	action"			
"	0.015	Impervious Man	ning 'n'	"			
"	98.000	Impervious SCS	Curve N	lo."			
"	0.893	Impervious Run	off coef	ficient"			
"	0.100	Impervious Ia/	S coeffi	.cient"			
"	0.518	Impervious Ini	tial abs	traction"			
"		0.382	0.000	0.069	0.485 0	.m/sec"	

	Catchment 203	Pervious	Impervious	Total Ar	ea "
	Surface Area	0.057	1.083	1.140	hectare"
	Time of concentration	25.022	2.847	3.225	minutes"
	Time to Centroid	175.305	121.436	122.356	minutes"
	Rainfall depth	54.031	54.031	54.031	mm"
"	Rainfall volume	30.80	585.15	615.95	c.m"
	Rainfall losses	38.102	5.776	7.393	mm"
"	Runoff depth	15.928	48.254	46.638	mm"
	Runoff volume	9.08	522.59	531.67	c.m"
	Runoff coefficient	0.295	0.893	0.863	п
	Maximum flow	0.002	0.382	0.382	c.m/sec"
" 40	HYDROGRAPH Add Runoff	"			
	4 Add Runoff "				
	0.382 0.38	82 0.069	0.485"		
" 40	HYDROGRAPH Copy to Out	flow"			
	8 Copy to Outflow"				
	0.382 0.38	³² 0.382	0.485"		
" 40	HYDROGRAPH Combine	1"			
	6 Combine "				
	1 Node #"				
	Outlet to Creek"				
	Maximum flow	0.8	67 c.m/s	ec"	
	Hydrograph volume	1532.6	72 c.m"		
	0.382 0.38	32 0.382	0.867"		
" 38	START/RE-START TOTALS	203"			
	3 Runoff Totals on EX	(IT"			
	Total Catchment area		4	.550 h	ectare"
	Total Impervious area		2	.503 h	ectare"
	Total % impervious		55	.011"	
" 19	EXIT"				

... MIDUSS Output ----->" ... Version 2.25 rev. 467" MIDUSS version ... MIDUSS created July 6, 2008" ... 10 Units used: ie METRIC" ... C:\Users\cmahoney\Documents\2024 Work\" Job folder: ... 2021-0713-10\New SWM Files\MIDUSS modelling\Post-Development - no mitigation" н 25 Year Developed Rev1.out" Output filename: п Licensee name: Circe Mahoney" ... WalterFedy" Company ... Date & Time last used: 2024-05-08 at 12:30:43 PM" ... TIME PARAMETERS" 31 ... Time Step" 5.000 п Max. Storm length" 240.000 п 1500.000 Max. Hydrograph" п 32 STORM Chicago storm" п Chicago storm" 1 ... 731.300 Coefficient A" ... Constant B" 0.000 ... 0.699 Exponent C" п 0.400 Fraction R" н Duration" 240.000 ... 1.000 Time step multiplier" н Maximum intensity 232.421 mm/hr" ... Total depth 63.444 mm" ... 025hyd Hydrograph extension used in this file" 6 ... 33 CATCHMENT 301" ... Triangular SCS" 1 ... 1 Equal length" н 1 SCS method" ... External catchment area - drains to 201" 301 ... 70.000 % Impervious" ... 0.390 Total Area" ... Flow length" 50.000 ... Overland Slope" 1.000 н 0.117 Pervious Area" ... 50.000 Pervious length" п 1.000 Pervious slope" ... 0.273 Impervious Area" ... Impervious length" 50.000 ... Impervious slope" 1.000 п 0.250 Pervious Manning 'n'" ... Pervious SCS Curve No." 75.000 ... 0.341 Pervious Runoff coefficient" н Pervious Ia/S coefficient" 0.100 ... Pervious Initial abstraction" 8.467 ... 0.015 Impervious Manning 'n'" п 98.000 Impervious SCS Curve No." ... Impervious Runoff coefficient" 0.908 ... Impervious Ia/S coefficient" 0.100

... Impervious Initial abstraction" 0.518 ... 0.000 0.000 c.m/sec" 0.118 0.000 ... Impervious Total Area " Catchment 301 Pervious ... Surface Area 0.117 0.273 0.390 hectare" ... Time of concentration 2.677 5.352 minutes" 21.996 ... Time to Centroid 169.356 120.544 127.304 minutes" ... Rainfall depth mm" 63.444 63.444 63.444 ... c.m" Rainfall volume 74.23 173.20 247.43 п Rainfall losses 41.828 5.820 16.622 mm" ... Runoff depth 46.821 mm" 21.615 57.624 ... Runoff volume 25.29 157.31 182.60 c.m" ... н Runoff coefficient 0.341 0.908 0.738 ... Maximum flow 0.007 0.117 0.118 c.m/sec" н HYDROGRAPH Add Runoff " 40 п 4 Add Runoff " ... 0.118 0.000 0.000" 0.118 н HYDROGRAPH Copy to Outflow" 40 " Copy to Outflow" 8 ... 0.000" 0.118 0.118 0.118 HYDROGRAPH Next link " ... 40 ... Next link " 5 ... 0.000" 0.118 0.118 0.118 н 33 CATCHMENT 201" п 1 Triangular SCS" 1 Equal length" ... SCS method" 1 ... 201 Controlled flow to Pond" ... 90.000 % Impervious" ... Total Area" 1.080 н 80.000 Flow length" ... Overland Slope" 2.000 ... 0.108 Pervious Area" ... 80.000 Pervious length" ... Pervious slope" 2.000 ... Impervious Area" 0.972 н 80.000 Impervious length" ... Impervious slope" 2.000 ... Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... Pervious Runoff coefficient" 0.341 ... Pervious Ia/S coefficient" 0.100 ... 8.467 Pervious Initial abstraction" ... 0.015 Impervious Manning 'n'" ... 98.000 Impervious SCS Curve No." н 0.906 Impervious Runoff coefficient" ... Impervious Ia/S coefficient" 0.100 ... 0.518 Impervious Initial abstraction" ... 0.405 0.118 0.118 0.000 c.m/sec" ... Catchment 201 Impervious Total Area " Pervious ... 0.972 Surface Area 0.108 1.080 hectare"

"	Ti	me of concentration	23.687	2.882	3.718	minutes"
"	Ti	me to Centroid	172.095	120.908	122.964	minutes"
"	Ra	infall depth	63.444	63.444	63.444	mm"
"	Ra	infall volume	68.52	616.67	685.19	c.m"
"	Ra	infall losses	41.807	5.972	9.556	mm"
"	Ru	noff depth	21.637	57.471	53.888	mm"
"	Ru	noff volume	23.37	558.62	581.99	c.m"
"	Ru	noff coefficient	0.341	0.906	0.849	
"	Ма	ximum flow	0.006	0.404	0.405	c.m/sec"
"	40 HY	DROGRAPH Add Runoff				·
"	4	Add Runoff "				
"		0.405 0.52	3 0.118	0.000"		
"	40 HY	DROGRAPH Copy to Out	flow"			
"	8	Copy to Outflow"				
"		0.405 0.52	3 0.523	0.000"		
"	40 HY	DROGRAPH Combine	1"			
"	6	Combine "				
"	1	Node #"				
"		Outlet to Creek"				
"	Ма	ximum flow	0.5	23 c.m/s	ec"	
"	Hy	drograph volume	764.5	92 c.m"		
"	-	0.405 0.52	3 0.523	0.523"		
"	40 HY	DROGRAPH Start - New	Tributary"			
"	2	Start - New Tributa	ry"			
"		0.405 0.00	0.523	0.523"		
"	33 CA	TCHMENT 302"				
"	1	Triangular SCS"				
"	1	Equal length"				
"	1	SCS method"				
"	302	External drainage a	rea - drain:	s to 202"		
"	70.000	% Impervious"				
"	0.120	Total Area"				
"	50.000	Flow length"				
"	1.000	Overland Slope"				
"	0.036	Pervious Area"				
"	50.000	Pervious length"				
"	1.000	Pervious slope"				
	0.084	Impervious Area"				
	50.000	Impervious length"				
	1.000	Impervious slope"				
	0.250	Pervious Manning 'n				
	75.000	Pervious SCS Curve	No."			
	0.341	Pervious Runoff coe	++icient"			
	0.100	Pervious Ia/S coeff	icient"			
	8.467	Pervious Initial ab	straction"			
	0.015	Impervious Manning	'n'''			
	98.000	Impervious SCS Curv	e No."			
	0.908	Impervious Runott c	oetticient"			
	0.100	Impervious Ia/S coe	++icient"			
	0.518	Impervious Initial	abstraction	•		

"	0	.036 6	000.0	0.523	0.523 c	.m/sec"	
"	Catchment	302	F	Pervious	Impervious	Total Area	"
"	Surface A	rea	(0.036	0.084	0.120	hectare"
"	Time of c	oncentrati	ion 2	21.996	2.677	5.352	minutes"
"	Time to C	entroid	-	169.356	120.544	127.304	minutes"
"	Rainfall	depth	6	53.444	63.444	63.444	mm"
"	Rainfall	volume		22.84	53.29	76.13	c.m"
"	Rainfall	losses	4	41.829	5.820	16.622	mm"
"	Runoff de	pth	2	21.615	57.624	46.821	mm"
"	Runoff vo	lume	-	7.78	48.40	56.19	c.m"
"	Runoff co	efficient	(0.341	0.908	0.738	"
"	Maximum f	low	(0.002	0.036	0.036	c.m/sec"
"	40 HYDROGRAP	H Add Rund	off "				
"	4 Add Ru	noff "					
"	0	.036 0	0.036	0.523	0.523"		
"	40 HYDROGRAP	H Copy to	Outf	low"			
"	8 Copy t	o Outflow'	•				
"		.036 0	0.036	0.036	0.523"		
"	40 HYDROGRAP	H Next lir	nk "				
"	5 Next 1	ink "					
"	0	.036 0	0.036	0.036	0.523"		
"	33 CATCHMENT	202"					
"	1 Triang	ular SCS"					
"	1 Equal	length"					
"	1 SCS me	thod"					
"	202 Uncont	rolled to	creel	k"			
"	5.000 % Impe	rvious"					
"	1.820 Total	Area"					
"	80.000 Flow l	ength"					
"	0.500 Overla	nd Slope"					
"	1.729 Pervio	us Area"					
"	80.000 Pervio	us length'	ı				
"	0.500 Pervio	us slope"					
"	0.091 Imperv	ious Area"	•				
"	80.000 Imperv	ious lengt	:h"				
"	0.500 Imperv	ious slope	بۇ				
"	0.250 Pervio	us Manning	g 'n''	п			
"	75.000 Pervio	us SCS Cur	ve No	o."			
"	0.341 Pervio	us Runoff	coef	ficient"			
"	0.100 Pervio	us Ia/S co	oeffi	cient"			
"	8.467 Pervio	us Initial	L abst	traction"			
"	0.015 Imperv	ious Manni	ing 'i	n'"			
"	98.000 Imperv	ious SCS C	Curve	No."			
"	0.910 Imperv	ious Runof	f coe	efficient"			
"	0.100 Imperv	ious Ia/S	coeft	ficient"			
"	0.518 Imperv	ious Initi	ial al	ostraction"	•		
"	. 0	.070 6	0.036	0.036	0.523 c	.m/sec"	
"	Catchment	202	F	Pervious	Impervious	Total Area	
"	Surface A	rea		1.729	0.091	1.820	hectare"
"	Time of c	oncentrati	ion 3	35.903	4.369	32.022	minutes"

"	Ti	me to Centroid	19	1.988	123.664	183.579	minutes"
"	Ra	infall depth	63	.444	63.444	63.444	mm"
"	Ra	infall volume	10	96.94	57.73	1154.67	c.m"
"	Ra	infall losses	41	.804	5.738	40.001	mm"
"	Ru	noff depth	21	.639	57.706	23.443	mm"
"	Ru	noff volume	37	4.15	52.51	426.66	c.m"
"	Ru	noff coefficie	nt 0.	341	0.910	0.370	п
"	Ма	ximum flow	0.	066	0.037	0.070	c.m/sec"
"	40 HY	DROGRAPH Add R	unoff "				
"	4	Add Runoff "					
"		0.070	0.087	0.036	0.523"		
"	40 HY	DROGRAPH Copy	to Outflo	w"			
"	8	Copy to Outfl	ow"				
"		0.070	0.087	0.087	0.523"		
"	40 HY	DROGRAPH Com	bine 1				
"	6	Combine "					
"	1	Node #"					
"		Outlet to Cre	ek"				
"	Ма	ximum flow		0.59	97 c.m/se	ec"	
"	Hy	drograph volum	e	1247.43	85 c.m"		
"		0.070	0.087	0.087	0.597"		
"	40 HY	DROGRAPH Start	- New Tr	ibutary"			
"	2	Start - New T	ributary"				
"		0.070	0.000	0.087	0.597"		
"	33 CA	TCHMENT 203"					
"	1	Triangular SC	S"				
"	1	Equal length"					
"	1	SCS method"					
"	203	Containment a	rea"				
"	95.000	% Impervious"					
"	1.140	Total Area"					
"	35.000	Flow length"					
"	0.500	Overland Slop	e"				
"	0.057	Pervious Area					
	35.000	Pervious leng	th"				
"	0.500	Pervious slop	e"				
	1.083	Impervious Ar	ea"				
	35.000	Impervious le	ngth"				
	0.500	Impervious sl	ope"				
	0.250	Pervious Mann	ing 'n'"				
	75.000	Pervious SCS	Curve No.				
	0.341	Pervious Runo	ff coeffi	cient"			
	0.100	Pervious Ia/S	coeffici	ent"			
	8.467	Pervious Init	ıal abstr	action"			
	0.015	Impervious Ma	nning 'n'				
	98.000	Impervious SC	S Curve N	0."			
	0.908	Impervious Ru	nott coef	+icient"			
	0.100	Impervious Ia	/S coetti	cient"			
	0.518	Impervious In	itial abs	traction"	•	,	
		0.465	0.000	0.087	0.597 (c.m/sec"	

	Catchment 203	Pervious	Impervious	Total A	rea "
п	Surface Area	0.057	1.083	1.140	hectare"
	Time of concentration	21.863	2.661	3.032	minutes"
	Time to Centroid	169.131	120.513	121.454	minutes"
	Rainfall depth	63.444	63.444	63.444	mm"
	Rainfall volume	36.16	687.09	723.26	c.m"
	Rainfall losses	41.824	5.811	7.612	mm"
	Runoff depth	21.620	57.632	55.832	mm"
	Runoff volume	12.32	624.16	636.48	c.m"
	Runoff coefficient	0.341	0.908	0.880	
	Maximum flow	0.003	0.464	0.465	c.m/sec"
" 40	HYDROGRAPH Add Runoff				
п	4 Add Runoff "				
	0.465 0.46	65 0.087	0.597"		
" 40	HYDROGRAPH Copy to Out	flow"			
	8 Copy to Outflow"				
	0.465 0.46	0.465	0.597"		
" 40	HYDROGRAPH Combine	1"			
	6 Combine "				
	1 Node #"				
	Outlet to Creek"				
	Maximum flow	1.0	62 c.m/s	ec"	
	Hydrograph volume	1883.9	18 c.m"		
	0.465 0.46	0.465	1.062"		
" 38	START/RE-START TOTALS	203"			
	3 Runoff Totals on EX	(IT"			
	Total Catchment area		4	.550	hectare"
	Total Impervious area		2	.503	hectare"
	Total % impervious		55	.011"	
" 19	EXIT"				

... MIDUSS Output ----->" ... Version 2.25 rev. 467" MIDUSS version ... MIDUSS created July 6, 2008" ... 10 Units used: ie METRIC" ... C:\Users\cmahoney\Documents\2024 Work\" Job folder: ... 2021-0713-10\New SWM Files\MIDUSS modelling\Post-Development - no mitigation" н 50 Year Developed Rev1.out" Output filename: п Licensee name: Circe Mahoney" ... WalterFedy" Company ... Date & Time last used: 2024-05-08 at 12:32:16 PM" ... 31 TIME PARAMETERS" ... Time Step" 5.000 п Max. Storm length" 240.000 п 1500.000 Max. Hydrograph" п 32 STORM Chicago storm" п Chicago storm" 1 ... 811.800 Coefficient A" ... Constant B" 0.000 ... 0.699 Exponent C" п 0.400 Fraction R" н Duration" 240.000 ... 1.000 Time step multiplier" н Maximum intensity mm/hr" 258.005 ... Total depth 70.427 mm" ... 050hyd Hydrograph extension used in this file" 6 ... 33 CATCHMENT 301" ... Triangular SCS" 1 ... 1 Equal length" н 1 SCS method" ... External catchment area - drains to 201" 301 ... 70.000 % Impervious" ... 0.390 Total Area" ... Flow length" 50.000 ... Overland Slope" 1.000 н 0.117 Pervious Area" ... 50.000 Pervious length" п 1.000 Pervious slope" ... 0.273 Impervious Area" ... Impervious length" 50.000 ... Impervious slope" 1.000 п Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... 0.372 Pervious Runoff coefficient" н Pervious Ia/S coefficient" 0.100 ... Pervious Initial abstraction" 8.467 ... Impervious Manning 'n'" 0.015 ... 98.000 Impervious SCS Curve No." ... Impervious Runoff coefficient" 0.917 ... Impervious Ia/S coefficient" 0.100

... Impervious Initial abstraction" 0.518 ... 0.134 0.000 0.000 c.m/sec" 0.000 ... Impervious Total Area " Catchment 301 Pervious ... Surface Area 0.117 0.273 0.390 hectare" ... Time of concentration 2.563 minutes" 20.248 5.179 ... Time to Centroid 165.776 119.964 126.742 minutes" ... Rainfall depth mm" 70.427 70.427 70.427 ... c.m" Rainfall volume 82.40 192.27 274.67 п Rainfall losses 44.262 5.851 17.374 mm" ... 26.165 Runoff depth 53.053 mm" 64.576 ... Runoff volume 30.61 176.29 206.91 c.m" ... н Runoff coefficient 0.372 0.917 0.753 ... Maximum flow 0.009 0.132 0.134 c.m/sec" н HYDROGRAPH Add Runoff " 40 п 4 Add Runoff " ... 0.134 0.000 0.000" 0.134 н HYDROGRAPH Copy to Outflow" 40 " Copy to Outflow" 8 ... 0.000" 0.134 0.134 0.134 HYDROGRAPH Next link " ... 40 ... 5 Next link " ... 0.000" 0.134 0.134 0.134 н 33 CATCHMENT 201" п 1 Triangular SCS" 1 Equal length" ... SCS method" 1 ... 201 Controlled flow to Pond" ... 90.000 % Impervious" ... Total Area" 1.080 н 80.000 Flow length" ... Overland Slope" 2.000 ... 0.108 Pervious Area" ... 80.000 Pervious length" ... Pervious slope" 2.000 ... Impervious Area" 0.972 н 80.000 Impervious length" ... Impervious slope" 2.000 ... Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... Pervious Runoff coefficient" 0.371 ... Pervious Ia/S coefficient" 0.100 ... 8.467 Pervious Initial abstraction" ... 0.015 Impervious Manning 'n'" ... 98.000 Impervious SCS Curve No." н 0.915 Impervious Runoff coefficient" ... Impervious Ia/S coefficient" 0.100 ... 0.518 Impervious Initial abstraction" ... 0.460 0.134 0.134 0.000 c.m/sec" ... Catchment 201 Impervious Total Area " Pervious ... 0.972 Surface Area 0.108 1.080 hectare"

<pre>Time to Centroid 168.350 120.330 122.402 minutes" Rainfall volume 76.06 684.55 760.62 c.m" Rainfall losses 44.273 5.986 9.815 mm" Runoff depth 26.154 64.441 60.612 mm" Runoff volume 28.25 626.37 654.61 c.m" Maximum flow 0.008 0.459 0.460 c.m/sec" 40 HYDROGRAPH Add Runoff " 4 Add Runoff " 5 Combine 1" 5 Combine 1" 5 Combine 1" 5 Combine 1 Creek" 5 Comparator Combine 1 5 Comparator Combine 1 5 Combine</pre>	"	Ti	me of concentration	21.804	2.760	3.581	minutes"
<pre>" Rainfall depth 70.427 70.427 70.427 mm" Rainfall volume 76.06 684.55 760.62 c.m" Rainfall losses 44.273 5.966 9.815 mm" Runoff depth 26.154 64.441 60.612 mm" Runoff volume 28.25 626.37 654.61 c.m" Runoff coefficient 0.371 0.915 0.861 " " Maximum flow 0.008 0.459 0.460 c.m/sec" " 4 Add Runoff Runoff</pre>	"	Ti	me to Centroid	168.350	120.330	122.402	minutes"
<pre>" Rainfall volume 76.06 684.55 760.62 c.m" Rainfall losses 44.273 5.986 9.815 mm" "Runoff depth 26.154 64.441 60.612 mm" Runoff volume 28.25 626.37 654.61 c.m" Maximum flow 0.008 0.459 0.460 c.m/sec" "40 HYDROGRAPH Add Runoff " 40 HYDROGRAPH Add Runoff " 40 HYDROGRAPH Combine 1" 6 Combine 1" 7 0.460 0.594 0.594 0.000" 40 HYDROGRAPH Compto 1.594 0.000" 40 HYDROGRAPH Compto 1.594 0.594 0.000" 40 HYDROGRAPH Compto 1.594 0.594 0.000" 44 HYDROGRAPH Compto 1.594 0.594 0.594 45 Compto 1.521 c.m" 46 Officient 0.594 0.594 0.594 47 Outlet to Creek" 48 Maximum flow 0.594 0.594 0.594 49 HYDROGRAPH Start - New Tributary" 40 HYDROGRAPH Start - New Tributary" 40 HYDROGRAPH Start - New Tributary" 41 Deter 1 Determine 1 42 Start - New Tributary 43 CATCHMENT 302" 44 HYDROGRAPH Start - New Tributary 45 Outlet to Creek 45 Outlet to Creek 46 Outlet to Creek 47 Outlet to Creek 47 Outlet to Creek 48 Outlet to Creek 49 Outle Coreek 49 Outlet to Creek 40 HYDROGRAPH Start - New Tributary 41 Outlet to Creek 49 Outlet to Creek 40 HYDROGRAPH Start - New Tributary 40 HYDROGRAPH Start - New Tributary 41 Outlet to Creek 40 HYDROGRAPH Start - New Tributary 41 Outlet to Creek 41 Outlet to Creek 42 Outlet to Creek 43 Outlet to Creek 44 Outlet to Creek 44 Outlet to Creek 45 Outlet to Creek 46 Outlet to Creek 47 Outlet to Creek 47 Outlet to Creek 48 Outlet to Creek 48 Outlet to Creek 49 Outlet to Creek 40 HYDROGRAPH Start - New Tributary 40 Outlet to Creek 40 HYDROGRAPH Start - New Tributary 40 Outlet to Creek 40 HYDROGRAPH Start - New Tributary 40 Outlet to Creek 40 HYDROGRAPH Start - New Tributary 40 Outlet to Creek 40 Outlet t</pre>	"	Ra	infall depth	70.427	70.427	70.427	mm"
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<pre>33 CATCHMENT 302" " 33 CATCHMENT 302" " 1 Equal length" 1 SCS method" " 302 External drainage area - drains to 202" " 70.000 % Impervious" " 0.120 Total Area" " 50.000 Flow length" " 1.000 Overland Slope" " 0.036 Pervious Area" " 50.000 Pervious length" " 1.000 Pervious length" " 1.000 Impervious length" " 1.000 Impervious length" " 1.000 Impervious length" " 1.000 Impervious slope" " 0.250 Pervious SCS Curve No." " 0.372 Pervious Runoff coefficient" " 0.100 Pervious Initial abstraction" " 0.015 Impervious SCS Curve No." " 0.917 Impervious Runoff coefficient" " 0.100 Impervious In/S coefficient" " 0.100 Impervious In/S coefficient" " 0.100 Impervious In/S coefficient" " 0.100 Impervious Runoff coefficient" " 0.100 Impervious In/S coefficient" " 0.100 Impervious Runoff coefficient" " 0.100 Impervious In/S coefficient" " 0.100 Impervious In/S coefficient" " 0.100 Impervious Runoff coefficient" " 0.100 Impervious In/S coefficient" " 0.100 Impervious Runoff coefficient" " 0.100 Impervious Runoff coefficient" " 0.100 Impervious In/S coefficient"</pre>		2	0 460 0 00	'у А 6594	0 591"		
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 I findigular Jobs I Equal length" I SCS method" 302 External drainage area - drains to 202" 70.000 % Impervious" 0.120 Total Area" 90.000 Flow length" 1.000 Overland Slope" 0.036 Pervious Area" 90.036 Pervious length" 1.000 Pervious slope" 0.084 Impervious length" 1.000 Impervious length" 1.000 Impervious length" 1.000 Impervious slope" 0.250 Pervious Manning 'n'" 75.000 Pervious SCS Curve No." 0.372 Pervious Runoff coefficient" 0.100 Pervious Initial abstraction" 0.015 Impervious SCS Curve No." 0.917 Impervious Runoff coefficient" 0.100 Impervious SCS coefficient" 0.101 Impervious Runoff coefficient" 		 1	Triangular SCS"				
<pre>1 SCS method" 1 SCS method" 1 302 External drainage area - drains to 202" 1 70.000 % Impervious" 1 0.120 Total Area" 1 50.000 Flow length" 1 0.000 Overland Slope" 1 0.036 Pervious Area" 1 50.000 Pervious length" 1 0.000 Pervious slope" 1 0.084 Impervious Area" 1 50.000 Impervious Area" 1 50.000 Impervious Slope" 1 0.084 Pervious Slope" 1 0.090 Pervious Slope" 1 0.091 Pervious SCS Curve No." 1 0.100 Pervious SCS Curve No." 1 0.100 Pervious Initial abstraction" 1 0.015 Impervious Manning 'n'" 1 98.000 Impervious SCS Curve No." 1 0.017 Impervious Runoff coefficient" 1 0.100 Impervious Runoff coefficient" 1 0.100 Pervious SCS Curve No." 1 0.017 Impervious Runoff coefficient" 1 0.100 Impervious Ia/S coefficient" 1 0.100 Pervious SCS Curve No." 1 0.010 Pervious SCS Curve No." 1 0.011 Pervious SCS Curve No." 1 0.012 Pervious SCS Curve No." 1 0.013 Pervious SCS Curve No." 1 0.014 Pervious SCS Curve No." 1 0.015 Pervious SCS Curve No." 1 0.016 Pervious SCS Curve No." 1 0.017 Pervious Runoff coefficient" 1 0.018 Pervious Runoff coefficient" 1 0.019 Pervious Runoff coefficient" 1 0.019 Pervious Runoff coefficient" 1 0.010 Pervious Runoff coefficient" 1 0.011 PERVIOUS RUNOFF COEfficient 1 0.012 PERVIOUS RUNOFF COEfficient 1 0.013 PERVIOUS RUNOFF COEfficient 1 0.014 PERVIOUS PERVIOUS</pre>		1	Faual length"				
 302 External drainage area - drains to 202" 70.000 % Impervious" 0.120 Total Area" 50.000 Flow length" 1.000 Overland Slope" 0.036 Pervious Area" 50.000 Pervious length" 1.000 Pervious slope" 0.084 Impervious Area" 50.000 Impervious length" 1.000 Impervious length" 1.000 Impervious slope" 0.250 Pervious slope" 0.250 Pervious slope" 0.250 Pervious SCS Curve No." 0.372 Pervious Runoff coefficient" 0.100 Pervious Ia/S coefficient" 98.000 Impervious SCS Curve No." 0.15 Impervious Manning 'n'" 98.000 Impervious SCS Curve No." 0.917 Impervious Runoff coefficient" 0.100 Impervious Runoff coefficient" 0.100 Impervious SCS Curve No." 		1	SCS method"				
 70.000 % Impervious" 70.000 % Impervious" 90.120 Total Area" 90.000 Flow length" 90.036 Pervious Area" 90.000 Pervious length" 90.000 Pervious slope" 90.084 Impervious Area" 90.000 Impervious length" 90.000 Impervious length" 90.000 Impervious length" 90.000 Impervious slope" 91.000 Pervious slope" 92.50 Pervious Manning 'n'" 92.600 Pervious SCS Curve No." 93.72 Pervious Runoff coefficient" 94.67 Pervious Initial abstraction" 98.000 Impervious SCS Curve No." 99.17 Impervious Runoff coefficient" 91.100 Impervious Runoff coefficient" 91.100 Impervious Runoff coefficient" 91.100 Impervious SCS Curve No." 91.1111 abstraction" 91.1111 abstraction" 91.1111 abstraction 91.1111 abstra		302	External drainage a	rea - drain	s to 202"		
 0.1000 Total Area" 0.120 Total Area" 50.000 Flow length" 1.000 Overland Slope" 0.036 Pervious Area" 50.000 Pervious length" 1.000 Pervious slope" 0.084 Impervious Area" 50.000 Impervious length" 1.000 Impervious slope" 0.250 Pervious Manning 'n'" 75.000 Pervious SCS Curve No." 0.372 Pervious Runoff coefficient" 0.100 Pervious Initial abstraction" 0.015 Impervious Manning 'n'" 98.000 Impervious SCS Curve No." 0.917 Impervious Runoff coefficient" 0.100 Impervious Anning 'n'" 		70 000	% Impervious"		5 (0 202		
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 1.000 Overland Slope" 0.036 Pervious Area" 50.000 Pervious length" 1.000 Pervious slope" 0.084 Impervious Area" 50.000 Impervious length" 1.000 Impervious slope" 0.250 Pervious Manning 'n'" 75.000 Pervious SCS Curve No." 0.372 Pervious Runoff coefficient" 0.100 Pervious Ia/S coefficient" 8.467 Pervious Initial abstraction" 0.015 Impervious Manning 'n'" 98.000 Impervious SCS Curve No." 0.917 Impervious Runoff coefficient" 0.100 Impervious Runoff coefficient" 0.100 Impervious Ia/S coefficient" 		50 000	Flow length"				
 0.036 Pervious Area" 0.036 Pervious length" 1.000 Pervious slope" 0.084 Impervious Area" 50.000 Impervious length" 1.000 Impervious slope" 0.250 Pervious Manning 'n'" 75.000 Pervious SCS Curve No." 0.372 Pervious Runoff coefficient" 0.100 Pervious Ia/S coefficient" 8.467 Pervious Initial abstraction" 0.015 Impervious Manning 'n'" 98.000 Impervious SCS Curve No." 0.917 Impervious Runoff coefficient" 0.100 Impervious Ia/S coefficient" 0.917 Impervious Runoff coefficient" 0.100 Impervious Ia/S coefficient" 		1 000	Overland Slope"				
 50.000 Pervious length" 1.000 Pervious slope" 0.084 Impervious Area" 50.000 Impervious length" 1.000 Impervious slope" 0.250 Pervious Manning 'n'" 75.000 Pervious SCS Curve No." 0.372 Pervious Runoff coefficient" 0.100 Pervious Ia/S coefficient" 8.467 Pervious Initial abstraction" 0.015 Impervious Manning 'n'" 98.000 Impervious SCS Curve No." 0.917 Impervious Runoff coefficient" 0.100 Impervious Runoff coefficient" 		9.000 0.036	Pervious Area"				
<pre>" 1.000 Pervious slope" " 0.084 Impervious Area" " 50.000 Impervious length" " 1.000 Impervious slope" " 0.250 Pervious Manning 'n'" " 75.000 Pervious SCS Curve No." " 0.372 Pervious Runoff coefficient" " 0.100 Pervious Ia/S coefficient" " 8.467 Pervious Initial abstraction" " 0.015 Impervious Manning 'n'" " 98.000 Impervious SCS Curve No." " 0.917 Impervious Runoff coefficient" " 0.100 Impervious Ia/S coefficient"</pre>		50,000	Pervious length"				
<pre>" 0.084 Impervious Area" " 50.000 Impervious length" " 1.000 Impervious slope" " 0.250 Pervious Manning 'n'" " 75.000 Pervious SCS Curve No." " 0.372 Pervious Runoff coefficient" " 0.100 Pervious Ia/S coefficient" " 8.467 Pervious Initial abstraction" " 0.015 Impervious Manning 'n'" " 98.000 Impervious SCS Curve No." " 0.917 Impervious Runoff coefficient" " 0.100 Impervious Ia/S coefficient"</pre>		1 000	Pervious slope"				
<pre>"50.004 Impervious Area "50.000 Impervious length" "1.000 Impervious slope" "0.250 Pervious Manning 'n'" "75.000 Pervious SCS Curve No." "0.372 Pervious Runoff coefficient" "0.100 Pervious Ia/S coefficient" "8.467 Pervious Initial abstraction" "0.015 Impervious Manning 'n'" "98.000 Impervious SCS Curve No." "0.917 Impervious Runoff coefficient" "0.100 Impervious Ia/S coefficient"</pre>		0 084	Tmpervious Area"				
<pre>" 1.000 Impervious length" " 1.000 Impervious slope" " 0.250 Pervious Manning 'n'" " 75.000 Pervious SCS Curve No." " 0.372 Pervious Runoff coefficient" " 0.100 Pervious Ia/S coefficient" " 0.015 Impervious Manning 'n'" " 98.000 Impervious SCS Curve No." " 0.917 Impervious Runoff coefficient" " 0.100 Impervious Ia/S coefficient"</pre>		50.004	Impervious length"				
 0.250 Pervious Manning 'n'" 75.000 Pervious SCS Curve No." 0.372 Pervious Runoff coefficient" 0.100 Pervious Ia/S coefficient" 8.467 Pervious Initial abstraction" 0.015 Impervious Manning 'n'" 98.000 Impervious SCS Curve No." 0.917 Impervious Runoff coefficient" 0.100 Impervious Ia/S coefficient" 		1,000	Impervious slope"				
<pre>" 75.000 Pervious SCS Curve No." " 0.372 Pervious Runoff coefficient" " 0.100 Pervious Ia/S coefficient" " 8.467 Pervious Initial abstraction" " 0.015 Impervious Manning 'n'" " 98.000 Impervious SCS Curve No." " 0.917 Impervious Runoff coefficient" " 0.100 Impervious Ia/S coefficient"</pre>		9 250	Pervious Manning 'n				
<pre>" 0.372 Pervious Runoff coefficient" " 0.100 Pervious Ia/S coefficient" " 8.467 Pervious Initial abstraction" " 0.015 Impervious Manning 'n'" " 98.000 Impervious SCS Curve No." " 0.917 Impervious Runoff coefficient" " 0.100 Impervious Ia/S coefficient"</pre>		75 000	Pervious SCS Curve	No "			
<pre>" 0.100 Pervious Ia/S coefficient" " 8.467 Pervious Initial abstraction" " 0.015 Impervious Manning 'n'" " 98.000 Impervious SCS Curve No." " 0.917 Impervious Runoff coefficient" " 0.100 Impervious Ia/S coefficient"</pre>		9.372	Pervious Runoff coe	fficient"			
<pre>" 8.467 Pervious Initial abstraction" " 0.015 Impervious Manning 'n'" " 98.000 Impervious SCS Curve No." " 0.917 Impervious Runoff coefficient" " 0.100 Impervious Ia/S coefficient"</pre>		0.100	Pervious Ta/S coeff	icient"			
<pre>" 0.015 Impervious Manning 'n'" " 98.000 Impervious SCS Curve No." " 0.917 Impervious Runoff coefficient" " 0.100 Impervious Ia/S coefficient"</pre>		8,467	Pervious Initial ab	straction"			
<pre>" 98.000 Impervious SCS Curve No." " 0.917 Impervious Runoff coefficient" " 0.100 Impervious Ia/S coefficient"</pre>		0.015	Impervious Manning	'n'"			
<pre>" 0.917 Impervious Runoff coefficient" " 0.100 Impervious Ia/S coefficient"</pre>		98 000	Impervious SCS Curve	e No."			
" 0.100 Impervious Ia/S coefficient"		0 917	Impervious Runoff o	oefficient"			
		0.J17 0 100	Impervious Ta/S coe	fficient"			
" 0.518 Impervious Initial abstraction"		0.518	Impervious Initial	abstraction	n		

"	0.041	0.000	0.594	0.594 c	.m/sec"		
"	Catchment 302	Pe	ervious	Impervious	Total Area		
"	Surface Area	0.	.036	0.084	0.120	hectare"	
"	Time of concentra	ation 20	9.248	2.563	5.179	minutes"	
"	Time to Centroid	16	55.777	119.964	126.742	minutes"	
"	Rainfall depth	76	9.427	70.427	70.427	mm"	
"	Rainfall volume	25	5.35	59.16	84.51	c.m"	
"	Rainfall losses	44	4.262	5.851	17.374	mm"	
"	Runoff depth	26	5.165	64.576	53.053	mm"	
"	Runoff volume	9.	.42	54.24	63.66	c.m"	
"	Runoff coefficier	nt 0.	. 372	0.917	0.753	н	
"	Maximum flow	0.	.003	0.041	0.041	c.m/sec"	
"	40 HYDROGRAPH Add Ru	unoff "					
"	4 Add Runoff "						
"	0.041	0.041	0.594	0.594"			
"	40 HYDROGRAPH Copy	to Outflo	ow"				
"	8 Copy to Outflo	ow"					
"	0.041	0.041	0.041	0.594"			
"	40 HYDROGRAPH Next	link "					
"	5 Next link "						
"	0.041	0.041	0.041	0.594"			
"	33 CATCHMENT 202"						
"	1 Triangular SCS	5"					
"	1 Equal length"						
"	1 SCS method"						
"	202 Uncontrolled	to creek'	•				
"	5.000 % Impervious"						
"	1.820 Total Area"						
"	80.000 Flow length"						
"	0.500 Overland Slope	e"					
"	1.729 Pervious Area	I					
"	80.000 Pervious leng	th"					
"	0.500 Pervious slope	e"					
"	0.091 Impervious Are	ea"					
"	80.000 Impervious le	ngth"					
"	0.500 Impervious slo	ope"					
"	0.250 Pervious Mann:	ing 'n'"					
"	75.000 Pervious SCS (Curve No.	•				
"	0.372 Pervious Runo	ff coeffi	icient"				
"	0.100 Pervious Ia/S	coeffici	ient"				
"	8.467 Pervious Init:	ial abstr	raction"				
"	0.015 Impervious Man	ning 'n'					
"	98.000 Impervious SCS	5 Curve M	No."				
"	0.914 Impervious Ru	noff coef	fficient"				
"	0.100 Impervious Ia,	/S coeffi	icient"				
"	0.518 Impervious In:	itial abs	straction"				
"	0.097	0.041	0.041	0.594 c	.m/sec"		
"	Catchment 202	Pe	ervious	Impervious	Total Area		
"	Surface Area	1.	.729	0.091	1.820	hectare"	
"	Time of concentra	ation 33	3.049	4.183	29.742	minutes"	
"	Tir	ne to Centroi	.d	186.837	123.021	179.526	minutes"
---	--------------------	---------------	---------------------------------------	-------------------	----------	----------	----------
	Rat	infall depth		70.427	70.427	70.427	mm"
	Rat	infall volume	!	1217.69	64.09	1281.78	c.m"
"	Rat	infall losses		44.248	6.062	42.338	mm"
"	Rur	noff depth		26.180	64.365	28.089	mm"
	Rur	noff volume		452.65	58.57	511.22	c.m"
	Rur	noff coeffici	ent	0.372	0.914	0.399	
"	Max	kimum flow		0.090	0.040	0.097	c.m/sec"
"	40 HYI	DROGRAPH Add	Runoff "				
"	4	Add Runoff "					
		0.097	0.104	0.041	0.594"		
"	40 HYI	DROGRAPH Copy	' to Outf	low"			
	8	Copy to Outf	low"				
		0.097	0.104	0.104	0.594"		
	40 HYI	DROGRAPH Co	mbine	1"			
"	6	Combine "					
	1	Node #"					
		Outlet to Cr	eek"				
	Max	kimum flow		0.6	80 c.m/s	ec"	
	Нус	drograph volu	me	1436.4	03 c.m"		
		0.097	0.104	0.104	0.680"		
	40 HYI	DROGRAPH Star	t - New	Tributary"			
	2	Start - New	Tributar	·у"			
		0.097	0.000	0.104	0.680"		
	33 CA ⁻	TCHMENT 203"					
	1	Triangular S	CS"				
	1	Equal length	"				
	1	SCS method"					
	203	Containment	area"				
	95.000	% Impervious					
	1.140	Total Area"					
	35.000	Flow length"					
	0.500	Overland Slo	pe"				
	0.057	Pervious Are	a"				
	35.000	Pervious len	gth"				
	0.500	Pervious slo	pe"				
	1.083	Impervious A	rea"				
	35.000	Impervious I	engtn"				
	0.500	Impervious s	lope"				
	0.250	Pervious Man	ning n				
	/5.000	Pervious SCS	Curve N				
	0.3/1	Pervious Run		Ticlent			
	0.100	Pervious 1a/	+iol obo	crent thattan"			
	ð.40/	Tervious ini	lannina '	craction			
	00 000	Impervious M					
	0000 A 017	Tubel.ATORS 2	upoff co	NU.			
	0.917 0 100	Impervious R		ficiont"			
	0.100 0 E10		a, 5 COUT	betraction			
	0.010		D D D D D D D D D D D D D D D D D D D		0 600		
		0.527	0.000	0.104	0.000	Com/ Sec	

	Catchment 203	Pervious	Impervious	Total Are	ea "
п	Surface Area	0.057	1.083	1.140	hectare"
п	Time of concentration	20.126	2.547	2.914	minutes"
	Time to Centroid	165.579	119.932	120.885	minutes"
п	Rainfall depth	70.427	70.427	70.427	mm"
п	Rainfall volume	40.14	762.73	802.87	c.m"
п	Rainfall losses	44.266	5.845	7.766	mm"
п	Runoff depth	26.161	64.582	62.661	mm"
п	Runoff volume	14.91	699.43	714.34	c.m"
	Runoff coefficient	0.371	0.917	0.890	
	Maximum flow	0.004	0.526	0.527	c.m/sec"
" 40	HYDROGRAPH Add Runoff	"			
	4 Add Runoff "				
	0.527 0.52	0.104	0.680"		
" 40	HYDROGRAPH Copy to Out	flow"			
	8 Copy to Outflow"				
	0.527 0.52	0.527	0.680"		
" 40	HYDROGRAPH Combine	1"			
	6 Combine "				
	1 Node #"				
	Outlet to Creek"				
	Maximum flow	1.20	07 c.m/se	ec"	
	Hydrograph volume	2150.74	41 c.m"		
	0.527 0.52	0.527	1.207"		
" 38	START/RE-START TOTALS	203"			
	3 Runoff Totals on EX	(IT"			
	Total Catchment area		4	.550 he	ectare"
	Total Impervious area		2	.503 he	ectare"
	Total % impervious		55	.011"	
" 19	EXIT"				

... MIDUSS Output ----->" ... Version 2.25 rev. 467" MIDUSS version ... MIDUSS created July 6, 2008" ... 10 Units used: ie METRIC" ... C:\Users\cmahoney\Documents\2024 Work\" Job folder: ... 2021-0713-10\New SWM Files\MIDUSS modelling\Post-Development - no mitigation" н 100 Year Developed Rev1.out" Output filename: п Licensee name: Circe Mahoney" ... WalterFedy" Company ... Date & Time last used: 2024-05-08 at 12:33:57 PM" ... 31 TIME PARAMETERS" ... Time Step" 5.000 п Max. Storm length" 240.000 п 1500.000 Max. Hydrograph" п 32 STORM Chicago storm" п Chicago storm" 1 ... 892.300 Coefficient A" ... Constant B" 0.000 ... 0.699 Exponent C" п 0.400 Fraction R" н Duration" 240.000 ... 1.000 Time step multiplier" н Maximum intensity mm/hr" 283.589 ... Total depth 77.411 mm" ... 100hyd Hydrograph extension used in this file" 6 ... 33 CATCHMENT 301" ... Triangular SCS" 1 ... 1 Equal length" н 1 SCS method" ... External catchment area - drains to 201" 301 ... 70.000 % Impervious" ... 0.390 Total Area" ... Flow length" 50.000 ... Overland Slope" 1.000 н 0.117 Pervious Area" ... 50.000 Pervious length" п 1.000 Pervious slope" ... 0.273 Impervious Area" ... Impervious length" 50.000 ... Impervious slope" 1.000 п Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... 0.399 Pervious Runoff coefficient" н Pervious Ia/S coefficient" 0.100 ... Pervious Initial abstraction" 8.467 ... 0.015 Impervious Manning 'n'" п 98.000 Impervious SCS Curve No." ... Impervious Runoff coefficient" 0.923 ... Impervious Ia/S coefficient" 0.100

... Impervious Initial abstraction" 0.518 ... 0.150 0.000 0.000 c.m/sec" 0.000 ... Pervious Impervious Total Area " Catchment 301 ... Surface Area 0.117 0.273 0.390 hectare" ... Time of concentration 2.464 5.024 minutes" 18.840 ... minutes" Time to Centroid 162.850 119.461 126.243 ... Rainfall depth mm" 77.411 77.411 77.411 ... c.m" Rainfall volume 90.57 211.33 301.90 п Rainfall losses 46.512 5.930 18.105 mm" ... 30.899 Runoff depth 59.306 mm" 71.481 ... Runoff volume 36.15 195.14 231.29 c.m" ... н Runoff coefficient 0.399 0.923 0.766 ... Maximum flow 0.011 0.148 0.150 c.m/sec" н HYDROGRAPH Add Runoff " 40 п 4 Add Runoff " ... 0.150 0.000 0.000" 0.150 н HYDROGRAPH Copy to Outflow" 40 " Copy to Outflow" 8 ... 0.000" 0.150 0.150 0.150 HYDROGRAPH Next link " ... 40 ... 5 Next link " ... 0.000" 0.150 0.150 0.150 н 33 CATCHMENT 201" п 1 Triangular SCS" 1 Equal length" ... SCS method" 1 ... 201 Controlled flow to Pond" ... 90.000 % Impervious" ... Total Area" 1.080 н 80.000 Flow length" ... Overland Slope" 2.000 ... 0.108 Pervious Area" ... 80.000 Pervious length" ... Pervious slope" 2.000 ... Impervious Area" 0.972 н 80.000 Impervious length" ... Impervious slope" 2.000 ... Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 75.000 ... Pervious Runoff coefficient" 0.400 ... Pervious Ia/S coefficient" 0.100 ... Pervious Initial abstraction" 8.467 ... 0.015 Impervious Manning 'n'" ... 98.000 Impervious SCS Curve No." н 0.923 Impervious Runoff coefficient" ... Impervious Ia/S coefficient" 0.100 ... 0.518 Impervious Initial abstraction" ... 0.516 0.150 0.150 0.000 c.m/sec" ... Catchment 201 Impervious Total Area " Pervious ... 0.972 Surface Area 0.108 1.080 hectare"

	Ti	me of concentration	20.288	2.654	3.463	minutes"
	Ti	me to Centroid	165.225	119.833	121.917	minutes"
	Ra	infall depth	77.411	77.411	77.411	mm''
	Ra	infall volume	83.60	752.44	836.04	c.m"
	Ra	infall losses	46.482	5.995	10.044	mm''
	Ru	noff depth	30.929	71.416	67.368	mm"
	Ru	noff volume	33.40	694.17	727.57	c.m"
	Ru	noff coefficient	0.400	0.923	0.870	п
	Ma	ximum flow	0.009	0.514	0.516	c.m/sec"
" 40	HY	DROGRAPH Add Runoff				
	4	Add Runoff "				
		0.516 0.66	6 0.150	0.000"		
" 40	HY	DROGRAPH Copy to Out	flow"			
	8	Copy to Outflow"				
		0.516 0.66	6 0.666	0.000"		
" 40	HY	DROGRAPH Combine	1"			
	6	Combine "				
	1	Node #"				
		Outlet to Creek"				
	Ма	ximum flow	0.6	66 c.m/s	ec"	
	Hy	drograph volume	958.8	63 c.m"		
	-	0.516 0.66	6 0.666	0.666"		
" 40	HY	DROGRAPH Start - New	Tributary"			
	2	Start - New Tributa	ry"			
		0.516 0.00	0 0.666	0.666"		
" 33	CA	TCHMENT 302"				
	1	Triangular SCS"				
	1	Equal length"				
	1	SCS method"				
	302	External drainage a	rea - drain	s to 202"		
	70.000	% Impervious"				
	0.120	Total Area"				
	50.000	Flow length"				
	1.000	Overland Slope"				
	0.036	Pervious Area"				
	50.000	Pervious length"				
	1.000	Pervious slope"				
	0.084	Impervious Area"				
	50.000	Impervious length"				
	1.000	Impervious slope"				
	0.250	Pervious Manning 'n				
	75.000	Pervious SCS Curve	No."			
	0.399	Pervious Runoff coe	fficient"			
	0.100	Pervious Ia/S coeff	icient"			
	8.467	Pervious Initial ab	straction"			
	0.015	Impervious Manning	'n'"			
	98.000	Impervious SCS Curv	e No."			
	0.923	Impervious Runoff c	oefficient"			
	0.100	Impervious Ia/S coe	fficient"			
	0.518	Impervious Initial	abstraction			

"	0.046	0.000	0.666	0.666 0	c.m/sec"	
"	Catchment 302		Pervious	Impervious	Total Area	"
"	Surface Area		0.036	0.084	0.120	hectare"
"	Time of conce	ntration	18.840	2.464	5.024	minutes"
"	Time to Centr	oid	162.850	119.461	126.243	minutes"
"	Rainfall dept	h	77.411	77.411	77.411	mm"
"	Rainfall volu	me	27.87	65.03	92.89	c.m"
"	Rainfall loss	es	46.512	5.930	18.105	mm"
"	Runoff depth		30.899	71.481	59.306	mm"
"	Runoff volume		11.12	60.04	71.17	c.m"
"	Runoff coeffi	cient	0.399	0.923	0.766	н
"	Maximum flow		0.003	0.045	0.046	c.m/sec"
"	40 HYDROGRAPH Ad	d Runoff '	1			
"	4 Add Runoff	п				
"	0.046	0.046	0.666	0.666"		
"	40 HYDROGRAPH Co	py to Outi	Flow"			
"	8 Copy to Ou	tflow"				
"	0.046	0.046	5 0.046	0.666"		
"	40 HYDROGRAPH Ne	xt link "				
"	5 Next link					
"	0.046	0.046	5 0.046	0.666"		
"	33 CATCHMENT 202					
"	1 Triangular	SCS"				
"	1 Equal leng	th"				
"	1 SCS method					
"	202 Uncontroll	ed to cree	ek"			
"	5.000 % Impervio	us"				
"	1.820 Total Area					
"	80.000 Flow lengt	h"				
"	0.500 Overland S	lope"				
"	1.729 Pervious A	rea"				
"	80.000 Pervious l	ength"				
"	0.500 Pervious s	lope"				
"	0.091 Impervious	Area"				
"	80.000 Impervious	length"				
"	0.500 Impervious	slope"				
"	0.250 Pervious M	anning 'n'				
"	75.000 Pervious S	CS Curve N	No."			
"	0.400 Pervious R	unoff coef	fficient"			
"	0.100 Pervious I	a/S coeffi	icient"			
"	8.467 Pervious I	nitial abs	straction"			
"	0.015 Impervious	Manning '	'n'"			
"	98.000 Impervious	SCS Curve	e No."			
"	0.917 Impervious	Runoff co	oefficient"			
"	0.100 Impervious	Ia/S coef	fficient"			
"	0.518 Impervious	Initial a	abstraction'	ı		
"	0.119	0.046	6 0.046	0.666 0	.m/sec"	
"	Catchment 202		Pervious	Impervious	Total Area	
"	Surface Area		1.729	0.091	1.820	hectare"
n	Time of conce	ntration	30.751	4.022	27.871	minutes"

"	Ti	me to Centroid	18	32.566	122.468	176.090	minutes"
"	Ra	infall depth	77	7.411	77.411	77.411	mm"
"	Ra	infall volume	13	338.44	70.44	1408.88	c.m"
"	Ra	infall losses	46	5.476	6.431	44.474	mm"
"	Ru	noff depth	36	0.935	70.980	32.937	mm"
"	Ru	noff volume	53	34.86	64.59	599.46	c.m"
"	Ru	noff coefficie	nt 0.	.400	0.917	0.425	"
"	Ma	ximum flow	0.	.113	0.044	0.119	c.m/sec"
"	40 HY	DROGRAPH Add R	unoff "				
"	4	Add Runoff "					
"		0.119	0.128	0.046	0.666"		
"	40 HY	DROGRAPH Copy	to Outflo	ow"			
"	8	Copy to Outfl	ow"				
"		0.119	0.128	0.128	0.666"		
"	40 HY	DROGRAPH Com	bine 1	L"			
"	6	Combine "					
"	1	Node #"					
"		Outlet to Cre	ek"				
"	Ma	ximum flow		0.76	5 c.m/se	ec"	
"	Hy	drograph volum	e	1629.48	6 c.m"		
"		0.119	0.128	0.128	0.765"		
"	40 HY	DROGRAPH Start	- New Tr	ributary"			
"	2	Start - New T	ributary'	•			
"		0.119	0.000	0.128	0.765"		
"	33 CA	TCHMENT 203"					
"	1	Triangular SC	S"				
	1	Equal length"					
"	1	SCS method"					
	203	Containment a	rea"				
	95.000	% Impervious"					
	1.140	Total Area"					
	35.000	Flow length"					
	0.500	Overland Slop	e"				
	0.057	Pervious Area					
	35.000	Pervious leng	th"				
	0.500	Pervious slop	e"				
	1.083	Impervious Ar	ea"				
	35.000	Impervious le	ngth"				
	0.500	Impervious si	ope"				
	0.250	Pervious Mann	ing 'n''				
	/5.000	Pervious SCS	Curve No.				
	0.399	Pervious Runo	tt coetti	lcient			
	0.100	Pervious 1a/S	COETTICI	Lent Doction"			
	8.46/	Tervious init	iai abstr mmine let	action			
	0.015	Impervious Ma	nning 'n' C. Cumura N				
	98.000	Impervious SC	s curve M	NU.			
	0.723	Impervious Ru		iciont"			
	0.100	Imponutous Ia	itial ak				
	0.218	Tuber.vions TU					
		8,588	0.000	0.128	0./65 0	. m/sec	

"	Catchment 203	Pervious	Impervious	Total Ar	ea "
"	Surface Area	0.057	1.083	1.140	hectare"
"	Time of concentration	18.726	2.449	2.811	minutes"
	Time to Centroid	162.654	119.430	120.392	minutes"
	Rainfall depth	77.411	77.411	77.411	mm"
11	Rainfall volume	44.12	838.36	882.49	c.m"
	Rainfall losses	46.507	5.935	7.964	mm"
	Runoff depth	30.905	71.476	69.447	mm"
	Runoff volume	17.62	774.09	791.70	c.m"
п	Runoff coefficient	0.399	0.923	0.897	н
	Maximum flow	0.005	0.587	0.588	c.m/sec"
" 40	HYDROGRAPH Add Runoff				
	4 Add Runoff "				
	0.588 0.588	8 0.128	0.765"		
" 40	HYDROGRAPH Copy to Out	flow"			
	8 Copy to Outflow"				
	0.588 0.588	8 0.588	0.765"		
" 40	HYDROGRAPH Combine	1"			
	6 Combine "				
	1 Node #"				
	Outlet to Creek"				
"	Maximum flow	1.35	53 c.m/se	ec"	
	Hydrograph volume	2421.18	86 c.m"		
	0.588 0.588	8 0.588	1.353"		
" 38	START/RE-START TOTALS 2	203"			
	3 Runoff Totals on EX.	IT"			
	Total Catchment area		4	.550 h	ectare"
	Total Impervious area		2	.503 h	ectare"
	Total % impervious		55	.011"	
" 19	EXIT"				

... MIDUSS Output ----->" ... Version 2.25 rev. 467" MIDUSS version ... MIDUSS created July 6, 2008" ... 10 Units used: ie METRIC" ... C:\Users\cmahoney\Documents\2024 Work\" Job folder: ... 2021-0713-10\New SWM Files\MIDUSS modelling\Post-Development - no mitigation" н Regional Developed Rev2.out" Output filename: п Licensee name: Circe Mahoney" ... WalterFedy" Company ... Date & Time last used: 2024-05-08 at 12:35:31 PM" ... 31 TIME PARAMETERS" ... Time Step" 5.000 п Max. Storm length" 720.000 п 1500.000 Max. Hydrograph" п 32 STORM Mass Curve" п Mass Curve" 3 ... 212.000 Rainfall depth" ... Duration" 720.000 ... 44 C:\Program Files (x86)\MIDUSSNet\Hazel12.mrd Hurricane Hazel (last 12 h)" mm/hr" Maximum intensity 53.000 ... Total depth 212.000 mm" п 250hyd Hydrograph extension used in this file" 6 33 CATCHMENT 301" ... Triangular SCS" 1 ... 1 Equal length" ... 1 SCS method" ... 301 External catchment area - drains to 201" н 70.000 % Impervious" ... Total Area" 0.390 ... Flow length" 50.000 ... 1.000 Overland Slope" ... Pervious Area" 0.117 п 50.000 Pervious length" н 1.000 Pervious slope" ... 0.273 Impervious Area" ... Impervious length" 50.000 ... 1.000 Impervious slope" ... Pervious Manning 'n'" 0.250 ... Pervious SCS Curve No." 88.000 п 0.843 Pervious Runoff coefficient" ... Pervious Ia/S coefficient" 0.100 ... 3.464 Pervious Initial abstraction" н Impervious Manning 'n'" 0.015 ... Impervious SCS Curve No." 98.000 ... 0.969 Impervious Runoff coefficient" п 0.100 Impervious Ia/S coefficient" ... 0.518 Impervious Initial abstraction" ... 0.058 0.000 0.000 0.000 c.m/sec"

	Catchment 301	Perv	vious	Impervious	Total Area	п
"	Surface Area	0.1	17	0.273	0.390	hectare"
	Time of concentratio	n 26.2	225	4.785	10.609	minutes"
	Time to Centroid	529	.681	477.235	491,481	minutes"
	Rainfall denth	212	.000	212.000	212.000	mm"
	Rainfall volume	248	.000	578.76	826.80	"
	Rainfall losses	33.3	290	6.621	14.622	mm"
	Runoff denth	178	710	205.379	197.378	 mm''
	Runoff volume	209	.09	560.68	769.78	с.m"
	Runoff coefficient	0.84	.05 13	0.969	0.931	"
	Maximum flow	0.0	18	0.041	0.058	c.m/sec"
	40 HYDROGRAPH Add Runof	f "		0.011	0.050	c, 5cc
	4 Add Runoff "					
	4 Add Namor 1 0 058 0	058	a aaa	a aaa"		
	40 HVDROGRAPH Copy to 0	utflow'	"	0.000		
	8 Conv to Outflow"					
		058	0 058	0 000"		
	40 HVDPOGRADH Next link		0.000	0.000		
	5 Nevt link "					
		050	0 050	0 000"		
	23 CATCHMENT 201"	020	0.030	0.000		
	1 Triangulan SCS"					
	1 Equal longth"					
	1 CCC mothod"					
	201 Controlled flow t	o Dond'				
	201 Controlled flow t	o Ponu				
	1.080 Total Apoa"					
	1.000 TOLAL Area					
	45.000 FIOW Teligiti					
	2.000 Overtand Stope					
	45 000 Pervious Area					
	2 000 Pervious tength					
	2.000 Pervious stope					
	45 000 Impervious Area					
	45.000 Impervious length					
	2.000 Impervious stope	الما				
	0.250 Pervious Manning	1) • • • •				
	88.000 Pervious SLS Curv	e No.	: .			
	0.842 Pervious Runott C	oettic:	lent			
	0.100 Pervious Ia/S coe	tticier	nt"			
	3.464 Pervious Initial	abstra	ction"			
	0.015 Impervious Mannin	g 'n'"				
	98.000 Impervious SCS Cu	rve No	•			
	0.946 Impervious Runott	coett:	icient"			
	0.100 Impervious Ia/S c	oettic:	ient"			
	0.518 Impervious Initia	l absti	raction'		<i>,</i>	
	0.150 0.	058	.0.058	- 0.000 d	c.m/sec"	
	Catchment 201	Perv	/10US	Impervious	Iotal Area	
	Surtace Area	0.10	28 	0.9/2	1.080	nectare"
	Time ot concentratio	n 19.9	997	3.649	5.121	minutes"
	Time to Centroid	522	.950	473.543	477.991	minutes"

"	Rainfall dep	th	212.000	212.000	212.000	mm"
"	Rainfall vol	ume	228.96	2060.64	2289.60	c.m"
"	Rainfall los	ses	33.479	11.509	13.706	mm"
"	Runoff depth		178.521	200.491	198.294	mm"
"	Runoff volum	e	192.80	1948.78	2141.58	c.m"
"	Runoff coeff	icient	0.842	0.946	0.935	
"	Maximum flow		0.016	0.142	0.150	c.m/sec"
"	40 HYDROGRAPH A	dd Runoff '	I			
"	4 Add Runof	f "				
"	0.15	0 0.207	7 0.058	0.000"		
"	40 HYDROGRAPH C	opy to Outi	Flow"			
"	8 Copy to O	utflow"				
"	0.15	0 0.207	7 0.207	0.000"		
"	40 HYDROGRAPH	Combine	1"			
"	6 Combine "					
"	1 Node #"					
"	Outlet to	Creek"				
"	Maximum flow		0.20	07 c.m/se	ec"	
"	Hydrograph v	olume	2911.35	55 c.m"		
"	0.15	0 0.207	7 0.207	0.207"		
"	40 HYDROGRAPH S	tart - New	Tributary"			
"	2 Start - N	ew Tributar	ry"			
"	0.15	0.000	0.207	0.207"		
"	33 CATCHMENT 30	2"				
"	1 Triangula	r SCS"				
"	1 Equal len	gth"				
"	1 SCS metho	d"				
"	302 External	drainage ar	rea - drains	s to 202"		
"	70.000 % Impervi	ous"				
"	0.120 Total Are	a"				
"	50.000 Flow leng	th"				
"	1.000 Overland	Slope"				
"	0.036 Pervious	Area"				
"	50.000 Pervious	length"				
"	1.000 Pervious	slope"				
"	0.084 Imperviou	s Area"				
"	50.000 Imperviou	s length"				
"	1.000 Imperviou	s slope"				
"	0.250 Pervious	Manning 'n'				
"	88.000 Pervious	SCS Curve N	No."			
"	0.843 Pervious	Runoff coef	fficient"			
"	0.100 Pervious	Ia/S coeffi	icient"			
"	3.464 Pervious	Initial abs	straction"			
"	0.015 Imperviou	s Manning '	'n'"			
"	98.000 Imperviou	s SCS Curve	e No."			
"	0.969 Imperviou	s Runoff co	pefficient"			
"	0.100 Imperviou	s Ia/S coef	fficient"			
"	0.518 Imperviou	s Initial a	abstraction'	•		
"	0.01	8 0.000	0.207	0.207 0	.m/sec"	
"	Catchment 30	2	Pervious	Impervious	Total Area	

		Surface Area	0.03	6	0.084	0.120	hectare"
"		Time of concentrat	ion 26.2	25	4.785	10.609	minutes"
"		Time to Centroid	529.	682	477.235	491.481	minutes"
"		Rainfall depth	212.	000	212.000	212.000	mm"
"		Rainfall volume	76.3	2	178.08	254.40	c.m"
"		Rainfall losses	33.2	90	6.621	14.622	mm"
"		Runoff depth	178.	710	205.379	197.378	mm"
"		Runoff volume	64.3	4	172.52	236.85	c.m"
"		Runoff coefficient	0.84	3	0.969	0.931	"
"		Maximum flow	0.00	5	0.013	0.018	c.m/sec"
"	40	HYDROGRAPH Add Run	off "				
"		4 Add Runoff "					
"		0.018	0.018	0.207	0.207"		
"	40	HYDROGRAPH Copy to	Outflow"				
"	:	B Copy to Outflow					
"		0.018	0.018	0.018	0.207"		
"	40	HYDROGRAPH Next li	nk "				
"		5 Next link "					
"		0.018	0.018	0.018	0.207"		
"	33	CATCHMENT 202"					
"		1 Triangular SCS"					
"	:	1 Equal length"					
"		1 SCS method"					
"	20	2 Uncontrolled to	creek"				
"	5.00	ð % Impervious"					
"	1.82	ð Total Area"					
	80.00	Flow length					
	0.50	Overland Slope"					
	1.72	Pervious Area"					
	80.00	9 Pervious Length					
	0.50	Ø Pervious slope"					
	0.09	I Impervious Area					
	80.00	0 Impervious leng	th"				
	0.50	lmpervious slop	e"				
	0.25	Ø Pervious Mannin,	g 'n'"				
	88.00	Ø Pervious SCS Cu	rve No."				
	0.84	B Pervious Runott	coettici	ent"			
	0.10	0 Pervious Ia/S c	oetticien	τ			
	3.46	4 Pervious Initia	l abstrac	tion"			
	0.01	5 Impervious Mann	ing n				
	98.00	a Impervious SCS	Curve No.				
	0.97	I Impervious Runo	tt coetti	cient"			
	0.10	a Impervious Ia/S	coettici	ent			
	0.51	s impervious init	ial abstr	action	0.007	/ H	
		0.2/1	0.018	.0.018	0.20/ 0	.m/sec"	
		Catchment 202	Perv	ious	impervious	IOTAL Area	h
		Surrace Area	1./2	9 05	U.UYL	1.020	nectare"
		Time to Contentrat		כט 257	/.ðll	40.00/	minutes "
		IIME TO CENTROID	54/.	357 000	480.188	543.520	minutes"
		катптатт дертп	212.	000	212.000	212.000	m

"	Rainfall volu	ne 36	665.48	192.92	3858.40	c.m"
"	Rainfall loss	es 33	3.186	6.193	31.836	mm"
"	Runoff depth	17	78.814	205.807	180.164	mm"
"	Runoff volume	30	091.70	187.28	3278.98	c.m"
"	Runoff coeffic	cient 0.	.843	0.971	0.850	
"	Maximum flow	0.	.258	0.014	0.271	c.m/sec"
"	40 HYDROGRAPH Add	d Runoff "				
"	4 Add Runoff	п				
"	0.271	0.287	0.018	0.207"		
"	40 HYDROGRAPH Coj	by to Outflo	ow"			
"	8 Copy to Ou	tflow"				
"	0.271	0.287	0.287	0.207"		
"	40 HYDROGRAPH (Combine 1	1"			
"	6 Combine "					
"	1 Node #"					
"	Outlet to (Creek"				
"	Maximum flow		0.49	1 c.m/se	c"	
"	Hydrograph vo	lume	6427.18	8 c.m"		
	0.271	0.287	0.287	0.491"		
	40 HYDROGRAPH Sta	art - New Tr	ributary"			
	2 Start - New	v Tributary'				
	0.271	0.000	0.287	0.491"		
"	33 CATCHMENT 203	•				
	1 Triangular	SCS"				
	1 Equal leng	th"				
	1 SCS method					
	203 Containmen	t area"				
	98.000 % Impervio	us"				
	1.140 Total Area					
	35.000 Flow length	ר" "				
	0.500 Overland S.	Lope"				
	0.023 Pervious A	rea"				
	35.000 Pervious le	ength"				
	0.500 Pervious s.	Lope				
	1.117 Impervious	Area				
	35.000 Impervious	iength				
	0.500 Impervious	stope				
		unoff cooff:	iciont"			
		non coern	iont"			
		a/S CUEITICI	naction"			
	0.015 Tmpopyious	Manning 'n'				
	98 000 Impervious					
		Runoff coef	 fficient"			
	0.100 Impervious	Ta/S coeffi	icient"			
	0.518 Impervious	Initial and	straction"			
	0.169	0,000	0.287	0.491 c	.m/sec"	
"	Catchment 203	0.000 Pe	ervious	Impervious	Total Area	п
"	Surface Area	0.	.023	1.117	1.140	hectare"

	Time of concentration	26.067	4.756	5.128	minutes"
	Time to Centroid	529.494	477.198	478.11	11 minutes"
	Rainfall depth	212.000	212.000	212.00	00 mm"
	Rainfall volume	48.34	2368.46	2416.8	30 c.m"
	Rainfall losses	33.306	6.614	7.148	mm"
	Runoff depth	178.694	205.386	204.85	52 mm"
	Runoff volume	40.74	2294.57	2335.3	31 c.m"
	Runoff coefficient	0.843	0.969	0.966	н
	Maximum flow	0.003	0.168	0.169	c.m/sec"
" 40	HYDROGRAPH Add Runoff				
	4 Add Runoff "				
	0.169 0.16	69 0.28	7 0.491	п	
" 40	HYDROGRAPH Copy to Ou [.]	tflow"			
"	8 Copy to Outflow"				
"	0.169 0.10	69 0.16	9 0.491	п	
" 40	HYDROGRAPH Combine	1"			
	6 Combine "				
"	1 Node #"				
	Outlet to Creek"				
"	Maximum flow	0.	658 c.m/	sec"	
	Hydrograph volume	8762.	504 c.m"		
	0.169 0.10	69 0.16	9 0.658		
" 38	START/RE-START TOTALS	203"			
	3 Runoff Totals on EX	XIT"			
	Total Catchment area			4.550	hectare"
	Total Impervious area			2.537	hectare"
	Total % impervious		5	5.763"	
" 19	EXIT"				

MIDUSS Hydrologic Modelling

Post-Development (with SWM)

"			MIDUSS Output>"
			MIDUSS version Version 2.25 rev. 467"
			MIDUSS created July 6, 2008"
		10	Units used: ie METRIC"
		20	lob folder: C:\Users\cmahonev\Documents\2024 Work\"
			2021-0713-10\New SWM Files\MTDUSS modelling\Post-Development"
			Output filename: 25 mm Post-Dev - REV10.out"
			Licensee name:
			Company WalterEedy"
			Date & Time last used: $2024_{-}05_{-}08 = \pm 11.09.15 \text{ AM}''$
	21	тт	ME DARAMETERS"
	51	5 000	Time Sten"
		240 000	Max Stopm longth"
		1500 000	Max. Hydrograph"
	22	CT	"OPM Chicago stopm"
	52	1	Chicago storm"
		140 20E	Coofficient A"
		449.205	Constant D"
		0.000	Constant B
		0.780	Exponent C
		0.400	Fraction K
		240.000	Duration
		1.000	Time Step multipiter
		Ma	IXIMUM INCENSILY IZ5.787 MM//II
		10	25.000 mm
		6	UDING Hydrograph extension used in this file
	33		Triangulan SCC"
		1	Fault longth"
		1	Equal tengen
		L 201	SUS Methou
		301	External uralnage area - uralns to 201
		70.000	% Impervious
		0.390	Total Area
		50.000	Flow length
		1.000	Overland Slope
		0.117	Pervious Area
		50.000	Pervious length
		1.000	Pervious slope
		0.273	Impervious Area
		50.000	Impervious length"
		1.000	Impervious slope"
		0.250	Pervious Manning 'n'
		/5.000	Pervious SCS Curve No."
		0.108	Pervious Runott coetticient"
		0.100	Pervious Ta/S coefficient
		8.46/	Pervious initial abstraction"
		0.015	Impervious Manning n
		98.000	Impervious SCS Curve NO.
		0./05	Impervious Runott Coetticient
		0.100	Impervious Id/S COETTICIENC
		0.518	impervious initial abstraction

"			0.049	0.000)	0.000	0.000 (.m/sec"	
"		Catchmen	t 301		Pervi	lous	Impervious	Total Area	н
"		Surface	Area		0.117	7	0.273	0.390	hectare"
"		Time of	concentrat	tion	52.58	37	3.553	6.284	minutes"
"		Time to	Centroid		217.7	22	122.821	128.107	minutes"
"		Rainfall	depth		25.00	90	25.000	25.000	mm"
"		Rainfall	volume		29.25	5	68.25	97.50	c.m"
"		Rainfall	losses		22.29	99	5.375	10.452	mm"
"		Runoff d	epth		2.701	L	19.625	14.548	mm"
"		Runoff v	olume		3.16		53.58	56.74	c.m"
"		Runoff c	oefficient	t	0.108	3	0.785	0.582	н
"		Maximum	flow		0.000)	0.049	0.049	c.m/sec"
"	40	HYDROGRA	PH Add Rur	noff '	•				
"	Z	Add R	unoff "						
"			0.049	0.049)	0.000	0.000"		
"	40	HYDROGRA	PH Copy to	o Outf	flow"				
"	8	В Сору	to Outflow	v"					
"			0.049	0.049	Ð	0.049	0.000"		
"	40	HYDROGRA	PH Next li	ink "					
"	5	5 Next	link "						
"			0.049	0.049	Ð	0.049	0.000"		
"	33	CATCHMEN	T 201"						
"	1	. Trian	gular SCS'	•					
"	1	. Equal	length"						
"	1	. SCS m	ethod"						
"	201	. Contr	olled flow	v to p	ond"				
"	90.000) % Imp	ervious"						
"	1.080) Total	Area"						
"	80.000) Flow	length"						
"	2.000) Overl	and Slope'	•					
"	0.108	8 Pervi	ous Area"						
"	80.000) Pervi	ous length	ר" ו					
	2.000) Pervi	ous slope'						
	0.972	2 Imper	vious Area	э"					
	80.000) Imper	vious leng	gth"					
	2.000) Imper	vious slop	pe"					
	0.256) Pervi	ous Mannir	וg 'n'					
	75.000) Pervi	ous SCS Cu	irve N	10."				
	0.108	8 Pervi	ous Runott	- coet	+icie	ent"			
	0.100) Pervi	ous Ia/S c	coetti	lcient				
	8.467	/ Pervi	ous Initia	al abs	stract	ion"			
	0.015	5 Imper	vious Manr	ning '	'n'"	-			
	98.000) Imper	vious SCS	Curve	• No."	• • •			
	0.785) Imper	vious Runo	ott co	pettic	:ient"			
	0.100) Imper	vious Ia/S	coef	ticie	ent"			
	0.518	s Imper	vious Init	tial a	abstra	ction'			
			0.181	0.049	, 	0.049	0.000 0	.m/sec"	
		Catchmen	τ 201		Pervi	lous	Impervious	Iotal Area	 h
		Surtace	Area	•	0.108	5	0.9/2	1.080	nectare"
		lime of	concentrat	tion	56.63	30	3.826	4.617	minutes"

"		Time to Cent	roid	223.882	123.247	124.755	minutes"
"		Rainfall dep	th	25.000	25.000	25.000	mm"
"		Rainfall vol	ume	27.00	243.00	270.00	c.m"
"		Rainfall los	ses	22.300	5.271	6.974	mm"
"		Runoff depth		2.700	19.729	18.026	mm"
"		Runoff volum	e	2.92	191.77	194.68	c.m"
"		Runoff coeff	icient	0.108	0.789	0.721	п
"		Maximum flow		0.000	0.181	0.181	c.m/sec"
"	40	HYDROGRAPH A	dd Runoff				
"		4 Add Runof	f "				
"		0.18	1 0.2	30 0.0	49 0.00	0"	
"	54	POND DESIGN"					
"	0.23	30 Current p	eak flow	c.m/sec			
"	0.36	57 Target ou	tflow	c.m/sec"			
"	251.	.4 Hydrograp	h volume	c.m"			
"	12	2. Number of	stages"				
"	506.40	00 Minimum w	ater leve	1 metre			
"	507.40	00 Maximum w	ater leve	1 metre			
"	506.40	00 Starting	water lev	el metr	e"		
"		0 Keep Desi	gn Data:	1 = True;	0 = False"		
"		Level D	ischarge	Volume"			
"		506.400	0.000	0.000"			
"		506.500	0.00146	34.948"			
"		506.600	0.00231	71.402"			
"		506.700	0.00292	110.901"			
"		506.800	0.01578	153.510"			
"		506.900	0.04667	199.291"			
"		507.000	0.1014	248.306"			
"		507.100	0.1639	300.603"			
"		507.200	0.2020	356.258"			
		507.300	0.2327	415.288"			
		507.350	0.3324	446.043"			
		507.400	0.5023	477.614"			
	1	L. WEIRS"					
		Crest	Weir	Crest	Left	Right"	
		elevation c	oefficie	breadth	sideslope s	ideslope"	
	_	507.300	0.900	5.000	0.000	0.000"	
	3	3. ORIFICES"					
		Orifice	Orifice	Oritice	Number of"		
		invert c	oetticie	diameter	orifices"		
		506.400	0.650	0.0500	1.000"		
		506.700	0.650	0.2500	1.000"		
		506./00	0.650	0.3000	1.000"		
	1	L. HOR. ORIF	ICES"				
		Oritice	Uritice	Uritice	Number of"		
		invert c	oetticie	diameter	oritices"		
		507.100	0.650	0.0750	1.000"		
		Peak outtiow	•	0	.019 C.N	I/ Sec"	
		Maximum leve	1	506	.813 met	re"	
		Maximum stor	age	159	.235 C.N	1	

"		Cei	ntroida	l lag		7	.623	hours"		
"			0.18	1 0.2	230	0.019	(0.000 c.m/	'sec"	
"	40	HYI	DROGRAP	H Combi	ine	1"				
"		6	Combin	e "						
"		1	Node #	п						
"			outlet	to creek	<"					
"		Max	ximum f	low		0	.019	c.m/se	ec"	
"		Нус	drograp	h volume		243	.302	c.m"		
"			0	.181	0.230	0.0	20	0.020"		
"	40	HYI	DROGRAP	H Start ·	- New	Tributar	у"			
"		2	Start	- New Tri	ibutar	`У"				
"			0	.181	0.000	0.0	19	0.019"		
	33	CA	TCHMENT	302"						
		1	Triang	ular SCS'	•					
		1	Equal	length"						
	_	1	SCS me	thod"						
	3	02	extern	al draina	age ar	rea - dra	ins	to 202"		
	/0.6	20	% Impe	rvious"						
	0.1	.20	IOTAL	Area						
	50.0	00	FIOW I	ength nd Clone'						
	1.0	26	Dopuio	nu stope						
	50.0	120	Pervio	us Area us longth	, "					
	1 0	00	Pervio	us clope'	1 1					
	1.0 0 0	84	Tmnerv	ious Area	- ''					
	50.0	04	Imperv	ious leng	⊿ ⊽th"					
	1.0	00	Imperv	ious slor	be"					
"	0.2	50	Pervio	us Mannir	ים ופ 'ח'					
"	75.0	00	Pervio	us SCS Cu	urve N	lo."				
"	0.1	.08	Pervio	us Runoff	f coef	ficient"				
"	0.1	.00	Pervio	us Ia/S d	coeffi	.cient"				
"	8.4	67	Pervio	us Initia	al abs	traction	"			
"	0.0	15	Imperv	ious Manr	ning '	n'"				
"	98.0	00	Imperv	ious SCS	Curve	e No."				
"	0.7	85	Imperv	ious Rund	off co	efficien	t"			
"	0.1	.00	Imperv	ious Ia/S	5 coef	ficient"				
	0.5	18	Imperv	ious Init	tial a	bstracti	on"			
		_	0	.015	0.000	0.0	19	0.019 0	.m/sec"	
		Cat	tchment	302		Pervious	Ir	npervious	Total Area	
		Sui	rtace A	rea	•	0.036	0	.084	0.120	hectare"
		1 r 	ne ot c	oncentrat	tion	52.58/	3	.553	6.284	minutes"
			ne to C	entrold		21/./22	1.	22.821	128.107	minutes"
		Ra:	intall	aeptn		25.000	2:	5.000	25.000	mm • • • • •
		Ra.	INTAIL : mfall	volume		9.00	Z.	275	30.00	C . [[]
		Ka:	TULATT	105562 n+h		22.299) 1	. 2/ 2 2 675	10.432	 mm"
		RUI	norr ue	Jume		2./UI 0 07	1	5 18	17 16	
		Rui	norr vo	afficiant	-	0.97	0 T	785	17.40 0 582	U • III II
		Mar	ximum f	low	-	0.000	a	. 015	0.015	c.m/sec"
	40	HYI	DROGRAP	H Add Rur	noff "		0			

		4	Add I	Runoff "						
"				0.015	0.015	5 0.	.020	0.019"		
"	40	HY	DROGR	АРН Сору	to Outf	flow"				
"		8	Сору	to Outfl	ow"					
"				0.015	0.015	5 0.	015	0.019"		
"	40	HY	DROGR	APH Next	link "					
"		5	Next	link "						
"				0.015	0.015	5 0.	015	0.019"		
"	33	CA	TCHME	NT 202"						
"		1	Tria	ngular SC	S"					
"		1	Equa	l length"						
"		1	SCS r	method"						
"		202	Uncor	ntrolled	to cree	ek"				
"		5.000	% Imµ	pervious"						
"		1.820	Tota.	l Area"						
"		80.000	Flow	length"						
"		0.500	Over	land Slop	e"					
"		1.729	Perv:	ious Area						
		80.000	Perv:	ious leng	th"					
		0.500	Perv:	ious slop	e"					
		0.091	Impe	rvious Ar	ea"					
		80.000	Imper	rvious le	ngth"					
		0.500	Impe	rvious sl	ope"					
		0.250	Perv:	Lous Mann	ing 'n'					
		75.000	Perv.	LOUS SUS	curve M	NO. Eficiani	_ 11			
		0.100	Perv.	ious Kullo		iciont"	-			
		8 467	Perv.	ious Ia/S	ial ahs	stractio	מר"			
п		0.407	Tmpoi	ovious Ma	nning '	'n'"				
		98 000	Ттре	vious SC	S Curve	- No "				
		0.804	Tmper	rvious Ru	noff cc	nefficie	nt"			
"		0.100	Impe	rvious Ia	/S coef	fficient	_ ''			
"		0.518	Impe	rvious In	itial a	abstract	- ion"			
"			p c .	0.018	0.015	5 0.	.015	0.020	.m/sec"	
"		Ca	tchme	nt 202		Pervio	IS	Impervious	Total Area	
"		Su	rface	Area		1.729		0.091	1.820	hectare"
"		Ti	me of	concentr	ation	85.835		5.799	63.302	minutes"
"		Ti	me to	Centroid		268.350)	126.695	228.470	minutes"
"		Ra	infal	l depth		25.000		25.000	25.000	mm"
"		Ra	infal	l volume		432.25		22.75	455.00	c.m"
"		Ra	infal	l losses		22.299		4.891	21.429	mm"
"		Ru	noff (depth		2.701		20.109	3.571	mm"
"		Ru	noff v	volume		46.70		18.30	65.00	c.m"
"		Ru	noff (coefficie	nt	0.108		0.804	0.143	
"		Ма	ximum	flow		0.004		0.017	0.018	c.m/sec"
	40	HY	DROGR	APH Add R	unoff "	11				
		4	Add I	Runoff "		_				
				0.018	0.033	3 0.	.015	0.019"		
	40	HY	DROGRA	APH Copy	to Outf	t⊥ow"				
		8	Сору	to Outfl	ow					

"			0.018	0.033	0.033	0.019"		
"	40	HYI	DROGRAPH Comb:	ine	1"			
"		6	Combine "					
		1	Node #"					
			outlet to cree	k"				
		Маз	ximum flow		0.03	5 c.m/se	ec"	
		Hve	drograph volume		325.75	58 c.m"		
		,	0.018	0.033	0.033	0.035"		
	40	HYI	DROGRAPH Start	- New T	ributarv"			
		2	Start - New Tr	ibutarv	,"			
		_	0.018	0.000	0.033	0.035"		
	33	C۵	TCHMENT 203"					
	55	1	Triangular SCS					
п		1	Foual length"					
		1	SCS method"					
		203	Containment and	oo"				
		95 000	% Tmpervious"	ca				
		1 1/0	Total Area"					
		35 000	Flow length"					
		0 500	Ovenland Slene					
		0.500	Denvious Anos"					
		25 000	Pervious Area	h"				
		0 500	Pervious lenger	1				
		1 002	Tmpopyious Apo	. "				
		1.005	Impervious Area	d a+b"				
		55.000	Impervious ien	gun oo"				
		0.500	Impervious Sio	pe ng 'n'"				
		0.250	Pervious Mannin	ng n univo No	п			
		/5.000	Pervious SCS C	urve No	· ·			
		0.108	Pervious Runor	г соетт	icient			
		0.100	Pervious Ia/S (Tent na stion"			
		8.467	Pervious Initia	al abst	raction			
		0.015	Impervious Man	ning n	NI - U			
		98.000	Impervious SCS	Curve				
		0.785	Impervious Rund	отт сое	TTIClent			
		0.100	Impervious Ia/S	5 соетт	icient			
		0.518	Impervious Ini	tial ab	straction	0.000	/ II	
		-	0.195	0.000	. 0.033	- 0.036 0	.m/sec"	
		Ca	tchment 203	Р	ervious	Impervious	lotal Area	
		Sui	rtace Area		.05/	1.083	1.140	hectare"
		111	me of concentrat	tion 5	2.270	3.531	3.882	minutes"
		Tir	me to Centroid	2	17.234	122.771	123.450	minutes"
		Ra	infall depth	2	5.000	25.000	25.000	mm''
		Ra	infall volume	1	4.25	270.75	285.00	c.m"
		Ra	infall losses	2	2.299	5.363	6.210	mm''
		Rui	noff depth	2	.701	19.637	18.790	mm"
"		Rui	noff volume	1	.54	212.66	214.20	c.m"
"		Rui	noff coefficient	t 0	.108	0.785	0.752	
"		Max	ximum flow	0	.000	0.195	0.195	c.m/sec"
"	40	HYI	DROGRAPH Add Rui	noff "				
"		4	Add Runoff "					

"		0.195	0.195	0.033	0.035	"	
"	54 PO	ND DESIGN"					
"	0.195	Current peak [.]	flow c.	.m/sec"			
"	0.367	Target outflow	v c.m/s	sec"			
"	214.2	Hydrograph vo	lume c.	. m''			
"	11.	Number of stag	ges"				
"	506.050	Minimum water	level	metre"			
"	507.900	Maximum water	level	metre"			
"	506.050	Starting wate	r level	metre"			
"	0	Keep Design Da	ata: 1 = 1	[rue; 0	= False"		
"		Level Discha	arge Vo	olume"			
"		506.050 0	.000 6	0.000"			
"		507.050 0.03	3373 2	2.000"			
"		507.150 0.03	3538 6	5.932"			
"		507.250 0.03	3695 99	9.984"			
"		507.350 0.03	3846 351	L.582"			
"		507.450 0.03	3991 741	L.190"			
"		507.550 0.04	4131 1197	7.540"			
"		507.650 0.04	4266 1666	5.800"			
"		507.750 0.04	4398 2153	8.836"			
"		507.850 0.04	4525 2658	3.672"			
		507.900 0.04	4587 2919	9.547"			
	1.	OUTFLOW PIPE"					
		Upstream Downs	tr'm	Pipe	Pipe	Manning	Entry"
		invert in	vert Le	ength D	iameter	'n'	loss Ke"
	_	506.050 505	.980 13	3.900	0.150	0.015	0.500"
	Pe	ak outflow		0.0	3/ c.m/	sec"	
	Ма	ximum level		507.2	40 metr	e"	
	Ma	ximum storage		90.4	11 c.m.		
	Ce	ntroidal lag	105 (2.3	88 nours		
	10 UV		.195 t	.05/	0.035 C.	m/sec	
		Combine "	Jue I				
	0	Nodo #"					
	T	outlet to crea					
	Ma	vinum flow	EK	aa	71 cm/	دەر"	
	На	drograph volum	2	538 0	92 cm"	360	
	iiy	0 195	- 0 195	0 037	0 072		
	38 ст	ART/RE-START TO			0.072		
	יין ב- ב- ב-	Runoff Totals	on FXTT"				
	To	tal Catchment :	area			4.550	hectare"
	To	tal Impervious	area			2.503	hectare"
	To	tal % impervio	JS		5	5.011"	
"	19 EX	IT"			5		

"			MIDUSS Output>"
"			MIDUSS version Version 2.25 rev. 467"
"			MIDUSS created July 6, 2008"
"		10	Units used: ie METRIC"
			Job folder: C:\Users\cmahonev\Documents\2024 Work\"
			2021-0713-10\New SWM Files\MTDUSS modelling\Post-Development"
			Output filename: 2 Year Post-Dev - REV10.out"
			licensee name: Circe Mahonev"
			Company WalterFedy"
			Date & Time last used: $2024-05-08$ at $11.07.15$ ΔM "
	31	тт	ME PARAMETERS"
	2	5.000	Time Sten"
		240 000	Max Storm length"
		1500 000	Max Hydrograph"
	32	ST	"ORM Chicago storm"
	52	1	Chicago storm"
		101 100	Coefficient A"
		404.100	Constant B"
		0.000	Exponent ("
		0.000	Exponence C
		2400	Public N
		1 000	Time step multipliep"
		1.000 Ma	111111111111111111111111111111111111
		Ма	$\frac{1}{20.450} \frac{1}{100} \frac{1}{10}$
		10 C	AC2byd Hydnograph cytonsion used in this file"
	22	6	TCUMENT 201"
	55	1	Triangulan SCS"
		1	Faull longth"
		1	Equal tengen
		L 201	SUS Methou
		70 000	External uranage area - urains to 201
		70.000	% Impervious
		0.390	Total Area
		50.000	Flow length
		1.000	Overland Slope
		0.117	Pervious Area
		50.000	Pervious length
		1.000	Pervious slope"
		0.273	Impervious Area"
		50.000	Impervious length"
		1.000	Impervious slope"
		0.250	Pervious Manning 'n'"
		/5.000	Pervious SCS Curve No."
		0.181	Pervious Runott coetticient"
		0.100	Pervious 1a/S coetticient"
		8.467	Pervious Initial abstraction"
		0.015	Impervious Manning 'n'"
		98.000	Impervious SCS Curve No."
		0.837	Impervious Runott coetticient"
		0.100	Impervious Ia/S coefficient"
		0.518	Impervious Initial abstraction"

"		0.055	5 0.000	0.000	0.000 (c.m/sec"	
"		Catchment 301	L	Pervious	Impervious	Total Area	п
"		Surface Area		0.117	0.273	0.390	hectare"
"		Time of conce	entration	38.717	3.454	6.449	minutes"
"		Time to Centr	roid	199.134	124.574	130.905	minutes"
"		Rainfall dept	h	35.058	35.058	35.058	mm"
"		Rainfall volu	ume	41.02	95.71	136.72	c.m"
"		Rainfall loss	ses	28.704	5.713	12.610	mm"
"		Runoff depth		6.354	29.345	22.447	mm"
"		Runoff volume	2	7.43	80.11	87.55	c.m"
"		Runoff coeffi	lcient	0.181	0.837	0.640	п
"		Maximum flow		0.001	0.055	0.055	c.m/sec"
"	40	HYDROGRAPH Ad	d Runoff "	I			
"	2	Add Runof	- "				
"		0.055	6 0.055	0.000	0.000"		
"	40	HYDROGRAPH Co	py to Outf	low"			
"	8	Copy to Ou	utflow"				
"		0.055	6 0.055	0.055	0.000"		
"	40	HYDROGRAPH Ne	ext link "				
"	5	Next link					
"		0.055	6 0.055	0.055	0.000"		
"	33	CATCHMENT 201	L"				
"	1	. Triangular	SCS"				
"	1	. Equal leng	gth"				
"	1	SCS method	1"				
"	201	. Controlled	d flow to p	ond"			
"	90.000) % Impervio	ous"				
"	1.080) Total Area	a''				
"	80.000) Flow lengt	:h"				
"	2.000) Overland S	Slope"				
"	0.108	B Pervious A	\rea"				
"	80.000) Pervious]	length"				
"	2.000) Pervious s	slope"				
"	0.972	1 Impervious	s Area"				
"	80.000) Impervious	s length"				
"	2.000) Impervious	s slope"				
"	0.250) Pervious M	1anning 'n'	"			
"	75.000) Pervious S	SCS Curve N	lo."			
"	0.181	. Pervious F	Runoff coef	ficient"			
"	0.100) Pervious 1	[a/S coeffi	.cient"			
"	8.467	' Pervious 1	Initial abs	straction"			
"	0.015	5 Impervious	s Manning '	n'"			
"	98.000) Impervious	s SCS Curve	e No."			
"	0.836	5 Impervious	s Runoff co	efficient"			
	0.100) Impervious	s Ia/S coef	ficient"	_		
	0.518	S Impervious	s Initial a	bstraction'			
		0.200	0.055	0.055	0.000 (c.m/sec"	_
		Catchment 201	L	Pervious	Impervious	Total Area	
		Surface Area		0.108	0.972	1.080	hectare"
"		Time of conce	entration	41.694	3.720	4.613	minutes"

"	-	Time to Centroid	203.630	125.095	126.943	minutes"
"	I	Rainfall depth	35.058	35.058	35.058	mm"
"	l	Rainfall volume	37.86	340.76	378.62	c.m"
"	I	Rainfall losses	28.705	5.762	8.056	mm"
"	I	Runoff depth	6.353	29.296	27.002	mm"
"	I	Runoff volume	6.86	284.76	291.62	c.m"
"	I	Runoff coefficient	0.181	0.836	0.770	
"	I	Maximum flow	0.001	0.200	0.200	c.m/sec"
"	40 I	HYDROGRAPH Add Rur	noff "			
"	4	Add Runoff "				
"		0.200	0.256 0.	055 0.0	00"	
"	54 I	POND DESIGN"				
"	0.256	Current peak f	Low c.m/se	c"		
"	0.367	Target outflow	c.m/sec"			
"	379.2	Hydrograph volu	ume c.m"			
"	12.	Number of stage	es"			
"	506.400	Minimum water]	level metr	e"		
"	507.400	Maximum water]	level metr	e"		
"	506.400	Starting water	level met	re"		
"	0	Keep Design Dat	:a: 1 = True;	0 = False"		
"		Level Dischar	rge Volume	, n		
"		506.400 0.0	0.000)"		
"		506.500 0.001	L46 34.948	II		
"		506.600 0.002	231 71.402			
"		506.700 0.002	110.901			
"		506.800 0.015	578 153.510) II		
"		506.900 0.046	567 199.291			
"		507.000 0.10	914 248.306	, u		
"		507.100 0.16	300.603	II		
"		507.200 0.20	356.258			
"		507.300 0.23	415.288			
		507.350 0.33	324 446.043	, II		
"		507.400 0.50	923 477.614	."		
	1.	WEIRS"				
		Crest We	eir Crest	Left	Right"	
"		elevation coeffic	ie breadth	sideslope	sideslope"	
		507.300 0.9	900 5.000	0.000	0.000"	
	3.	ORIFICES"		_		
"		Orifice Orifi	ice Orifice	Number of"		
"		invert coeffic	cie diameter	orifices"		
		506.400 0.6	550 0.0500	1.000"		
"		506.700 0.6	550 0.2500	1.000"		
"		506.700 0.6	550 0.3000	1.000"		
"	1.	HOR. ORIFICES"		_		
"		Orifice Orifi	ice Orifice	Number of"		
		invert coeffic	ie diameter	orifices"		
		507.100 0.6	50 0.0750	1.000"	,	
	I	Peak outflow		0.045 c.	m/sec"	
	I	Maximum level	50	6.895 me	tre"	
"	I	Maximum storage	19	7.001 c.	m''	

"		Centroidal	lag	6.1	37 hours"		
"		0.200	0.256	0.045	0.000 c.m/	/sec"	
"	40	HYDROGRAPH	Combine	1"			
"		6 Combine					
"		1 Node #"					
"		outlet	to creek"				
"		Maximum flo	OW	0.0	32 c.m/se	ec"	
"		Hydrograph	volume	370.6	26 c.m"		
"		0.2	200 0.25	6 0.045	0.045"		
"	40	HYDROGRAPH	Start - New	ı Tributary"			
"		2 Start -	New Tributa	iry"			
		0.2	200 0.00	0.032	0.032"		
	33	CATCHMENT	302"				
		1 Triangu.	lar SCS"				
		1 Equal le	ength"				
	20	1 SCS meth	nod" I dua ina ang		- + - 2021		
	30	2 externa.	i drainage a	irea - drain	s to 202"		
	/0.00	0 % Imperv	vious				
	6.12		red				
	1 00	0 FIOW IE	ngun d Slopo"				
	1.00	6 Penvious	a Stope				
	50.05	0 Pervious 0 Pervious	s longth"				
	1 00	0 Perviou	s slone"				
	0.08	4 Impervi	ous Area"				
"	50.00	0 Impervio	ous length"				
	1.00	0 Impervio	ous slope"				
"	0.25	Ø Pervious	Manning 'n	1'"			
"	75.00	0 Pervious	s SCS Curve	No."			
"	0.18	1 Pervious	s Runoff coe	efficient"			
"	0.10	0 Pervious	s Ia/S coeff	icient"			
"	8.46	7 Pervious	s Initial ab	straction"			
"	0.01	5 Impervio	ous Manning	'n'"			
"	98.00	0 Impervio	ous SCS Curv	ve No."			
	0.83	7 Impervio	ous Runoff c	coefficient"			
	0.10	0 Impervio	ous Ia/S coe	etticient"			
	0.51	8 Impervio	ous initial	abstraction			
		0.0	0.00	0.032	0.032 (.m/sec"	
		Catchment :	302	Pervious	Impervious	o 120	hactona"
		Jurrace Are	ed ncontration	0.020	2 151	6 449	minutoc"
		Time to Co	ntentration	20./10 100 13/	2.424 121 571	130 005	minutes
		Rainfall de	anth	35 058	35 058	35 058	mm"
		Rainfall v	olume	12 62	29 45	42 07	с m"
		Rainfall 10	nsses	28 704	5 713	12 610	mm"
"		Runoff dent	th	6.354	29.345	22.447	 mm"
"		Runoff volu	ume	2.29	24.65	26.94	c.m"
"		Runoff coe	fficient	0.181	0.837	0.640	
"		Maximum flo	OW	0.000	0.017	0.017	c.m/sec"
"	40	HYDROGRAPH	Add Runoff	п			-

"		4	Add Run	off "					
"		-	0.	017	0.017	0.032	0.032"		
"	40	HY	DROGRAPH	Copy t	o Outf	low"			
"		8	Copy to	Outflo	w"				
"			0.	017	0.017	0.017	0.032"		
"	40	HY	DROGRAPH	Next 1	ink "				
"		5	Next li	nk "					
u.			0.	017	0.017	0.017	0.032"		
"	33	CA	TCHMENT	202"					
"		1	Triangu	lar SCS					
"		1	Equal 1	ength"					
"		1	SCS met	hod"					
"		202	Uncontr	olled t	o cree	k"			
"		5.000	% Imper	vious"					
"		1.820	Total A	rea"					
"		80.000	Flow le	ngth"					
"		0.500	Overlan	d Slope					
"		1.729	Perviou	s Area"					
"		80.000	Perviou	s lengt	h"				
"		0.500	Perviou	s slope					
		0.091	Impervi	ous Are	a"				
		80.000	Impervi	ous len	gth"				
		0.500	Impervi	ous slo	pe"				
		0.250	Perviou	s Manni	ng 'n'				
		/5.000	Perviou	s SCS C	urve N	0." 			
		0.181	Perviou	s Runot	t coet	ficient"			
		0.100	Perviou	s Ia/S	COETT1	cient troction"			
		8.467	Transmui	S INITI	ai abs	craction			
		0.015	Imponvi		Cupyo	No "			
		98.000	Impervi	ous sus	off co	officient"			
		0.004	Impervi	ous Ta/	S coef	ficient"			
		0.100	Impervi	ous Ini	tial a	hstraction			
п		0.910	2 mpci v1 0.	003 INI 022	0.017	0.017	0.032	.m/sec"	
		Ca	tchment	202	0.01/	Pervious	Impervious	Total Area	н
"		Su	rface Ar	ea		1.729	0.091	1.820	hectare"
"		Ti	me of co	ncentra	tion	63.196	5.638	51.760	minutes"
"		Ti	me to Ce	ntroid		236.123	128.286	214.698	minutes"
"		Ra	infall d	epth		35.058	35.058	35.058	mm"
u.		Ra	infall v	olume		606.14	31.90	638.05	c.m"
u.		Ra	infall l	osses		28.704	5.125	27.525	mm"
"		Ru	noff dep	th		6.354	29.932	7.533	mm"
"		Ru	noff vol	ume		109.86	27.24	137.10	c.m"
"		Ru	noff coe	fficien	t (0.181	0.854	0.215	"
"		Ма	ximum fl	OW	(0.011	0.020	0.022	c.m/sec"
"	40	HY	DROGRAPH	Add Ru	noff "				
"		4	Add Run	off "					
"			0.	022	0.039	0.017	0.032"		
"	40	HY	DROGRAPH	Copy t	o Outf	low"			
"		8	Copy to	Outflo	w"				

"		(0.022	0.039	0.039	0.032"		
"	40	HYDROGRA	PH Comb:	ine	1"			
"		6 Combi	ne "					
"		1 Node a	#"					
"		outle [.]	t to creel	k"				
"		Maximum [.]	flow		0.04	17 c.m/se	ec"	
"		Hydrogra	ph volume		534.66	51 c.m"		
"		, U	0.022	0.039	0.039	0.060"		
"	40	HYDROGRA	PH Start ·	- New ⁻	Tributary"			
"		2 Start	- New Tr	ibutarv	v"			
		(0.022	0.000	0.039	0.047"		
"	33	CATCHMEN ^T	T 203"					
		1 Trian	gular SCS'					
		1 Equal	length"					
		1 SCS m	ethod"					
	20	3 Conta	inment are	ea"				
	95.00	0 % Tmp	ervious"	- 4				
	1.14	0 Total	Area"					
	35.00	0 Flow	length"					
	0.50	0 Overla	and Slone'					
	0.05	7 Pervi	ous Area"					
	35.00	0 Pervi	ous length	h"				
	0.50	0 Pervi	ous slone'					
	1.08	3 Imper	vious Area	a"				
	35.00	0 Imper	vious leng	a ⊽th"				
	0.50	0 Imper	vious slor	ne"				
	0.25	0 Pervi	ous Manni	ρς ng 'n''				
	75.00	0 Pervi		urve No	o."			
	0.18	1 Pervi	ous Runoft	f coef	ficient"			
	0.10	0 Pervi	ous Ta/S d	coeffi	cient"			
	8.46	7 Pervi	ous Initia	al absi	traction"			
	0.01	5 Imper	vious Man	ning 'n	n'"			
	98.00	0 Imper	vious SCS	Curve	No."			
	0.83	8 Imper	vious Runa	off co	officient"			
	0.10	0 Imper	vious Ta/9	s coef	ficient"			
	0.51	8 Imper	vious Init	tial al	ostraction"	ı		
	0151	، <u>۲</u>	9.218	0.000	0.039	0.047	m/sec"	
		Catchmen	+ 203	0.000	Pervious	Impervious	Total Area	п
		Surface	Δrea		2.057	1.083	1.140	hectare"
		Time of	concentrat	tion 3	38,484	3,433	3,828	minutes"
		Time to (Centroid		198 783	124 528	125 365	minutes"
		Rainfall	denth	-	35 058	35 058	35 058	mm"
		Rainfall	volume	-	19 98	379 67	399 66	с m"
		Rainfall		-	28 705	5 697	6 847	mm"
			enth	4	5 353	29 361	28 211	mm"
			olume		3.62	317.98	321.60	
п			oefficient	+ 4	3.181	0.838	0.805	
п		Maximum ·	flow		2.001	0.218	0.218	c.m/sec"
	40	HYDROGRA	 DH ∆dd R…	noff "		0.210	0.210	
п		4 Δdd Ri	unoff "					

"		0.218	0.218	0.039	0.047"	
"	54 PC	OND DESIGN"				
"	0.218	Current peak [.]	flow c.	.m/sec"		
"	0.367	Target outflow	v c.m/s	sec"		
"	321.6	Hydrograph vo	lume c.	. m"		
"	11.	Number of stag	ges"			
"	506.050	Minimum water	level	metre"		
"	507.900	Maximum water	level	metre"		
"	506.050	Starting wate	r level	metre"		
"	0	Keep Design Da	ata: 1 = 1	[rue; 0 =	= False"	
"		Level Discha	arge Vo	olume"		
"		506.050 0	.000 0	0.000"		
"		507.050 0.03	3373 2	2.000"		
"		507.150 0.03	3538 6	5.932"		
"		507.250 0.03	3695 99	9.984"		
"		507.350 0.03	3846 351	L.582"		
"		507.450 0.03	3991 741	L.190"		
"		507.550 0.04	4131 1197	7.540"		
"		507.650 0.04	4266 1666	5.800"		
"		507.750 0.04	4398 2153	8.836"		
"		507.850 0.04	4525 2658	3.672"		
"		507.900 0.04	4587 2919	9.547"		
"	1.	OUTFLOW PIPE"				
		Upstream Downs	tr'm	Pipe	Pipe Man	ning Entry"
		invert in	vert Le	ength Di	iameter	'n' loss Ke"
	_	506.050 505	.980 13	3.900	0.150 0	.015 0.500"
	Pe	eak outflow		0.03	37 c.m/sec	"
	Ma	aximum level		507.25	5/ metre"	
	Ma	aximum storage		11/.16	02 c.m"	
	Le	entroidal lag	21.0	2.5:	38 hours"	11
	40 10		.218 k	1.03/ '	0.047 C.M/S	ec
	40 1	DRUGRAPH COM	bine i			
	6	Combine				
	T	NOUE #	ok"			
	M	outlet to the	ek	0.00		
	Mc Liv	dhoghoph volum	2		54 C.III/SEC	
	пу	a 210	= 0 210	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
	38 51	U.210 TART/RE_START T	0,210 יבטכ אעדר	0.057	0.057	
	רכ טכ ג	Runoff Totale	on FXIT"			
	ر ۲	tal Catchmont	area		1 5	50 hectane"
	T	tal Impervious	area			03 hectare"
	To	tal % imnervio			55 0	11"
"	19 E>	(IT"				

"			MIDUSS Output>"
"			MIDUSS version Version 2.25 rev. 467"
"			MIDUSS created July 6, 2008"
"		10	Units used: ie METRIC"
"			Job folder: C:\Users\cmahoney\Documents\2024 Work\"
"			2021-0713-10\New SWM Files\MIDUSS modelling\Post-Development"
"			Output filename: 5 Year Post-Dev - REV10.out"
"			Licensee name: Circe Mahonev"
"			Company WalterFedy"
"			Date & Time last used: 2024-05-08 at 11:04:57 AM"
"	31	TI	ME PARAMETERS"
		5.000	Time Step"
		240.000	Max. Storm length"
		1500.000	Max. Hydrograph"
	32	ST	ORM Chicago storm"
	52	1	Chicago storm"
		535 400	Coefficient A"
		0 000 0 000	Constant B"
		0.000	Exponent ("
		0.000	Exponence C
		240 000	Duration"
		1 000	Time sten multinlier"
		1.000 Ma	vinum intensity $170 \ 160 \ \text{mm/hr}$
		То	170.100 mm/m
		6	005byd Hydrograph extension used in this file"
	22	о С Л	TCHMENT 301"
	22	1	Triangulan SCS"
		1	Faull longth"
		1	Equal tengen
		1 201	Sts methou External drainage area drains to 201"
		70 000	⁹ Impopulaus"
		/0.000	Total Anoa"
		6.590	Flow longth"
		1 000	Flow Teligui
		1.000	Dervieus Anaz"
		6.117	Pervious Area
		1 000	Pervious length
		1.000	Pervious slope
		0.273	Impervious Area
		50.000	Impervious length
		1.000	Impervious slope
		0.250	Pervious Manning In T
		/5.000	Pervious SLS Curve No."
		0.253	Pervious Runott coetticient"
		0.100	Pervious la/S coefficient"
		8.46/	Pervious initial abstraction"
		0.015	Impervious Manning 'n'"
		98.000	Impervious SCS Curve No."
		0.876	Impervious Runott coetticient"
		0.100	Impervious Ia/S coetticient"
.,		0.518	Impervious Initial abstraction"

"		0	.080	0.000	0.000	0.000 (.m/sec"	
"		Catchment	301		Pervious	Impervious	Total Area	"
"		Surface A	rea		0.117	0.273	0.390	hectare"
"		Time of c	oncentrat	ion	28.877	3.055	5.898	minutes"
"		Time to C	entroid		182.422	122.455	129.058	minutes"
"		Rainfall	depth		46.448	46.448	46.448	mm"
"		Rainfall	volume		54.34	126.80	181.15	c.m"
"		Rainfall	losses		34.697	5.744	14.430	mm"
"		Runoff de	pth		11.752	40.705	32.019	mm"
"		Runoff vo	lume		13.75	111.12	124.87	c.m"
"		Runoff co	efficient		0.253	0.876	0.689	"
"		Maximum f	low		0.003	0.079	0.080	c.m/sec"
"	40	HYDROGRAP	H Add Run	off "	1			
"	4	Add Ru	noff "					
"		0	.080	0.080	0.000	0.000"		
"	40	HYDROGRAP	H Copy to	Outf	low"			
"	8	Copy t	o Outflow	"				
"		0	.080	0.080	0.080	0.000"		
"	40	HYDROGRAP	H Next li	nk "				
"	5	Next 1	ink "					
"		0	.080	0.080	0.080	0.000"		
"	33	CATCHMENT	201"					
"	1	. Triang	ular SCS"					
"	1	. Equal	length"					
"	1	. SCS me	thod"					
"	201	. Contro	lled flow	to p	ond"			
"	90.000) % Impe	rvious"					
"	1.080) Total	Area"					
"	80.000) Flow l	ength"					
"	2.000	0 Overla	nd Slope"					
"	0.108	Pervio	us Area"					
"	80.000) Pervio	us length					
	2.000) Pervio	us slope"					
	0.972	Imperv	ious Area					
	80.000	1mperv	ious leng	th"				
	2.000	1 Imperv	ious slop	e"				
	0.256	Pervio	us Mannin	g'n'				
	/5.000	Pervio	us SCS Cu	rve N				
	0.253	Pervio	us Runott	coet	ficient"			
	0.100	Pervio	us la/S c	0e++1	.cient" "			
	8.46/	Pervio	us Initia	i abs	straction"			
	0.015	Imperv	ious Mann	ing '	n [·]			
	98.000	1mperv	ious SCS	Curve				
	0.8/2	Imperv	LOUS KUNO	TT CC	perricient"			
	0.100	Imperv	ious Ia/S	coet	TICLENT			
	0.518	mperv	LOUS INIT	Lat a		0.000		
		Catchmant	.2/3	0.086	0.080	0.000 (Totol Ange	
			701		Pervious	impervious	1 000	h
		Surtace A	rea	.	801.00	0.972	1.080	nectare"
		ilme of C	oncentrat	TOU	21.02/	3.290	4.158	minutes

"	-	Time to Centroid	185.907	122.984	124.949	minutes"
"	I	Rainfall depth	46.448	46.448	46.448	mm"
"	I	Rainfall volume	50.16	451.48	501.64	c.m"
"	I	Rainfall losses	34.692	5.929	8.806	mm"
"	I	Runoff depth	11.757	40.519	37.643	mm"
"	I	Runoff volume	12.70	393.84	406.54	c.m"
"	I	Runoff coefficient	0.253	0.872	0.810	п
"	I	Maximum flow	0.002	0.273	0.273	c.m/sec"
"	40 I	HYDROGRAPH Add Runo	ff "			
"	4	Add Runoff "				
"		0.273 0	.353 0.0	0.006)"	
"	54	POND DESIGN"				
"	0.353	Current peak flo	w c.m/sec	. 11		
"	0.367	Target outflow	c.m/sec"			
"	531.4	Hydrograph volum	e c.m"			
"	12.	Number of stages				
"	506.400	Minimum water le	vel metre	"		
"	507.400	Maximum water le	vel metre	"		
"	506.400	Starting water 1	evel metr	e"		
"	0	Keep Design Data	: 1 = True;	0 = False"		
"		Level Discharg	e Volume'			
"		506.400 0.00	0.000"			
"		506.500 0.0014	6 34.948"			
"		506.600 0.0023	1 71.402"			
"		506.700 0.0029	2 110.901"			
"		506.800 0.0157	8 153.510"			
"		506.900 0.0466	7 199.291"			
"		507.000 0.101	4 248.306"			
"		507.100 0.163	9 300.603"			
"		507.200 0.202	0 356.258"			
"		507.300 0.232	7 415.288"			
"		507.350 0.332	4 446.043"			
"		507.400 0.502	3 477.614"			
"	1.	WEIRS"				
"		Crest Wei	r Crest	Left	Right"	
"		elevation coeffici	e breadth	sideslope si	ideslope"	
"		507.300 0.90	0 5.000	0.000	0.000"	
"	3.	ORIFICES"				
"		Orifice Orific	e Orifice	Number of"		
"		invert coeffici	e diameter	orifices"		
"		506.400 0.65	0 0.0500	1.000"		
"		506.700 0.65	0 0.2500	1.000"		
"		506.700 0.65	0 0.3000	1.000"		
"	1.	HOR. ORIFICES"				
"		Orifice Orific	e Orifice	Number of"		
"		invert coeffici	e diameter	orifices"		
"		507.100 0.65	0 0.0750	1.000"		
"	I	Peak outflow	e	.067 c.m/	/sec"	
"	I	Maximum level	507	.012 metr	re"	
"	1	Maximum storage	254	.591 c.m'	ı	
	-			- /		

"		Centroidal 1	ag	5.10	04 hours"		
"		0.273	0.353	0.067	0.000 c.m/	'sec"	
"	40	HYDROGRAPH	Combine	1"			
"	6	5 Combine "					
"	-	L Node #"					
"		outlet to	creek"				
"		Maximum flow		0.06	57 c.m/se	ec"	
"		Hydrograph v	olume	522.88	31 c.m"		
		0.27	3 0.353	8 0.067	0.067"		
	40	HYDROGRAPH S	tart - New	Tributary"			
	-	2 Start - N	ew Tributar	`У"			
	22	0.27	3 0.000	0.06/	0.06/"		
	33	CAICHMENI 30	2"				
	-	L Irianguia	r SCS ath"				
	-	L Equal len	gun a"				
		1 313 metho	u dhainago ar	oo dooind	+ + 202"		
	202 70 00	2 external 2 % Imponvi	urainage ar	ea - urains	5 10 202		
	0.000) % Impervi A Total Are	ous >"				
	50.120	A Flow leng	a th"				
	1.000	Overland	Slone"				
	0.03	5 Pervious	Area"				
"	50.000) Pervious	length"				
"	1.000) Pervious	slope"				
"	0.084	l Imperviou	s Area"				
"	50.000) Imperviou	s length"				
"	1.000) Imperviou	s slope"				
"	0.250) Pervious	Manning 'n'	п			
"	75.000	Pervious	SCS Curve N	lo."			
"	0.253	8 Pervious	Runoff coef	ficient"			
"	0.100	Pervious	Ia/S coeffi	lcient"			
"	8.467	7 Pervious	Initial abs	straction"			
	0.01	5 Imperviou	s Manning '	n'"			
	98.000) Imperviou	s SCS Curve	e No."			
	0.876	5 Imperviou	s Runott co	efficient"			
	0.100	1 Imperviou	s la/S coet	ficient"			
	0.518	s Imperviou	s initial a		0.067		
		Catchmont 30	4 0.000 ว	0.06/	0.06/ C	Total Anoa	
		Catchment 30	Z	Pervious	Impervious	o 120	hactona"
		Jurrace Area	ontnation		2 055	5 909	minutoc"
		Time to Cent	noid	20.0//	2.022 122 155	170 050	minutes
		Rainfall den	1010 th	16 118	122.435	129.000	mm"
		Rainfall vol	ume	16.72	39.02	55.74	 c.m"
		Rainfall loc	Ses	34,697	5.744	14.430	mm"
"		Runoff denth		11.752	40.705	32.019	 mm"
"		Runoff volum	e	4.23	34.19	38.42	c.m"
"		Runoff coeff	icient	0.253	0.876	0.689	II .
"		Maximum flow		0.001	0.024	0.024	c.m/sec"
"	40	HYDROGRAPH A	dd Runoff "	,			-

		4	Add R	unoff "						
"		-		0.024	0.024	1 0.0	967	0.067"		
"	40	HY	DROGRA	PH Copy t	to Outf	Flow"				
"		8	Copy	to Outflo	ow"					
"			15	0.024	0.024	4 0.6	924	0.067"		
"	40	HY	DROGRA	PH Next]	link "					
"		5	Next	link "						
"				0.024	0.024	1 0.0	924	0.067"		
"	33	CA	TCHMEN	T 202"						
"		1	Trian	gular SCS	5"					
"		1	Equal	length"						
"		1	SCS m	ethod"						
"		202	Uncon	trolled t	to cree	ek"				
"		5.000	% Imp	ervious"						
"		1.820	Total	Area"						
"		80.000	Flow	length"						
"		0.500	0verl	and Slope	e"					
"		1.729	Pervi	ous Area'	•					
"		80.000	Pervi	ous lengt	th"					
		0.500	Pervi	ous slope	e"					
		0.091	Imper	vious Are	ea"					
		80.000	Imper	vious ler	ngth"					
		0.500	Imper	VIOUS SIC	ope"					
		0.250	Pervi	ous Manni	ing 'n'					
		/5.000	Pervi	OUS SUS (Lurve N	NO. Eficiont'				
		0.253	Pervi		rt coet	rticient				
		8 467	Pervi	ous Ia/S	ial abs	tnaction	. "			
		0.407 0.015	Tmpon	vious Mar	ning '	'n'"	1			
		98 000	Imper	vious SC9		No "				
		0.886	Imper	vious Bur	noff co	oefficier	nt"			
"		0.100	Imper	vious Ia/	/S coef	fficient'				
		0.518	Imper	vious Ini	itial a	abstracti	ion"			
"				0.033	0.024	4 0.0	324	0.067	.m/sec"	
"		Ca	tchmen	t 202		Pervious	s Im	pervious	Total Area	"
"		Su	rface	Area		1.729	0.	091	1.820	hectare"
"		Ti	me of	concentra	ation	47.135	4.	986	40.579	minutes"
"		Ti	me to	Centroid		211.196	12	5.881	197.928	minutes"
"		Ra	infall	depth		46.448	46	.448	46.448	mm"
"		Ra	infall	volume		803.09	42	.27	845.36	c.m"
"		Ra	infall	losses		34.691	5.	306	33.222	mm"
"		Ru	noff d	lepth		11.758	41	.142	13.227	mm"
"		Ru	noff v	olume		203.29	37	.44	240.73	c.m"
"		Ru	noff c	oefficier	nt	0.253	0.	886	0.285	"
		Ma	ximum	flow		0.027	0.	027	0.033	c.m/sec"
	40	HY	DROGRA	PH Add Ru	unoff "	•				
		4	Add R	unott "	0 0		~~ 4	0.07-"		
	40			0.033	0.056	o 0.6	o24	0.06/"		
	40	HY		PH Copy t	to Uutt	LTOM				
		8	сору	to Out+lo	W					

"			0.033	0.056	0.056	0.067"		
	40	HY	DROGRAPH Combi	ine 1	L"			
		6	Combine "					
"		1	Node #"					
"			outlet to creek	۲"				
		Ма	ximum flow		0.09	94 c.m/se	°C"	
		Hv	drograph volume		802.03	2 c.m"		
		,	0.033	0.056	0.056	0.094"		
	40	ну	DROGRAPH Start -	- New Tr	ributary"	0.051		
	10	2	Start - New Tri	ibutarv'	'			
п		-	0 033	a aaa	0 056	0 094"		
	22	CA	TCHMENT 203"	0.000	0.050	0.054		
	55	1	Triangular SCS					
		1	Faual length"					
		1	SCS method"					
		203	Containment and	י רי				
		95 000	% Tmpenvious"	- 0				
п		1 1/0	Total Area"					
		25 000	Flow longth"					
		33.000	Ovenland Slene'					
		0.300	Bonvious Anop"					
		25 000	Pervious Area	, "				
		53.000	Pervious lenger	1 1				
		1 002	Transmisus Ana					
		1.005	Impervious Area	; -+				
		35.000	Impervious ieng	gun or				
		0.500	Impervious sion					
		0.250	Pervious Mannin	ig ii				
		/5.000	Pervious SCS CC	irve No.				
		0.253	Pervious Runoti	г соетті	LCIENT			
		0.100	Pervious la/S d	coettici	Lent			
		8.467	Pervious Initia	al abstr	raction			
		0.015	Impervious Mann	iing 'n'				
		98.000	Impervious SCS	Curve N				
		0.8//	Impervious Rund	off coef	fficient"			
		0.100	Impervious la/S	coetti	icient"			
		0.518	Impervious Init	cial abs	straction"		<i>,</i>	
			0.315	0.000	.0.056	- 0.094 0	.m/sec"	
		Ca	tchment 203	Pe	ervious	Impervious	lotal Area	
		Su	rtace Area	. 0.	.05/	1.083	1.140	hectare"
		11	me of concentrat	210n 28	3.703	3.036	3.420	minutes"
		Ti	me to Centroid	18	32.153	122.412	123.306	minutes"
		Ra	infall depth	46	5.448	46.448	46.448	mm''
		Ra	infall volume	26	5.48	503.04	529.51	c.m"
		Ra	infall losses	34	4.700	5.733	7.181	mm"
"		Ru	noff depth	11	1.749	40.716	39.268	mm"
"		Ru	noff volume	6.	.70	440.95	447.65	c.m"
"		Ru	noff coefficient	. 0.	.253	0.877	0.845	
"		Ма	ximum flow	0.	.001	0.315	0.315	c.m/sec"
"	40	HY	DROGRAPH Add Rur	noff "				
"		4	Add Runoff "					

"		0.315	0.315	0.056	0.094"	
"	54 PC	ND DESIGN"				
"	0.315	Current peak	flow c.	m/sec"		
"	0.367	Target outflo	w c.m/s	sec"		
"	447.6	Hydrograph vo	lume c.	. m''		
"	11.	Number of sta	ges"			
"	506.050	Minimum water	level	metre"		
"	507.900	Maximum water	level	metre"		
"	506.050	Starting wate	r level	metre"		
"	0	Keep Design D	ata: 1 = 1	[rue; 0 =	False"	
"		Level Disch	arge Vo	olume"		
"		506.050 0	.000 0	0.000"		
"		507.050 0.0	3373 2	2.000"		
"		507.150 0.0	3538 6	5.932"		
"		507.250 0.0	3695 99	9.984"		
"		507.350 0.0	3846 351	L.582"		
"		507.450 0.0	3991 741	L.190"		
"		507.550 0.0	4131 1197	7.540"		
"		507.650 0.0	4266 1666	5.800"		
"		507.750 0.04	4398 2153	8.836"		
"		507.850 0.0	4525 2658	3.672"		
"		507.900 0.0	4587 2919	9.547"		
"	1.	OUTFLOW PIPE"				
"		Upstream Downs	tr'm	Pipe	Pipe Manniı	ng Entry"
		invert in	vert Le	ength Dia	ameter 'ı	n' loss Ke"
	_	506.050 505	.980 13	3.900	0.150 0.03	15 0.500"
	Pe	eak outflow		0.03	7 c.m/sec"	
	Ma	iximum level		507.28	5 metre"	
	Ma	aximum storage		18/.5/	3 c.m"	
	Le	entroidal lag	245	2.83.	3 hours"	
	40 11		.315 k	1.03/	0.094 C.m/sec	
	40 Hi	DRUGRAPH COM	bine i			
	0	Combine				
	T	Noue #	ok"			
	м-	vinum flow	eĸ	0 12		
	нс Цу	vdnognanh volum	0	1250 30	2 C.III/SEC 8 C.m."	
	пу	a 215	e 0315	1230.390 0 037	0 174"	
	אַ אָ	ΔRT/RF_START T	בדרים יצמכ צועדר	1 10.037	0.1/4	
	د اد 50	Runoff Totale	on FYTT"			
	J Tr	tal Catchment	area		4 550	hectare"
	Te	tal Impervious	area		2,503	hectare"
	Te	tal % impervio			55.011	neecui e
"	19 EX	(IT"			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
"			MIDUSS Output>"			
---	----	-------------	---			
"			MIDUSS version Version 2.25 rev. 467"			
"			MIDUSS created July 6, 2008"			
		10	Units used: ie METRIC"			
			lob folder: C:\Users\cmahonev\Documents\2024 Work\"			
			2021-0713-10\New SWM Files\MTDUSS modelling\Post-Development"			
			Output filename: 10 Year Post-Dev - REV10.out"			
			Licensee name: Circe Mahonev"			
			Company WalterFedy"			
			Date & Time last used: 2024-05-08 at 11:01:23 AM"			
	31	TI	ME PARAMETERS"			
	-	5.000	Time Sten"			
		240.000	Max. Storm length"			
		1500.000	Max. Hydrograph"			
	32	ST	ORM Chicago storm"			
	52	1	Chicago storm"			
		622 800	Coefficient A"			
		0.000	Constant B"			
		0.000	Exponent ("			
		0.055	Exponence C Eraction R"			
		240 000	Duration"			
		1 000	Time sten multinlier"			
		1.000 Ma	vince step materprise			
		To	tal denth $54.031 \text{ mm}''$			
		6	010hvd Hydrograph extension used in this file"			
	33	ČA	TCHMENT 301"			
	55	1	Triangular SCS"			
		1	Faual length"			
		- 1	SCS method"			
		301	External drainage area - drains to 201"			
		70.000	% Impervious"			
"		0.390	Total Area"			
		50.000	Flow length"			
		1.000	Overland Slope"			
		0.117	Pervious Area"			
		50.000	Pervious length"			
		1.000	Pervious slope"			
"		0.273	Impervious Area"			
		50.000	Impervious length"			
"		1.000	Impervious slope"			
		0.250	Pervious Manning 'n'"			
		75.000	Pervious SCS Curve No."			
"		0.295	Pervious Runoff coefficient"			
"		0.100	Pervious Ia/S coefficient"			
		8.467	Pervious Initial abstraction"			
"		0.015	Impervious Manning 'n'"			
"		98.000	Impervious SCS Curve No."			
"		0.893	Impervious Runoff coefficient"			
"		0.100	Impervious Ia/S coefficient"			
"		0.518	Impervious Initial abstraction"			

"			0.097	0.000	9	0.000	0.000 (c.m/sec"	
"		Catchmer	nt 301		Pervi	ous	Impervious	Total Area	"
"		Surface	Area		0.117		0.273	0.390	hectare"
"		Time of	concentr	ration	25.17	4	2.864	5.629	minutes"
"		Time to	Centroid	1	175.5	54	121.463	128.167	minutes"
"		Rainfal	l depth		54.03	1	54.031	54.031	mm"
"		Rainfal	l volume		63.22		147.50	210.72	c.m"
"		Rainfal	l losses		38.10	5	5.788	15.483	mm"
"		Runoff d	depth		15.92	6	48.242	38.547	mm"
"		Runoff v	/olume		18.63		131.70	150.33	c.m"
"		Runoff d	coefficie	ent	0.295		0.893	0.713	"
"		Maximum	flow		0.004		0.096	0.097	c.m/sec"
"	40	HYDROGRA	APH Add R	Runoff '	II.				
"		4 Add F	Runoff "						
"			0.097	0.097	7	0.000	0.000"		
"	40	HYDROGRA	АРН Сору	to Out	flow"				
"		8 Сору	to Outfl	.ow"					
"			0.097	0.097	7	0.097	0.000"		
"	40	HYDROGRA	APH Next	link "					
"		5 Next	link "						
"			0.097	0.097	7	0.097	0.000"		
"	33	CATCHMEN	NT 201"						
"		1 Trian	ngular SC	:S"					
"		1 Equa	l length"	I					
"		1 SCS r	nethod"						
"	20	1 Contr	rolled fl	low to p	oond"				
	90.00	0 % Imp	pervious"	1					
"	1.08	0 Tota	l Area"						
	80.00	0 Flow	length"						
	2.00	0 Over.	Land Slop	e"					
	0.10	8 Pervi	ious Area	a" 					
	80.00	0 Perv:	Lous Leng	gth"					
	2.00	0 Perv:	LOUS SLOP	e"					
	0.97	2 Imper	rvious Ar	'ea"					
	80.00	0 Imper	rvious le	ength"					
	2.00	o Imper	rvious si	ope					
	0.25	0 Pervi	Lous Manr	ning n					
	/5.00	Domu	LOUS SUS	Curve r	٥ ٠ دد:د:ه	∽ + ″			
	0.29	o Perv.	LOUS RUNC		iciont	nt "			
	0.10	7 Dony	LOUS Id/3	ial ab	rt pact	ion"			
	8.40 0.01	7 Perv.	LOUS INIC	lai aus	stract 'p'"	101			
	0.01	o Impor	vious Ma	anniting S. Cupya	11 2 No "				
	0.00	0 Imper 0 Tmpor	vious Sc avious Ru	noff co	e NO.	iont"			
	0.05	0 Imper 0 Tmpor	vious Ta	1011 CC	fficio	nt"			
	0.10	0 Imper 8 Imper	vious Id	nitial a	ahstra	ction'			
	0.51	o Tilhei	0 222 TI	чтстат с	ausurd 7	0 007	0 000 /	m/sec"	
		Catchmer	1+ 201	0.09	, Pervi		Impervious	Total Area	
		Surface	Δrea		0 102	545	0.972	1,080	hectare"
		Time of	concentr	ration	27.11	0	3.084	3.937	minutes"
						-			

"	Time to Centroid	178.636	121.923	123.937	minutes"
"	Rainfall depth	54.031	54.031	54.031	mm''
"	Rainfall volume	58.35	525.18	583.53	c.m"
"	Rainfall losses	38.091	5.933	9.149	mm"
"	Runoff depth	15.940	48.098	44.882	mm''
"	Runoff volume	17.21	467.51	484.72	c.m"
"	Runoff coefficient	0.295	0.890	0.831	
"	Maximum flow	0.004	0.331	0.332	c.m/sec"
"	40 HYDROGRAPH Add Runof	f "			
"	4 Add Runoff "				
"	0.332 0.4	428 0.09	0.000		
"	54 POND DESIGN"				
"	0.428 Current peak flow	c.m/sec"			
"	0.367 Target outflow	c.m/sec"			
"	635.1 Hydrograph volume	c.m"			
"	12. Number of stages"				
"	506.400 Minimum water lev	el metre"			
"	507.400 Maximum water lev	el metre"			
"	506.400 Starting water lev	vel metre	è"		
"	0 Keep Design Data:	1 = True; 0) = False"		
"	Level Discharge	Volume"			
"	506.400 0.000	0.000"			
"	506.500 0.00146	34.948"			
"	506.600 0.00231	71.402"			
"	506.700 0.00292	110.901"			
"	506.800 0.01578	153.510"			
"	506.900 0.04667	199.291"			
"	507.000 0.1014	248.306"			
"	507.100 0.1639	300.603"			
"	507.200 0.2020	356.258"			
"	507.300 0.2327	415.288"			
"	507.350 0.3324	446.043"			
"	507.400 0.5023	477.614"			
"	1. WEIRS"				
"	Crest Weir	Crest	Left	Right"	
"	elevation coefficie	breadth s	ideslope si	deslope"	
"	507.300 0.900	5.000	0.000	0.000"	
"	3. ORIFICES"		_		
"	Orifice Orifice	Orifice N	lumber of"		
"	invert coefficie	diameter	orifices"		
"	506.400 0.650	0.0500	1.000"		
"	506.700 0.650	0.2500	1.000"		
"	506.700 0.650	0.3000	1.000"		
"	1. HOR. ORIFICES"				
"	Orifice Orifice	Orifice N	lumber of"		
"	invert coefficie	diameter	orifices"		
	507.100 0.650	0.0750	1.000"		
	Peak outflow	0.	122 c.m/	sec"	
	Maximum level	507.	082 metr	e"	
"	Maximum storage	291.	188 c.m"		

"		Centroidal lag		4.33	1 hours"		
"		0.332	0.428	0.122	0.000 c.m/	'sec"	
"	40	HYDROGRAPH C	ombine	1"			
"		5 Combine "					
"	:	1 Node #"					
"		outlet to c	reek"				
"		Maximum flow		0.12	2 c.m/se	e	
"		Hydrograph vol	ume	626.41	.4 c.m"		
"		0.332	0.428	0.122	0.122"		
"	40	HYDROGRAPH Sta	rt - New	Tributary"			
"		2 Start - New	Tributar	у"			
"		0.332	0.000	0.122	0.122"		
"	33	CATCHMENT 302"					
"	:	1 Triangular	SCS"				
"	:	1 Equal lengt	h"				
"	:	<pre>SCS method"</pre>					
"	30	2 external dr	ainage ar	ea - drains	; to 202"		
"	70.00	ð 🕺 % Imperviou	s"				
"	0.12	7 Total Area					
"	50.00	9 Flow length					
"	1.00	0 Overland Sl	ope"				
"	0.03	6 Pervious Ar	ea"				
"	50.00	Ø Pervious le	ngth"				
"	1.00	Ø Pervious sl	ope"				
"	0.08	4 Impervious	Area"				
"	50.00	0 Impervious	length"				
"	1.00	<pre>0 Impervious</pre>	slope"				
"	0.25	9 Pervious Ma	nning 'n'				
"	75.00	9 Pervious SC	S Curve N	o."			
"	0.29	5 Pervious Ru	noff coef	ficient"			
"	0.10	9 Pervious Ia	/S coeffi	cient"			
"	8.46	7 Pervious In	itial abs	traction"			
"	0.01	5 Impervious	Manning '	n'"			
"	98.00	ð Impervious	SCS Curve	No."			
	0.89	3 Impervious	Runoff co	efficient"			
	0.10	0 Impervious	Ia/S coef	ficient"			
	0.51	8 Impervious	Initial a	bstraction"			
		0.030	0.000	0.122	0.122 0	:.m/sec"	
		Catchment 302		Pervious	Impervious	Total Area	
		Surface Area		0.036	0.084	0.120	hectare"
		Time of concen	tration	25.174	2.864	5.629	minutes"
		Time to Centro	id	175.554	121.463	128.167	minutes"
		Rainfall depth		54.031	54.031	54.031	mm"
		Rainfall volum	e	19.45	45.39	64.84	c.m"
		Rainfall losse	S	38.105	5.788	15.483	mm"
		Runott depth		15.926	48.242	38.547	mm"
		Runott volume		5./3	40.52	46.26	c.m"
		Kunott coetfic	ient	0.295	6.893	0./13	,
		Maximum flow		0.001	0.030	0.030	c.m/sec"
	40	HYDROGRAPH Add	Runoff "				

		4	Add R	unoff "						
"				0.030	0.030	9 0.	122	0.122"		
"	40	HY	'DROGRA	PH Copy t	to Outf	low"				
"		8	Copy	to Outflo	ow"					
"			.,	0.030	0.030	9 0.	030	0.122"		
"	40	HY	'DROGRA	PH Next 1	link "					
"		5	Next	link "						
"				0.030	0.030	9 0.	030	0.122"		
"	33	CA	TCHMEN	T 202"						
"		1	Trian	gular SCS	S"					
"		1	Equal	length"						
"		1	SCS m	ethod"						
"		202	Uncon	trolled t	to cree	ek"				
"		5.000	% Imp	ervious"						
"		1.820	Total	Area"						
"		80.000	Flow	length"						
"		0.500	0verl	and Slope	e"					
"		1.729	Pervi	ous Area'						
"		80.000	Pervi	ous lengt	th"					
		0.500	Pervi	ous slope	e"					
		0.091	Imper	vious Are	ea"					
		80.000	Imper	vious lei	ngth"					
		0.500	Imper	vious slo	ope" · · ·					
		0.250	Pervi	ous Mann:	ing 'n'					
		/5.000	Pervi	OUS SCS (Curve N	10."				
		0.295	Pervi		rt coet	ricient"				
		0.100	Pervi	ous Id/S	ial abo	thatio	ה "			
		0.407	Tmpop	vious Mar	iai aus oping '	'n'"	11			
		98 999	Imper	vious SC	S Curve	No "				
п		0.899	Imper	vious Bu	noff co	efficie	nt"			
		0.100	Imper	vious Ta	/S coef	ficient	"			
"		0.518	Imper	vious In:	itial a	abstract	ion"			
		01010		0.047	0.030) 0.	030	0.122 d	.m/sec"	
"		Ca	tchmen	t 202		Perviou	s Ir	npervious	Total Area	
"		Su	irface	Area		1.729	0.	.091	1.820	hectare"
"		Ti	me of	concentra	ation	41.090	4.	.675	36.053	minutes"
"		Ti	me to	Centroid		201.083	12	24.752	190.524	minutes"
"		Ra	infall	depth		54.031	54	4.031	54.031	mm"
"		Ra	infall	volume		934.19	49	9.17	983.36	c.m"
"		Ra	infall	losses		38.099	5.	.433	36.466	mm"
"		Ru	noff d	lepth		15.932	48	8.597	17.565	mm"
"		Ru	noff v	olume		275.46	44	4.22	319.68	c.m"
"		Ru	noff c	oefficie	nt	0.295	0.	.899	0.325	
"		Ма	ximum	flow		0.044	0.	.032	0.047	c.m/sec"
"	40	HY	DROGRA	PH Add Ru	unoff "	1				
		4	Add R	unoff "						
	46			0.047	0.069) 0. 	030	0.122"		
,,	40	HY	DROGRA	PH Copy	to Outf	-TOM.,				
		8	Сору	το Out+la	DM.,					

			0.047	0.069	0.069	0.122"		
"	40	HY	DROGRAPH Comb:	ine 1	L"			
"		6	Combine "					
		1	Node #"					
"			outlet to creek	<"				
"		Ma	ximum flow		0.15	9 c.m/se	ec"	
"		Hy	drograph volume		992.35	4 c.m"		
		2	0.047	0.069	0.069	0.159"		
	40	HY	DROGRAPH Start ·	- New Tr	ributary"			
"		2	Start - New Tr	ibutary'				
"			0.047	0.000	0.069	0.159"		
"	33	CA	TCHMENT 203"					
"		1	Triangular SCS	•				
"		1	Equal length"					
"		1	SCS method"					
		203	Containment are	ea"				
"		95.000	% Impervious"					
"		1.140	Total Area"					
"		35.000	Flow length"					
"		0.500	Overland Slope'	•				
"		0.057	Pervious Area"					
"		35.000	Pervious lengt	า"				
"		0.500	Pervious slope	•				
"		1.083	Impervious Area	э"				
"		35.000	Impervious len	gth"				
"		0.500	Impervious slop	be"				
"		0.250	Pervious Mannin	ng 'n'"				
"		75.000	Pervious SCS Cu	urve No.	, "			
"		0.295	Pervious Runof	f coeffi	icient"			
"		0.100	Pervious Ia/S	coeffici	ient"			
		8.467	Pervious Initia	al abstr	raction"			
"		0.015	Impervious Man	ning 'n'				
"		98.000	Impervious SCS	Curve N	No."			
"		0.893	Impervious Rund	off coef	ficient"			
"		0.100	Impervious Ia/S	5 coeffi	icient"			
"		0.518	Impervious Init	tial abs	straction"			
"			0.382	0.000	0.069	0.159 c	.m/sec"	
		Ca	tchment 203	Pe	ervious	Impervious	Total Area	
		Su	rface Area	0.	.057	1.083	1.140	hectare"
"		Ti	me of concentrat	tion 25	5.022	2.847	3.225	minutes"
		Ti	me to Centroid	17	75.305	121.436	122.356	minutes"
		Ra	infall depth	54	1.031	54.031	54.031	mm"
"		Ra	infall volume	30	9.80	585.15	615.95	c.m"
		Ra	infall losses	38	3.102	5.776	7.393	mm"
"		Ru	noff depth	15	5.928	48.254	46.638	mm"
"		Ru	noff volume	9.	.08	522.59	531.67	c.m"
"		Ru	noff coefficient	t 0.	. 295	0.893	0.863	
"		Ma	ximum flow	0.	.002	0.382	0.382	c.m/sec"
"	40	HY	DROGRAPH Add Rur	noff "				
"		4	Add Runoff "					

"		0.382	0.382	0.069	0.159'	I	
"	54 P	OND DESIGN"					
"	0.382	Current peak	flow c.	.m/sec"			
"	0.367	Target outflo	w c.m/s	sec"			
"	531.7	Hydrograph vo	lume c.	.m"			
"	11.	Number of sta	ges"				
"	506.050	Minimum water	level	metre"			
"	507.900	Maximum water	level	metre"			
"	506.050	Starting wate	r level	metre"			
"	0	Keep Design D	ata: 1 = 1	[rue; 0 =	= False"		
"		Level Disch	arge Vo	olume"			
"		506.050 0	.000	0.000"			
"		507.050 0.0	3373 2	2.000"			
"		507.150 0.0	3538 6	5.932"			
"		507.250 0.0	3695 99	9.984"			
"		507.350 0.0	3846 351	L.582"			
"		507.450 0.0	3991 743	L.190"			
"		507.550 0.0	4131 1197	7.540"			
"		507.650 0.0	4266 1666	5.800"			
"		507.750 0.0	4398 2153	8.836"			
"		507.850 0.0	4525 2658	3.672"			
"		507.900 0.0	4587 2919	9.547"			
"	1.	OUTFLOW PIPE"					
"		Upstream Downs	tr'm	Ріре	Pipe N	lanning	Entry"
"		invert in	vert Le	ength Di	iameter	'n'	loss Ke"
"		506.050 505	.980 13	3.900	0.150	0.015	0.500"
"	P	eak outflow		0.03	38 c.m/s	sec"	
"	M	aximum level		507.30	05 metre	?"	
"	M	aximum storage		238.62	22 c.m"		
"	C	entroidal lag		3.04	41 hours'	I	
"		0.382 0	.382 @	0.038	0.159 c.m	ı/sec"	
"	40 H	YDROGRAPH Com	bine 1'	1			
"	6	Combine "					
"	1	Node #"					
"		outlet to cre	ek"				
"	M	aximum flow		0.19	97 c.m/s	sec"	
"	H	ydrograph volum	e	1521.42	23 c.m"		
"		0.382	0.382	0.038	0.228	I	
"	38 S	TART/RE-START T	OTALS 203'	I			
"	3	Runoff Totals	on EXIT"				
"	Т	otal Catchment	area		2	1.550	hectare"
"	T	otal Impervious	area		-	2.503	hectare"
"	T	otal % impervio	us		55	5.011"	
"	19 E	XIT"					

"			MIDUSS Output>"
"			MIDUSS version Version 2.25 rev. 467"
			MTDUSS created July 6, 2008"
		10	Units used: ie METRIC"
		10	loh folder: C:\Users\cmahonev\Documents\2024 Work\"
			2021-0713-10\New SWM Files\MTDUSS modelling\Post-Development"
			Output filename: 25 Year Post-Dev - REV10 out"
			Licensee name:
			Company WalterEedy"
			Date & Time last used: $2024_05_08 = 10.57.21 \text{ AM}''$
	21	тт	
	1	5 000	Time Step"
		240.000	Max Stopm longth"
		1500 000	Max. Hydrograph"
	วว	1300.000	"OPM Chicago stopm"
	32	1	Chicago storm
		L 221 200	Chicago Storm
		/31.300	Coefficient A
		0.000	Constant B"
		0.699	Exponent C
		0.400	Fraction R"
		240.000	Duration"
		1.000	Time step multiplier"
"		Ма	ximum intensity 232.421 mm/hr"
"		То	tal depth 63.444 mm"
"		6	025hyd Hydrograph extension used in this file"
"	33	CA	TCHMENT 301"
"		1	Triangular SCS"
"		1	Equal length"
"		1	SCS method"
"		301	External drainage area - drains to 201"
"		70.000	% Impervious"
"		0.390	Total Area"
"		50.000	Flow length"
"		1.000	Overland Slope"
"		0.117	Pervious Area"
"		50.000	Pervious length"
"		1.000	Pervious slope"
"		0.273	Impervious Area"
"		50.000	Impervious length"
"		1.000	Impervious slope"
"		0.250	Pervious Manning 'n'"
"		75.000	Pervious SCS Curve No."
"		0.341	Pervious Runoff coefficient"
"		0.100	Pervious Ia/S coefficient"
"		8.467	Pervious Initial abstraction"
"		0.015	Impervious Manning 'n'"
"		98.000	Impervious SCS Curve No."
"		0.908	Impervious Runoff coefficient"
		0.100	Impervious Ia/S coefficient"
		0.518	Impervious Initial abstraction"
			F

"			0.118	0.000	0.000	0.000	c.m/sec"	
"		Catchmen	t 301		Pervious	Impervious	Total Area	
"		Surface	Area		0.117	0.273	0.390	hectare"
"		Time of	concentra	ation	21.996	2.677	5.352	minutes"
"		Time to	Centroid		169.356	120.544	127.304	minutes"
"		Rainfall	depth		63.444	63.444	63.444	mm"
"		Rainfall	volume		74.23	173.20	247.43	c.m"
"		Rainfall	losses		41.828	5.820	16.622	mm"
"		Runoff d	epth		21.615	57.624	46.821	mm"
"		Runoff v	olume		25.29	157.31	182.60	c.m"
"		Runoff c	oefficier	nt	0.341	0.908	0.738	н
"		Maximum	flow		0.007	0.117	0.118	c.m/sec"
"	40	HYDROGRA	PH Add Ru	unoff '	II			
"		4 Add R	unoff "					
"			0.118	0.118	8 0.000	0.000"		
"	40	HYDROGRA	PH Copy t	to Out	flow"			
"		8 Copy	to Outflo	w"				
"			0.118	0.118	8 0.118	0.000"		
"	40	HYDROGRA	PH Next]	link "				
"		5 Next	link "					
"			0.118	0.118	8 0.118	0.000"		
"	33	CATCHMEN	T 201"					
"		1 Trian	gular SCS	5"				
"		1 Equal	length"					
"		1 SCS m	ethod"					
"	20	1 Contr	olled flo	ow to p	oond"			
"	90.00	0 % Imp	ervious"					
"	1.08	0 Total	Area"					
"	80.00	0 Flow	length"					
"	2.00	0 Overl	and Slope	2"				
"	0.10	8 Pervi	ous Area'	•				
"	80.00	0 Pervi	ous lengt	ch"				
"	2.00	0 Pervi	ous slope	è				
"	0.97	2 Imper	vious Are	ea"				
"	80.00	0 Imper	vious ler	ngth"				
"	2.00	0 Imper	vious slo	ope"				
"	0.25	0 Pervi	ous Manni	ing 'n				
"	75.00	0 Pervi	ous SCS (Curve N	No."			
"	0.34	1 Pervi	ous Runof	ff coet	fficient"			
"	0.10	0 Pervi	ous Ia/S	coeff	icient"			
"	8.46	7 Pervi	ous Initi	ial abs	straction"			
"	0.01	5 Imper	vious Mar	ning	'n'"			
"	98.00	0 Imper	vious SCS	5 Curve	e No."			
"	0.90	6 Imper	vious Rur	noff co	pefficient"			
"	0.10	0 Imper	vious Ia,	/S coet	fficient"			
"	0.51	8 Imper	vious Ini	itial a	abstraction			
"			0.405	0.118	8 0.118	0.000	c.m/sec"	
"		Catchmen	t 201		Pervious	Impervious	Total Area	п
"		Surface	Area		0.108	0.972	1.080	hectare"
"		Time of	concentra	ation	23.687	2.882	3.718	minutes"

"	1	Time to Centro	id	172.095	120.908	122.964	minutes"
"	F	Rainfall depth		63.444	63.444	63.444	mm"
"	F	Rainfall volum	e	68.52	616.67	685.19	c.m"
"	F	Rainfall losse	s	41.807	5.972	9.556	mm"
"	F	Runoff depth		21.637	57.471	53.888	mm"
"	F	Runoff volume		23.37	558.62	581.99	c.m"
"	F	Runoff coeffic:	ient	0.341	0.906	0.849	II.
"	Ν	1aximum flow		0.006	0.404	0.405	c.m/sec"
"	40 H	IYDROGRAPH Add	Runoff				
"	4	Add Runoff					
"		0.405	0.52	23 0.1	18 0.0	00"	
"	54 F	POND DESIGN"					
"	0.523	Current pea	k flow	c.m/sec			
"	0.367	Target outf	low (c.m/sec"			
"	764.6	Hydrograph y	volume	c.m"			
"	12.	Number of s	tages"				
"	506.400	Minimum wat	er leve	l metre			
"	507.400	Maximum wat	er leve	l metre			
"	506.400	Starting wa [.]	ter leve	el metr	e"		
"	0	Keep Design	Data: 2	1 = True;	0 = False"		
"		Level Dis	charge	Volume"			
"		506.400	0.000	0.000"			
"		506.500 0	.00146	34.948"			
"		506.600 0	.00231	71.402"			
"		506.700 0	.00292	110.901"			
"		506.800 0	.01578	153.510"			
"		506.900 0	.04667	199.291"			
"		507.000	0.1014	248.306"			
"		507.100	0.1639	300.603"			
"		507.200	0.2020	356.258"			
		507.300	0.2327	415.288"			
"		507.350	0.3324	446.043"			
"		507.400	0.5023	477.614"			
	1.	WEIRS"					
		Crest	Weir	Crest	Left	Right"	
"		elevation coe	fficie	breadth	sideslope	sideslope"	
"		507.300	0.900	5.000	0.000	0.000"	
"	3.	ORIFICES"			_		
"		Orifice O	rifice	Orifice	Number of"		
"		invert coe [.]	fficie	diameter	orifices"		
"		506.400	0.650	0.0500	1.000"		
"		506.700	0.650	0.2500	1.000"		
		506.700	0.650	0.3000	1.000"		
"	1.	HOR. ORIFIC	ES"				
"		Orifice O	rifice	Orifice	Number of"		
"		invert coe [.]	fficie	diameter	orifices"		
		507.100	0.650	0.0750	1.000"		
	F	Peak outflow		0	.190 c.	m/sec"	
	Ν	1aximum level		507	.168 me	tre"	
"	Ν	laximum storag	e	338	.445 c.	m''	

"		Centroidal	lag		4.00	4 hours	, ''	
"		0.405	0.523	0.1	L90	0.000 c.	m/sec"	
"	40	HYDROGRAPH	Combine	1"				
"	(5 Combine						
"	:	L Node #"						
"		outlet t	co creek"					
"		Maximum flo	W		0.19	0 c.m/	'sec"	
"		Hydrograph	volume		755.34	.9 c.m"		
"		0.4	105 0.5	523	0.190	0.190)"	
	40	HYDROGRAPH	Start - Ne	w Tribu	itary"			
	2	2 Start -	New Tribut	ary"				
	22	0.4	405 0.0	000	0.190	0.190)"	
	33	CAICHMENI	302"					
	-	L Iriangui	Lar SCS					
	-	L Equal le	engtn					
	ימר	L SCS metr	100		ممغمم	±		
	30.	2 external	i ouc"	area -	urains	10 202		
	70.000	0 % Imperv	/10us					
	50.120 50.000		ea					
	1 000	A Overland	Igui I Slone"					
	0 03	5 Pervious	a Siope : Δrea"					
	50,000) Pervious	length"					
	1.000) Pervious	s slope"					
	0.084	1 Impervic	ous Area"					
"	50.000) Impervio	ous length"	ı				
"	1.000) Impervic	ous slope"					
"	0.25) Pervious	Manning '	n'"				
"	75.000	Pervious	SCS Curve	No."				
"	0.343	L Pervious	s Runoff co	efficie	ent"			
"	0.100	Pervious	s Ia/S coef	ficient	- "			
"	8.46	7 Pervious	s Initial a	bstract	ion"			
"	0.01	5 Impervio	ous Manning	g 'n'"				
	98.000) Impervic	ous SCS Cur	ve No.'				
	0.908	3 Impervic	bus Runoff	coeffic	ient"			
	0.100) Impervic	ous la/S co	etticie	ent"			
	0.518	3 Impervio	ous Initial	. abstra	action"	0 100		
		Catchmont 3		Donui	0.190	0.190	C.M/Sec	
		Catchment 3	202	0 020	LOUS	Tubel.ATOR	A 120	hoctono"
		Jurrace Are	a contration	21 00		0.004	0.120 5 252	minutoc"
		Time to Cor	troid	160 3	256	120 511	2.222 127 201	minutes
		Rainfall de	nth	63 //	14	63 111	63 111	mm"
		Rainfall vo		22 84	+-+ 1	53 29	76 13	 с m"
		Rainfall lo		41 82	, 99	5 820	16 622	mm"
		Runoff dent	h	21.61	 L5	57.624	46.821	 mm"
"		Runoff volu	ume	7.78	-	48.40	56.19	c.m"
"		Runoff coef	ficient	0.341	L	0.908	0.738	
"		Maximum flo	W	0.002	2	0.036	0.036	c.m/sec"
"	40	HYDROGRAPH	Add Runoff					

" 4 Add Runoff "		
" 0.036 0.036 0.190 0.190"		
" 40 HYDROGRAPH Copy to Outflow"		
" 8 Copy to Outflow"		
" 0.036 0.036 0.036 0.190"		
" 40 HYDROGRAPH Next link "		
" 5 Next link "		
" 0.036 0.036 0.036 0.190"		
" 33 CATCHMENT 202"		
" 1 Triangular SCS"		
" 1 Equal length"		
" 1 SCS method"		
" 202 Uncontrolled to creek"		
" 5.000 % Impervious"		
" 1.820 Total Area"		
" 80.000 Flow length"		
" 0.500 Overland Slope"		
" 1.729 Pervious Area"		
" 80.000 Pervious length"		
" 0.500 Pervious slope"		
" 0.091 Impervious Area"		
" 80.000 Impervious length"		
" 0.500 Impervious slope"		
" 0.250 Pervious Manning 'n'"		
" 75.000 Pervious SCS Curve No."		
" 0.341 Pervious Runoff coefficient"		
" 0.100 Pervious Ia/S coefficient"		
" 8.467 Pervious Initial abstraction"		
" 0.015 Impervious Manning 'n'"		
98.000 Impervious SCS Curve No."		
0.910 Impervious Runott coetticient"		
0.100 Impervious Ia/S coefficient"		
0.518 Impervious initial abstraction		
0.070 0.036 0.036 0.190 C.	.m/sec	11
" Supface Aper 1,720 0,001 1	1 0101 Area	hactono"
" Time of concentration 25 002 4 260	1.020	minutos"
" Time to Controld 101 000 122 664 1	32.022 193 570	minutes
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	103.3/9	mm"
" Painfall volume 1006 04 57 73 1	1151 67	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	10 001	c mm"
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	73 <i>1</i> 13	mm"
" Runoff volume 374 15 52 51 4	126 66	 ۲
= Runoff coefficient 0.341 0.910 0	720.00 7 370	"
" Maximum flow 0.066 0.037 0	2.070	c.m/sec"
" 40 HYDROGRAPH Add Runoff "		
" 4 Add Runoff "		
" 0.070 0.087 0.036 0.190"		
" 40 HYDROGRAPH Copy to Outflow"		
" 8 Copy to Outflow"		

"			0.070	0.087	0.087	0.190"		
"	40	HY	DROGRAPH Combi	ine 1"				
"		6	Combine "					
"		1	Node #"					
"			outlet to creek	<"				
"		Ма	ximum flow		0.25	58 c.m/se	ec"	
"		Hy	drograph volume		1238.19	93 c.m"		
"		,	0.070	0.087	0.087	0.258"		
"	40	HY	DROGRAPH Start -	New Tri	.butarv"			
"		2	Start - New Tri	butarv"	,			
"			0.070	0.000	0.087	0.258"		
"	33	CA	TCHMENT 203"					
"		1	Triangular SCS'	ı				
"		-	Equal length"					
"		-	SCS method"					
		203	Containment are	אי"				
		95,000	% Impervious"					
		1,140	Total Area"					
		35,000	Flow length"					
		0 500	Overland Slone'	ı				
		0.057	Pervious Area"					
		35,000	Pervious length	י"				
		0.500	Pervious slone'	, I				
		1 083	Impervious Area	, "				
		35,000	Impervious leng	oth"				
		0.500	Impervious slor)e"				
		0.250	Pervious Mannir	νς 1σ'n'"				
		75,000	Pervious SCS C	irve No."				
		0.341	Pervious Runoff	coeffic	ient"			
		0.100	Pervious Ta/S (nefficie	nt"			
		8.467	Pervious Initia	al abstra	nction"			
		0.015	Impervious Manr	ning 'n'"				
		98,000	Impervious SCS	Curve No	. "			
		0.908	Impervious Runo	off coeff	icient"			
		0,100	Impervious Ta/9	S coeffic	ient"			
"		0.518	Impervious Init	ial abst	raction"			
		01920	0.465	0.000	0.087	0.258	.m/sec"	
		Ca	tchment 203	Per	vious	Impervious	Total Area	н
		Su	rface Area	0.0	91005 957	1.083	1,140	hectare"
"		Ti	me of concentrat	ion 21.	863	2.661	3.032	minutes"
		Ti	me to Centroid	169	0.131	120.513	121.454	minutes"
		Ra	infall denth	63	444	63 444	63 444	mm"
		Ra	infall volume	36	16	687.09	723.26	
		Ra	infall losses	41	824	5.811	7.612	mm"
		Ru	noff denth		620	57.632	55,832	 mm"
		Ru	noff volume	21. 17	32	624,16	636.48	
		nu			22	0 000	0.000	
		Ru	noff coefficient	- и-	41	<i>U. 90X</i>	0.880	
		Ru Ma	noff coefficient	: 0.3 a a	641 103	0.908	0.880	" c.m/sec"
 	40	Ru Ma нv	noff coefficient ximum flow DROGRAPH Add Rur	2 0.3 0.0 noff "	903	0.908 0.464	0.880	c.m/sec"

"		0.465	0.465	0.087	0.258"	
"	54 I	POND DESIGN"				
"	0.465	Current peak	flow c.	m/sec"		
"	0.367	Target outflo	w c.m/s	sec"		
"	636.5	Hydrograph vo	lume c.	. m''		
"	11.	Number of sta	ges"			
"	506.050	Minimum water	level	metre"		
"	507.900	Maximum water	level	metre"		
"	506.050	Starting wate	r level	metre"		
"	0	Keep Design D	ata: 1 = 1	[rue; 0 =	False"	
"		Level Disch	arge Vo	olume"		
"		506.050 0	.000	0.000"		
"		507.050 0.0	3373 2	2.000"		
"		507.150 0.0	3538 6	5.932"		
"		507.250 0.0	3695 99	9.984"		
"		507.350 0.0	3846 351	L.582"		
"		507.450 0.0	3991 741	L.190"		
"		507.550 0.0	4131 1197	7.540"		
"		507.650 0.0	4266 1666	5.800"		
"		507.750 0.0	4398 2153	8.836"		
"		507.850 0.0	4525 2658	8.672"		
"		507.900 0.0	4587 2919	9.547"		
"	1.	OUTFLOW PIPE"				
"		Upstream Downs	tr'm	Pipe	Pipe Manning	Entry"
"		invert in	vert Le	ength Dia	meter 'n'	loss Ke"
"		506.050 505	.980 13	3.900	0.150 0.015	0.500"
"	I	Peak outflow		0.038	c.m/sec"	
"	I	Maximum level		507.332	metre"	
"	I	Maximum storage		305.916	c.m"	
"	(Centroidal lag		3.322	hours"	
"		0.465 0	.465 6	0.038	0.258 c.m/sec"	
"	40 I	HYDROGRAPH Com	bine 1'	1		
	6	Combine "				
"	1	Node #"				
		outlet to cre	ek"			
"	I	Maximum flow		0.296	c.m/sec"	
	I	Hydrograph volum	e	1873.685	c.m"	
		0.465	0.465	0.038	0.296"	
	38	START/RE-START_T	OTALS 203	1		
	3	Runotf Totals	on EXIT"			
	-	Total Catchment	area		4.550	hectare"
	-	Total Impervious	area		2.503	hectare"
		⊺otal % impervio	us		55.011"	
••	19	EXIT"				

"			MIDUSS Output>"
"			MIDUSS version Version 2.25 rev. 467"
			MIDUSS created July 6, 2008"
		10	Units used: ie METRIC"
		10	loh folder: C:\Users\cmahonev\Documents\2024 Work\"
			2021-0713-10\New SWM Files\MTDUSS modelling\Post-Development"
			Output filename: 50 Year Post-Dev - REV10 out"
			Licensee name:
			Company WalterEedy"
			Date & Time last used: $2024_05_08 = 10.53.44 \text{ AM}''$
	21	тт	
	1	5 000	Time Step"
		240.000	Max Stopm longth"
		1500 000	Max. Hydrograph"
	วว	1300.000	"OPM Chicago stopm"
	52	1	Chicago storm
		L 011 000	Chicago Storm
		811.800	Coefficient A
		0.000	Constant B"
		0.699	Exponent C
		0.400	Fraction R"
		240.000	Duration"
		1.000	Time step multiplier"
"		Ма	ximum intensity 258.005 mm/hr"
"		То	tal depth 70.427 mm"
"		6	050hyd Hydrograph extension used in this file"
"	33	CA	TCHMENT 301"
"		1	Triangular SCS"
"		1	Equal length"
"		1	SCS method"
"		301	External drainage area - drains to 201"
"		70.000	% Impervious"
"		0.390	Total Area"
"		50.000	Flow length"
"		1.000	Overland Slope"
"		0.117	Pervious Area"
"		50.000	Pervious length"
"		1.000	Pervious slope"
"		0.273	Impervious Area"
"		50.000	Impervious length"
"		1.000	Impervious slope"
"		0.250	Pervious Manning 'n'"
"		75.000	Pervious SCS Curve No."
"		0.372	Pervious Runoff coefficient"
"		0.100	Pervious Ia/S coefficient"
"		8.467	Pervious Initial abstraction"
"		0.015	Impervious Manning 'n'"
"		98.000	Impervious SCS Curve No."
"		0.917	Impervious Runoff coefficient"
		0.100	Impervious Ia/S coefficient"
		0.518	Impervious Initial abstraction"
			F

"		0.134	4 0.000	0.000	0.000 (.m/sec"	
"		Catchment 303	L	Pervious	Impervious	Total Area	
"		Surface Area		0.117	0.273	0.390	hectare"
"		Time of conce	entration	20.248	2.563	5.179	minutes"
"		Time to Cent	roid	165.776	119.964	126.742	minutes"
"		Rainfall dept	th	70.427	70.427	70.427	mm"
"		Rainfall volu	ume	82.40	192.27	274.67	c.m"
"		Rainfall loss	ses	44.262	5.851	17.374	mm"
"		Runoff depth		26.165	64.576	53.053	mm"
"		Runoff volume	2	30.61	176.29	206.91	c.m"
"		Runoff coeff:	icient	0.372	0.917	0.753	
"		Maximum flow		0.009	0.132	0.134	c.m/sec"
"	40	HYDROGRAPH Ad	dd Runoff '				
"	Z	Add Runof	F "				
"		0.134	4 0.134	0.000	0.000"		
"	40	HYDROGRAPH Co	opy to Outf	low"			
"	8	Copy to Ou	utflow"				
"		0.134	4 0.134	0.134	0.000"		
"	40	HYDROGRAPH Ne	ext link "				
"	5	Next link	н				
"		0.134	4 0.134	0.134	0.000"		
"	33	CATCHMENT 202	L"				
"	1	. Triangula	n SCS"				
"	1	. Equal leng	gth"				
"	1	SCS method	d"				
"	201	Controlled	d flow to p	ond"			
"	90.000) % Impervi	ous"				
"	1.080	Total Area	э"				
"	80.000	Flow length	th"				
"	2.000	0 Overland S	Slope"				
"	0.108	Pervious /	Area"				
"	80.000	Pervious .	Length"				
	2.000	Pervious s	slope"				
	0.972	Impervious	s Area"				
	80.000	Impervious	s length"				
	2.000	Impervious	s slope"				
	0.256	Pervious l	lanning 'n'				
	/5.000	Pervious S	SCS Curve M				
	0.3/1	Pervious I	Runott coet	ficient"			
	0.100	Pervious	La/S coetti	lcient			
	8.46/	Pervious .	LNITIAL ADS	straction			
	0.015	Impervious	s Manning	n Ne "			
	98.000	Tripervious	SUS CURVE	e NO.			
	0.915						
	0.100	Impervious	5 IA/S CO01	-TICIENT			
	0.516		S TUTCTAT S		0 000	m/coc"	
		Catchmont 20	4.134 ע	+ 0.134		Total Apon	
		Calciment 20.	L	0 100		1 000	boctore"
		Surrace Area	ntnation	21 004	2 760	1.000 2 E01	nectare
		TTILE OF CONCE	ENTRACION	21.004	2./00	2.201	minuces

"		Time to Centroid	168.350	120.330	122.402	minutes"
"		Rainfall depth	70.427	70.427	70.427	mm"
"		Rainfall volume	76.06	684.55	760.62	c.m"
"		Rainfall losses	44.273	5.986	9.815	mm"
"		Runoff depth	26.154	64.441	60.612	mm"
"		Runoff volume	28.25	626.37	654.61	c.m"
"		Runoff coefficient	0.371	0.915	0.861	п
"		Maximum flow	0.008	0.459	0.460	c.m/sec"
"	40	HYDROGRAPH Add Rund	off "			
"	4	Add Runoff "				
"		0.460	ð.594 0.1	L34 0.000	9"	
"	54	POND DESIGN"				
"	0.594	Current peak flo	ow c.m/see	2"		
"	0.367	Target outflow	c.m/sec"			
"	861.5	Hydrograph volur	ne c.m"			
"	12.	Number of stages	5"			
"	506.400) Minimum water le	evel metro	2"		
"	507.400	Maximum water le	evel metro	<u>e</u> "		
"	506.400	Starting water	level met	re"		
"	0	Keep Design Data	a: 1 = True;	0 = False"		
"		Level Dischar	ge Volume'	•		
"		506.400 0.00	0.000'	I		
"		506.500 0.0014	46 34.948	I		
"		506.600 0.0023	31 71.402	•		
"		506.700 0.0029	92 110.901	•		
"		506.800 0.0157	78 153.510	I		
"		506.900 0.0466	57 199.291	1		
"		507.000 0.103	14 248.306	1		
"		507.100 0.163	39 300.603	I		
"		507.200 0.202	20 356.258	I		
"		507.300 0.232	415.288			
"		507.350 0.332	24 446.043			
"		507.400 0.502	23 477.614			
"	1.	WEIRS"				
"		Crest We	ir Crest	Left	Right"	
"		elevation coeffic:	ie breadth	sideslope s:	ideslope"	
"		507.300 0.96	5.000	0.000	0.000"	
"	3.	ORIFICES"				
"		Orifice Orific	ce Orifice	Number of"		
"		invert coeffic:	ie diameter	orifices"		
"		506.400 0.65	50 0.0500	1.000"		
"		506.700 0.65	50 0.2500	1.000"		
"		506.700 0.65	50 0.3000	1.000"		
"	1.	HOR. ORIFICES"				
"		Orifice Orific	ce Orifice	Number of"		
"		invert coeffic	ie diameter	orifices"		
"		507.100 0.65	50 0.0750	1.000"		
"		Peak outflow	(0.212 c.m,	/sec"	
"		Maximum level	50	7.232 met	re"	
"		Maximum storage	374	1.980 c.m'		

"		Centroidal	lag		3.82	4 hour	s"	
"		0.460	0.594	0.2	212	0.000 c	.m/sec"	
"	40	HYDROGRAPH	Combine	1"				
"	(5 Combine	п					
"	:	1 Node #"						
"		outlet t	o creek"					
"		Maximum flo	W		0.21	.2 c.m	/sec"	
"		Hydrograph	volume		852.39	98 c.m	"	
"		0.4	60 0.	594	0.212	0.21	2"	
"	40	HYDROGRAPH	Start - No	ew Tribu	utary"			
"	:	2 Start -	New Tribu	tary"				
"		0.4	.60 0.0	900	0.212	0.21	2"	
"	33	CATCHMENT 3	02"					
"	:	1 Triangul	ar SCS"					
"		1 Equal le	ngth"					
"		1 SCS meth	od"					
"	302	2 external	drainage	area -	drains	to 202"		
"	70.00	0 % Imperv	ious"					
"	0.120	ð Total Ar	ea"					
"	50.00	ð Flow len	gth"					
"	1.00	0 Overland	Slope"					
"	0.03	6 Pervious	Area"					
"	50.00	9 Pervious	length"					
"	1.00	9 Pervious	slope"					
"	0.084	4 Impervio	us Area"					
"	50.00	0 Impervio	us length	II				
"	1.00	ð Impervio	us slope"					
"	0.25	9 Pervious	Manning	'n'"				
"	75.00	9 Pervious	SCS Curve	e No."				
"	0.37	2 Pervious	Runoff co	pefficie	ent"			
"	0.10	9 Pervious	Ia/S coe	fficient	t"			
"	8.46	7 Pervious	Initial a	abstract	tion"			
	0.01	5 Impervio	us Mannin	g 'n'"				
	98.00	ð Impervio	us SCS Cu	rve No.'				
	0.91	7 Impervio	us Runoff	coeffic	cient"			
	0.10	ð Impervio	ous Ia/S co	petticie	ent"			
	0.51	8 Impervio	us Initia.	l abstra	action"	0.04		
		0.0	41 0.0	900	0.212	0.21	2 c.m/sec"	
		Catchment 3	02	Pervi	lous	Impervio	us lotal Area	1
		Surface Are	a	0.036	5	0.084	0.120	hectare
		lime of con	centratio	n 20.24	48	2.563	5.1/9	minutes"
		lime to Cen	troid	165.7	///	119.964	126.742	minutes"
		Rainfall de	pth	/0.42	2/	/0.42/	/0.42/	mm
		Raintall Vo	lume	25.35		59.16	84.51	c.m.
		Kaintall lo	sses	44.26	5Z	5.851	1/.3/4	mm "
		KUNOTT dept	.[]	26.16	55	04.5/6	53.053	mm"
		RUNOTT VOLU	me ficiart	9.42	- -	54.24 0.017		C.M [°]
		KUNOTT COET	TICIENT	0.3/2	<u>۲</u>	0.91/	0./53	a
	40			ט.טט: ב יי	5	0.041	0.041	c.m/sec"
	40	ΠΥΡΚΟΘΚΑΡΗ	AUG KUNOT	Г				

"		4	Add	Runoff "						
"				0.041	0.041	1 0	.212	0.212"		
	40	HYD	DROGR	APH Copy 1	to Outf	flow"	•			
	-	8	Copy	to Outflo		-				
"		-		0.041	0.041	1 e	.041	0.212"		
"	40	HYE	ROGR	APH Next	link "	-				
"		5	Next	link "						
"				0.041	0.041	1 e	.041	0.212"		
"	33	CAT	CHME	NT 202"						
"		1	Tria	ngular SCS	5"					
"		1	Equa	l length"						
"		1	SCS I	method"						
"		202	Unco	ntrolled t	to cree	ek"				
"	5	5.000	% Im	pervious"						
"	1	L.820	Tota	l Area"						
"	86	000.000	Flow	length"						
"	6	0.500	0ver	land Slope	e"					
"	1	L.729	Perv	ious Area'						
"	86	0.000	Perv	ious lengt	th"					
"	e	0.500	Perv	ious slope	e"					
	e	0.091	Impe	rvious Are	ea"					
	86	0.000	Impe	rvious ler	ngth"					
	6	0.500	Impe	rvious slo	ope"					
	6	0.250	Perv	ious Manni	ing 'n'					
	75	5.000	Perv	ious SCS (Curve N	No."				
	E	0.3/2	Perv	ious Runo	tt coet	Fficien	t"			
	k c	0.100	Perv	ious Ia/S	coetti	icient"	II			
	2	3.46/	Perv	ious init:	lal abs	stracti	on			
		0.015	Impe	rvious mar	ning Curve	n No "				
	90	014	ттре	rvious sca	s Curve	e NO.	ont"			
		100 100	ттре	rvious Kur		fficion	enc +"			
	e G	A 510	Ттре	nvious Ia	itial a	abstrac	tion"			
	ť		тшре	0 007	0 0/1		0/1	0 212	c m/sec"	
		Cat	chmo	0.007	0.041	Pervio	.041	Tmnervious	Total Area	
		Sur	face	Area		1.729	us	0.091	1.820	hectare"
		Tin	ne of	concentra	ation	33.049		4.183	29.742	minutes"
"		Tin	ne to	Centroid		186.83	7	123.021	179.526	minutes"
"		Rai	nfal	l depth		70.427		70.427	70.427	mm"
"		Rai	nfal	l volume		1217.6	9	64.09	1281.78	c.m"
"		Rai	nfal	l losses		44.248		6.062	42.338	mm"
"		Rur	off	depth		26.180)	64.365	28.089	mm"
"		Rur	noff '	volume		452.65		58.57	511.22	c.m"
"		Rur	off	coefficier	nt	0.372		0.914	0.399	н
"		Max	cimum	flow		0.090		0.040	0.097	c.m/sec"
"	40	HYE	ROGR	APH Add Ru	unoff "					
"		4	Add	Runoff "						
"				0.097	0.104	4 e	.041	0.212"		
"	40	HYE	ROGR	APH Copy 1	to Outf	flow"				
"		8	Сору	to Outflo	ow"					

			0.097	0.104	0.104	0.212"		
"	40	HYI	DROGRAPH Combi	ine 1	."			
"		6	Combine "					
"		1	Node #"					
"			outlet to creek	<"				
"		Ma	ximum flow		0.29	7 c.m/se	ec"	
"		Hy	drograph volume		1427.28	1 c.m"		
"			0.097	0.104	0.104	0.297"		
"	40	HYI	DROGRAPH Start -	- New Tr	ibutary"			
"		2	Start - New Tri	ibutary"				
"			0.097	0.000	0.104	0.297"		
"	33	CA	TCHMENT 203"					
"		1	Triangular SCS	1				
		1	Equal length"					
"		1	SCS method"					
"		203	Containment are	ea"				
		95.000	% Impervious"					
		1.140	Total Area"					
		35.000	Flow length"	_				
		0.500	Overland Slope	•				
		0.057	Pervious Area"					
		35.000	Pervious length	ו" י				
		0.500	Pervious slope					
		1.083	Impervious Area	Э 				
		35.000	Impervious leng	gtn				
		0.500	Impervious sion					
		75 000	Pervious Mannin	ig li				
		13.000	Pervious SCS CC	F cooffi	ciont"			
		0.371	Pervious Ta/S	coeffici	ont"			
		8 467	Pervious Initia	al ahstr	enc			
		0.015	Impervious Man	ning 'n'	"			
		98.000	Impervious SCS	Curve N	lo."			
		0.917	Impervious Runo	off coef	ficient"			
		0.100	Impervious Ia/S	5 coeffi	.cient"			
"		0.518	Impervious Init	ial abs	traction"			
			0.527	0.000	0.104	0.297 0	.m/sec"	
"		Ca	tchment 203	Pe	rvious	Impervious	Total Area	п
"		Su	rface Area	0.	057	1.083	1.140	hectare"
"		Ti	me of concentrat	ion 20	.126	2.547	2.914	minutes"
"		Ti	me to Centroid	16	5.579	119.932	120.885	minutes"
"		Ra	infall depth	70	.427	70.427	70.427	mm"
"		Ra	infall volume	40	.14	762.73	802.87	c.m"
"		Ra	infall losses	44	.266	5.845	7.766	mm"
п		Ru	noff depth	26	.161	64.582	62.661	mm"
"		Ru	noff volume	14	.91	699.43	714.34	c.m"
"		Ru	noff coefficient	. 0	371	0.917	0.890	"
"		Ma	ximum flow	0.	004	0.526	0.527	c.m/sec"
"	40	HY	DROGRAPH Add Rur	noff "				
"		4	Add Runoff "					

"		0.527	0.527	0.104	4 0.29	97"	
"	54 P	OND DESIGN"					
"	0.527	Current peak	flow c	.m/sec"			
"	0.367	Target outflo	w c.m/:	sec"			
"	714.3	Hydrograph vo	lume c	.m"			
"	11.	Number of sta	ges"				
"	506.050	Minimum water	level	metre"			
"	507.900	Maximum water	level	metre"			
"	506.050	Starting wate	r level	metre'	•		
"	0	Keep Design D	ata: 1 = [·]	True; 0	= False"		
"		Level Disch	arge Vo	olume"			
"		506.050 0	.000	0.000"			
"		507.050 0.0	3373	2.000"			
"		507.150 0.0	3538	5.932"			
"		507.250 0.0	3695 9	9.984"			
"		507.350 0.0	3846 35	1.582"			
"		507.450 0.0	3991 74:	1.190"			
"		507.550 0.0	4131 119	7.540"			
"		507.650 0.0	4266 166	5.800"			
"		507.750 0.0	4398 215	3.836"			
"		507.850 0.0	4525 265	8.672"			
		507.900 0.0	4587 2919	9.547"			
	1.	OUTFLOW PIPE"	_	_			
		Upstream Downs	tr'm	Pipe	Pipe	Manning	Entry"
		invert in	vert L	ength [Diameter	'n'	loss Ke"
	_	506.050 505	.980 1	3.900	0.150	0.015	0.500"
	P	eak outflow		0.0	038 c.r	n/sec"	
	M	aximum level		50/.:	352 met	tre"	
	M	aximum storage		358.6	050 c.r	n	
	C	entroidal lag	F 2 7	3.5	535 hour	rs	
	40	0.52/ 0	.52/	0.038	0.297 0	c.m/sec	
	40 H	YDROGRAPH COM	bine i				
	0	Combine					
	T	Noue #	ok"				
	м	outlet to the	ek	0 3	025 c r	n/coc"	
	Li,	aximum riow Vdnognanh Volum	0	21/2 9		n"	
	п	a 527	e 0 527	0 039	$\mathbf{x} = \mathbf{x}$	" 2 5 "	
	38 C	υ.υ./ ταrt/re-start τ	0.527				
	د ²	Runoff Totale	on FYTT"				
	т	otal Catchment	area			4.550	hectare"
	T.	otal Impervious	area			2.503	hectare"
	Т	otal % impervio	us			55.011"	
"	19 E	XIT"					

"			MIDUSS Output>"
"			MIDUSS version Version 2.25 rev. 467"
			MIDUSS created July 6, 2008"
		10	Units used: ie METRIC"
			lob folder: C:\Users\cmahonev\Documents\2024 Work\"
			2021-0713-10\New SWM Files\MTDUSS modelling\Post-Development"
			Output filename: 100 Year Post-Dev - REV10.out"
			Licensee name:
			Company WalterEedy"
			Date & Time last used: $2024_05_08 = 10.44.34 \text{ AM}''$
	21	тт	ME DARAMETERS"
	51	5 000	Time Sten"
		240 000	Max Stopm longth"
		1500 000	Max. Hydrograph"
	22	000.0001 CT	"OPM Chicago stopm"
	52	اد 1	Chicago storm"
			Coofficient A"
		892.300	Constant P"
		0.000	Constant B
		0.699	Exponent C
		0.400	Fraction R ^a
		240.000	Duration"
		1.000	lime step multiplier"
		ма	IXIMUM INTENSITY 283.589 mm/nr
		10	otal depth //.411 mm ^m
	~~	6	Idonya Hydrograph extension used in this file"
	33		Triangulan SCC
		1	Inlangular SCS
		1	Equal length"
		1	SCS method"
		301	External drainage area - drains to 201"
		/0.000	% Impervious"
		0.390	lotal Area"
		50.000	Flow length"
		1.000	Overland Slope"
		0.117	Pervious Area"
		50.000	Pervious length"
		1.000	Pervious slope"
		0.273	Impervious Area"
"		50.000	Impervious length"
"		1.000	Impervious slope"
"		0.250	Pervious Manning 'n'"
"		75.000	Pervious SCS Curve No."
"		0.399	Pervious Runoff coefficient"
		0.100	Pervious Ia/S coefficient"
"		8.467	Pervious Initial abstraction"
"		0.015	Impervious Manning 'n'"
"		98.000	Impervious SCS Curve No."
"		0.923	Impervious Runoff coefficient"
"		0.100	Impervious Ia/S coefficient"
"		0.518	Impervious Initial abstraction"

"			0.150	0.000	0.000	0.000	c.m/sec"	
"		Catchmer	nt 301		Pervious	Impervious	Total Area	
"		Surface	Area		0.117	0.273	0.390	hectare"
"		Time of	concentra	tion	18.840	2.464	5.024	minutes"
"		Time to	Centroid		162.850	119.461	126.243	minutes"
"		Rainfall	l depth		77.411	77.411	77.411	mm"
"		Rainfall	l volume		90.57	211.33	301.90	c.m"
"		Rainfall	losses		46.512	5.930	18.105	mm"
"		Runoff d	lepth		30.899	71.481	59.306	mm"
"		Runoff \	/olume		36.15	195.14	231.29	c.m"
"		Runoff d	coefficien	t	0.399	0.923	0.766	
"		Maximum	flow		0.011	0.148	0.150	c.m/sec"
"	40	HYDROGRA	APH Add Ru	noff '				
"		4 Add F	Runoff "					
"			0.150	0.150	0.000	0.000"		
"	40	HYDROGRA	APH Copy t	o Out	flow"			
"	:	3 Сору	to Outflo	w"				
"			0.150	0.150	0.150	0.000"		
"	40	HYDROGRA	APH Next l	ink "				
"	!	5 Next	link "					
"			0.150	0.150	0.150	0.000"		
"	33	CATCHMEN	IT 201"					
"	:	l Triar	ngular SCS					
"	:	L Equal	l length"					
"	:	1 SCS n	nethod"					
"	20	1 Contr	rolled flo	w to p	oond"			
"	90.00	0 % Imp	pervious"					
"	1.08	0 Total	Area"					
"	80.00	ð Flow	length"					
"	2.00	0 0verl	land Slope					
	0.10	8 Pervi	lous Area"					
"	80.00	0 Pervi	lous lengt	h"				
"	2.00	0 Pervi	lous slope	"				
	0.97	2 Imper	rvious Are	a"				
	80.00	0 Imper	rvious len	gth"				
	2.00	0 Imper	rvious slo	pe"				
	0.25) Pervi	lous Manni	ng 'n				
	75.00) Pervi	Lous SCS C	urve I	No."			
	0.40) Pervi	Lous Runof	f coet	fficient"			
	0.10) Pervi	Lous Ia/S	coeff:	icient"			
	8.46	7 Pervi	lous Initi	al abs	straction"			
	0.01	5 Imper	vious Man	ning	'n'"			
	98.00	0 Imper	vious SCS	Curve	e No."			
	0.92	3 Imper	vious Run	ott co	pefficient"			
	0.10	0 Imper	vious Ia/	S coet	rticient"			
	0.51	s Imper	vious Ini	τial a	abstraction			
		Catal	0.516	0.150	0.150 Data	0.000	c.m/sec"	
		Catchmer	it 201		Pervious	Impervious	IOTAL Area	
		Surtace	Area .		0.108	0.9/2	1.080	nectare"
		lime of	concentra	tion	20.288	2.654	3.463	minutes"

"		Time to Centroid	165.225	119.833	121.917	minutes"
"		Rainfall depth	77.411	77.411	77.411	mm"
"		Rainfall volume	83.60	752.44	836.04	c.m"
"		Rainfall losses	46.482	5.995	10.044	mm"
"		Runoff depth	30.929	71.416	67.368	mm"
"		Runoff volume	33.40	694.17	727.57	c.m"
"		Runoff coefficient	0.400	0.923	0.870	п
"		Maximum flow	0.009	0.514	0.516	c.m/sec"
"	40	HYDROGRAPH Add Runof	f "			
"	4	Add Runoff "				
"		0.516 0.	666 0.15	0.000		
"	54	POND DESIGN"				
"	0.666	Current peak flow	c.m/sec"			
"	0.367	Target outflow	c.m/sec"			
"	958.9	Hydrograph volume	c.m"			
"	12.	Number of stages"				
"	506.400	Minimum water lev	el metre"			
"	507.400	Maximum water lev	el metre"			
"	506.400	Starting water le	vel metre	, n		
"	0	Keep Design Data:	1 = True; 0) = False"		
"		Level Discharge	Volume"			
"		506.400 0.000	0.000"			
"		506.500 0.00146	34.948"			
"		506.600 0.00231	71.402"			
"		506.700 0.00292	110.901"			
"		506.800 0.01578	153.510"			
"		506.900 0.04667	199.291"			
"		507.000 0.1014	248.306"			
"		507.100 0.1639	300.603"			
"		507.200 0.2020	356.258"			
"		507.300 0.2327	415.288"			
"		507.350 0.3324	446.043"			
"		507.400 0.5023	477.614"			
"	1.	WEIRS"				
"		Crest Weir	Crest	Left	Right"	
"		elevation coefficie	breadth s	ideslope si	deslope"	
"		507.300 0.900	5.000	0.000	0.000"	
"	3.	ORIFICES"				
"		Orifice Orifice	Orifice N	lumber of"		
"		invert coefficie	diameter	orifices"		
"		506.400 0.650	0.0500	1.000"		
"		506.700 0.650	0.2500	1.000"		
"		506.700 0.650	0.3000	1.000"		
"	1.	HOR. ORIFICES"				
"		Orifice Orifice	Orifice N	lumber of"		
"		invert coefficie	diameter	orifices"		
"		507.100 0.650	0.0750	1.000"		
"		Peak outflow	0.	232 c.m/	sec"	
"		Maximum level	507.	297 metr	e"	
"		Maximum storage	413.	763 c.m"		
		~				

"		Centroidal l	ag	3.6	81 ho	urs"	
"		0.516	0.666	0.232	0.000	c.m/sec"	
"	40	HYDROGRAPH	Combine	1"			
		5 Combine "					
		1 Node #"					
		outlet to	o creek"				
		Maximum flow	I _	0.2	.32 c	.m/sec"	
		Hydrograph v	volume	950.2	26 c	.m"	
		0.51	.6 0.66	6 0.232	0.	232"	
	40	HYDROGRAPH S	start - New	Tributary"			
		2 Start - N	lew Tributa	ry"	-		
		0.51	.6 0.00	0 0.232	0.	232"	
	33	CAICHMENI 30)2" 				
		l Iriangula	ar SCS"				
		L Equal len	igth"				
	2.0	I SCS metho	od"			.	
	30.	2 external	arainage a	rea - drair	is το 20	2	
	/0.00	0 % Impervi	Lous				
	0.12	0 TOTAL ARE	3d -+ 6 "				
	50.00	<pre>0 FIOW Leng 0 Overland</pre>	stri Slono"				
			Stope				
	50.00	a Pervious	Area				
п	1 00	a Pervious	slope"				
	0.08	1 Imperviou	stope				
п	50.00	a Imperviou	is length"				
	1,00	a Imperviou	is slone"				
п	0.25	9 Pervious	Manning 'n				
	75.00	9 Pervious	SCS Curve	No."			
"	0.39	9 Pervious	Runoff coe	fficient"			
"	0.10	9 Pervious	Ia/S coeff	icient"			
п	8.46	7 Pervious	Initial ab	straction"			
п	0.01	5 Imperviou	ıs Manning	'n'"			
"	98.00	0 Imperviou	is SCS Curv	e No."			
"	0.92	3 Imperviou	is Runoff c	oefficient"			
"	0.10	0 Imperviou	ıs Ia/S coe	fficient"			
"	0.51	3 Imperviou	ıs Initial	abstractior	"		
"		0.04	6 0.00	0 0.232	0.	232 c.m/sec"	
"		Catchment 30)2	Pervious	Imperv	ious Total Are	a "
"		Surface Area	1	0.036	0.084	0.120	hectare"
"		Time of conc	entration	18.840	2.464	5.024	minutes"
"		Time to Cent	roid	162.850	119.46	1 126.243	minutes"
"		Rainfall dep	oth	77.411	77.411	77.411	mm"
"		Rainfall vol	ume	27.87	65.03	92.89	c.m"
"		Rainfall los	ses	46.512	5.930	18.105	mm"
		Runoff depth	ı	30.899	71.481	59.306	mm"
		Runoff volum	1e	11.12	60.04	71.17	c.m"
		Runotf coeff	icient	0.399	0.923	0.766	" ,
		Maximum flow		0.003	0.045	0.046	c.m/sec"
"	40	HYDROGRAPH A	Add Runoff				

"		4	Add R	unoff "						
		-		0.046	0.046	5 6).232	0.232"		
"	40	HY	DROGRA	PH Copy t	to Outf	Flow"				
"		8	Copy	to Outflo	w"					
"				0.046	0.046	5 6	.046	0.232"		
"	40	HY	DROGRA	PH Next]	link "					
"		5	Next	link "						
"				0.046	0.046	5 6	0.046	0.232"		
"	33	CA	TCHMEN	T 202"						
"		1	Trian	gular SCS	5"					
"		1	Equal	length"						
"		1	SCS m	ethod"						
"		202	Uncon	trolled t	to cree	ek"				
"		5.000	% Imp	ervious"						
"		1.820	Total	Area"						
"		80.000	Flow	length"						
"		0.500	0verl	and Slope	<u>e</u> "					
"		1.729	Pervi	ous Area'	•					
"		80.000	Pervi	ous lengt	ch"					
"		0.500	Pervi	ous slope	è					
		0.091	Imper	vious Are	ea"					
		80.000	Imper	vious ler	ıgth"					
		0.500	Imper	vious slo	ppe".					
		0.250	Pervi	ous Manni	ing 'n'					
		/5.000	Pervi	ous SCS (Lurve N	NO."				
		0.400	Pervi	ous Runoi	rt coet	rticier	וד י			
		0.100	Pervi	ous Id/S ous Initi	COETTI ial abo	tent tencti	on"			
		0.407	Tmpop	vious Mar	lai aus ning '	strattı 'n'"	.011			
		98 999	Imper	vious Mar	niiing S Curve	No "				
п		0.917	Imper	vious Sur	off cc	effici	ent"			
		0.100	Imper	vious Ta	/S coef	fficier	nt"			
"		0.518	Imper	vious Ini	itial a	abstrac	tion'	,		
"		01920	Tuber	0.119	0.046	5 6	0.046	0.232	c.m/sec"	
"		Ca	tchmen	t 202		Pervio	ous	Impervious	Total Area	н
"		Su	rface	Area		1.729		0.091	1.820	hectare"
"		Ti	me of	concentra	ation	30.751	L	4.022	27.871	minutes"
"		Ti	me to	Centroid		182.56	6	122.468	176.090	minutes"
"		Ra	infall	depth		77.411	L	77.411	77.411	mm"
"		Ra	infall	volume		1338.4	4	70.44	1408.88	c.m"
"		Ra	infall	losses		46.476	5	6.431	44.474	mm"
"		Ru	noff d	epth		30.935	5	70.980	32.937	mm"
"		Ru	noff v	olume		534.86	5	64.59	599.46	c.m"
"		Ru	noff c	oefficier	nt	0.400		0.917	0.425	
"		Ма	ximum	flow		0.113		0.044	0.119	c.m/sec"
"	40	HY	DROGRA	PH Add Ru	unoff "	•				
		4	Add R	unoff "		_				
	46			0.119	0.128	3 (C ,	0.046	0.232"		
,,	40	HY	DROGRA	PH Copy t	to Outf	LOM.				
		8	Сору	το Out+lo	DM					

"			0.119	0.128	0.128	0.232"		
"	40	HYI	DROGRAPH Comb	ine	1"			
"		6	Combine "					
"		1	Node #"					
"			outlet to cree	k"				
"		Max	ximum flow		0.33	35 c.m/se	ec"	
"		Hy	drograph volume	1	1620.84	19 c.m"		
"			0.119	0.128	0.128	0.335"		
"	40	HYI	DROGRAPH Start	- New 1	Tributary"			
"		2	Start - New Tr	ibutary	y"			
"			0.119	0.000	0.128	0.335"		
"	33	CA	TCHMENT 203"					
"		1	Triangular SCS					
"		1	Equal length"					
"		1	SCS method"					
		203	Containment ar	ea"				
"	9	5.000	% Impervious"					
"		1.140	Total Area"					
"	3	5.000	Flow length"					
"		0.500	Overland Slope	п				
"		0.057	Pervious Area"					
"	3	5.000	Pervious lengt	h"				
"		0.500	Pervious slope					
"		1.083	Impervious Are	a"				
"	3	5.000	Impervious len	gth"				
"		0.500	Impervious slo	pe"				
"		0.250	Pervious Manni	ng 'n''				
"	7	5.000	Pervious SCS C	urve No	o."			
		0.399	Pervious Runof	f coeff	ficient"			
		0.100	Pervious Ia/S	coeffic	cient"			
		8.467	Pervious Initi	al abst	traction"			
	-	0.015	Impervious Man	ning 'r	ייי יי			
	9	8.000	Impervious SCS	Curve	No."			
		0.923	Impervious Run	ott coe	etticient"			
		0.100	Impervious la/	S coeti	Ficient"			
		0.518	Impervious ini		ostraction	0 225		
		Car	0.588	0.000	0.128	0.335 (.m/sec	
		Car	tchment 203	H	Pervious	1 opp	lotal Area	h
		Sul T:	rtace Area	tion 1	0.05/	1.083	1.140	nectare
		111	me of concentra		16.720	2.449	2.011	minutes
			infall donth	-	102.004	119.450	120.392	minutes
		Rd. Do:	infall uepth		//.411	//.411 020 26	//.411	(((())) (())
		Na. Do:	infall loccos		+4.12	636.30 E 02E	7 964	C.III mm"
		Na. Dui	noff donth	-	+0.307	71 176	60 117	""""""""""""""""""""""""""""""""""""""
		RUI D	nori ueptii noff volumo	-	17 67	771 00	09.44/ 701 70	 c m''
		RUI Diii	nori vorume noff coefficion	+ 0	200	0 973	0 807	C.III 11
п		Mar	vimum flow		2.399 2.005	0.525	0.097	c m/sec"
п	10	на. ЦVI	NRUCEVDH V44 Du	noff "		0.00/	0.000	C . III/ SEC
	τu	лті Д	Add Runoff "					
		-						

"		0.588	0.588	0.128	0.335"	
"	54	POND DESIGN"				
"	0.588	Current peak	flow c.	m/sec"		
"	0.367	Target outflo	w c.m/s	sec"		
"	791.7	' Hydrograph vo	lume c.	. m''		
"	11.	Number of sta	iges"			
"	506.050) Minimum water	level	metre"		
"	507.900	Maximum water	level	metre"		
"	506.050) Starting wate	er level	metre"		
"	0) Keep Design D	ata: 1 = 1	[rue; 0 =	False"	
"		Level Disch	iarge Vo	olume"		
"		506.050 0	.000 0	000"		
"		507.050 0.0	3373 2	2.000"		
"		507.150 0.0)3538 (5.932"		
"		507.250 0.0	3695 99	9.984"		
"		507.350 0.0	3846 351	L.582"		
"		507.450 0.0	3991 741	L.190"		
"		507.550 0.0	4131 1197	7.540"		
"		507.650 0.0	4266 1666	5.800"		
"		507.750 0.0	4398 2153	8.836"		
"		507.850 0.0	4525 2658	8.672"		
"		507.900 0.0	4587 2919	9.547"		
"	1.	OUTFLOW PIPE"				
"		Upstream Downs	tr'm	Ріре	Pipe Mannin	eg Entry"
"		invert ir	ivert Le	ength Dia	ameter 'n	' loss Ke"
"		506.050 505	.980 13	3.900	0.150 0.01	.5 0.500"
"		Peak outflow		0.039	e.m/sec"	
"		Maximum level		507.366	5 metre"	
"		Maximum storage		412.581	. c.m"	
"		Centroidal lag		3.752	2 hours"	
		0.588 0	.588 6	0.039	0.335 c.m/sec"	
"	40	HYDROGRAPH Com	bine 1'	1		
"	6	Combine "				
	1	Node #"				
		outlet to cre	ek"		<i></i>	
		Maximum +low		0.373	s c.m/sec"	
		Hydrograph volum	ie	2415.408	3 c.m"	
	20	0.588	0.588	0.039	0.373"	
	38	START/RE-START T	OTALS 203			
	3	Runott Totals	on EXIT"			
		Iotal Catchment	area		4.550	hectare"
		IOTAL Impervious	area		2.503	nectare"
	10	iotal % impervio	ous		55.011"	
	19					

		MIDUSS Output>"
		MIDUSS version Version 2.25 rev. 467"
		MIDUSS created July 6, 2008"
	10	Units used: ie METRIC"
		Job folder: C:\Users\cmahonev\Documents\2024 Work\"
		2021-0713-10\New SWM Files\MIDUSS modelling\Post-Development"
		Output filename: Regional Post-Dev - REV10.out"
		Licensee name: Circe Mahonev"
		Company WalterFedy"
		Date & Time last used: 2024-05-08 at 10:51:17 AM"
" 31	TI	IME PARAMETERS"
"	5.000	Time Step"
"	720,000	Max. Storm length"
	1500,000	Max. Hydrograph"
" 32	500.000	TORM Mass Curve"
"	3	Mass Curve"
	212 000	Rainfall denth"
	720 000	Duration"
	720.000	C:\Program Files (x86)\MTDUSSNet\Hazel12 mrd Hurricane Hazel
(last	12 h)"	
"	12 II) Ma	aximum intensity 53,000 mm/hr"
	To	otal denth 212.000 mm"
	6	250hvd Hvdrograph extension used in this file"
" 33	Č	ATCHMENT 301"
"	1	Triangular SCS"
	1	Faual length"
	1	SCS method"
	301	External drainage area - drains to 201"
	70 000	% Impervious"
	0.000	Total Area"
	50.000	Flow length"
	1 000	Overland Slone"
	0 117	Pervious Area"
	50 000	Pervious length"
	1 000	Pervious slope"
	0 273	Tmnervious Area"
	50.275	Impervious length"
	1 000	Impervious clope"
	0 250	Pervious Manning 'n'"
	88 000	Pervious SCS Curve No."
	0 843	Penvious Runoff coefficient"
	0.845	Pervious Ta/S coefficient"
	3 161	Pervious Initial abstraction"
	0 015	Tmnenvious Manning 'n'"
	0.010	Impervious SCS Curve No "
	98.000	Impervious Scs curve No.
	0.909 0 100	Impervious Ta/S coefficient"
	0.100 0 510	Impervious Initial abstraction"
	0.010	0.058 0.000 0.000 0.000 0.000 0.000 0.000 0.000
	C -	atchment 301 Denvious Impenvious Intal Anea "
	La	ACCUMENC SOT FERVIOUS TIMPERVIOUS IOLAL AREA

"	Surface Are	а	0.117	0.273	0.390	hectare"
"	Time of con	centration	26.225	4.785	10.609	minutes"
"	Time to Cen	troid	529.681	477.235	491.481	minutes"
"	Rainfall de	pth	212.000	212.000	212.000	mm"
"	Rainfall vo	lume	248.04	578.76	826.80	c.m"
"	Rainfall lo	sses	33.290	6.621	14.622	mm"
"	Runoff dept	h	178.710	205.379	197.378	mm"
"	Runoff volu	me	209.09	560.68	769.78	c.m"
"	Runoff coef	ficient	0.843	0.969	0.931	п
"	Maximum flo	W	0.018	0.041	0.058	c.m/sec"
"	40 HYDROGRAPH	Add Runoff	"			
"	4 Add Runo	ff "				
"	0.0	58 0.05	6.000	0.000"		
"	40 HYDROGRAPH	Copy to Out	flow"			
"	8 Copy to	Outflow"				
"	0.0	58 0.05	68 0.058	0.000"		
"	40 HYDROGRAPH	Next link "	1			
"	5 Next lin	k "				
"	0.0	58 0.05	68 0.058	0.000"		
"	33 CATCHMENT 2	01"				
"	1 Triangul	ar SCS"				
"	1 Equal le	ngth"				
"	1 SCS meth	od"				
"	201 Controll	ed flow to	pond"			
"	90.000 % Imperv	ious"				
"	1.080 Total Ar	ea"				
	80.000 Flow len	gth"				
"	2.000 Overland	Slope"				
	0.108 Pervious	Area"				
	80.000 Pervious	length"				
	2.000 Pervious	slope"				
	0.972 Impervio	us Area"				
	80.000 Impervio	us length"				
	2.000 Impervio	us slope"				
	0.250 Pervious	Manning 'n				
	88.000 Pervious	SCS Curve	No."			
	0.842 Pervious	Runott coe	efficient"			
	0.100 Pervious	Ia/S coeff	icient"			
	3.464 Pervious	INITIAL AD	straction"			
	0.015 Impervio	us Manning	n Na Wa W			
	98.000 Impervio	us SCS Curv	e No.			
	0.968 Impervio	US RUNOTT C	COETTICIENT			
		us Ia/S COe uc Initiol				
		us initial		0.000	c m/coc"	
	U.I	29.05 EC				
		2 2	0 100		1 000	hoctono"
	Time of con	a	28 2/1	5 152	7 122	minutes"
	Time to Con	troid	20.241 531 736	77 AAA	/82 220	minutes
	Painfall do	nth	212 000	777.7444 212 000	702,229 212 000	milliores
	Natiliatt üe	pen	212.000	212.000	212.000	

"	Rainfall vol	Lume	228.96	2060.64	2289.60	c.m"
"	Rainfall los	ses	33.417	6.680	9.353	mm"
"	Runoff depth	ו	178.583	205.320	202.647	mm"
"	Runoff volur	ne	192.87	1995.71	2188.58	c.m"
"	Runoff coeft	icient	0.842	0.968	0.956	п
"	Maximum flow	V	0.016	0.147	0.159	c.m/sec"
"	40 HYDROGRAPH A	Add Runoff	п			
"	4 Add Runof	f "				
"	0.15	⁵⁹ 0.2	17 0.0	58 0.000"		
"	54 POND DESIGN'	ı				
"	0.217 Current p	oeak flow	c.m/sec			
"	0.367 Target ou	utflow	c.m/sec"			
"	2958.4 Hydrogram	oh volume	c.m"			
"	12. Number of	⁼ stages"				
"	506.400 Minimum v	vater leve	1 metre			
"	507.400 Maximum v	water leve	l metre			
	506.400 Starting	water lev	el metr	e"		
	0 Keen Dest	ign Data:	1 = True:	0 = False"		
n	Level [Discharge	Volume"			
	506,400	0.000	0.000"			
	506,500	0.00146	34.948"			
	506,600	0.00231	71.402"			
	506, 700	0.00292	110,901"			
	506 800	0.00232	153 510"			
	506,900	0.01570	199 291"			
	507,000	0.04007 0 1014	248 306"			
	507.000	0.1014	300 603"			
	507.100	0.1000	356 258"			
	507.200	0.2020	115 200			
п	507.300	0.2327	415.200			
	507.350	0.5524	440.045			
	1 WETPS"	0.3023	477.014			
	I. WEIRS	Wain	Cnact	l oft	Dicht"	
		wein	Crest hnordth	LETL cidaclana cid	Kigni	
				sidestope sid	lestope	
		0.900	5.000	0.000	0.000	
	3. URIFICES	0	0	Number of Cil		
	Urifice	Urifice	Urifice	Number of		
	invert o	coetticle	diameter	orifices"		
	506.400	0.650	0.0500	1.000"		
	506.700	0.650	0.2500	1.000"		
	506.700	0.650	0.3000	1.000"		
	1. HOR. ORIF	ICES"				
	Orifice	Orifice	Orifice	Number of"		
"	invert d	coefficie	diameter	orifices"		
"	507.100	0.650	0.0750	1.000"		
"	Peak outflow	J	e	.203 c.m/s	ec"	
"	Maximum leve	21	507	.203 metre	è"	
"	Maximum stor	rage	358	.175 c.m"		
"	Centroidal 1	Lag	9	.224 hours"		
"	0.159	0.217	0.203	0.000 c.m	ı/sec"	

"	40 H	YDROGRAPH Combi	ne 1''	ı			
"	6	Combine "					
"	1	Node #"					
"		outlet to creek					
"	M	laximum flow		0.20)3 c.m/se	ec"	
"	н	vdrograph volume		2928.22	24 c.m"		
"		0.159	0.217	0.203	0.203"		
"	40 H	YDROGRAPH Start -	New Tri	butarv"			
"	2	Start - New Tri	butarv"	,, ,			
"		0.159	0.000	0.203	0.203"		
"	33 C	ATCHMENT 302"					
"	1	Triangular SCS"					
	- 1	Equal length"					
	- 1	SCS method"					
	302	external draina	ge area	- drains	to 202"		
	70,000	% Impervious"					
	0.120	Total Area"					
	50.000	Flow length"					
	1.000	Overland Slope"					
	0.036	Pervious Area"					
	50.000	Pervious length					
	1.000	Pervious slope"					
	0.084	Impervious Area					
	50.000	Impervious leng	th"				
	1.000	Impervious slop	e"				
"	0.250	Pervious Mannin	e 'n'"				
"	88.000	Pervious SCS Cu	rve No."	ı			
"	0.843	Pervious Runoff	coeffic	ient"			
"	0.100	Pervious Ia/S c	oefficie	ent"			
"	3.464	Pervious Initia	l abstra	action"			
"	0.015	Impervious Mann	ing 'n'"	1			
"	98.000	Impervious SCS	Curve No)."			
"	0.969	Impervious Runo	ff coeff	icient"			
"	0.100	Impervious Ia/S	coeffic	ient"			
"	0.518	Impervious Init	ial abst	raction"	ı		
"		0.018	0.000	0.203	0.203 0	.m/sec"	
"	C	atchment 302	Per	rvious	Impervious	Total Area	"
"	S	urface Area	0.0	936	0.084	0.120	hectare"
"	Т	ime of concentrat	ion 26.	225	4.785	10.609	minutes"
"	Т	ime to Centroid	529	.682	477.235	491.481	minutes"
"	R	ainfall depth	212	2.000	212.000	212.000	mm"
"	R	ainfall volume	76.	32	178.08	254.40	c.m"
"	R	ainfall losses	33.	290	6.621	14.622	mm"
"	R	unoff depth	178	3.710	205.379	197.378	mm"
"	R	unoff volume	64.	34	172.52	236.85	c.m"
"	R	unoff coefficient	0.8	343	0.969	0.931	п
"	M	laximum flow	0.0	905	0.013	0.018	c.m/sec"
"	40 H	YDROGRAPH Add Run	off "				
"	4	Add Runoff "					
"		0.018	0.018	0.203	0.203"		

"	40	HY	DROGRAPH Copy	to Outf	Flow"			
"		8	Copy to Outflo	ow"				
"			0.018	0.018	3 0.018	0.203"		
"	40	HY	DROGRAPH Next	link "				
"		5	Next link "					
"			0.018	0.018	3 0.018	0.203"		
"	33	CA	TCHMENT 202"					
"		1	Triangular SC	S"				
"		1	Equal length"					
"		1	SCS method"					
"		202	Uncontrolled t	to cree	ek"			
"		5.000	% Impervious"					
"		1.820	Total Area"					
"		80.000	Flow length"					
"		0.500	Overland Slope	e"				
"		1.729	Pervious Area	п				
"		80.000	Pervious leng	th"				
"		0.500	Pervious slope	e"				
"		0.091	Impervious Are	ea"				
"		80.000	Impervious le	ngth"				
"		0.500	Impervious slo	ope"				
"		0.250	Pervious Mann	ing 'n'				
"		88.000	Pervious SCS (Curve N	lo."			
		0.843	Pervious Runo	ff coef	ficient"			
		0.100	Pervious Ia/S	coeffi	icient"			
		3.464	Pervious Init:	ial abs	straction"			
		0.015	Impervious Mai	nning '	'n'"			
		98.000	Impervious SC	S Curve	• No."			
		0.971	Impervious Ru	nott co	betticient"			
		0.100	Impervious la,	/S coet	ficient"			
		0.518	Impervious In:	itial a	abstraction		/ 11	
		6.	0.271	0.018		0.203 (.m/sec	
		Ca	itchment 202		Pervious	Impervious	lotal Area	
		Su Ti	Irtace Area		1.729	0.091	1.820	nectare
		11	me of concentra	ation	42.805	/.811	40.807	minutes
			ime to centroid		247.357	400.100	242.220	minutes
		K d	infall uepth		212.000	212.000	212.000	
		K d	infall loccoc		2002.40 22 10C	192.92	2020.40 21 026	C.III
		Nd Du	unoff donth		33.100 170 01 <i>1</i>	205 207	190 161	"""
		Ru Bu	moff volumo		2001 70	203.00/	2270 00	
		Ru	noff coefficie	o+	0 843	107.20	0 950	
		Ma	vimum flow		0.045	0.971	0.000	c m/sec"
	10	HU	DROGRAPH Add Ri	unoff "		0.014	0.271	C. III/ SEC
	40	1	Add Runoff "					
		7	0.271	0.287	7 0 012	0.203"		
	40	НΥ	DROGRAPH Conv	to Outf	Flow"	0.205		
		8	Copy to Outfl		=•			
		0	0.271	0.287	0.287	0.203"		
"	40	HY	DROGRAPH Com	bine	1"			

"		6	Combine "					
"		1	Node #"					
п			outlet to	creek"				
"		Ma	ximum flow		0.49	90 c.m/se	ec"	
"		Hv	drograph vo	lume	6444.0	72 c.m"		
"		,	0.271	0.28	7 0.287	0.490"		
"	40	HY	DROGRAPH St	art - New	Tributary"			
"		2	Start - Ne	w Tributa	rv"			
"			0.271	0.000	0.287	0.490"		
"	33	CA	TCHMENT 203					
"		1	Triangular	SCS"				
"		1	Equal leng	th"				
"		1	SCS method					
"		203	Containmen	t area"				
"	98	3.000	% Impervio	us"				
"	1	.140	Total Area					
"	35	5.000	Flow lengt	h"				
"	e	0.500	Overland S	lope"				
"	e	0.023	Pervious A	rea"				
"	35	5.000	Pervious l	ength"				
"	e	0.500	Pervious s	lope"				
"	1	.117	Impervious	Area"				
"	35	5.000	Impervious	length"				
"	e	0.500	Impervious	slope"				
"	e	0.250	Pervious M	anning 'n				
"	88	3.000	Pervious S	CS Curve N	No."			
"	e	0.843	Pervious R	unoff coet	fficient"			
"	e	0.100	Pervious I	a/S coeff:	icient"			
"	3	3.464	Pervious I	nitial abs	straction"			
"	e	0.015	Impervious	Manning	'n'"			
"	98	3.000	Impervious	SCS Curve	e No."			
"	e	9.969	Impervious	Runoff co	pefficient"			
"	e	0.100	Impervious	Ia/S coet	fficient"			
"	6	0.518	Impervious	Initial a	abstraction			
"			0.169	0.00	0.287	0.490 0	:.m/sec"	
"		Ca	tchment 203		Pervious	Impervious	Total Area	"
"		Su	rface Area		0.023	1.117	1.140	hectare"
"		Ti	me of conce	ntration	26.067	4.756	5.128	minutes"
		Ti	me to Centr	oid	529.494	477.198	478.111	minutes"
		Ra	infall dept	h	212.000	212.000	212.000	mm"
		Ra	infall volu	me	48.34	2368.46	2416.80	c.m"
		Ra	infall loss	es	33.306	6.614	7.148	mm"
		Ru	noff depth		178.694	205.386	204.852	mm"
		Ru	noff volume	•	40.74	2294.57	2335.31	c.m"
		Ru	noff coeffi	cient	0.843	0.969	0.966	
		Ma	ximum tlow		0.003	0.168	0.169	c.m/sec"
	40	HY	DROGRAPH Ad	a Runott '				
		4	Add Kunott			o		
	F 4		0.169	0.169	9 0.287	0.490"		
	54	P01	ND DESIGN"					

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"	0.169	Current p	eak flow	c.m/sec				
"	0.367	Target ou	itflow	c.m/sec"				
"	2335.3	Hydrograp	h volume	c.m"				
"	11.	Number of	⁼ stages"					
"	506.050	Minimum w	uater leve	1 metre				
"	507.900	Maximum w	ater leve	1 metre				
"	506.050	Starting	water lev	el metro	e"			
	0	Keep Desi	gn Data:	1 = True;	0 = Fa	lse"		
		Level D	Discharge	Volume"				
		506.050	0.000	0.000"				
		507.050	0.03373	2.000"				
		507,150	0.03538	6.932"				
		507 250	0.03695	99 984"				
		507 350	0.03846	351 582"				
		507.550	0.03040 0 03991	741 190"				
		507.550	0.03331	1107 5/0"				
		507.550	0.04151	1666 800"				
		507.050	0.04200	2153 836"				
		507.750	0.04535	2155.050				
		507.000	0.04525	2030.072				
	1			2919.547				
	1.	UDIFLOW F	IFL	Dino	r	ino	Manning	Entry"
		invont	invont	Fipe Longth	Diama	tpe i	anning. ימ'	loss Ko"
					DIame	150		TOSS KE
	Do			13.900	0.11	150	0.015	0.500
	Pe	ak outtion	/	6	.041	C.m/	sec ."	
	Ma	ximum ieve	;T	507	.501	metr	e	
	Ma	ximum stor	rage	974	.026	C.M		
	Ce	ntroidal i	ag	10	.6/8	nours		
	40	0.169	0.169	0.041	0.	490 C.	n/sec	
	40 HY	DRUGRAPH	Compine	1.				
	6	Combine "	-					
	1	Node #"						
		outlet to	creek"			,		
	Ма	XIMUM TION	1	0	.530	c.m/	sec	
	Ну	drograph v	volume	8776	.912	c.m"		
		0.16	9 0.1	69 0.04	41	0.530		
	38 ST.	ART/RE-STA	ART TOTALS	203"				
	3	Runoff To	otals on E	XIT"				· · · ·-
	To	ta⊥ Catchn	ient area				4.550	hectare"
	To	tal Imperv	vious area				2.537	hectare"
"	То	tal % impe	ervious			5	5.763"	
"	19 EX	IT"						